

**THE METROPOLITAN DISTRICT
HARTFORD COUNTY, CONNECTICUT**

PROJECT MANUAL

MDC



January 2017

The Metropolitan District
(Project Name)
Contract No. XXXX-XX

Project Manual
Table of Contents

Section	Title
Division 0	Bidding and Contract Requirements
00020	Invitation to Bid
00100	Instructions to Bidders
00300	Bid Form
	Part A – Miscellaneous Work
	Part B – Sewers and Appurtenances
	Part C – Sewer Rehabilitation
	Part D – Water Main and Appurtenances
	Part E – Excavation and Backfill
	Part F – Maintenance and Protection of Traffic
	Part G – Paved Surface Restoration
	Part H – Unpaved Surface Restoration
	Part I – Project Specific Items
	Part J – Fixed Prices
00400	Table of Contents Supplements to Bid Forms
00410	Bid Bond
00420	Bidder's Qualification Form
00425	Representation Regarding Self-Performed Work
00430	Affidavit of Non-Collusion and Independent Price Determination
00440	Certificate of Authority
00445	OSHA Compliance History Certification
00450	MDC Fair Employment Equal Opportunity Non-Discrimination
00460	Letter Re Performance and Payment Bonds
00470	Contractor Safety Final-revisions
00485B	Named Subcontractor Bidder Qualification Form
00485C	Contractor Licensing
00490	DAS Update (Bid) Statement
00500	Agreement
00600	Bonds and Certificates
00610	Performance Bond
00615	Payment Bond

**The Metropolitan District
(Project Name)
Contract No. XXXX-XX**

**Project Manual
Table of Contents**

Section	Title
00630	Insurance Form
00700	Standard General Conditions
00800	Supplementary Conditions
Division 1	General Requirements
01010	Summary of Work
01025	Measurement and Payment
01025A	Asphalt Adjustment Table
01030	Allowances
01035	Modification Procedures
01040	Coordination With Utilities
01044	Progress and Sequence of Work
01046	Control of Work
01050	Field Engineering
01050A	District Layout & Stationing Procedures
01060	Regulatory Requirements
01060A	Application for Temp Hydrant Use
01060B	Hydrant Meter Process Contractor
01060C	DEEP Planned Bypass Form
01060D	Command Center Procedure
01082	Project Signs
01082A	Project Sign Template
01090	Reference Standards
01110	Environmental Protection Procedures
01120	Site Specific Health & Safety Plan
01152	Applications for Payment
01152A	Application for Payment Form
01200	Project Meetings
01300	Submittals
01310	Progress Schedules
01320	Construction Photographs
01321	Color Audio-Video Documentation Surveys

**The Metropolitan District
(Project Name)
Contract No. XXXX-XX**

**Project Manual
Table of Contents**

Section	Title
01370	Schedule of Values
01390	Contractor Evaluations
01390A	MDC Contractor Performance Evaluation form at 50%
01390B	MDC Contractor Performance Evaluation form at 100%
01450	Quality Control
01451	Independent Testing Services
01490	Contractor Staging Area
01500	Temporary Facilities
01510	Maintenance of Flow in Existing Sewers
01561	Pest Control
01562	Dust Control
01570	Maintenance and Protection of Traffic
01576	Traffic Control Persons
01600	Delivery, Storage, and Handling
01630	Substitutions and Product Options
01700	Contract Closeout
01720	As-Built Documents
01725	Preservation and Restoration of Project Features
01740	Warranties
Division 2	Sitework
02011	Test Pits
02050	Demolition and Modifications
02053	Removal and Disposal of Existing Pipe, Manholes and Appurtenances
02054	Removal or Abandonment of Existing Water Main and Appurtenances
02100	Site Preparation
02112	Asbestos Cement Pipe Repairs, Removal and Disposal
02140	Dewatering and Drainage
02145	Handling Contaminated Groundwater
02150	Bypass Pumping, Handling Storm Runoff and Sanitary Sewage Flows
02160	Excavation Support Systems

**The Metropolitan District
(Project Name)
Contract No. XXXX-XX**

**Project Manual
Table of Contents**

Section	Title
02200	Earthwork
02201	Earth Excavation Below Specified Grade and Outside Limits of the Trench
02202	Trench Refill
02210	Rock Excavation and Disposal (Blasting Not Allowed)
02213	Rock Excavation and Disposal (Blasting Allowed)
02260	Excavation, Handling, Transportation and Disposal of Regulated Soil
02270	Sedimentation and Erosion Control
02312	Shaft Excavation and Support
02317	Underground Warning Tape
02444	Chain Link Fence and Gates
02510	Temporary and Permanent Paved Surface Restoration
02515	Concrete Sidewalks and Walkways
02516	Concrete Driveway Aprons and Ramps
02517	Reinforced Concrete Pavement Base
02605	Manholes
02610	Sewer Testing and Cleaning
02612	Reinforced Concrete Pipe
02615	Ductile Iron Pipe for Sanitary Sewer
02622	Polyvinyl Chloride Sewer Pipe
02628	Pipe Repair Couplings
02640	Point Repairs to Sanitary Sewer Lines
02641	Air Valve Assembly
02642	12-Inch and Smaller Gate Valves
02644	16-Inch and Larger Butterfly Valves
02645	Fire Hydrant Assembly
02651	Ductile Iron Water Main and Fittings
02653	Disinfecting and Flushing Water Mains
02654	Removal of Protruding Taps
02656	Tapping Sleeve and Gate Valve
02657	Water Service Renewal or Reconnection

**The Metropolitan District
(Project Name)
Contract No. XXXX-XX**

**Project Manual
Table of Contents**

Section	Title
02669	Blow-Off Assembly
02677	Sewer Service Lateral Rehabilitation
02720	Catch Basins
02721	Laying Sewer and Drain Pipe
02764	Television Inspection
02765	Cured-in-Place Spot Repair
02766	Cured-in-Place Pipe for Sewer Mains
02767	Manhole Rehabilitation
02768	Manhole Monolithic Lining System
02769	Manhole Chimney Lining System
02770	Manhole Cleaning
02771	Granite Curbing
02900	Landscaping
02905	Unpaved Surface Restoration and Reset Miscellaneous Items
02930	Loaming, Seeding and Sodding
02971	Cleanup
Division 3	Concrete
03100	Concrete Formwork
03200	Concrete Reinforcing
03302	Miscellaneous Concrete
03604	Non-Shrink Construction Grout
03740	Modifications To Existing Concrete
Appendix	
A	MDC Standard Details Manual
B	MDC Standard Materials List

Division 0 – Bidding and Contract Requirements

THE METROPOLITAN DISTRICT

INSERT CONTRACT NAME

CONTRACT NUMBER INSERT NUMBER

INVITATION TO BID

Sealed Bids for construction of **Contract Number 20##-##: [Insert Name of Project]** Project will be received and safeguarded by The Metropolitan District, at the office of the District Clerk of the Metropolitan District, 555 Main Street, P.O. Box 800, Hartford, CT, 06142-0800 until **2:00 PM (Local Time), [Insert Date]** and at that time and place Bids will be publicly opened and read aloud.

The Work shall consist of all labor, equipment, fees, permits, and other related costs necessary to provide for **[insert project description]** along with support equipment and accessories as shown and specified. Bidders are directed to Section 01010 Summary of Work for specific details. The Work shall be located in the City of **[Insert Location]**; in the State of Connecticut as shown on the Drawings and specified therein.

Contract documents may be obtained from The Metropolitan District's electronic procurement bidding system. Prospective Bidders must register at the web site; once registered, prospective bidders can download the bid package from the web site at www.ebidexchange.com/mdc. The Contract documents can also be viewed in person at MDC Headquarters located at 555 Main St., Hartford, CT by making an appointment with the District Clerk's Office at 860.278.7850, Ext. 3207.

Each Bid shall be submitted in strict accordance with the Instructions to Bidders and shall be accompanied by a Bid Security in the amount of 10 percent of the Bid.

The Contractor, and any Subcontractors performing work with a subcontract value of \$500,000 or greater, shall hold a current **DAS Contractor Prequalification Certificate** from the Department of Administrative Services of the State of Connecticut according to C.G.S. § 4a-100, C.G.S. § 4b-101 and C.G.S. § 4b-91. The Certificate Classification shall be **"insert classification"**. Bidders shall submit with their Bids a DAS Contractor Prequalification Certificate along with a current Update (Bid) Statement. Any bid submitted without a copy of the DAS Prequalification Certificate and an Update (Bid) Statement shall be invalid. Prior to the commencement of any portion of the Work by a Subcontractor whose subcontract value is equal to or greater than \$500,000, the Contractor shall provide to the Owner a current DAS Contractor Prequalification Certificate for such Subcontractor along with an Update (Bid) Statement. Bidders do not need to include subcontractor certificates with their bids, but the apparent low bidder shall submit such certificates to owner within fourteen (14) calendar days after Bid opening.

The Successful Bidder and each of its Subcontractors having subcontracts in value equal

to or greater than \$500,000 shall maintain and keep current their respective DAS Contractor Prequalification Certificates at all times during the term of the Contract and any warranty period set forth in the Contract Documents.

A mandatory pre-bid conference will be held for potential Bidders at **INSERT DATE AND TIME**, at MDC PreBid Conference Room, 231 Brainard Rd, Hartford, CT. Prospective Bidders must attend this conference. All prospective Bidders are invited to ask questions to the District and/or the District's Agent(s) during this conference.

John S. Mirtle
District Clerk

THE METROPOLITAN DISTRICT

INSERT CONTRACT NAME

CONTRACT NUMBER INSERT NUMBER

INSTRUCTIONS TO BIDDERS

ARTICLE 1. GENERAL INSTRUCTIONS

1.1 The Work of the Project is defined in Section 01010 of the technical specifications and the other specifications and Contract Drawings included in the Contract Documents and listed on eBid exchange.

ARTICLE 2. COPIES OF CONTRACT DOCUMENTS

2.1 Complete sets of Contract Documents shall be used in preparing Bids; neither the Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

2.2 The Owner and Engineer in making copies of Contract Documents available do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

ARTICLE 3. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

3.1 Before submitting a Bid, each Bidder must (a) examine the Contract Documents thoroughly, (b) attend the Mandatory Pre-Bid Conference **and Site Tour** to become familiar with local conditions that may in any manner affect cost, progress or performance of the Work, (c) become familiar with Federal, State and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the Work; and (d) study and carefully correlate Bidder's observations with the requirements of the Contract Documents. **The Bidder's attention is drawn to the Special Provisions document listed on the eBid exchange website.**

3.2 Before submitting a Bid, Bidders shall, at their own expense, make such investigations and tests as they may deem necessary to determine their Bid for performance of the Work is in accordance with the time, price and other terms and conditions of the Contract Documents.

3.3 Not Used.

3.4 The lands upon which the Work is to be performed, rights-of-way for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Supplementary Conditions, Standard General Conditions or on the Contract Drawings.

3.5 The submission of a Bid will constitute an incontrovertible representation that the Bidder has complied with every requirement of these Instructions and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

3.6 Any Contract or Contracts awarded under this invitation for Bids are expected to be funded in part by the State of Connecticut Department of Energy and Environmental Protection and/or the Department of Public Health. Neither the State of Connecticut nor any of its departments, agencies or employees is or will be a party to this invitation for Bids or any resulting Contract. This procurement will be subject to the requirements contained in subsections (h), (j) and (o) of Section 22a-482-4 of the Regulations of Connecticut State Agencies. A copy of these Regulations is included in the Supplementary Conditions.

3.7 The Successful Bidder shall have **Insert Number of Days** calendar days to perform the Work from the date specified in a Notice to Proceed issued by the Owner.

ARTICLE 4. INTERPRETATIONS/QUESTIONS

4.1 Questions concerning the Bid submittal process such as formats, forms, and bonding should be referred to the Owner's Contract Specialist, **Insert Name**, at telephone 860-278-7850, **Ext. XXXX** between the hours of 8:00 a.m. to 4:00 p.m., Monday through Friday, except holidays.

4.2 Questions about the meaning or intent of the Contract Documents shall be received only by email to the Owner's Project Manager, **Insert Name**, at **Insert Email Address**, no later than 4:00 PM on **Insert Date**. All inquiries should include a subject line beginning with " **Insert Contract Number** Bid Period Inquiry, #, Organization" replacing "#" with the inquiry # (beginning with 1) and replacing "Organization" with the name of the organization submitting the inquiry.

4.3 The Owner is not responsible for any questions not received by the date and time required. The Owner will neither approve nor disapprove particular products or methods prior to the opening of the Bids; such products or methods will be considered only if offered by the Successful Bidder for incorporation into the Work using the methods prescribed by the Contract Documents including the provisions that relate to submittals and "or equal" substitutions.

4.4 Written clarifications, interpretations or any solicitation changes will be issued by Addenda not later than five (5) business days before the Bid opening date. Only questions answered by formal written Addenda will be binding. Oral and other clarifications or interpretations will be without legal effect. Addenda and all supporting documents will be posted on eBid exchange website (www.eBidexchange.com/mdc) to allow Bidders to download Addenda.

4.5 Bidders are responsible for determining that they have received all Addenda issued and noting such receipt on the Bid Form.

ARTICLE 5. PRE-BID CONFERENCE AND SITE TOUR

5.1 A mandatory Pre-Bid Conference (and Site Tour) will be held for potential Bidders at Insert Date and Time at Insert Location and Address, Connecticut. Prospective Bidders must attend both the Pre-Bid_Conference and Site Tour and provide requested information on the sign-in sheet provided at the start of the Pre-Bid Conference and initial the sign-in sheet following the conclusion of the Site Tour. All prospective Bidders are invited to ask questions to the Owner and/or the Owner's Agent(s) during this conference, but only written responses to such questions may alter information contained in the Bid documents. Attendees on the Site Tour must have appropriate personal protective equipment (PPE), which shall at a minimum include hard hat, reflective vests, steel-toed boots, and eye protection. Attendees without appropriate PPE will not be allowed to participate in the Site Tour.

ARTICLE 6. BID SECURITY

6.1 Each Bid must be accompanied by a Bid bond, or a certified check, or a treasurer's or cashier's check issued by, a responsible bank or trust company, payable to the Owner ('Bid Security'). Bid bonds must be issued by a surety licensed in Connecticut and listed on the Department of Treasury's Listing of Approved Sureties with an underwriting limitation of no less than the full amount of the Bid. The Bid Security shall be in the amount EQUAL TO TEN PERCENT (10%) of the amount of the Bid. Bid Security shall be sealed in a separate envelope from the Bid and then attached to the envelope containing the Bid. All Bid Securities except those of the three (3) apparently lowest, responsible and eligible Bidders will be returned within ten (10) business days after opening of the Bids. All Bid Securities will be returned on the execution of the Agreement or if no award is made, within **NINETY (90) business** days after the actual date of opening of the Bids, unless forfeited under the conditions herein stipulated.

6.2 In case a party to whom a Contract is awarded shall fail or neglect to execute the Agreement and furnish the satisfactory bonds within the time specified, the Owner may determine that the Bidder has abandoned the Contract, and thereupon the Bid of such Bidder and Owner's acceptance therefore shall be null and void and the Bid Security accompanying such Bid shall be forfeited to the Owner as liquidated damages for such failure or neglect and to indemnify said Owner for any loss which may be sustained by failure of the Bidder to execute the Agreement and furnish the bonds as aforesaid, provided that the amount forfeited to the Owner shall not exceed the difference between the Bid Price of said Bidder and that of the next lowest responsible and eligible Bidder and provided further that, in case of death, disability, or other unforeseen circumstances affecting the Bidder who failed to execute the Agreement and furnish the bonds as aforesaid, such Bid Security may be returned to such Bidder in the sole discretion of the Owner. After execution of the Agreement and acceptance of the bonds by the Owner, the Bid Security accompanying the Bid of the Successful Bidder will be returned.

ARTICLE 7. PERFORMANCE, PAYMENT AND OTHER BONDS

7.1 Performance, Payment and other Bonds shall be provided in accordance with Article 5 of the Standard General Conditions, Special Provisions, and Supplementary Conditions of the Contract.- ("Contract Security")

7.2 All Bonds required as Contract Security shall be furnished with the executed Agreement.

ARTICLE 8. BID FORM

8.1 Each Bid shall be completed on the Bid Form, Document 00300, which shall be unchanged except for the insertion of names, addresses, prices and other required data in the spaces provided on the Bid Form. All blank spaces for Bid prices must be filled in with the unit price for the Item or the lump sum for which the Bid is made. Refer to Special Provisions for list of documents to be completed and submitted at time of Bid.

8.2 Bid Forms shall be completed in ink or by typewriter. The Bid price of each Item on the form shall be stated in both words and figures. If unit prices are required on the Bid Form, discrepancies between unit prices and their respective total amounts will be resolved in favor of the unit prices. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

8.3 Bids by corporations shall be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

8.4 Bids by limited liability companies shall be executed in the limited liability company name by a duly authorized member or manager of the company. The company address and State of organization shall be shown below the signature.

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

8.6 Not Used.

8.7 All names shall be typed or printed below the signature. Signatures shall be in blue ink.

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

8.9 The name, address and email address to which communications regarding the Bid are to be directed shall be shown clearly.

8.10 One copy of each Bid shall be submitted in a sealed opaque envelope bearing on the outside the Bidder's name, address, and the Project Title for which the Bid is submitted. (If forwarded by mail, Bid and sealed envelope marked as described above shall be enclosed in another envelope with the notation "BID ENCLOSED" on the face and addressed as indicated in the Invitation to Bid.)

8.11 The Owner may consider not responsive any Bid not prepared and submitted in accordance with the provisions hereof.

ARTICLE 9. RECEIPT OF BIDS

9.1 Sealed Bids for the Work of this Contract will be received and safeguarded at the time and place indicated in the Invitation to Bid.

9.2 Bidders are cautioned that it is the responsibility of each individual Bidder to assure that their Bid is in the possession of the responsible official or the designated alternate prior to the stated time and at the place of the Bid opening. The Owner is not responsible for Bids delayed by mail and/or delivery services, of any nature.

ARTICLE 10. MODIFICATION AND WITHDRAWAL OF BIDS

10.1 Bids may be modified only by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

10.2 Bids may be withdrawn prior to the scheduled time (or authorized postponement thereof) for the opening of Bids only upon submission of a written request to the District Clerk.

10.3 No Bid may be withdrawn for a period of **NINETY (90) business** days after the actual date of the opening of the Bids.

ARTICLE 11. OPENING OF BIDS

11.1 At the time specified in the Invitation for Bids, no further Bids shall be accepted and filed Bids shall be opened and the amounts of the base Bid read out loud. The Bid results will be posted on eBid and the apparent low Bidder notified that its Bid will be subject to a more detailed review as set forth herein.

ARTICLE 12. ASSESSMENT OF BID FOR RESPONSIVENESS AND ELIGIBILITY

12.1 Upon identification of the apparent low Bidder, the Owner will carefully review the substance of the information contained in the Bid as submitted and to verify the information contained therein. A Bidder who submits a Bid package that is not complete may be deemed a non-responsive Bidder and the Bid will be rejected.

12.2 A Bid which includes any line item of a Bid Price that is abnormally low or high may be rejected as unbalanced. While it is often a difficult task to determine if a line Item is truly unbalanced, the Owner reserves the right to have the Bidder explain the apparent unbalancing, and, if the explanation offered is not satisfactory, to reject the Bid.

12.3 If a Bid contains an apparent mistake, the Owner shall advise the Bidder of the apparent mistake and the reasons the Owner concluded that the identified Bid response was a mistake. The Bidder must, within ten (10) calendar days deliver to the Owner clear and convincing documentation from the Bidder either verifying that the response was not a mistake or to admit that there was a mistake and request relief from its Bid.

12.4 Mistakes include but are not limited to instances where decimal points are obviously misplaced, numbers obviously reversed or units improperly designated. Bids that are, in the opinion of the Owner so much lower than either the estimate or other Bids so as to lead to the conclusion that a mistake may have been made or are unbalanced or incomplete may also result in a request for Bid verification. The Owner may also seek verification that all work contained in a unit price Bid has been included in the price offered.

12.5 The Owner reserves the right to waive any and all informalities in the Bid if it is in the Owner's interest to do so and the right to disregard all non-conforming, non-responsive or conditional Bids.

ARTICLE 13. ASSESSMENT OF BIDDERS FOR RESPONSIBILITY

13.1 The Owner reserves the right to reject any Bid if the evidence submitted by, or the investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Contract Documents and to complete the Work contemplated therein. The Owner further reserves the right to waive any informality in or to reject any or all Bids if deemed to be in the Owner's best interest.

13.2 Bidders may be investigated by the Owner to determine if they are qualified to perform the Work. All Bidders shall be prepared to submit within **fourteen (14) calendar days** of the Owner's or Engineer's request, written evidence of such additional information and data as the Owner may deem necessary to make this determination.

13.3 The investigation of a Bidder will seek to determine whether:

- a. The Bidder has adequate financial resources to perform the Contract;
- b. The Bidder has the resources to meet the project schedule contained in the Bid documents;
- c. The Bidder has a satisfactory record of performing similar work;
- d. The Bidder has a satisfactory record of integrity and business ethics;
- e. The Bidder has the necessary organization to perform the Contract;
- f. The Bidder has the necessary technical resources and equipment needed to perform the Work.

13.4 Other work to which the Bidder is then engaged or to which it is committed may also be considered as a factor in determining responsibility.

13.5 Bids received from any Bidder whose performance on a previous Metropolitan District project has been rated unacceptable in a Contractor Performance Evaluation will not be considered for award for the period specified therein.

13.6 The Bidder shall hold a current DAS Contractor Prequalification Certificate in **Insert Classification** from the Department of Administrative Services of the State of Connecticut according to C.G.S. § 4a-100, C.G.S. § 4b-101 and C.G.S. § 4b-91. Bidders shall submit with their Bids their DAS Contractor Prequalification Certificate along with a current Update Bid Statement. Any Bid submitted without a copy of the DAS Prequalification Certificate and an Update Bid Statement shall be invalid.

As to proposed Subcontractors whose subcontract value is equal to or greater than \$500,000, the apparent low Bidder shall submit to the Owner, no later than fourteen (14) days after Bid opening, a current DAS Contractor Prequalification Certificate in an appropriate work classification along with an Update Bid Statement for each such Subcontractor. Bidders do not need to include Subcontractor Prequalification Certificates and Update Bid Statements with their Bids.

The Successful Bidder and each of its Subcontractors having subcontracts in value equal to or greater than \$500,000 shall maintain and keep current their respective DAS Contractor Prequalification Certificates at all times during the term of the Contract and any warranty period set forth in the Contract Documents.

13.7 Each Bidder will include with the Bid Submission a list of Subcontractors and their qualifications as required by Section 00485A and 00485B herein. The list will include: Subcontractor's name, legal address, amount of proposed subcontract, and specification sections and qualifications to perform the required Work. Bidders will provide this information for all Subcontractors with their Bids whose subcontracts equal or exceed \$25,000.00..

13.8 The Successful Bidder is required to self-perform a minimum of 25% of the value of the Work and to explain how that will be accomplished with its own forces in Section 00425.

13.9 Please note that this project has specific experience criteria that must be documented for a Bidder to be determined to be responsible. These criteria are included in Section 00420 of the Bid documents.

ARTICLE 14. AWARD OF CONTRACT

14.1 The Contract will be awarded to the lowest responsive, responsible, and eligible Bidder ("Successful Bidder"). Such a Bidder shall possess the skill, ability, and integrity necessary for the faithful performance of the Work. The term "lowest responsive, responsible and eligible Bidder" as used herein shall mean the Bidder whose **Total Base Bid plus accepted Bid alternatives** is the lowest of those Bidders possessing

the skill, ability and integrity necessary for the faithful performance of the Work. The Owner may accept any combination of Bid alternatives with the base Bid at its discretion.

ARTICLE 15. EXECUTION OF AGREEMENT

15.1 When the Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by at least one (1) unsigned copy of the Agreement and all other applicable Contract Documents. Within **fourteen (14) calendar days** after the date of receipt of such notification Contractor shall complete and return the following Contract Documents to the Owner;

- a. Signed agreement
- b. Bonds
- c. Insurance Certificates
- d. Executed agreements with all subcontractors with subcontract value of \$25,000 or greater.
- e. DAS Prequalification Certificates and Update (Bid) Statements for Subcontractors consistent with the timelines and requirements provided in Section 13.6 hereof
- f. Evidence of Compliance with bond requirements of the Connecticut Department of Revenue Services, and
- g. All other submittals required by the Contract Documents

ARTICLE 16. NONDISCRIMINATION AND AFFIRMATIVE ACTION

16.1 The successful Contractor agrees to the following provisions: (1) Contractor agrees and warrants that in the performance of this Agreement Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, intellectual disability, mental disability or physical disability, including but not limited to blindness, unless it is shown by Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or the State of Connecticut (the "State"); and Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, intellectual disability, mental disability or physical disability, including but not limited to blindness, unless it is shown by Contractor that such disability prevents performance of the work involved; (2) Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Connecticut Commission on Human Rights and Opportunities (the "Commission"); (3) Contractor agrees to provide each labor union or representative of workers with which Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which Contractor has a

contract or understanding, a notice to be provided by the Commission advising the labor union, workers' representative and vendor of Contractor's commitments under C.G.S. §§4a-60, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) Contractor agrees to comply with each provision of C.G.S. §§4a-60, and with each regulation or relevant order issued by said Commission pursuant to C.G.S. §§46a-56; and (5) the Contractor agrees to provide the Commission with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of C.G.S. §§4a-60 and 46a-56.

16.2 The successful Contractor agrees to the following provisions: (1) Contractor agrees and warrants that in the performance of this Agreement Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) Contractor agrees to provide each labor union or representative of workers with which Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which Contractor has a contract or understanding, a notice to be provided by the Commission advising the labor union, workers' representative and vendor of Contractor's commitments under C.G.S. §4a-60a, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) Contractor agrees to comply with each provision of C.G.S. §4a-60a, and with each regulation or relevant order issued by said Commission pursuant to C.G.S. §46a-56; and (4) the Contractor agrees to provide the Commission with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of C.G.S. §4a-60a and 46a-56.

16.3 The successful Contractor agrees and warrants that it will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials to perform work or services hereunder; and Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.

16.4 If successful Contractor has one or more contracts with the State or a political subdivision thereof (including the District) that is valued at less than fifty thousand dollars for each year of the contract, Contractor shall provide the District with a written or electronic representation that complies with nondiscrimination agreements and warranties in Sections 16.1(1) and 16.2(1) above, provided if there is any change in such representation, Contractor shall provide the updated representation to the District not later than thirty days after such change.

If the successful Contractor has one or more contracts with the State or a political subdivision thereof (including the District) that is valued at fifty thousand dollars or more for any year of the Contract, Contractor shall provide the District with any of the following:

- (A) documentation in the form of a company or corporate policy adopted by resolution of the board of directors, shareholders, managers, members or other governing body of Contractor that complies with the nondiscrimination agreements and warranties in Sections 16.1(1) and 16.2(1);
- (B) documentation in the form of a company or corporate policy adopted by a prior resolution of the board of directors, shareholders, managers, members or other governing body of Contractor if (i) the prior resolution is certified by a duly authorized corporate officer of Contractor to be in effect on the date the documentation is submitted, and (ii) the head of the agency of the State or such political subdivision, or a designee, certifies that the prior resolution complies with the nondiscrimination agreements and warranties in Sections 16.1(1) and 16.2(1); or
- (C) documentation in the form of an affidavit signed under penalty of false statement by a chief executive officer, president, chairperson or other corporate officer duly authorized to adopt Contractor's company or corporate policy that certifies that the company or corporate policy of Contractor complies with the nondiscrimination agreements and warranties in Sections 16.1(1) and 16.2(1) and is in effect on the date that the affidavit is signed.

16.5 The District shall not award a Contract to an Contractor who has not provided the representation or documentation required under Section 16.4, and the successful Contractor warrants that it has provided all such representations and documentation to the District as required under Section 16.4 hereof. Contractor shall not be required to resubmit such representation or documentation unless there is a change in the information contained in such representation or documentation. In the event of such a change, Contractor shall submit an updated representation or documentation, as applicable, either (A) not later than thirty days after the effective date of such change, or (B) upon the execution of a new contract with the State or a political subdivision thereof, whichever is earlier. Contractor shall also certify, in accordance with Section 16.4(B) or (C) and not later than fourteen (14) days after the twelve (12) month anniversary of the most recently filed representation or documentation, that such representation or documentation on file with the State or the political subdivision thereof is current and accurate.

16.6 The successful Contractor shall include the provisions of Sections 16.1, 16.2 and 16.3 in every subcontract or purchase order entered into in order to fulfill any obligation of Contractor under this Agreement and such provisions shall be binding on a Subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with C.G.S. §46a-56; provided, if Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor, as a result of such direction by the Commission, the Contractor

may request the State to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

16.7 For purposes of this Article 16, the terms "Agreement" shall include any extension or modification of the Agreement, and "Contractor" includes any successors or assigns of the successful Contractor; and the terms "minority business enterprise" and "good faith efforts" shall have the meanings assigned to such terms in C.G.S. §4a-60(e).

ARTICLE 17. SAFETY AND HEALTH REGULATIONS

17.1 This project is subject to the Safety and Health Regulations (CFR 29, Part 1926 – "safety standards for the construction industry" and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974 and CFR 29, Part 1910, General Industry Safety and Health Regulations Identified as Applicable to Construction.

17.2 The Successful Bidder shall comply with the Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL-91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL-91-54).

17.3 The Successful Bidder shall have a competent person or persons, as required under the Occupational Safety and Health Act on the Site to inspect the Work and to supervise the conformance of the Work with the regulations of the Act.

17.4 The Owner also has certain safety requirements outlined in the Project Manual included in the Contract Documents which must be complied with in the submission of the Contractor's Health and Safety Plan.

ARTICLE 18. STATE WAGE RATES

18.1 State wage rates apply to this project. The State Wage Determination is included in Project Specific Wage Rate Schedule included in the Special Provisions.

18.2 It is the responsibility of the Bidder before the Bid opening to request, if necessary, any additional information on State Wage Rates for those trades people who are not covered by the applicable Wage Determination, but who may be employed for the proposed work under this Contract.

18.3 All construction associated with this Contract will be governed by Heavy and Highway Rates.

ARTICLE 19. ***See Special Provisions***

ARTICLE 20. ACCESS TO SITE

20.1 The Owner, Engineer, Owner's authorized representatives, and any local, state or federal agencies having a direct interest in the Work shall have access to the Work wherever it is in preparation or progress and the Contractor shall provide proper facilities for such access and inspection. Refer to Article 13.02 of the Standard General Conditions for additional requirements.

ARTICLE 21. NOT TO BE USED (see article 16)

ARTICLE 22. ***See Special Provisions***

ARTICLE 23. CONTRACTOR EVALUATION

23.1 The Successful Bidder will be evaluated on job performance in accordance with Section 01390.

ARTICLE 24. ***See Special Provisions***

END OF SECTION

BID FORM TO
THE METROPOLITAN DISTRICT

INSERT CONTRACT NAME

CONTRACT NUMBER <<Insert Number>>

The undersigned declares that the only persons or parties interested in this Bid as principals are as stated; that the Bid is made without any collusion with other persons, firms, or corporations; that all the Contract Documents as prepared by The Metropolitan District and dated **Insert Date** have been carefully examined; that the undersigned is fully informed in regard to all conditions pertaining to the Work and the place where it is to be done, and from them the undersigned makes this Bid. These prices shall cover all expenses incurred in performing the Work required under the Contract Documents, of which this Bid Form is a part.

If a Notice of Award accompanied by at least one unsigned copy of the Agreement and all other applicable Contract Documents is delivered to the undersigned within **NINETY (90) Business days**, after the actual date of the opening of the Bids, the undersigned will within **fourteen (14) calendar days** after the date of receipt of such notification, execute and return all copies of the Agreement and all other applicable Contract Documents to Owner. The premiums for all Bonds required shall be paid by Contractor and shall be included in the Contract Price. The undersigned Bidder further agrees that the Bid Security accompanying this Bid shall become the property of Owner if the Bidder fails to execute the Agreement as stated above.

The undersigned hereby agrees that the Contract Time shall commence on the date set forth in a Notice to Proceed and to fully complete the Work for the Bid Items within **<<Insert Number of Calendar Days>>Calendar Days** in accordance with the terms as stated in the Agreement. The undersigned further agrees to pay Owner, as liquidated damages, **Insert \$ amount** per day for each calendar day beyond the Contract Time Limit or extension thereof that the Work remains incomplete, in accordance with the terms of the Agreement.

All addenda related to this Contract issued by the Owner shall be attached to and made part of this Contract. All such addenda shall be attached and submitted with this Bid as confirmation and acknowledgment of receipt. Failure to submit addenda acknowledgment and confirmation along with your Bid package may cause your Bid to be considered non-responsive and thereby rejected. The Owner assumes no responsibility nor shall it or its representatives be held liable for failure of the Bidder to submit addenda as required hereunder.

The undersigned acknowledges receipt of addenda numbered:

Addenda #:	_____	Dated:	_____	Addenda #:	_____	Dated:	_____
Addenda #:	_____	Dated:	_____	Addenda #:	_____	Dated:	_____

In accordance with the above understanding, the undersigned proposes to perform the Work, furnish all materials and complete the Work in its entirety in the manner and under the conditions required at the prices listed as follows:

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART A - MISCELLANEOUS WORK				
G- 1	Mobilization, Demobilization and Related Expense (no greater than 5% of total Bid, excluding this item itself and Item G-2) (Section 01025)	\$	LUMP SUM	\$
G- 2	General Requirements (no greater than 10% of total Bid, excluding this item itself and Item G-1) (Section 01025)	\$	LUMP SUM	\$
G- 3	Erosion and Sedimentation Control (Section 02270)	\$	LUMP SUM	\$
G- 4	Catch Basin Sedimentation Control (Section 02270)	\$	EA	\$
G- 5	Clearing and Grubbing (Section 02100)	\$	SY	\$
G- 6	Remove and Replace Tree (Section 02900)	\$	EA	\$
<u>PART A - MISCELLANEOUS WORK SUBTOTAL</u>			\$	
(Items G-1 through G-6):				

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-1- SMH II	Type II 4-ft Diameter, Precast Concrete Sewer Manholes 0-ft to 10-ft deep (Section 02605)	\$	EA	\$
S-2- SMH II	Type II 4-ft Diameter, Precast Concrete Sewer Manholes Greater than 10-ft to 15-ft deep (Section 02605)	\$	EA	\$
S-3- SMH II	Type II 4-ft Diameter, Precast Concrete Sewer Manholes Greater than 15-ft deep (Section 02605)	\$	EA	\$
S-1- SMH IV	Type IV 5-ft Diameter, Precast Concrete Sewer Manholes 0-ft to 10-ft deep (Section 02605)	\$	EA	\$
S-2- SMH IV	Type IV 5-ft Diameter, Precast Concrete Sewer Manholes Greater than 10-ft to 15-ft deep (Section 02605)	\$	EA	\$
S-3- SMH IV	Type IV 5-ft Diameter, Precast Concrete Sewer Manholes Greater than 15-ft deep (Section 02605)	\$	EA	\$
S-1- SMH VI	Type VI 5-ft Diameter, Precast Concrete Sewer Manholes 0-ft to 10-ft deep (Section 02605)	\$	EA	\$
S-2- SMH VI	Type VI 5-ft Diameter, Precast Concrete Sewer Manholes Greater than 10-ft to 15-ft deep (Section 02605)	\$	EA	\$
S-3- SMH VI	Type VI 5-ft Diameter, Precast Concrete Sewer Manholes Greater than 15-ft deep (Section 02605)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-4- SMH II	Doghouse Type II Manhole Constructed Over Existing Sewer 0-ft to 10-ft deep (Section 02605)	\$	EA	\$
S-5- SMH II	Doghouse Type II Manhole Constructed Over Existing Sewer Greater than 10-ft to 15-ft deep (Section 02605)	\$	EA	\$
S-6- SMH II	Doghouse Type II Manhole Constructed Over Existing Sewer Greater than 15-ft deep (Section 02605)	\$	EA	\$
S-4- SMH VI	Doghouse Type VI Manhole Constructed Over Existing Sewer 0-ft to 10-ft deep (Section 02605)	\$	EA	\$
S-5- SMH VI	Doghouse Type VI Manhole Constructed Over Existing Sewer Greater than 10-ft to 15-ft deep (Section 02605)	\$	EA	\$
S-6- SMH VI	Doghouse Type VI Manhole Constructed Over Existing Sewer Greater than 15-ft deep (Section 02605)	\$	EA	\$
S-7- 8DI	8-in DI Sewer 0-ft to 8-ft deep (Section 02615)	\$	LF	\$
S-8- 8DI	8-in DI Sewer Greater than 8-ft to 12-ft deep (Section 02615)	\$	LF	\$
S-9- 8DI	8-in DI Sewer Greater than 12-ft to 16-ft deep (Section 02615)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-10- 8DI	8-in DI Sewer Greater than 16-ft deep (Section 02615)	\$	LF	\$
S-7- 10DI	10-in DI Sewer 0-ft to 8-ft deep (Section 02615)	\$	LF	\$
S-8- 10DI	10-in DI Sewer Greater than 8-ft to 12-ft deep (Section 02615)	\$	LF	\$
S-9- 10DI	10-in DI Sewer Greater than 12-ft to 16-ft deep (Section 02615)	\$	LF	\$
S-10- 10DI	10-in DI Sewer Greater than 16-ft deep (Section 02615)	\$	LF	\$
S-7- 12DI	12-in DI Sewer 0-ft to 8-ft deep (Section 02615)	\$	LF	\$
S-8- 12DI	12-in DI Sewer Greater than 8-ft to 12-ft deep (Section 02615)	\$	LF	\$
S-9- 12DI	12-in DI Sewer Greater than 12-ft to 16-ft deep (Section 02615)	\$	LF	\$
S-10- 12DI	12-in DI Sewer Greater than 16-ft deep (Section 02615)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-7- 18DI	18-in DI Sewer 0-ft to 8-ft deep (Section 02615)	\$	LF	\$
S-8- 18DI	18-in DI Sewer Greater than 8-ft to 12-ft deep (Section 02615)	\$	LF	\$
S-9- 18DI	18-in DI Sewer Greater than 12-ft to 16-ft deep (Section 02615)	\$	LF	\$
S-10- 18DI	18-in DI Sewer Greater than 16-ft deep (Section 02615)	\$	LF	\$
S-7- 24DI	24-in DI Sewer 0-ft to 8-ft deep (Section 02615)	\$	LF	\$
S-8- 24DI	24-in DI Sewer Greater than 8-ft to 12-ft deep (Section 02615)	\$	LF	\$
S-9- 24DI	24-in DI Sewer Greater than 12-ft to 16-ft deep (Section 02615)	\$	LF	\$
S-10- 24DI	24-in DI Sewer Greater than 16-ft deep (Section 02615)	\$	LF	\$
S-7- 30DI	30-in DI Sewer 0-ft to 8-ft deep (Section 02615)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-8- 30DI	30-in DI Sewer Greater than 8-ft to 12-ft deep (Section 02615)	\$	LF	\$
S-9- 30DI	30-in DI Sewer Greater than 12-ft to 16-ft deep (Section 02615)	\$	LF	\$
S-10- 30DI	30-in DI Sewer Greater than 16-ft deep (Section 02615)	\$	LF	\$
S-7- 8PVC	8-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-8- 8PVC	8-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-9- 8PVC	8-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-10- 8PVC	8-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-7- 10PVC	10-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-8- 10PVC	10-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-9- 10PVC	10-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-10- 10PVC	10-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-7- 12PVC	12-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-8- 12PVC	12-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-9- 12PVC	12-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-10- 12PVC	12-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-7- 15PVC	15-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-8- 15PVC	15-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-9- 15PVC	15-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-10- 15PVC	15-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-7- 18PVC	18-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-8- 18PVC	18-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-9- 18PVC	18-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-10- 18PVC	18-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-7- 21PVC	21-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-8- 21PVC	21-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-9- 21PVC	21-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-10- 21PVC	21-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-7- 24PVC	24-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-8- 24PVC	24-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-9- 24PVC	24-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-10- 24PVC	24-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-7- 27PVC	27-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-8- 27PVC	27-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-9- 27PVC	27-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-10- 27PVC	27-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-7- 30PVC	30-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-8- 30PVC	30-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-9- 30PVC	30-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-10- 30PVC	30-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-7- 12RCP	12-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-8- 12RCP	12-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-9- 12RCP	12-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-10- 12RCP	12-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-7- 15RCP	15-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-8- 15RCP	15-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-9- 15RCP	15-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-10- 15RCP	15-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-7- 18RCP	18-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-8- 18RCP	18-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-9- 18RCP	18-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-10- 18RCP	18-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-7- 24RCP	24-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-8- 24RCP	24-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-9- 24RCP	24-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-10- 24RCP	24-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-7- 30RCP	30-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-8- 30RCP	30-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-9- 30RCP	30-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-10- 30RCP	30-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-7- 36RCP	36-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-8- 36RCP	36-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-9- 36RCP	36-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-10- 36RCP	36-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-7- 48RCP	48-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-8- 48RCP	48-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-9- 48RCP	48-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-10- 48RCP	48-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-7- 54RCP	54-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-8- 54RCP	54-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-9- 54RCP	54-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-10- 54RCP	54-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-11- 8DI	Cross Country, 8-in DI Sewer 0-ft to 8-ft deep (Section 02615)	\$	LF	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-12- 8DI	Cross Country, 8-in DI Sewer Greater than 8-ft to 12-ft deep (Section 02615)	\$	LF	\$
S-13- 8DI	Cross Country, 8-in DI Sewer Greater than 12-ft to 16-ft deep (Section 02615)	\$	LF	\$
S-14- 8DI	Cross Country, 8-in DI Sewer Greater than 16-ft deep (Section 02615)	\$	LF	\$
S-11- 10DI	Cross Country, 10-in DI Sewer 0-ft to 8-ft deep (Section 02615)	\$	LF	\$
S-12- 10DI	Cross Country, 10-in DI Sewer Greater than 8-ft to 12-ft deep (Section 02615)	\$	LF	\$
S-13- 10DI	Cross Country, 10-in DI Sewer Greater than 12-ft to 16-ft deep (Section 02615)	\$	LF	\$
S-14- 10DI	Cross Country, 10-in DI Sewer Greater than 16-ft deep (Section 02615)	\$	LF	\$
S-11- 12DI	Cross Country, 12-in DI Sewer 0-ft to 8-ft deep (Section 02615)	\$	LF	\$
S-12- 12DI	Cross Country, 12-in DI Sewer Greater than 8-ft to 12-ft deep (Section 02615)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-13- 12DI	Cross Country, 12-in DI Sewer Greater than 12-ft to 16-ft deep (Section 02615)	\$	LF	\$
S-14- 12DI	Cross Country, 12-in DI Sewer Greater than 16-ft deep (Section 02615)	\$	LF	\$
S-11- 18DI	Cross Country, 18-in DI Sewer 0-ft to 8-ft deep (Section 02615)	\$	LF	\$
S-12- 18DI	Cross Country, 18-in DI Sewer Greater than 8-ft to 12-ft deep (Section 02615)	\$	LF	\$
S-13- 18DI	Cross Country, 18-in DI Sewer Greater than 12-ft to 16-ft deep (Section 02615)	\$	LF	\$
S-14- 18DI	Cross Country, 18-in DI Sewer Greater than 16-ft deep (Section 02615)	\$	LF	\$
S-11- 8PVC	Cross Country, 8-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-12- 8PVC	Cross Country, 8-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-13- 8PVC	Cross Country, 8-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-14- 8PVC	Cross Country, 8-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-11- 10PVC	Cross Country, 10-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-12- 10PVC	Cross Country, 10-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-13- 10PVC	Cross Country, 10-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-14- 10PVC	Cross Country, 10-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-11- 12PVC	Cross Country, 12-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-12- 12PVC	Cross Country, 12-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-13- 12PVC	Cross Country, 12-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-14- 12PVC	Cross Country, 12-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-11- 15PVC	Cross Country, 15-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-12- 15PVC	Cross Country, 15-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-13- 15PVC	Cross Country, 15-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-14- 15PVC	Cross Country, 15-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-11- 18PVC	Cross Country, 18-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-12- 18PVC	Cross Country, 18-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-13- 18PVC	Cross Country, 18-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-14- 18PVC	Cross Country, 18-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-11- 21PVC	Cross Country, 21-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-12- 21PVC	Cross Country, 21-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-13- 21PVC	Cross Country, 21-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-14- 21PVC	Cross Country, 21-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-11- 24PVC	Cross Country, 24-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-12- 24PVC	Cross Country, 24-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-13- 24PVC	Cross Country, 24-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-14- 24PVC	Cross Country, 24-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-11- 27PVC	Cross Country, 27-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-12- 27PVC	Cross Country, 27-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-13- 27PVC	Cross Country, 27-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-14- 27PVC	Cross Country, 27-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-11- 30PVC	Cross Country, 30-in PVC Sewer 0-ft to 8-ft deep (Section 02622)	\$	LF	\$
S-12- 30PVC	Cross Country, 30-in PVC Sewer Greater than 8-ft to 12-ft deep (Section 02622)	\$	LF	\$
S-13- 30PVC	Cross Country, 30-in PVC Sewer Greater than 12-ft to 16-ft deep (Section 02622)	\$	LF	\$
S-14- 30PVC	Cross Country, 30-in PVC Sewer Greater than 16-ft deep (Section 02622)	\$	LF	\$
S-11- 12RCP	Cross Country, 12-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-12- 12RCP	Cross Country, 12-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-13- 12RCP	Cross Country, 12-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-14- 12RCP	Cross Country, 12-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-11- 15RCP	Cross Country, 15-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-12- 15RCP	Cross Country, 15-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-13- 15RCP	Cross Country, 15-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-14- 15RCP	Cross Country, 15-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-11- 18RCP	Cross Country, 18-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-12- 18RCP	Cross Country, 18-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-13- 18RCP	Cross Country, 18-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-14- 18RCP	Cross Country, 18-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-11- 24RCP	Cross Country, 24-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-12- 24RCP	Cross Country, 24-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-13- 24RCP	Cross Country, 24-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-14- 24RCP	Cross Country, 24-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-11- 30RCP	Cross Country, 30-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-12- 30RCP	Cross Country, 30-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-13- 30RCP	Cross Country, 30-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-14- 30RCP	Cross Country, 30-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-11- 36RCP	Cross Country, 36-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-12- 36RCP	Cross Country, 36-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-13- 36RCP	Cross Country, 36-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-14- 36RCP	Cross Country, 36-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-11- 48RCP	Cross Country, 48-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-12- 48RCP	Cross Country, 48-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$
S-13- 48RCP	Cross Country, 48-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-14- 48RCP	Cross Country, 48-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-11- 54RCP	Cross Country, 54-in RCP Sewer 0-ft to 8-ft deep (Section 02612)	\$	LF	\$
S-12- 54RCP	Cross Country, 54-in RCP Sewer Greater than 8-ft to 12-ft deep (Section 02612)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S-13- 54RCP	Cross Country, 54-in RCP Sewer Greater than 12-ft to 16-ft deep (Section 02612)	\$	LF	\$
S-14- 54RCP	Cross Country, 54-in RCP Sewer Greater than 16-ft deep (Section 02612)	\$	LF	\$
S-15- 4DI	4-in DI Force Main, All Depths (Section 02615)	\$	LF	\$
S-15- 6DI	6-in DI Force Main, All Depths (Section 02615)	\$	LF	\$
S-15- 8DI	8-in DI Force Main, All Depths (Section 02615)	\$	LF	\$
S-15- 10DI	10-in DI Force Main, All Depths (Section 02615)	\$	LF	\$
S-15- 12DI	12-in DI Force Main, All Depths (Section 02615)	\$	LF	\$
S-16- DI	6-in DI Sewer Service Pipe, All Depths (Sections 02615)	\$	LF	\$
S-16- PVC	6-in PVC Sewer Service Pipe, All Depths (Sections 02622)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S- 17	Precast Sewer Chimney	\$	VF	\$
S- 18	Air Release/Inlet Manhole along Force Main (Section 15100)	\$	EA	\$
S- 19	Hartford Type Auxiliary Inlet Basin (Section 02720)	\$	EA	\$
S- 20	Typical Catch Basin for Paved Lot or Area Drainage (Section 02720)	\$	EA	\$
S- 21	Minimum Standard for Catch Basin in Areas not Subjected to Vehicular Traffic (in Private Lands) (Section 02720)	\$	EA	\$
S- 22	Hartford Type Precast Catch Basin (Section 02720)	\$	EA	\$
S- 23	Catch Basin (CTDOT) (Section 02720)	\$	EA	\$
S- 24	Double grate Pre-Cast Catch Basin, Type I (Section 02720)	\$	EA	\$
S- 25	Double Grate Pre-Cast Catch Basin, Type II (Section 02720)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART B - SEWERS AND APPURTENANCES				
S- 26	Standard Catch Basin for Granite Curb Back (Section 02720)	\$	EA	\$
S- 27	Catch Basin with Offset Sump (Section 02720)	\$	EA	\$
S- 28	Typical Trough Catch Basin (Section 02720)	\$	EA	\$
S- 29	Removal of Existing Manhole or Catch Basin, All depths, All sizes (Section 02053)	\$	EA	\$
S- 30	Abandonment of Existing Sewer without CLSM, All Sizes, All Depths (Section 02053)	\$	Lump Sum	\$
S- 31	Abandonment of Existing Sewer with CLSM, All Sizes, All Depths (Section 02053)	\$	LF	\$
S- 32	Removal of Existing Sewer All Sizes, All Depths (Section 02053)	\$	LF	\$
<u>PART B - SEWERS AND APPURTENANCES SUBTOTAL</u>			\$	
(Items S-1 through S-32):				

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART C - REHABILITATION				
R-1- 8	Cured-in-Place Pipe 8-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-1- 10	Cured-in-Place Pipe 10-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-1- 12	Cured-in-Place Pipe 12-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-1- 15	Cured-in-Place Pipe 15-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-1- 18	Cured-in-Place Pipe 18-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-1- 21	Cured-in-Place Pipe 21-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-1- 24	Cured-in-Place Pipe 24-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-1- 27	Cured-in-Place Pipe 27-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-1- 30	Cured-in-Place Pipe 30-in Sewer, All Depths (Section 02766)	\$	LF	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART C - REHABILITATION				
R-1- 36	Cured-in-Place Pipe 36-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-1- 48	Cured-in-Place Pipe 48-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-2- 8	Cured-in-Place Pipe (Cross Country) 8-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-2- 10	Cured-in-Place Pipe (Cross Country) 10-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-2- 12	Cured-in-Place Pipe (Cross Country) 12-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-2- 15	Cured-in-Place Pipe (Cross Country) 15-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-2- 18	Cured-in-Place Pipe (Cross Country) 18-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-2- 21	Cured-in-Place Pipe (Cross Country) 21-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-2- 24	Cured-in-Place Pipe (Cross Country) 24-in Sewer, All Depths (Section 02766)	\$	LF	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART C - REHABILITATION				
R-2- 27	Cured-in-Place Pipe (Cross Country) 27-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-2- 30	Cured-in-Place Pipe (Cross Country) 30-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-2- 36	Cured-in-Place Pipe (Cross Country) 36-in Sewer, All Depths (Section 02766)	\$	LF	\$
R-2- 48	Cured-in-Place Pipe (Cross Country) 48-in Sewer, All Depths (Section 02766)	\$	LF	\$
R- 3	Heavy Hydraulic Cleaning/ Root Removal (Section 02610)	\$	LF	\$
R- 4	Heavy Hydraulic Cleaning/ Root Removal (Cross Country) (Section 02610)	\$	LF	\$
R- 5	Reconnect Active Service Lateral (Section 02766)	\$	EA	\$
R- 6	Reconnect Active Service Lateral (Cross Country) (Section 02766)	\$	EA	\$
R-7- 6	Cured-in-Place Spot Repair 6-in Sewer, All Depths (Section 02765)	\$	EA	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART C - REHABILITATION				
R-7- 8	Cured-in-Place Spot Repair 8-in Sewer, All Depths (Section 02765)	\$	EA	\$
R-7- 10	Cured-in-Place Spot Repair 10-in Sewer, All Depths (Section 02765)	\$	EA	\$
R-7- 12	Cured-in-Place Spot Repair 12-in Sewer, All Depths (Section 02765)	\$	EA	\$
R-7- 15	Cured-in-Place Spot Repair 15-in Sewer, All Depths (Section 02765)	\$	EA	\$
R-7- 18	Cured-in-Place Spot Repair 18-in Sewer, All Depths (Section 02765)	\$	EA	\$
R-7- 21	Cured-in-Place Spot Repair 21-in Sewer, All Depths (Section 02765)	\$	EA	\$
R-7- 24	Cured-in-Place Spot Repair 24-in Sewer, All Depths (Section 02765)	\$	EA	\$
R-7- 27	Cured-in-Place Spot Repair 27-in Sewer, All Depths (Section 02765)	\$	EA	\$
R-7- 30	Cured-in-Place Spot Repair 30-in Sewer, All Depths (Section 02765)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART C - REHABILITATION				
R-7- 36	Cured-in-Place Spot Repair 36-in Sewer, All Depths (Section 02765)	\$	EA	\$
R-7- 48	Cured-in-Place Spot Repair 48-in Sewer, All Depths (Section 02765)	\$	EA	\$
R-8- 6	Cured-in-Place Spot Repair 6-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-8- 8	Cured-in-Place Spot Repair 8-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-8- 10	Cured-in-Place Spot Repair 10-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-8- 12	Cured-in-Place Spot Repair 12-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-8- 15	Cured-in-Place Spot Repair 15-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-8- 18	Cured-in-Place Spot Repair 18-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-8- 21	Cured-in-Place Spot Repair 21-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART C - REHABILITATION				
R-8- 24	Cured-in-Place Spot Repair 24-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-8- 27	Cured-in-Place Spot Repair 27-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-8- 30	Cured-in-Place Spot Repair 30-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-8- 36	Cured-in-Place Spot Repair 36-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-8- 48	Cured-in-Place Spot Repair 48-in Sewer, All Depths (Cross Country) (Section 02765)	\$	EA	\$
R-9- 8	PVC Point Repair 8-in Sewer 0-ft to 16-ft deep (Section 02640)	\$	EA	\$
R-10- 8	PVC Point Repair 8-in Sewer Greater than 16-ft deep (Section 02640)	\$	EA	\$
R-9- 10	PVC Point Repair 10-in Sewer 0-ft to 16-ft deep (Section 02640)	\$	EA	\$
R-10- 10	PVC Point Repair 10-in Sewer Greater than 16-ft deep (Section 02640)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART C - REHABILITATION				
R-9- 12	PVC Point Repair 12-in Sewer 0-ft to 16-ft deep (Section 02640)	\$	EA	\$
R-10- 12	PVC Point Repair 12-in Sewer Greater than 16-ft deep (Section 02640)	\$	EA	\$
R-9- 15	PVC Point Repair 15-in Sewer 0-ft to 16-ft deep (Section 02640)	\$	EA	\$
R-10- 15	PVC Point Repair 15-in Sewer Greater than 16-ft deep (Section 02640)	\$	EA	\$
R-9- 18	PVC Point Repair 18-in Sewer 0-ft to 16-ft deep (Section 02640)	\$	EA	\$
R-10- 18	PVC Point Repair 18-in Sewer Greater than 16-ft deep (Section 02640)	\$	EA	\$
R-9- 21	PVC Point Repair 21-in Sewer 0-ft to 16-ft deep (Section 02640)	\$	EA	\$
R-10- 21	PVC Point Repair 21-in Sewer Greater than 16-ft deep (Section 02640)	\$	EA	\$
R-9- 24	PVC Point Repair 24-in Sewer 0-ft to 16-ft deep (Section 02640)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART C - REHABILITATION				
R-10- 24	PVC Point Repair 24-in Sewer Greater than 16-ft deep (Section 02640)	\$	EA	\$
R-9- 27	PVC Point Repair 27-in Sewer 0-ft to 16-ft deep (Section 02640)	\$	EA	\$
R-10- 27	PVC Point Repair 27-in Sewer Greater than 16-ft deep (Section 02640)	\$	EA	\$
R-9- 30	PVC Point Repair 30-in Sewer 0-ft to 16-ft deep (Section 02640)	\$	EA	\$
R-10- 30	PVC Point Repair 30-in Sewer Greater than 16-ft deep (Section 02640)	\$	EA	\$
R-11- 8	PVC Point Repair 8-in Sewer 0-ft to 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-12- 8	PVC Point Repair 8-in Sewer Greater than 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-11- 10	PVC Point Repair 10-in Sewer 0-ft to 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-12- 10	PVC Point Repair 10-in Sewer Greater than 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART C - REHABILITATION				
R-11- 12	PVC Point Repair 12-in Sewer 0-ft to 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-12- 12	PVC Point Repair 12-in Sewer Greater than 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-11- 15	PVC Point Repair 15-in Sewer 0-ft to 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-12- 15	PVC Point Repair 15-in Sewer Greater than 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-11- 18	PVC Point Repair 18-in Sewer 0-ft to 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-12- 18	PVC Point Repair 18-in Sewer Greater than 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-11- 21	PVC Point Repair 21-in Sewer 0-ft to 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-12- 21	PVC Point Repair 21-in Sewer Greater than 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-11- 24	PVC Point Repair 24-in Sewer 0-ft to 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure		
		UNIT PRICES		
		Written Words		
PART C - REHABILITATION				
R-12- 24	PVC Point Repair 24-in Sewer Greater than 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-11- 27	PVC Point Repair 27-in Sewer 0-ft to 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-12- 27	PVC Point Repair 27-in Sewer Greater than 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-11- 30	PVC Point Repair 30-in Sewer 0-ft to 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-12- 30	PVC Point Repair 30-in Sewer Greater than 16-ft deep (Section 02640) (Cross Country)	\$	EA	\$
R-13- 6	CCTV of 6-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-13- 8	CCTV of 8-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-13- 10	CCTV of 10-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-13- 12	CCTV of 12-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART C - REHABILITATION				
R-13- 15	CCTV of 15-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-13- 18	CCTV of 18-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-13- 21	CCTV of 21-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-13- 24	CCTV of 24-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-13- 27	CCTV of 27-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-13- 30	CCTV of 30-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-13- 36	CCTV of 36-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-13- 48	CCTV of 48-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (02764)	\$	LF	\$
R-14- 6	CCTV of 6-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART C - REHABILITATION				
R-14- 8	CCTV of 8-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$
R-14- 10	CCTV of 10-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$
R-14- 12	CCTV of 12-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$
R-14- 15	CCTV of 15-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$
R-14- 18	CCTV of 18-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$
R-14- 21	CCTV of 21-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$
R-14- 24	CCTV of 24-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$
R-14- 27	CCTV of 27-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$
R-14- 30	CCTV of 30-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure		
		UNIT PRICES		
		Written Words		
PART C - REHABILITATION				
R-14- 36	CCTV of 36-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$
R-14- 48	CCTV of 48-in Sewer Mains from Manhole to Manhole prior to Rehabilitation or Repair (Cross Country) (02764)	\$	LF	\$
R- 15	Service Lateral Connection Liner (Top Hat) All Depths (Section 02677)	\$	EA	\$
R- 16	Service Lateral Connection Liner (Top Hat) All Depths (Cross Country) (Section 02677)	\$	EA	\$
R- 17	Sewer Service Lateral Cured-in-Place Liner from 0-ft to 5-ft All Depths (Section 02677)	\$	EA	\$
R- 18	Sewer Service Lateral Cured-in-Place Liner from 0-ft to 5-ft All Depths (Cross Country) (Section 026077)	\$	EA	\$
R- 19	Sewer Service Lateral Cured-in-Place Liner, Additional footage All Depths (Section 02677)	\$	LF	\$
R- 20	Sewer Service Lateral Cured-in-Place Liner, Additional footage All Depths (Cross Country) (Section 02677)	\$	LF	\$
R- 21	Sewer Service Lateral Cleanout installed in Lawn/Unpaved Areas All Sizes, All Depths (Section 02677)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART C - REHABILITATION				
R- 22	Sewer Service Lateral Cleanout installed in Paved Areas All Sizes, All Depths (Section 02677)	\$	EA	\$
R- 23	Remove and Replace Standard Sewer Manhole Frame and Cover for 24-inch Diameter Chimney (Section 02605)	\$	EA	\$
R- 24	Remove and Replace Standard Sewer Manhole Frame and Cover for 24-inch Diameter Chimney (Cross Country) (Section 02605)	\$	EA	\$
R- 25	Remove and Replace Standard Sewer Manhole Frame and Cover for 36-inch Diameter Chimney (Section 02605)	\$	EA	\$
R- 26	Remove and Replace Standard Sewer Manhole Frame and Cover for 36-inch Diameter Chimney (Cross Country) (Section 02605)	\$	EA	\$
R- 27	Remove Existing Frame and Cover and Replace with Standard Watertight Sewer Manhole Frame and Cover (Section 02605)	\$	EA	\$
R- 28	Remove Existing Frame and Cover and Replace with Standard Watertight Sewer Manhole Frame and Cover (Cross Country) (Section 02605)	\$	EA	\$
R- 29	Removal of Existing Manhole Chimney & Replacement with New Manhole Chimney (Section 02767)	\$	IN	\$
R- 30	Removal of Existing Manhole Chimney & Replacement with New Manhole Chimney (Cross Country) (Section 02767)	\$	IN	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART C - REHABILITATION				
R- 31	Remove and Replace Internal Manhole Drop Connections (Section 02622)	\$	EA	\$
R- 32	Remove and Replace Internal Manhole Drop Connections (Cross Country) (Section 02622)	\$	EA	\$
R- 33	Repair or Rebuild Existing Manhole Inverts (Section 02767)	\$	EA	\$
R- 34	Repair or Rebuild Existing Manhole Inverts (Cross Country) (Section 02767)	\$	EA	\$
R- 35	Sewer Manhole Monolithic Cementitious Lining 4-ft Diameter (Section 02768)	\$	VF	\$
R- 36	Sewer Manhole Monolithic Cementitious Lining 4-ft Diameter (Cross Country) (Section 02768)	\$	VF	\$
R- 37	Sewer Manhole Monolithic Cementitious Lining >4-ft to 6-ft Diameter (Section 02768)	\$	VF	\$
R- 38	Sewer Manhole Monolithic Cementitious Lining >4-ft to 6-ft Diameter (Cross Country) (Section 02768)	\$	VF	\$
R- 39	Sewer Manhole Chimney Lining (Section 02769)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure		
		UNIT PRICES		
		Written Words		
PART C - REHABILITATION				
R- 40	Sewer Manhole Chimney Lining (Cross Country) (Section 02769)	\$	EA	\$
PART C - REHABILITATION			\$	
(Items R-1 through R-40):				

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART D - WATER MAIN AND APPURTENANCES				
W-1- 8DI	8-in DI Water Main (Section 02651)	\$	LF	\$
W-1 - 10DI	10-in DI Water Main (Section 02651)	\$	LF	\$
W-1 - 12DI	12-in DI Water Main (Section 02651)	\$	LF	\$
W-1 - 16DI	16-in DI Water Main (Section 02651)	\$	LF	\$
W-1 - 20DI	20-in DI Water Main (Section 02651)	\$	LF	\$
W-1 - 24DI	24-in DI Water Main (Section 02651)	\$	LF	\$
W-1 - 30DI	30-in DI Water Main (Section 02651)	\$	LF	\$
W-1 - 36DI	36-in DI Water Main (Section 02651)	\$	LF	\$
W-1 - 42DI	42-in DI Water Main (Section 02651)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART D - WATER MAIN AND APPURTENANCES				
W-1 - 48DI	48-in DI Water Main (Section 02651)	\$	LF	\$
W-1 - 54DI	54-in DI Water Main (Section 02651)	\$	LF	\$
W-2 - 4	4-in Gate Valve (Section 02642)	\$	EA	\$
W-2 - 6	6-in Gate Valve (Section 02642)	\$	EA	\$
W-2 - 8	8-in Gate Valve (Section 02642)	\$	EA	\$
W-2 - 10	10-in Gate Valve (Section 02642)	\$	EA	\$
W-2 - 12	12-in Gate Valve (Section 02642)	\$	EA	\$
W-3 - 16	16-in Butterfly Valve (Section 02644)	\$	EA	\$
W-3 - 20	20-in Butterfly Valve (Section 02644)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART D - WATER MAIN AND APPURTENANCES				
W-3 - 24	24-in Butterfly Valve (Section 02644)	\$	EA	\$
W-3 - 30	30-in Butterfly Valve (Section 02644)	\$	EA	\$
W-3 - 36	36-in Butterfly Valve (Section 02644)	\$	EA	\$
W-3 - 42	42-in Butterfly Valve (Section 02644)	\$	EA	\$
W-3 - 48	48-in Butterfly Valve (Section 02644)	\$	EA	\$
W-3 - 54	54-in Butterfly Valve (Section 02644)	\$	EA	\$
W-4 - 8x4	8-in x 4-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 8x6	8-in x 6-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 10x4	10-in x 4-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART D - WATER MAIN AND APPURTENANCES				
W-4 - 10x6	10-in x 6-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 10x8	10-in x 8-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 12x4	12-in x 4-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 12x6	12-in x 6-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 12x8	12-in x 8-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 12x10	12-in x 10-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 16x8	16-in x 8-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 16x10	16-in x 10-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 16x12	16-in x 12-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART D - WATER MAIN AND APPURTENANCES				
W-4 - 20x8	20-in x 8-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 20x10	20-in x 10-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 20x12	20-in x 12-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 20x16	20-in x 16-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 24x8	24-in x 8-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 24x10	24-in x 10-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 24x12	24-in x 12-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 24x16	24-in x 16-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 24x20	24-in x 20-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART D - WATER MAIN AND APPURTENANCES				
W-4 - 30x8	30-in x 8-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 30x10	30-in x 10-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 30x12	30-in x 12-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 30x16	30-in x 16-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 30x20	30-in x 20-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 30x24	30-in x 24-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 36x8	36-in x 8-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 36x10	36-in x 10-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 36x12	36-in x 12-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART D - WATER MAIN AND APPURTENANCES				
W-4 - 36x16	36-in x 16-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 36x20	36-in x 20-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 36x24	36-in x 24-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 36x30	36-in x 30-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 42x8	42-in x 8-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 42x10	42-in x 10-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 42x12	42-in x 12-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 42x16	42-in x 16-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 42x20	42-in x 20-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure		
		UNIT PRICES Written Words		
PART D - WATER MAIN AND APPURTENANCES				
W-4 - 42x24	42-in x 24-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 42x30	42-in x 30-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W-4 - 42x36	42-in x 36-in Tapping Sleeve and Gate Valve (Section 02656)	\$	EA	\$
W- 5	Air Valve/Chlorination Inlet/Blow-off (Section 02641)	\$	EA	\$
W-6 -4	4-in Blow-Off Assembly (Section 02669)	\$	EA	\$
W-6 -6	6-in Blow-Off Assembly (Section 02669)	\$	EA	\$
W-6 -8	8-in Blow-Off Assembly (Section 02669)	\$	EA	\$
W-6 -10	10-in Blow-Off Assembly (Section 02669)	\$	EA	\$
W - 7	Fire Hydrant and Assembly (Section 02645)	\$	EA	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART D - WATER MAIN AND APPURTENANCES				
W- 8	Remove Existing Fire Hydrant Assembly (Section 02645)	\$	EA	\$
W- 9	Copper Water or Fire Service All Services Smaller than 4-in (Section 02657)	\$	LF	\$
W- 10	DI Water Service or Fire Service All Services 4-in & Greater (Section 02651)	\$	LF	\$
W- 11	Temporary Water Main System (Section 02659)	\$	LF	\$
W- 12	Abandonment of Existing Water Main without CLSM, All Sizes, All Depths (Section 02054)	\$	Lump Sum	\$
W- 13	Abandonment of Existing Water Main with CLSM, All Sizes, All Depths (Section 02054)	\$	LF	\$
W- 14	Removal of Existing Water Main All Sizes, All Depths (Section 02054)	\$	LF	\$
W- 15	Ductile Iron Pipe Insulation (Section 02651)	\$	LF	\$
W- 16	Polyethylene Encasement Tubing (Section 02651)	\$	LF	\$
PART D - WATER MAIN AND APPURTENANCES SUBTOTAL			\$	
(Items W-1 through W-16):				

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure		
		UNIT PRICES		
		Written Words		
PART E - EXCAVATION AND BACKFILL				
E- 1-E	Test Pits, Excavated (Section 02011)	\$	CY	\$
E- 1-V	Test Pits, Vacuumed (Section 02011)	\$	VF	\$
E- 2-Sh	Excavation Support System Left in Place - Sheet piling (Section 02160)	\$	SF	\$
E- 2-So	Excavation Support System Left in Place - Soldier Piling and Lagging (Section 02160)	\$	SF	\$
E- 3-M	Rock and Boulder Excavation and Disposal (Non Blasting) (Section 02210)	\$	CY	\$
E- 3-B	Rock and Boulder Excavation and Disposal by Blasting (Section 02213)	\$	CY	\$
E- 4	Removal and Disposal of Existing Reinforced Concrete Road Base (Section 02510)	\$	CY	\$
E- 5C	Removal and Disposal of Contaminated Soil (Section 02260)	\$	Tons	\$
E- 5P	Removal and Disposal of Polluted Soil (Section 02260)	\$	Tons	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART E - EXCAVATION AND BACKFILL				
E- 6	Processed Stone Base (Section 02202)	\$	CY	\$
E- 7	Controlled Low Strength Material (CLSM) (Section 02202)	\$	CY	\$
E- 8	Miscellaneous Concrete (Section 03302)	\$	CY	\$
E- 9	Trench Dam (Section 02202)	\$	EA	\$
<u>PART E - EXCAVATION AND BACKFILL SUBTOTAL</u>			\$	
(Items E-1 through E-9):				

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART F - MAINTENANCE AND PROTECTION OF TRAFFIC				
T- 1	Maintenance and Protection of Traffic (Section 01570)	\$	Lump Sum	\$
T- 2	Construction Signs - Encapsulated Lens Type III Reflective Sheeting (Section 01570)	\$	SF	\$
T- 3	Changeable Message Signs (Section 01570)	\$	Days	\$
T- 4	42-Inch Traffic Cones (Section 01570)	\$	EA	\$
T- 5	Traffic Drums (Section 01570)	\$	EA	\$
T- 6	Type III Construction Barricades (Section 01570)	\$	EA	\$
T- 7	Barricade Warning Lights (Type B) (Section 01570)	\$	Days	\$
T- 8	Traffic Cone Bars (Section 01570)	\$	EA	\$
T- 9	Temporary Hot Applied Painted Pavement Markings, 4-Inch White Line (Section 01570)	\$	LF	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure		
		UNIT PRICES		
		Written Words		
PART F - MAINTENANCE AND PROTECTION OF TRAFFIC				
T- 10	Temporary Hot Applied Painted Pavement Markings, 4-Inch Yellow Line (Section 01570)	\$	LF	\$
T- 11	Temporary Hot Applied Painted Pavement Markings, 12-Inch White Line (Section 01570)	\$	LF	\$
T- 12	Temporary Hot Applied Painted Pavement Markings, Symbols and Legends (Section 01570)	\$	SF	\$
T- 13	Permanent Epoxy Resin Pavement Markings, 4-Inch White Line (Section 01570)	\$	LF	\$
T- 14	Permanent Epoxy Resin Pavement Markings, 4-Inch Yellow Line (Section 01570)	\$	LF	\$
T- 15	Permanent Epoxy Resin Pavement Markings, 12-Inch White Line (Section 01570)	\$	LF	\$
T- 16	Permanent Epoxy Resin Pavement Markings, Symbols and Legends (Section 01570)	\$	SF	\$
T- 17	Loop Vehicle Detector (Section 01570)	\$	EA	\$
T- 18	Uniformed Police (Section 01576)	FDE to fill in allowance	Allowance	FDE to fill in allowance
		FDE to fill in allowance		

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART F - MAINTENANCE AND PROTECTION OF TRAFFIC				
T- 19	Certified Flaggers (Section 01576)	<i>FDE to fill in allowance</i>	Allowance	<i>FDE to fill in allowance</i>
		<i>FDE to fill in allowance</i>		
<u>PART F - MAINTENANCE AND PROTECTION OF TRAFFIC SUBTOTAL</u>			\$	
(Items T-1 through T-19):				

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART G - PAVED SURFACE RESTORATION				
P1- 2	Temporary Pavement (Class 1, 2-in thick) (Section 02510)	\$	SY	\$
P1- 3	Temporary Pavement (Class 1, 3-in thick) (Section 02510)	\$	SY	\$
P1- 4	Temporary Pavement (Class 1, 4-in thick) (Section 02510)	\$	SY	\$
P2- 1-1	Permanent Paved Trench Surface Restoration (Class 1, 2-in Binder, Class 1, 2-in Top) (Section 02510)	\$	SY	\$
P2- 1-4	Permanent Paved Trench Surface Restoration (Class 4, 3.5-in Binder, Class 1, 1.5-in Top) (Section 02510)	\$	SY	\$
P2- 1-2	Permanent Paved Trench Surface Restoration (Class 1, 2-in Binder, Class 2, 2-in Top) (Section 02510)	\$	SY	\$
P2- 2-2	Permanent Paved Trench Surface Restoration (Class 2, 1.5-in Binder, Class 2, 1.5-in Top) (Section 02510)	\$	SY	\$
P2- 4-1	Permanent Paved Trench Surface Restoration (Class 4, 6-in Binder, Class 1, 3-in Top) (Section 02510)	\$	SY	\$
P2- 4	Permanent Paved Trench Surface Restoration Prior to Milling (Class 4, 4-in Binder) (Section 02510)	\$	SY	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES Dollars Figure	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		UNIT PRICES Written Words		
PART G - PAVED SURFACE RESTORATION				
P2- 5	Permanent Paved Trench Surface Restoration Prior to Milling (Class 4, 5-in Binder)	\$	SY	\$
P3- 1-1.5	Final Mill and Overlay Pavement (Class 1, 1.5-in Top) (Section 02510)	\$	SY	\$
P3- 1-2	Final Mill and Overlay Pavement (Class 1, 2-in Top) (Section 02510)	\$	SY	\$
P3- 2-1.5	Final Mill and Overlay Pavement (Class 2, 1.5-in Top) (Section 02510)	\$	SY	\$
P3- 2-2	Final Mill and Overlay Pavement (Class 2, 2-in Top) (Section 02510)	\$	SY	\$
P3- SP-2	Final Mill and Overlay Pavement (Hot mix asphalt superpave 0.50 design level 2, 2-in Top) (Section 02510)	\$	SY	\$
P- 4	Reinforced Concrete Road Base Installation (Section 02517)	\$	CY	\$
P- 5	Five (5) Inch Concrete Sidewalk (Section 02515)	\$	SY	\$
P- 6	Eight (8) Inch Concrete Sidewalk and Driveway Apron (Section 02515/02516)	\$	SY	\$

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words		
PART G - PAVED SURFACE RESTORATION				
P- 7	Sidewalk Ramps (Section 02515)	\$	SY	\$
P- 8	Bituminous Concrete Driveways/Aprons (02510)	\$	SY	\$
P- 9	Remove and Reset Granite Curbing (Section 02771)	\$	LF	\$
P- 10	Remove and Provide New Granite Curbing (Section 02771)	\$	LF	\$
P- 11	Remove and Provide New Bituminous Concrete Curbing (Section 02510)	\$	LF	\$
P- 12	Remove and Provide New Precast Concrete Curbing (Section 02510)	\$	LF	\$
P- 13	Remove and Provide New Concrete Curbing (Section 02510)	\$	LF	\$
P- 14	Pavement Skimcoat / Leveling (Section 02510)	\$	Tons	\$
P- 15	Asphalt Price Adjustment (Section 02510)	<i>FDE to fill in allowance</i>	Allowance	<i>FDE to fill in allowance</i>
		<i>FDE to fill in allowance</i>		
PART G - PAVED SURFACE RESTORATION SUBTOTAL			\$	
(Items P-1 through P-15);				

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS				
(In case of error or discrepancies "UNIT PRICES Written Words" govern)				
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE	TOTAL PRICE Dollar Figure
		Dollars Figure		
		UNIT PRICES		
		Written Words		
PART H - UNPAVED SURFACE RESTORATION				
L- 1	Loaming and Seeding (Section 02930)	\$	SY	\$
L- 2	Loaming and Sodding (Section 02930)	\$	SY	\$
L- 3	Landscaping (Section 02900)	<i>FDE to fill in allowance</i>	Allowance	<i>FDE to fill in allowance</i>
		<i>FDE to fill in allowance</i>		
L- 4	Remove and Reset Fencing (Section 02905)	\$	LF	\$
<u>PART H - UNPAVED SURFACE RESTORATION SUBTOTAL</u>			\$	
(Items L-1 through L-4):				

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

BIDDER MUST FILL IN THE UNIT PRICES AND COMPUTE THE TOTALS					
(In case of error or discrepancies "UNIT PRICES Written Words" govern)					
ITEM NO	DESCRIPTION OF SCHEDULED ITEM	UNIT PRICES	ESTIMATED QTY/ UNIT OF MEASURE		TOTAL PRICE Dollar Figure
		Dollars Figure UNIT PRICES Written Words			
PART I - PROJECT SPECIFIC ITEMS					
X- 1	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 2	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 3	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 4	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 5	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 6	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 7	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 8	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 9	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 10	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 11	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 12	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 13	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 14	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 15	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 16	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 17	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 18	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 19	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$
X- 20	FDE to fill in	\$	FDE to fill in	FDE to fill in	\$

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

Fixed Prices - Part I

In addition to the foregoing competitively bid items, it is agreed the following FIXED PRICES will be paid if and where the following are ordered by the Engineer and furnished or performed by the Contractor just as if they were unit prices bid. Fixed prices shall have no upper limit on quantity or value when ordered.

Where a unit price item bid duplicates a Fixed Price item, the unit prices bid shall govern and the duplicate Fixed Price item shall be ignored. The duplicate Fixed Price item shall not be used when the unit price item quantity has exceeded the contract amount or when there is a changed condition associated with the bid unit price item.

Measurement and payment terms for the following FIXED PRICES are included in Section 01025, Paragraph 2.09. These specifications will only be used for the Fixed Price items as ordered by the Engineer and when not included in the competitively bid items. Measurement and payment terms for the bid unit price items will govern over the Fixed Price items as described in the previous paragraph.

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

ITEM NO.	DESCRIPTION OF FIXED PRICE ITEM	UNIT PRICES Dollars Figure	UNIT OF MEASURE
		UNIT PRICES Written Words	
PART J - FIXED PRICES			
F- 1-E	Test Pits, Excavated (Section 02011)	\$132.00	CY
		One Hundred Thirty Two Dollars	
F- 1-V	Test Pits, Vacuumed (Section 02011)	\$2,000.00	Day
		Two Thousand Dollars	
F- 2-Sh	Excavation Support System Left in Place - Sheeting (Section 02160)	\$40.00	SF
		Forty Dollars	
F- 2-So	Excavation Support System Left in Place - Soldier Piling and Lagging (Section 02160)	\$56.00	SF
		Fifty Six Dollars	
F- 3-M	Rock and Boulder Excavation and Disposal (Non Blasting) (Section 02210)	\$150.00	CY
		One Hundred Fifty Dollars	
F- 3-B	Rock and Boulder Excavation and Disposal by Blasting (Section 02213)	\$125.00	CY
		One Hundred Twenty Five Dollars	
F- 4	Earth Excavation (Section 02201)	\$37.00	CY
		Thirty Seven Dollars	
F- 5	Bank Run Gravel (Section 02202)	\$31.00	CY
		Thirty One Dollars	
F- 6	Sand (Section 02202)	\$32.00	CY
		Thirty Two Dollars	
F- 7	Crushed Stone (Section 02202)	\$46.00	CY
		Forty Six Dollars	
F- 8	Common Fill (Section 02202)	\$20.00	CY
		Twenty Dollars	
F- 9	Controlled Low Strength Material (CLSM) (Section 02202)	\$160.00	CY
		One Hundred Sixty Dollars	
F- 10	Removal and Disposal of Existing Reinforced Concrete Road Base (Section 02510)	\$54.00	CY
		Fifty Four Dollars	
F- 11	Reinforced Concrete Road Base Installation, 8-in thickness (Section 02517)	\$71.00	SY
		Seventy One Dollars	
F- 12	Under-drain Pipe (Section 02622)	\$43.00	LF
		Forty Three Dollars	

The Metropolitan District

(Project Name)
Contract Number: XXXX-XX

Schedule of Prices

ITEM NO.	DESCRIPTION OF FIXED PRICE ITEM	UNIT PRICES Dollars Figure	UNIT OF MEASURE
		UNIT PRICES Written Words	
PART J - FIXED PRICES			
F- 13	Standard Riprap (Section 02202)	\$91.00	CY
		Ninety One Dollars	
F- 14	Miscellaneous Concrete (Section 03302)	\$228.00	CY
		Two Hundred Twenty Eight Dollars	
F- 15	Pavement Skimcoat (Section 02510)	\$185.00	Tons
		One Hundred Eighty Five Dollars	
F- 16	DI Water Fittings All Sizes (Section 02651)	\$7.00	LB
		Seven Dollars	
F- 17-A	PVC Sewer Wye/Tee 8" x 6" (Section 02622)	\$250.00	EA
		Two Hundred Fifty Dollars	
F- 17-B	PVC Sewer Wye/Tee 10" x 6" or 10" x 8" (Section 02622)	\$300.00	EA
		Three Hundred Dollars	
F- 17-C	PVC Sewer Wye/Tee 12" x 6" or 12" x 8" (Section 02622)	\$350.00	EA
		Three Hundred Fifty Dollars	
F- 17-D	PVC Sewer Wye/Tee 15" x 6" or 15" x 8" (Section 02622)	\$400.00	EA
		Four Hundred Dollars	
F- 18	Precast Sanitary Sewer Chimney (Section 02622)	\$325.00	VF
		Three Hundred Twenty Five Dollars	
F- 19	Drop Pipe Installed in Manholes (Section 02605)	\$75.00	VF
		Seventy Five Dollars	
F- 20	Bulkhead - all sizes (per inch of diameter) (Section 02053)	\$11.00	IN
		Eleven Dollars	
F- 21	Restraint Joints on Pipes 12-inch Diameter or Less (Section 02651)	\$948.00	EA
		Nine Hundred Forty Eight Dollars	
F- 22	Inserta Tees on Pipes 12-Inch Diameter or Less (Section 02622)	\$316.00	EA
		Three Hundred Sixteen Dollars	
F- 23	Trench Dam on Pipes 24-Inch Diameter or Less (Section 02202)	\$400.00	EA
		Four Hundred Dollars	

The Metropolitan District

(Project Name)

Contract Number: XXXX-XX

Schedule of Prices

(In case of error or discrepancies "TOTAL PRICE Written Words" govern)	
SUMMARY	
<u>PART A - MISCELLANEOUS WORK</u> (Items G-1 through G-6):	\$
<u>PART B - SEWERS AND APPURTENANCES</u> (Items S-1 through S-32):	\$
<u>PART C - SEWER REHABILITATION</u> (Items R-1 through R-40):	\$
<u>PART D - WATER MAIN AND APPURTENANCES</u> (Items W-1 through W-16):	\$
<u>PART E - EXCAVATION AND BACKFILL</u> (Items E-1 through E-9):	\$
<u>PART F - TRAFFIC</u> (Items T-1 through T-19):	\$
<u>PART G - PAVED SURFACE RESTORATION</u> (Items P-1 through P-15):	\$
<u>PART H - UNPAVED SURFACE RESTORATION</u> (Items L-1 through L-4):	\$
<u>PART I - PROJECT SPECIFIC ITEMS</u> (Items X-1 through X-XX):	\$
<u>TOTAL BASE BID:</u> Part A + Part B + Part C + Part D + Part E + Part F + Part G + Part H + Part I	\$

As a condition of the Contract award, the successful Bidder shall provide proof, from the Connecticut Secretary of State's office, of its current authorization to do business in Connecticut. All Connecticut corporations must provide a Certificate of Legal Existence from the Secretary of State's Office. All foreign (out of State) corporations shall provide a current Certificate of Authority from the Secretary of State's office and evidence of compliance with the bond requirements of the Connecticut Department of Revenue Services. These documents must be presented within thirty (30) days from the date of the Bid opening.

The undersigned agrees that extra work, if any, will be performed in accordance with Article 10 of the Conditions of the Contract and will be paid for in accordance with Article 11 of the Conditions of the Contract.

The undersigned has previously performed work subject to the President's Executive Order No. 11246, which relates to nondiscrimination.

Amounts shall be shown in both words and figures, where indicated. In case of discrepancy, the amount shown in words will govern.

The above prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance and incidentals required to complete the Work.

Basis of award shall be based on the lowest responsive and eligible Bidder whose Base Bid Plus Accepted Alternates is the lowest of those Bidders possessing the skill, ability and integrity necessary to the faithful performance of the work.

The names and residences of all persons and parties interested in the foregoing Bid as principals are as follows:

(Give first and last names in full. In the case of a corporation, see Article 8.3 of the Instructions to Bidders, in the case of a limited liability company, see Article 8.4 of the Instructions to Bidders, in the case of a partnership, see Article 8.5 of the Instructions to Bidders and in the case of a joint venture, see Article 8.6 of the Instructions to Bidders.)

The undersigned hereby certifies that he is prepared to self-perform a minimum of 25% of the value of the Work as outlined in Section 00425.

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.

The undersigned hereby certifies under the penalties of perjury that this Bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this section, the word "person" shall mean any natural person, joint venture, partnership, corporation, or other business or legal entity.

Social Security Number
or Federal Identification
Number

Signature of Individual or
Corporate Name

By: _____
Corporate Officer
(if applicable)

Notice of acceptance should be mailed, faxed, or delivered to the following:

(Name)

By: _____
(Title)

(Business Address)

(City and State)

Date _____

Note: If the Bidder is a corporation, indicate State of incorporation under signature, complete the certification below and affix corporate seal; if a partnership, give full names and residential addresses, if different from business address.

CERTIFICATE OF CORPORATE CONTRACTOR

I, _____, certify that I am

_____ of the Corporation which executed the above
(Title)

Contract; that _____ who signed this
(Name)

Contract in behalf of said Corporation was then _____
(Title)

of the Corporation signing for and on behalf of said Corporation by authority of its governing body; and was acting within the scope of its corporate powers.

By: _____

(Corporate Seal)

(Title)

DOCUMENT 00400

SUPPLEMENTS TO BID FORMS

TABLE OF CONTENTS

00410	BID BOND
00420	BIDDER'S QUALIFICATION FORM
00425	REPRESENTATION REGARDING SELF-PERFORMED WORK
00430	AFFIDAVIT OF NON-COLLUSION AND INDEPENDENT PRICE DETERMINATION
00440	CERTIFICATE AS TO CORPORATE BIDDER
00445	OSHA COMPLIANCE HISTORY CERTIFICATION
00450	THE METROPOLITAN DISTRICT FAIR EMPLOYMENT EQUAL OPPORTUNITY, NON-DISCRIMINATION
00460	LETTER RE: PERFORMANCE AND PAYMENT BONDS
00470	MDC CONTRACTOR SAFETY PROGRAM
00485-A	LIST OF SUBCONTRACTORS
00485-B	NAMED SUBCONTRACTOR BIDDER'S QUALIFICATION STATEMENT
00485-C	CONTRACTOR'S LICENSING
00490	STATE OF CONNECTICUT DEPARTMENT OF ADMINISTRATIVE SERVICES UPDATE (BID) STATEMENT

DOCUMENT 00410 BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, _____ as PRINCIPAL, and _____, as SURETY are held and firmly bound unto The Metropolitan District hereinafter called the "District," in the penal sum of _____ Dollars (\$_____), lawful money of the United States of America, to be paid to the said District, the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the accompanying bid, dated _____, 20____, in connection and conformance with the District Project Manual, Contract Number <<insert contract number>> and all work associated therewith as set forth in certain Contract Drawings and Specifications filed at the office of the District.

NOW, THEREFORE, if the Principal shall not withdraw said bid within the period specified therein before the opening of the same, and, if no other period be specified, said bid shall remain in effect for **NINETY (90) business days**, after the said opening and, if the bid is awarded to the Principal, the Principal if no other period be specified, within **ten (10) days** after the fully executed Contract is presented to him or her give both bond with good and sufficient surety or sureties, as may be required, for the faithful performance, payment and proper fulfillment of such Contract and insurance certificates as may be required by such Contract; or in the event of the withdrawal of said bid within the period specified, or the failure to enter into such Contract and give such bond within the time specified, the Principal shall pay the District the difference between the amount specified in said bid and the amount for which the District may procure the required work or supplies or both, if the latter amount be in excess of the former; or if said bid shall be rejected by the District, then the above obligation shall be void and of no effect, otherwise to remain in full force and effect.

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

In presence of:

_____ L.S.

_____ L.S.
(Business Address)

_____ L.S.
(Individual Principal)

_____ L.S.
(Address)

_____ (SEAL)
(Corporate Principal)

By: _____

(Business Address)

Attest:

(Corporate Surety)

Affix
Corporate
Seal

By _____
(Title)

DOCUMENT 00420

BIDDER'S QUALIFICATION FORM

The bidder is required to provide the following information to enable the District to evaluate the bidder's ability to perform the Work.

- A. Form of bidder (corporation, limited partnership, partnership, individual):_____
- B. Date of organization/commencement:_____
- C. State in which organized:_____
- D. If a corporation:
1. The corporation is qualified to do business and is in good standing in the State of Connecticut
___yes ___no
 2. The corporation's agent for service of process is:

Name: _____
Address: _____

 3. The corporation is in good standing with the:
U.S. Internal Revenue Service ___yes ___no;
Connecticut Department of Labor ___yes ___no;
U.S. Labor Department ___ yes ___no.
- E. Please describe other work that you have performed which is similar to the work, stating the dates performed, the entity for whom the work was performed and whether the work was performed in accord with the terms of the agreement:
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

- F. Please list at least two (2) references the District may contact to evaluate the bidder's experience, skill, available financial resources, credit and business standing:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

DOCUMENT 00425

REPRESENTATION REGARDING SELF-PERFORMED WORK

Bidder is aware of the requirement that the Contractor must perform a minimum of 25% of the Contract work for this project. Contractor intends to meet this goal in the manner described below. [Please, in narrative form, describe the nature of the work and approximate value or percentage of the work. Self-performed means using Contractor employed labor.]

Signed by _____ as part of the Bid for Contract _____

**AFFIDAVIT OF NON-COLLUSION AND
INDEPENDENT PRICE DETERMINATION**

STATE OF _____

ss. at _____

COUNTY OF _____

This Affidavit is made to the Metropolitan District Commission ("MDC") by the undersigned ("Bidder") in connection with The Bid ("Bid") submitted by Bidder in response to MDC's competitive bid solicitation process.

_____ hereby deposes and
says:

1. THAT all representations made by Bidder and contained in the Bid are true, accurate and complete;

2. THAT neither Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest has (i) in any way colluded , conspired, connived, or agreed, directly or indirectly, with any other bidder, firm or person to submit, or to refrain from submitting, a competing bid in connection with this bid submission, or (ii) in any manner, directly or indirectly, sought by agreement or collusion of communication or conference with any other bidder, firm or person to fix the price or prices in the Bid or any bid of any other bidder or to fix any overhead, profit or cost element of said Bid or an other bid or bidder, or (iii) sought in any way to secure through collusion, conspiracy, connivance, or agreement any advantage against MDC or any person interested in the proposed Contract;

3. THAT the Bid has been determined independently by Bidder, its team members or representatives, without consultation, communication or agreement for the purpose of restricting competition, and is not tainted by any collusion or conspiracy by any parties in interest, including Bidder;

4. THAT the Bid has not been disclosed by Bidder to any other bidder, potential bidder and will not be disclosed by Bidder, prior to bid opening , directly or indirectly to any other Bidder or potential bidder;

5. THAT no person acting for or employed by the MDC is now or will hereafter be directly or indirectly interested therein or in any portion of the profits thereof in any manner which is contrary to law or is unethical. And that no person acting for or employed by the MDC is now or will hereafter benefit financially directly or indirectly from bidder's award of the proposed Contract or participation in the bidding process;

6. THAT bidder has submitted only the Bid and has not directly or indirectly used a related company, agent, employee, officer, partner, representative or nominee to submit any other bid;

The undersigned, who is responsible for determining the prices being offered in the Bid, has read the foregoing and the same is true and correct to the best of his or her knowledge, information and belief;

IN WITNESS WHEREOF, the undersigned has executed this Affidavit as of this

_____ day of _____, 20____.

BIDDER:

Printed Name of Bidder

By:_____
Signature of Bidder

Print Name and Title of Authorized Signatory

Subscribed and sworn to before me,
The undersigned, this _____ day of
_____, 20_____.

Commissioner of the Superior Court
Notary Public
My Commission Expires:_____

Notice Concerning Legal Action

Any person who knowingly makes a false statement of otherwise executes a document he/she knows to be false, with the intent to mislead a municipality is in violation of Connecticut General Statute 53a-157b, Making a False Statement, and shall be subject to penalty.

DOCUMENT 00440

CERTIFICATE AS TO CORPORATE BIDDER

I, _____, certify that I am
(Name)

The _____ of the
(Title)

Corporation/Partnership/Limited Liability Company which executed the above Bid;

that _____ who
(Name)

signed said Bid Form on behalf of said Corporation/Partnership/Limited Liability
Company was then _____
(Title)

of the Corporation/Partnership/Limited Liability Company signing for and on behalf of
said Corporation/Partnership/Limited Liability Company by authority of its governing
body; and was acting within the scope of its corporate powers.

By: _____

(Corporate Seal)

Secretary

DOCUMENT 00445

OSHA COMPLIANCE HISTORY CERTIFICATION

The undersigned Bidder hereby certifies as follows:

1. It has not, in the past three years, received any citations from the United States Department of Labor, Occupational Safety and Health Administration for willful or serious violations of the Occupational Safety and Health Act ("OSHA"); or

2. It has been cited for willful or serious violations of the OSHA in the past three years and the circumstances and resolutions of such violations are as follows:

3. The following is a list of all OSHA violations (open or closed) issued against the Bidder in the past three years:

Name of bidder if the bidder is an Individual

Name of partner if the bidder is a partnership

Name of officer if the bidder is a corporation

Subscribed and sworn to before me, the undersigned, this ____ day of ____, 20____.

Commissioner of the Superior Court
Notary Public/My Commission Expires

DOCUMENT 00450

THE METROPOLITAN DISTRICT FAIR EMPLOYMENT EQUAL OPPORTUNITY,
NON-DISCRIMINATION

The Fair Employment Practices Qualification Form inserted into this Project Manual is deemed to be a part hereof. Both pages are to be completely filled in. Failure to submit the completed form may cause your bid to be considered non-responsive and thereby rejected.

Equal opportunity requirements in the Instruction to Bidders or elsewhere in this Project Manual are deemed to be part of the Contract Agreement.

Non-Discrimination requirements in the Instruction to Bidders or elsewhere in this Project Manual are deemed to be part of the Contract Agreement.

**FAIR EMPLOYMENT PRACTICES QUALIFICATION FORM
FOR VENDORS AND BIDDERS
THE METROPOLITAN DISTRICT**

Every employer having 10 or more employees must fill out this complete Questionnaire. Firms having fewer than 10 employees are required to fill out Sections A and C only. **FAILURE TO COMPLETE AND RETURN THIS FORM MAY BE SUFFICIENT CAUSE FOR REJECTION OF YOUR BIDS OR CANCELLATION OF PURCHASES.**

This questionnaire will be evaluated by The Metropolitan District to determine whether or not your firm is to be retained on the District's Bidding and Vendor List.

SECTION A: All vendors must fill out this section and sign on page 2.

Name of Firm: _____ Number of Employees: _____

Address: _____ Telephone Number: _____

Spokesperson for Firm: _____ Title: _____

Nature of Business: _____

SECTION B: This section must be filled out by all employers having 10 or more employees.

The employer will indicate its willingness or unwillingness to participate in the following affirmative action employment practices by circling one of the key letters. The key letters are:

- A This is now the practice of the Company.
 - B The Company will adopt this affirmative action.
 - C The Company cannot or will not adopt this affirmative action.
- (If 'C' is circled, reason must be stated.)

It is understood that the Company's willingness to participate in affirmative action employment practices will be evaluated by The Metropolitan District and this evaluation may directly influence vendor qualification.

-
1. The Company will adopt a policy of non-discrimination on the basis of race, color, creed, mental or physical disability, age, sex, national origin or ancestry.

A B C Reason:

-
2. The Company's non-discriminatory policies are in writing and will be communicated to the following:

All employees: _____ A B C Reason

All recruitment sources: _____ A B C Reason:

All relevant labor unions: _____ A B C Reason:

SECTION B: (Continued)

3. If the Company conducts any formal or informal training programs, the recruitment for these programs will be conducted so as not to discriminate against minority group persons.

A B C Reason:

4. The Company will take steps to integrate all positions, departments and plant locations.

A B C Reason:

5. The Company will review its qualifications for each job to determine whether such standards eliminate those unemployed persons who could, if hired, perform the duties of the job adequately. The following qualifications will be reviewed:

Education

A B C

Reason:

Experience

A B C

Reason:

Tests

A B C

Reason:

Arrest Record

A B C

Reason:

6. The Company will advise the Connecticut Commission on Human Rights and Opportunities as to employment opportunities as they become available.

A B C Reason:

SECTION C:

Firm, Name and Signature. This section must be filled out by all Vendors and Bidders.

Name of Firm: _____

Address: _____ Telephone Number: _____

Signature of Officer: _____

Title: _____ Date: _____

**PLEASE RETURN FORM TO: THE METROPOLITAN DISTRICT
PURCHASING AGENT
P. O. BOX 800
HARTFORD, CT 06142-0800**

DOCUMENT 00460

LETTER RE: PERFORMANCE AND PAYMENT BONDS

The Metropolitan District
555 Main Street
PO Box 800
Hartford, CT 06142-0800

Re: Performance and Payment Bonds

Gentlemen:

This is to assure The Metropolitan District that, in the event Contract
Number Insert Number is awarded to _____,
the undersigned agrees that it will provide to The Metropolitan District, on behalf
of _____ the Performance and Payment
Bonds required pursuant to the General Conditions and Supplemental Conditions
of the Contract, in the full amount of the Contract.

Sincerely,

SURETY:

BY: _____



The Metropolitan District Contractor Safety Program

Purpose:

To provide MDC personnel and contractors with a clear and concise understanding of the safety requirements and responsibilities needed while working on MDC property and/or MDC projects.

Policy:

All firms contracted by MDC are required by the Occupational Safety and Health Act of 1970 and updates to provide safe and healthy employment to their employees.

MDC, as an employer, is also responsible for providing a safe and healthful work environment for its employees. Contract work may present situations or conditions that potentially could adversely impact the safety and health of MDC employees. This program is intended to ensure that both the MDC and the contractor provide a safe and healthy workplace at all times.

Contractors are required to provide safe workplaces and implement their own safety programs. This Contractor Safety Program is intended to assist in coordinating MDC and contractor operations during construction and renovation projects or providing services to MDC. By becoming familiar with the policies and procedures in the program, the safety-minded contractor will get the job done safely and minimize or eliminate workplace hazards.

Contractors are required to comply with all applicable Federal, State, and Local laws and also follow safe work practices for construction trades. Some of these regulations and safe work practices are outlined in this program.

Contractor management and supervisors must thoroughly review their own work practices and workplace hazards and provide their employees all the necessary training, certifications, and equipment for their safety.

This program applies to all contractors and their subcontractors under contract by the MDC. (All contractors, whether under contract or working under a purchase order agreement, are considered under contract and are covered by this entire program.) The following guidelines and provisions do not impose a duty on the MDC to initiate, maintain, oversee, inspect, supervise or control MDC contracted contractors' or subcontractors' compliance with applicable Federal, State and Local laws or otherwise ensure worksite safety for non-MDC employees. The following guidelines and provisions outline the MDC's role regarding contract administration.

Definitions:**MDC Construction Engineer**

An MDC employee assigned to observe the progress of the contract and act as the primary MDC contact with the contractor.

MDC Liaison:

An MDC employee assigned to on-site observation and evaluation of the contractor's compliance with the contract or purchase order agreement.

Contractor:

A firm or individual who has contracted to the MDC to provide services.

Near miss:

A near miss is an incident that occurs that had the potential of causing a personal injury, damage to property or a release to the environment had it not been discovered and avoided in time or did not cause damages due to fortuitous circumstances.

Procedures:

1. The Metropolitan District shall include the Contractor Safety Program in all applicable contracts. The contractor shall complete the Contractor Safety Questionnaire (see Attachment A) and submit it with the bid. The contractor is required to sign the last page of the Questionnaire.
2. The safety record of a prospective contractor shall be one of the factors considered in the awarding of a contract for construction or related work. Factors to be considered are:
 - a) Worker's compensation rating (Experience Modification Rating (EMR));
 - b) Number of OSHA violations in the past three years;
 - c) The type of violations. (e.g. serious or willful, as defined by OSHA); and
 - d) The abatement of the violations.
3. EH&S will review the information prospective contractors provide in the Contractors Safety Questionnaire, including but not limited to, factors mentioned in Procedure No. 2.
4. If the information submitted in the Contractor Safety Questionnaire reveals higher rates of unsafe incidents than the acceptable incident rates published for the NAICS code, MDC reserves the right to reject the bid, or may refuse to hire the contractor under a purchase order agreement.
5. Failure to fully complete the Contractor Safety Questionnaire and submit with the bid will result in rejection of the bid for non-compliance, or refusal to hire under a purchase order agreement.

Responsibilities:**All MDC personnel responsible for managing contracts will:**

1. Provide contractor with warnings of known hazards that may be encountered in the project;
2. Observe whether work performed by contractor is in compliance with the contract.

The MDC Construction Engineer will review the contract language with EH&S for provisions regarding contractor's duty to:

1. Meet and comply with applicable federal, state, and local environmental, health, and safety regulations and MDC requirements; and
2. Provide its employees with the necessary training, medical exams, and safety equipment.

The MDC Construction Engineer will also:

1. Review the contractual, statutory, and other environmental, health, and safety requirements with the contractor prior to the start of the contract;
2. Instruct the contractor to submit a safety and health plan with the bid package, if applicable*, and provide a copy to the MDC Environment, Health & Safety Department ("EH&S") for review and incorporate the submitted health and safety plan into the contract;
3. Upon receipt of a report of noncompliance or any condition, which poses a serious or imminent danger to human health or safety, or a serious hazard to the environment, issue a request for corrective action to the contractor. Any such request by MDC Construction Engineer or any other authorized MDC personnel for corrective action from the contractor is not to be construed as undertaking a duty for initiating, maintaining, supervising or otherwise ensuring safety at the worksite of non-MDC employees.

The MDC Construction Engineer, and/or the MDC Liaison will:

1. Determine if EH&S has reviewed the contractor's written health and safety plan prior to the pre-construction meeting with the contractor;
2. Provide advanced notification to EH&S of all pre-construction meetings with the contractors so that they may have a representative present;
3. Observe whether contractor is complying with the contract health and safety plan and pertinent environmental, health, and safety regulations and refer any questions regarding compliance with specific regulations to EH&S;
4. Observe whether contractor has complied with its contractual duty to complete safety or environmental permits and make such permits available for review by an authorized person and/or appropriate EH&S personnel;
5. Notify EH&S of accidents and provide EH&S with a copy of the contractor's accident reports; and
6. Notify EH&S of an OSHA complaint and/or inspection of contractor's jobsite.

* EH&S will determine if a Health and Safety Plan or Program is necessary, depending on the nature of the contract or services being provided.

Pre-construction Meeting

Representatives of the contractor shall meet with the MDC Construction Engineer and a EH&S representative prior to the start of construction for the purpose of reviewing safety requirements and pertinent material safety data sheets (MSDS) for the work pertinent to the contract.

MDC is required by OSHA standards, most notably 29 CFR 1910.1200, Hazard Communication Standard, to provide information to contractors of any known hazards present at the work site. This information will be made available to the contractor in the project specifications (pre-bid) and at the pre-construction meeting.

Environment, Health and Safety Department

EH&S will review all contracts at least one week prior to advertising, to determine whether appropriate environmental, health and safety regulations pertinent to the work site have been incorporated into the contract.

EH&S may make periodic on-site visits to review the contractor's compliance with the contracted health and safety plan and applicable environmental, health, and safety requirements. EH&S will distribute reports of the on-site visits to the contractor and Construction Engineer. **Any such on-site visit by EH&S or by MDC Construction Engineer or any other MDC personnel for review of contractor's compliance with its contracted health and safety plan and/or environmental, health or safety requirements shall not be construed as MDC undertaking a duty for initiating, maintaining, supervising or otherwise ensuring safety at the worksite of non-MDC employees.**

Contractor

The contractor's duties shall include but are not limited to:

1. Providing frequent and regular safety inspections of the worksites, materials, and equipment by designated employees of contractor to ensure appropriate safety conditions are in place at all times on the project;
2. Notifying the MDC Construction Engineer of construction accidents immediately upon knowledge of the accident but in no instance shall notification be made more than twenty-four (24) hours after an accident;
3. Providing a detailed Accident/Incident Report of construction accidents, including corrective measures to avoid reoccurrences, within 48 hours.
4. Notifying the Construction Engineer of non-formal and/or formal OSHA complaint notifications and/or OSHA inspections of the jobsite; and
5. Provide training records of OSHA programs related to the project.

Health and Safety Plan

It is the duty of the contractor and any subcontractors to develop and implement a comprehensive health and safety plan for their respective employees and agents, which covers all aspects of onsite construction and activities associated with the contract. The contractor shall provide the MDC Construction Engineer with a copy of this plan with its bid package.

The contractor shall address within its contract the following information pertaining to OSHA regulations. The following OSHA regulations are not an exhaustive list of said regulations nor are the subparts a comprehensive list of the information the contractor should address in its Health and Safety Plan.

Hazard Communication (OSHA 29 CFR 1910.1200)

1. Procedures for labeling and storing all chemical containers brought on MDC property or MDC jobs.
2. Procedures for maintaining and providing material safety data sheets (MSDSs) for all chemicals brought on MDC property/jobs.
3. Procedures for training personnel in the control of anticipated hazards.
4. Statement that employees have been trained.

**Personal Protective Equipment (OSHA 29 CFR 1910.132 to 1910.139)
(Including eye, face, head, foot and hand protection).**

1. Procedures for conducting workplace hazard assessment that determines the hazards likely to be present and selects types of PPE that will fit and protect the employee.
2. Procedures for use and maintenance of personal protective equipment.
3. Written respiratory protection program. (29 CFR 1910.134)

Confined Space (OSHA 29 CFR 1910.146)

1. Procedures to protect contractor employees from the hazards of entry into permit-required confined spaces.
2. Procedures for coordinating with MDC personnel when entering MDC permit-required confined spaces per MDC Confined Space Program.
3. Procedures for training personnel in the required duties and potential hazards of confined space entry.

Lockout/Tagout (OSHA 29 CFR 1910.147)

1. Procedures pertaining to the servicing and maintenance of machines and equipment in which the “unexpected” energization or start up of the machines or equipment, or release of stored energy could cause injury to contractor or MDC employees.
2. Procedures for training personnel in the required duties and potential hazards of energy control.

Electrical (OSHA 29 CFR 1910 Subpart S)

1. Procedures for compliance with OSHA electrical standards 29 CFR 1910.301 to 1910.335

Compressed Gas and Air Equipment (OSHA 29 CFR 1910.166 to 1910.169)

1. Procedures for safe handling and securing of compressed gas cylinders.

Powered Industrial Trucks (OSHA 29 CFR 1910.178)

1. Procedures for safe operation of forklifts, platform lift trucks, and motorized hand trucks.

Machinery and Machine Guarding (OSHA 29 CFR 1910.211 to 1910.219)

1. Procedures for safe operation and maintenance of equipment with power transmission belts, pulleys, sprockets, chains, or clutches.

Toxic and Hazardous Substances (OSHA 29 CFR 1910.1000 to 1910.1450)

1. Procedures for minimizing employee exposure to toxic and hazardous substances to comply with published permissible exposure limits.

Asbestos (OSHA 29 CFR 1910.1001 and 1926.1101)

Lead (29 CFR 1910.1025/1926.62/1926.103)

1. Procedures for preventing disturbance of potential asbestos and/or lead containing materials.
2. Procedures for protecting employees from exposure above the OSHA PEL.
3. Procedures for obtaining asbestos bulk material surveys when the potential exists for the disturbance of potential asbestos containing materials.

Welding and Cutting (OSHA 29 CFR 1926.350 to 1926.354)

1. Procedures for safe transportation and storage of compressed gas cylinders.
2. Procedures for safe welding and cutting including grounding, shielding, PPE, fire prevention (fire watch), Hot Work Permits, ventilation, and performing such operations on metals of toxic significance.

Scaffolds (OSHA 29 CFR 1926.450 to 1926.454)

1. Procedures for safe use of scaffolding and aerial lifts including load capacities, construction techniques, fall protection and protection from falling objects.

Fall Protection (OSHA 29 CFR 1926.500 to 1926.503)

1. Procedures for providing employee fall protection where employees walk or work on work surfaces that are six feet or more above a lower level including but not limited to, portable and fixed ladders, aerial lifts, scaffolds, roofs and elevated work levels and platforms.

Cranes, Derricks, and Hoists (OSHA 29 CFR 1926.550 to 556)

1. Procedures for safe operation of overhead cranes, truck cranes and hoists.
2. Procedures for safe operation of material hoists, personnel hoists, and elevators.

Excavations (OSHA 29 CFR 1926.650 to 1926.652)

1. Procedures for safe excavation including the design of sloping, benching, support, and shield systems; site inspection; protection from water accumulation; and stability of adjacent structures.

Concrete and Masonry Construction (OSHA 29 CFR 1926.700 to 1926.706)

1. Procedures to protect employees from hazards associated with concrete and masonry operations.
2. Procedures for use of head and face protection when applying cement, sand, and water mixtures through a pneumatic hose.

Steel Erection (OSHA 29 CFR 1926.750 to 1926.753)

1. Procedures for safe erection of skeleton steel construction in tiered buildings, structural steel assembly, bolting, and riveting.

Demolition (OSHA 29 CFR 1926.850 to 1926.860)

1. Procedures for safe demolition of existing structures on MDC properties including contingencies to safely assess and manage potentially hazardous constituents such as asbestos and lead.

Stairways and Ladders (OSHA 29 CFR 1926.1050 to 1926.1060)

1. Procedures for the safe construction and use of stairways and ladders.

Hazardous Materials/Hazardous Waste

1. Procedures for storing and removing all hazardous materials and waste from MDC properties or job sites prior to completion of work.
Note: Only authorized MDC personnel may sign manifests where MDC is generator of waste.

Work Zone Safety (OSHA 29 CFR 1926 subpart G)

1. All contract work performed on public roads where the work will interrupt the normal flow of traffic and/or present hazards to pedestrians, the contractor must have procedures in place for conforming to the Manual on Uniform Traffic Control Devices, Part 6 (MUTCD).

Fire Prevention and Protection

The contractor shall include in its safety and health plan an effective fire protection and prevention plan, including, but not limited to, provisions for the fire protection and suppression equipment, as set forth in this section.

- A. Housekeeping. Good housekeeping, with provision for prompt removal and disposal of accumulations of combustible scrap and debris, shall be maintained in all areas of the jobsite. Self-closing metal containers shall be used for the disposal of waste saturated with flammable liquids.
- B. Codes and regulations. The contractor shall comply with the requirements published in the current revisions of the National Electrical Code, National Electrical Safety Code, and the National Fire Protection Association standards.
- C. Smoking. Smoking or other sources of ignition shall not be permitted in areas where flammable or explosive materials are used, stored or are present. All such areas shall be conspicuously posted: NO SMOKING OR OPEN FLAMES. There is a no smoking policy in effect in all MDC facilities except in designated areas.
- D. Fires. Fires and open flame devices shall not be left unattended unless protected with automatic temperature control and cutoff devices.
- E. Cleaning and degreasing. Gasoline and liquids with a flash point below 100 degrees Fahrenheit shall not be used for cleaning and degreasing.

Issues of Non-Compliance

If during the course of the contract, EH&S personnel observe a contractor's non-compliance with the contractor's contracted safety and health plan or the MDC safety and health requirements, EH&S personnel may bring it to the attention of the MDC Construction Engineer and may also document such non-compliance in writing. Failure to correct the violation or continued violations shall be grounds for termination of the contract.

If after notifying the Construction Engineer in writing of deficiencies in health, safety, or environmental requirements, EH&S personnel observe continued violations of those requirements, or observe actions that pose an imminent danger, an immediate order to stop work may be issued. The contractor will be solely responsible for any costs associated with the order to stop work until the deficiencies have been rectified. Should this occur, EH&S personnel will bring the matter to the attention of the MDC Construction Engineer, and the Manager of EH&S. Such deficiencies may result in the default of the contract or preclude contractor from performing future business with the MDC.

Any action taken by EH&S, MDC Construction Engineer or any other MDC personnel, including but not limited to observation, documentation and/or contract termination or suspension is not to be construed as undertaking a duty for initiating, maintaining, supervising or ensuring safety at the worksite of non-MDC employees.

Safety Training

The contractor shall ensure that its employees have completed appropriate health and safety training when required by statute* or regulation and/or by MDC requirements, and provide current documentation of such training when required by the contract.

**In compliance with Section 31-53b of the Connecticut General Statutes: “ Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration”. Per Section 31-53b-2(c) each employee must complete the course no earlier than five years before the commencement date of the public works project.*

Medical Clearance

The contractor shall ensure that its employees have appropriate medical clearance when required by governmental regulations or by MDC requirements. Copies of current medical clearance for contractor personnel are required to be presented as specified by the contract.

Incident Reporting

EH&S may participate with contractors in the investigation of incidents resulting in injury/illness and/or damage or loss of property and near misses.

Safety and Personal Protective Equipment

The contractor shall provide all necessary safety and personal protective equipment needed by its employees and as required per OSHA and ANSI regulations.

The contractor shall ensure that its employees have received appropriate training on the use and maintenance of safety and personal protective equipment prior to its use. The MDC shall not be responsible for the failure of non-MDC employees to correctly use appropriate safety equipment and any such failure to properly use safety equipment is a violation of the contract and may result in default of the contract.

Documentation

The contractor shall provide MDC with documentation, including but not limited to, required training, medical clearances, permits, material safety data sheets (MSDS) for its employees or operations at the pre-construction meeting. Where subcontractors are used, it is the responsibility of the contractor to provide this information to MDC.

CONTRACTOR SAFETY QUESTIONNAIRE

Attachment A

DATE: _____

COMPANY NAME

COMPANY TYPE (General Contractor, Mechanical, etc.):

ADDRESS: _____ TELEPHONE NO.: _____

RESOURCES

1. Name of company Health and Safety Contact:

Title:

Telephone No. of Health and Safety Contact:

2. What percent of this person's time is spent on Health and Safety related matters? %

3. How many other full-time Health and Safety representatives are employed by your company?

4. Name of Safety Representative proposed for this project? _____

Title:

What percent of this person's time will be spent on Health and Safety related matters? %

Submit copy of Safety Representative's qualifications with completed questionnaire.

5. Does your company have a written procedure to ensure that adequate health and safety program resources, such as budget, equipment, training and manpower are included in each bid? If yes, submit a copy with completed questionnaire.

<u>No.</u>		<u>Yes</u>	<u>No</u>	<u>Applicable Page No. in H&S Plan</u>
1.	Does your company have a written Health and Safety Plan? If yes, submit a copy with your completed questionnaire. If the answer is no, the bid may be disqualified.	_____	_____	_____
2.	Does your company have a written program to ensure Health and Safety issues are preplanned into each project and work operation (e.g., job hazard analysis, checklists, etc.)? If yes, submit a copy with the completed questionnaire or reference page number in the Health and Safety Plan.	_____	_____	_____
3.	Does your company have a written safety incentive program that will be implemented on this project? If yes, submit a copy with the completed questionnaire or reference page number in the Health and Safety Plan.	_____	_____	_____
4.	Does your company have a written accident/incident procedure? If yes, submit a copy with the completed questionnaire or reference page number in the Health and Safety Plan.	_____	_____	_____
	Do your written procedures require near-miss incidents to be investigated?	_____	_____	_____
5.	Does your company have a written health and safety training program? If yes, submit a copy with the completed questionnaire or reference page number in the Health and Safety Plan. If the answer is no, the bid may be disqualified.	_____	_____	_____
	If yes, does the program include the following:			
	New employee/project orientation	_____	_____	_____
	Weekly "toolbox" meetings	_____	_____	_____
	Daily job briefings	_____	_____	_____
	Supervisor safety training	_____	_____	_____
	Task specific training	_____	_____	_____
	OSHA required training	_____	_____	_____
	Other	_____		

<u>No.</u>		<u>Yes</u>	<u>No</u>	<u>Applicable Page No. in H&S Plan</u>
6.	Does your company have a written procedure to ensure that only employees who are qualified by training and experience are allowed to operate equipment, tools, machinery and vehicles? If yes, submit a copy with the completed questionnaire or reference page number in the Health and Safety Plan.	_____	_____	_____
7.	Does your company designate and train competent people as required by the applicable OSHA standards (e.g., excavations, scaffold erection, etc.)?	_____	_____	_____
8.	Does your company have a written procedure to audit projects to ensure all projects are in compliance with applicable laws, requirements, etc.? If yes, submit a copy with the completed questionnaire or reference page number in the Health and Safety Plan.	_____	_____	_____
9.	Does your company have a written procedure to screen subcontractors based on their past safety performance? If yes, submit a copy with the completed questionnaire or reference page number in the Health and Safety Plan.	_____	_____	_____
10.	Does your company use a screening process to ensure employees are physically able to perform work as assigned? If yes, submit a copy with the completed questionnaire or reference page number in the Health and Safety Plan.	_____	_____	_____

.....

DRUG FREE WORKPLACE PROGRAM

<u>No.</u>		<u>Yes</u>	<u>No</u>	<u>Applicable Page No. in H&S Plan</u>
1.	Does your company have a written drug free workplace program that includes drug testing? If yes, submit a copy with your completed questionnaire. If the answer is no, the bid may be disqualified.	_____	_____	_____

<u>No.</u>		<u>Yes</u>	<u>No</u>	<u>Applicable Page No. in H&S Plan</u>
2.	If the answer to question 1 is yes, does your written drug free workplace program include the following?	_____	_____	_____
	Pre-employment drug & alcohol testing	_____	_____	_____
	Post accident drug & alcohol testing	_____	_____	_____
	Reasonable suspicion drug & alcohol testing	_____	_____	_____
	Random drug & alcohol testing	_____	_____	_____
	Supervisor and employee training	_____	_____	_____

.....

OSHA CITATIONS

<u>No.</u>		<u>Yes</u>	<u>No</u>
1.	Has your company received any OSHA citations (opened and closed) within the last three years?	_____	_____
2.	If the answer to question 1 is yes, how many of each of the following types of citations have you received?		
		<u>Number</u>	
	Serious	_____	
	Willful	_____	
	Repeat	_____	
	Other	_____	
	De minimus	_____	

Give a brief description of the nature of the citation(s), or attach a copy of the citation(s).

.....

ACCIDENT AND ILLNESS STATISTICS

	Year: 20__	20__	20__
1. How many man-hours has your company worked in each of the last three years?	_____	_____	_____
2. How many OSHA recordable injuries did your company experience in each of the last three years?	_____	_____	_____

3. Based on the below listed formula (a), what are your incident rates for each of the last three years? If the rates are above the current national average, the bid may be disqualified. _____
 4. How many lost time accidents has your company experienced in each of the last three years? _____
 5. Based on the below listed formula (b), what is your lost workday case rate for each of the last three years? If the rates are above the current national average, the bid may be disqualified. _____
 6. How many fatalities has your company experienced in each of the last three years? _____
 7. Submit a copy of your OSHA 300 logs for the last three years with your completed questionnaire.
- (a)
$$\text{Incident rate} = \frac{\text{No. of OSHA recordable injuries} \times 200,000}{\text{Man-hours}}$$
- (b)
$$\text{Lost workday case rate} = \frac{\text{No. of lost time accidents} \times 200,000}{\text{Man-hours}}$$

.....

WORKERS' COMPENSATION EXPERIENCE MODIFICATION RATE

- | | Year 20__ | 20__ | 20__ |
|---|-----------|-------|-------|
| 1. List your company's Workers' Compensation Experience Modification Rate for each of the last three years. If most recent year has a rate greater than one, the bid may be disqualified. | _____ | _____ | _____ |
| 2. SUBMIT, ON YOUR INSURANCE COMPANY LETTERHEAD, YOUR WORKERS' COMPENSATION EXPERIENCE MODIFICATION RATE FOR EACH OF THE LAST THREE YEARS WITH YOUR COMPLETED QUESTIONNAIRE. | | | |

.....

Is there any additional information you feel we need to properly evaluate your company's safety and health program? If yes, please explain below or attach additional sheets.

Name of Person Completing Questionnaire (Please Print):

Signature of Person Completing Questionnaire: _____

Title: _____ Date: _____

AUTHORIZATION

1. I have reviewed and authorized release of this information for confidential use by the Metropolitan District.

Printed or typed name

Signature

Title

Date

End of Section

SECTION 00485 - B
NAMED SUBCONTRACTOR
BIDDER'S QUALIFICATION STATEMENT
MUST BE SUBMITTED WITH THIS FORM

(This form shall be submitted for any Subcontractor Agreement of \$25,000 or greater)

If a question or request for information does not pertain to your organization in any way, use the symbol "NA" (Not Applicable). Use additional 8 ½" x 11" sheets with your letterhead as necessary.

1. Indicate exactly the name by which this organization is known, legal address, telephone, value of the this Subcontractor Agreement and the Section / Sections of the Technical Specifications applicable to the Subcontractor Agreement :

Name: _____

Address: _____

Subcontractor
Agreement
Value _____

Describe
Subcontractor's
work and include
the references to
the technical
specifications
Sections: _____

2. How many years has this organization been in business under its present business name?

Years: _____

3. How many years has this organization been in business as a Subcontractor?

Years: _____

4. If this organization has not always been a Subcontractor, list the trade(s) that your firm customarily performed prior to the time that you became a Subcontractor:

4.1 _____

4.2 _____

4.3 _____

5. Indicate all other names by which this organization has been known and the length of time known by each name:

5.1 _____

5.2 _____

5.3 _____

6. This firm is a:

Corporation	<input type="checkbox"/>
Partnership	<input type="checkbox"/>
Sole	<input type="checkbox"/>
Proprietorship	
Joint Venture	<input type="checkbox"/>
Other	_____

7. Attach resumes of all supervisory personnel, such as Principals, Project Managers, and Superintendents, who will be directly involved with the project on which you are now a bidder. Indicate the number of years of construction experience and number of years of which they were in a Supervisory capacity.
8. List all sub-trades which your firm customarily performs with own employees – **this table must be completed for electrical and mechanical trades for all projects, and also for all named trades for threshold projects.** Include also the following licenses if applicable to the Subcontractor Agreement:

Unlimited plumbing-piping contractor's license (P-1)

Unlimited plumbing-piping journeyman's license (P-2)

Plumbing & Piping Limited Contractor (P-7)

Licensed Land Surveyor (Sec 20-300-1)

Limited Electrical Contractor

Limited Electrical Journeyperson

Trade		Name of License holder	State of CT D.C.P. License/Registration No. Format: Prefix-Number- Suffix
8.1			
8.2			
8.3			
8.4			
8.5			

9. **Trade References:** Names, addresses and telephone numbers of several firms with whom your organization has regular business dealings (attach separate sheets as necessary):

10. **All** Construction Projects your organization has **in process** (attach separate sheets using the following format as necessary):

10.1 Specific Title & Location: _____

10.2 Contract Amount: _____

10.3 Description of your scope
of work performed: _____

10.4 Owner: _____

10.5 General Contractor: _____

10.6 Designer: _____

10.7 Start Date: _____

10.8 Finish Date: _____

*10.9 Any complaint on
Quality or Management: _____

10.10 Owners Representative:		
	(Name)	Telephone Number

10.11 G.C. Representative:		
	(Name)	Telephone Number

11. All Construction Projects your organization has **completed** in the past five years or the 20 projects most recently completed (attach separate sheets using the following format as necessary):

11.1 Specific Title &
Location: _____

11.2 Contract Amount: _____

***Please attach a separate sheet explaining any negative entry in this row.**

11.4 Owner: _____

11.5 General Contractor: _____

11.6 Designer: _____

11.7 Start Date: _____

11.8 Finish Date: _____

*11.9 Any complaint on
Quality or
Management: _____

11.10 Owners Representative: _____
(Name) Telephone Number

11.11 G.C. Representative: _____
(Name) Telephone Number

***Please attach a separate sheet explaining any negative entry in this row.**

12. Has your organization ever failed to complete a contract, or has any officer or partner of your organization ever been an officer or partner of another organization that failed to complete a contract? If so, indicate the circumstances leading to the project failure and the name of the company which provided the bonding for the failed contract(s):

13. List all legal or administrative proceedings currently pending or concluded adversely within the last five years which relate to procurement or performance of any public or private construction contracts. (Exclude OSHA violations which are called for elsewhere in this statement).

13.1 ☐
Attached:

13.2 N/A: ☐

14. List all willful or serious violations of any Occupational Safety and Health Act (OSHA) or of any standard, order or regulation promulgated pursuant to such act, during the three year period preceding the bid, provided such violations were cited in accordance with the provisions of any State Occupational Safety and Health Act or Occupational Safety and Health Act of 1970. Indicate whether these were abated within the time fixed by the citation or whether the citation was appealed. If appealed what is the status or disposition.

14.1

14.2

14.3

15. Has your organization had any criminal convictions related to the injury or death of any employee in the three-year period preceding the bid. Please list any such convictions below.

15.1

15.2

15.3

Attachment to Instructions to Bidders
NAMED SUBCONTRACTOR
BIDDER'S QUALIFICATION STATEMENT FORM
PAGE 7 OF 8

Dated at _____

Signed this _____ day of _____, 2
0 _____

Name of
Organization: _____

Signature _____

(Print Name) _____

Title _____

Notary Statement:

Mr./Mrs./Ms _____ being duly sworn
.

deposes and says that he/she _____ of
is the _____
(Position or Title)

_____, and that the answers to the
_____ foregoing
(Firm Name)

questions and all statements therein contained are true and correct.

Subscribed and sworn before me _____ day of _____, 20
this _____

Notary Public _____

My Commission _____, 20
Expires _____

This form must be submitted for each of the Named Subcontractors and attached to the Bid Submission.

END OF BIDDER'S QUALIFICATION STATEMENT FORM

SECTION 485 C

TRADESMAN LICENSING

Connecticut General Statutes Title 20 Chs 391 and 393 and the Regulations of Connecticut State Agencies, Title 20: Professional Licenses, Department of Consumer Protection (4) Occupational Licenses, Sec. 20-332 require certain tradesmen to be licensed to perform their work. One or more of those trades may be needed to perform this project. Prior to performing work requiring a license, the Contractor shall provide the District a list of the names, addresses, Effective and Expiration dates and license number and a copy of the license for each tradesman holding a contractors or journeyman's license as may be required.

Trades requiring licenses include, but may not be limited to: Plumbing, Electrical and Land Surveyors.

Contractors are urged to consult with the Department of Consumer Protection to resolve any license questions prior to starting work.

State of Connecticut
Department of Administrative Services (DAS) Contractor Prequalification
Update (Bid) Statement
(Statement to be included with the bid)

Connecticut General Statute §4a-100 and Connecticut General Statute §4b-91

Each bid submitted for a contract shall include a copy of a prequalification certificate issued by the Commissioner of Administrative Services. The bid shall also be accompanied by an **update bid statement** in such form as the Commissioner of Administrative Services prescribes. The form for such **update bid statement** shall provide space for information regarding all projects completed by the bidder since the date the bidder's prequalification certificate was issued or renewed, all projects the bidder currently has under contract, including the percentage of work on such projects not completed, the names and qualifications of the personnel who will have supervisory responsibility for the performance of the contract, any significant changes in the bidder's financial position or corporate structure since the date the certificate was issued or renewed, any change in the contractor's qualification status, and such other relevant information as the Commissioner of Administrative Services prescribes. Any bid submitted without a copy of the prequalification certificate and an **update bid statement** shall be invalid. Any public agency that accepts a bid submitted without a copy of such prequalification certificate and an **update bid statement**, as required by this section, may become ineligible for the receipt of funds related to such bid.

Name of Project that company is bidding on:		
Project Number:		
Name of Company:		
FEIN:		
Company Address:		
Prequalification Contact:		Telephone Number:
Date of Prequalification with the DAS:	Single Limit:	Aggregate Work Capacity (AWC):
* This amount equals your company's AWC minus the Total \$ Amount of Work Remaining.		* Remaining Aggregate Work Capacity:

Please list all of your company's BONDED PROJECTS (BOTH PUBLIC AND PRIVATE) WHICH WERE 100% COMPLETED SINCE THE DATE YOUR PREQUALIFICATION WAS ISSUED OR RENEWED: (Please add additional page(s) if required)

Name of Project	Owner of Project	Date Project Completed	Total Contract Amount

Please list all of your company's BONDED PROJECTS (BOTH PUBLIC AND PRIVATE) CURRENTLY UNDER CONTRACT:
(Please add additional page(s) if required. Please total the Work Remaining column)

Name of Project	Owner of Project	Total Contract Amount	% Complete	Work Remaining (\$)
Total \$ Amount of Work Remaining →				

Please list the names and titles of the personnel who will have supervisory responsibility for the performance of the contract being bid on:
(Please add additional page(s) if required)

Individual Name	Title of Individual

Have there been any changes in your company's financial condition or business organization, which might affect your company's ability to successfully complete this contract?

Yes ☐ No ☐

If yes, please explain:

I certify under penalty of law that all of the information contained in this Update (Bid) Statement is true and accurate to the best of my knowledge as of the date below.

Signature

Date

It is the responsibility of the Awarding Authority to determine if any of the information provided above will impact the contractor's performance on this project.
The DAS' Contractor Prequalification Program can be reached at (860) 713-5280

THE METROPOLITAN DISTRICT

Insert Contract Name

CONTRACT NUMBER Insert Contract No.

AGREEMENT

THIS AGREEMENT is made as of the _____ day of _____ in the year 20__ by and between The Metropolitan District, a Connecticut municipal corporation having an office at 555 Main Street, Hartford, Connecticut, hereinafter called Owner, or District acting through its Chief Executive Officer, and

with legal address and principal place of business at _____
_____ hereinafter called Contractor.

Owner and Contractor in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK.

1.1 Contractor shall perform the Work as specified or indicated in the Contract Documents. The Work is as described in SECTION 01010.

ARTICLE 2. ENGINEER.

2.1 The Project has been designed by **Insert Final Design Engineer Name**. Unless advised otherwise, the Owner will act as Engineer in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 3. CONTRACT TIME.

3.1 The Contract Time shall be **Insert Number of Days Calendar Days** commencing on the date in the Notice to Proceed issued by the Owner.

3.2 Contractor agrees that the Work shall be prosecuted regularly, diligently and uninterruptedly and at such rate of progress as will insure full completion thereof within the Contract Time stated above. It is expressly understood and agreed, by and between Contractor and Owner that the Contract Time is reasonable for the completion of the Work, taking into consideration the average climatic range, and usual industrial conditions prevailing in this locality.

The number of calendar days for the completion of the Work, included in this Article 3 of the Agreement shall not include the time period from each December 1 through the

following March 31 (the "winter shutdown period"). The Contract time will begin to run on the date designated in the Notice to Proceed as the date for the commencement of the Project and the time will be computed on a consecutive-day basis including all Saturdays, Sundays, holidays and non-work days from April 1 through November 30 of each included year. With the approval of the Engineer, the Contractor may perform work during the winter shutdown period, with any charge against the Contract Time or other charge being a part of the approval. Should the Contractor fail to complete the Project prior to December 1 of a given year, any remaining Contract Time will recommence on April 1 of the following year.

3.3 The Contractor shall not be entitled to costs for delay due to Owner ordered Modifications or any other circumstances for the period of time between the Contractor's elected early completion and the end of the Contract Time. Such costs include, but are not limited to, extended home office costs, field office costs, or supervisory and management costs incurred in performance of the Work. Early completion of the Work shall not merit additional compensation.

ARTICLE 4. CONTRACT PRICE.

4.1 Owner will pay Contractor for performance of the Work in accordance with the Contract Documents in current funds at the unit price agreed upon in the Contractor's Bid Form a copy of which Bid Form is included as Section 00300 of the Contract Documents.

4.2 This award shall be made in acceptance of the Contractor's Bid, (inclusive of Bid Alternate(s) _____) for a total award value of \$_____ as shown in the Bid Form.

ARTICLE 5. APPLICATIONS FOR PAYMENT

5.1 Contractor shall submit Applications for Payment in accordance with Article 14 of the Standard General Conditions of the Construction Contract which are a part of the Contract Documents (the "Standard General Conditions"). Applications for Payment will be processed by Engineer as provided in the Standard General Conditions.

ARTICLE 6. PROGRESS AND FINAL PAYMENTS

6.1 Owner will make progress payments and final payment in accordance with Article 14 of the Standard General Conditions of the Construction Contract which are a part of the Contract Documents (the "Standard General Conditions").

ARTICLE 7. LIQUIDATED DAMAGES

7.1 Owner and Contractor recognize that TIME IS OF THE ESSENCE of this Agreement and further, that Owner will suffer financial loss if the Work is not completed within the Contract Time specified in Article 3 above, plus any extensions thereof allowed in accordance with Article 12 of the Standard General Conditions. The parties

hereto also recognize the delays, expense and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that, as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner <<<<<<<To Be Determined>>>>>>> per day for each calendar day of delay beyond the last day of the Contract Time (as it may be extended in accordance with the Contract Documents) that the Work is not fully complete.

7.2 Provided, that Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the Work is for reasons included in Paragraph 12.03 A of the Standard General Conditions.

7.3 Provided, further that Contractor shall submit the required notification of Contractor's claim for such delays in accordance with Paragraph 12.02 of the Standard General Conditions.

ARTICLE 8. ASSURANCE

8.1 Contractor has familiarized itself with the nature and extent of the Contract Documents, Work, locality, and with all local conditions and Federal, State and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.

8.2 Contractor has made or caused to be made examinations, investigations and tests and studies of such reports and related data as Contractor deems necessary for the performance of the Work at the Contract Price within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required for such purposes.

8.3 Contractor has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

8.4 Contractor has given Engineer written notice of any conflict, error or discrepancy that Contractor has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Contractor.

8.5 Contractor agrees that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work in accordance with the Contract Documents.

8.6 In accordance with Section 215 of the Clean Water Act, and implementing EPA regulations and guidelines, Contractor agrees that preference will be given to domestic construction material by Contractor, subcontractors, materialmen and suppliers in the performance of the Work.

ARTICLE 9. CONTRACT DOCUMENTS.

9.1 The Contract Documents which comprise of the Contract between Owner and Contractor are included in the Project Manual as modified by the Special Provisions; as noted below and or attached hereto and made a part hereof and consist of the following:

9.1.1 Invitation To Bid.

9.1.2 Instructions To Bidders.

9.1.3 Bid Form.

9.1.4 This Agreement.

9.1.5 Performance Bond, Payment Bond, and other required Bonds.

9.1.6 Certificate of Insurance.

9.1.7 General Conditions, EJCDC Document No. C-700, 2007 edition (as modified).

9.1.8 Supplementary Conditions

9.1.9 Special Provisions

9.1.10 Specifications (as listed in Table of Contents).

9.1.11 Contract Drawings dated<<<<To be Determined>>>>, enumerated as follows:

INSERT LIST OF CONTRACT DRAWINGS

9.1.12 Addenda numbers _____ to _____, inclusive.

9.1.13 Any modification, including Change Orders, duly delivered after execution of Agreement.

ARTICLE 10. MISCELLANEOUS

10.1 Terms used in this Agreement which are defined in Article 1 of the Standard General Conditions shall have the meanings set forth in the Standard General Conditions.

10.2 Contractor shall not, without the prior written consent of the Owner, assign or sublet in whole or in part any interest under any of the Contract Documents; and, specifically but without limitation, Contractor shall not assign any monies due or to become due without the prior written consent of Owner. In case Contractor assigns all or any part of any monies due or to become due under the Contract Documents, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to

Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the Work called for in the Contract Documents.

10.3 Owner and Contractor each binds itself, its successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

10.4 The Contract Documents constitute the entire agreement between Owner and Contractor and may only be altered, amended or repealed by written agreement signed by both Owner and Contractor.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement. All portions of the Contract Documents have been signed or identified by The MDC and Contractor or by Engineer on their behalf.

This Agreement shall become effective on _____, 2017.

THE METROPOLITAN DISTRICT

CONTRACTOR

By:
Title:

By:
Title:

(CORPORATE SEAL)

(CORPORATE SEAL)

Attest

Attest

John S. Mirtle, District Clerk

Address for giving notices

Address for giving notices

555 Main Street

P.O. Box 800

Hartford, CT 06142

Note: If Contractor is a corporation, an affidavit giving the principal the right to sign the Agreement must accompany the executed Agreement.

Approved as to Form and Content:

R. Bartley Halloran
District Counsel

{00509869.DOC 3}

DOCUMENT 00600 BONDS AND CERTIFICATES

TABLE OF CONTENTS

00610	PERFORMANCE BOND (attached)
00615	PAYMENT BONDS (attached)
00630	INSURANCE CERTIFICATE (Submit on Metropolitan District's Standard Form INS390 upon award of Contract.)

THE METROPOLITAN DISTRICT
PERFORMANCE BOND

BOND NO. _____

KNOW ALL MEN BY THESE PRESENTS:

That _____
of _____ (hereinafter
called the Principal as Principal), and _____,
a corporation duly established under the laws of the State of _____
and duly authorized to transact business in the State of Connecticut (hereinafter called
the Surety(ies) as Surety(ies), are firmly bound and held unto THE METROPOLITAN
DISTRICT, as Obligee, the sum of _____
_____ DOLLARS (\$_____),
for the payment of which we bind ourselves and our heirs, executors, administrators,
successors and assigns, jointly and severally by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the principal has entered into or intends to enter into a written
contract (the "Contract") with the Metropolitan District Commission for the construction
of _____ which contract,
together with all plans and specifications now made or which may hereafter be made in
extension, modification or alteration thereof, is hereby referred to, incorporated in, and
made a part of this bond as though fully set forth herein.

NOW, THEREFORE, if the principal faithfully performs and fulfills all of the
undertakings, covenants, terms, conditions, and agreements of the Contract during the
original term of the Contract and any extensions thereof that are granted by The
Metropolitan District, with or without notice to the Surety(ies), and during the life of any
guaranty required under the contract; and also faithfully performs and fulfills all the
undertakings, covenants, terms and conditions and agreements of any and all duly
authorized modifications of the Contract that hereafter are made, then this obligation
shall be void; otherwise it shall remain in full force and effect.

Any alterations which may be made in the terms of the Contract, or in the work
done or to be done under it, or the giving by The Metropolitan District of any extension
of time for the performance of the Contract or any other forbearance on the part of
either The Metropolitan District or the principal, one to the other, shall not in any way
release the principal, and/or the Surety(ies) or either of them, their representatives,

heirs, executors, administrators, successors or assigns from liability hereunder, and notice to the Surety(ies) of any such alteration, modification, extension or forbearance is hereby specifically and absolutely waived.

In the event that the Surety(ies) assumes the Contract or obtains a bid or bids for completion of the Contract, the Surety(ies) shall ensure that the contractor chosen to complete the Contract is prequalified pursuant to Section 4a-100 of the Connecticut General Statutes in the requisite classification and has the aggregate work capacity rating and single project limit necessary to complete the Contract.

Signed, sealed and executed at _____ this
_____ day of _____, 20_____.

Signed, sealed and delivered in the presence of:

_____ By _____ (L.S.)

As to Principal

Signed, sealed and executed at _____
this _____ day of _____, 20_____.

Signed, sealed and delivered
in the presence of:

_____ By _____ (L.S.)

As to Surety(ies)

THE METROPOLITAN DISTRICT
LABOR AND MATERIAL PAYMENT BOND

BOND NO. _____

KNOW ALL MEN BY THESE PRESENTS:

That _____
of _____ (hereinafter called
the Principal), and _____,
a corporation duly established under the laws of the State of _____
and duly authorized to transact surety business in the State of Connecticut (hereinafter
called the Surety or Surety(ies), are firmly bound and held unto The Metropolitan
District, 555 Main Street, Hartford, CT 06142 as Obligee, in the sum of

DOLLARS (\$ _____), for the payment for the labor, materials
and equipment furnished for use in the Project defined below, and the Principal and
Surety(ies) binds, itself, its successors and assigns, himself, his heirs, executors,
administrators, and assigns, jointly and severally by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the principal has entered into or intends to enter into a written
contract (the "contract") with The Metropolitan District, as Obligee for the construction of

(the Project), which contract, together with all plans and specifications now made or
which may hereafter be made in extension, modification or alteration thereof, is hereby
referred to, incorporated in, and made a part of this bond as though fully set forth
herein;

NOW, THEREFORE, if the Principal faithfully makes payment for all materials
and labor used or employed in the performance of the contract, as required by the
contract documents and the General Statutes of Connecticut, as amended, then this
obligation shall be null and void; otherwise it shall remain in full force and effect. This
bond is provided pursuant to Sections 49-41 et seq. of the General Statutes of
Connecticut and shall be governed thereby.

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

Signed, sealed and executed at _____ this
_____ day of _____, 20____.

Signed, sealed and delivered in the presence of:

_____ By _____ (L.S.)

As to Principal

Signed, sealed and executed at _____ this
_____ day of _____, 20____.

Signed, sealed and delivered
in the presence of:

_____ By _____ (L.S.)

As to Surety(ies)

CERTIFICATE OF INSURANCE -THE METROPOLITAN DISTRICT FORM					ISSUE DATE (MM/DD/YY)	
INS390						
INSURED			THIS IS TO CERTIFY THAT THE POLICIES LISTED BELOW HAVE BEEN ISSUED, SUBJECT TO APPLICABLE TERMS, CONDITIONS AND EXCLUSIONS. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES INDICATED BELOW.			
			COMPANIES AFFORDING COVERAGE			
PRODUCER			COMPANY			
			LETTER A			
			COMPANY			
			LETTER B			
			COMPANY			
			LETTER C			
MINIMUM INSURANCE REQUIREMENTS BODILY INJURY AND PROPERTY DAMAGE \$1,000,000 EACH OCCURRENCE \$1,000,000 AGGREGATE			(NOTE: CERTAIN PROJECTS, CONTRACTS OR AGREEMENTS MAY REQUIRE HIGHER OR LOWER LIMITS AND/OR REQUIRE SPECIFIC ADDITIONAL INSURANCE COVERAGES. SEE PROJECT, CONTRACT OR AGREEMENT FOR ADDITIONAL INFORMATION.)			
COVERAGES						
CO LTR	TYPE OF INSURANCE	POLICY NUMBER	EFF. DATE (MM/DD/YY)	EXP. DATE (MM/DD/YY)	ALL LIMITS <u>IN THOUSANDS</u>	
	GENERAL LIABILITY _____ COMMERCIAL GENERAL LIABILITY _____ CLAIMS MADE _____ OCCUR. _____ PER PROJECT AGG. LIMIT END. _____ BLANKET CONTRACTUAL _____ THE METROPOLITAN DISTRICT AND THE STATE OF CONN. ADDED AS ADDITIONAL INSURED				EACH OCCURRENCE \$ GENERAL AGGREGATE \$ PRODUCTS COMP/OPS AGGREGATE \$ SELF-INSURED RETENTION \$	
	AUTOMOBILE LIABILITY _____ ANY AUTO _____ ALL OWNED AUTOS _____ SCHEDULED AUTOS _____ HIRED AUTOS _____ NON-OWNED AUTOS				COMBINED SINGLE LIMIT \$ BODILY INJURY (Per Person) \$ BODILY INJURY (Per Accident) \$ PROPERTY DAMAGE \$ SELF-INSURED RETENTION \$	
	EXCESS/UMBRELLA LIABILITY				EACH OCCURR. \$ AGGREGATE \$	
	WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY 				STATUTORY \$ (EACH ACCIDENT) \$ (DISEASE-POLICY LIMIT) \$ (DISEASE-EACH EMPLOYEE)	
	PROTECTIVE LIABILITY (IN THE NAME OF THE METROPOLITAN DISTRICT) POLICY MUST BE SUBMITTED.				BODILY INJURY & PROPERTY DAMAGE EACH OCCURRENCE: AGGREGATE:	
	OTHER					
DESCRIPTION OF OPERATIONS						
CERTIFICATE HOLDER THE METROPOLITAN DISTRICT 555 MAIN STREET-PO BOX 800 HARTFORD, CT 06142-0800		IT IS AGREED THAT 30 DAYS' NOTICE OF CANCELLATION OR RESTRICTIVE AMENDMENT OF SAID POLICIES SHALL BE MAILED TO THE METROPOLITAN DISTRICT, AND IT IS FURTHER AGREED THAT ALL EARNED PREMIUM CHARGES FOR THE PROTECTIVE LIABILITY AND OTHER POLICIES WILL BE BILLED TO THE ABOVE NAMED PERSON OR FIRM. AUTHORIZED REPRESENTATIVE				

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by



AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE

A Practice Division of the

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

This document has been modified from its original form as an EJCDC document.

These General Conditions have been prepared for use with the Agreement and Suggested EJCDC forms(EJCDC C-520 or C-525, 2007 Editions) between Owner and Contractor. Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Special Provisions, see Guide to the Preparation of Special Provisions (EJCDC C-800, 2007 Edition).

Copyright © 2007 National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314-2794
(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
(800) 548-2723
www.asce.org

Associated General Contractors of America
2300 Wilson Boulevard, Suite 400, Arlington, VA 22201-3308
(703) 548-3118
www.agc.org

The copyright for this EJCDC document is owned jointly by the four
EJCDC sponsoring organizations and held in trust for their benefit by NSPE.

This document has been modified from its original form as an EJCDC document.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
ARTICLE 1 – DEFINITIONS AND TERMINOLOGY	7
1.01 <i>Defined Terms</i>	7
1.02 <i>Terminology</i>	10
ARTICLE 2 – PRELIMINARY MATTERS.....	11
2.01 <i>Delivery of Bonds and Evidence of Insurance</i>	11
2.02 <i>Copies of Documents</i>	11
2.03 <i>Commencement of Contract Times; Notice to Proceed</i>	11
2.04 <i>Starting the Work</i>	11
2.05 <i>Before Starting Construction</i>	11
2.06 <i>Preconstruction Conference; Designation of Authorized Representatives</i>	12
2.07 <i>Initial Acceptance of Schedules</i>	12
ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE.....	13
3.01 <i>Intent</i>	13
3.02 <i>Reference Standards</i>	14
3.03 <i>Reporting and Resolving Discrepancies</i>	14
3.04 <i>Amending and Supplementing Contract Documents</i>	15
3.05 <i>Reuse of Documents</i>	15
3.06 <i>Electronic Data</i>	15
ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS.....	16
4.01 <i>Availability of Lands</i>	16
4.02 <i>Subsurface and Physical Conditions</i>	16
4.03 <i>Differing Subsurface or Physical Conditions</i>	17
4.04 <i>Underground Facilities</i>	18
4.05 <i>Reference Points</i>	19
4.06 <i>Hazardous Environmental Condition at Site</i>	19
ARTICLE 5 – BONDS AND INSURANCE.....	20
5.01 <i>Performance, Payment, and Other Bonds</i>	20
5.02 <i>Licensed Sureties and Insurers</i>	21
5.03 <i>Certificates of Insurance</i>	21
5.04 <i>Contractor's Insurance</i>	21
5.05 <i>Owner's Liability Insurance</i>	24
5.06 <i>Property Insurance – NOT USED</i>	24
5.07 <i>Waiver of Rights</i>	24
5.08 <i>Receipt and Application of Insurance Proceeds – NOT USED</i>	24
5.09 <i>Acceptance of Bonds and Insurance; Option to Replace</i>	24

This document has been modified from its original form as an EJCDC document.

5.10	<i>Partial Utilization, Acknowledgment of Property Insurer – NOT USED</i>	24
ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES		
6.01	<i>Supervision and Superintendence</i>	24
6.02	<i>Labor; Working Hours</i>	25
6.03	<i>Services, Materials, and Equipment</i>	26
6.04	<i>Progress Schedule</i>	27
6.05	<i>Substitutes and "Or-Equals"</i>	27
6.06	<i>Concerning Subcontractors, Suppliers, and Others</i>	29
6.07	<i>Patent Fees and Royalties</i>	30
6.08	<i>Permits</i>	30
6.09	<i>Laws and Regulations</i>	30
6.10	<i>Taxes</i>	31
6.11	<i>Use of Site and Other Areas</i>	31
6.12	<i>Record Documents</i>	31
6.13	<i>Safety and Protection</i>	32
6.14	<i>Safety Representative</i>	33
6.15	<i>Hazard Communication Programs</i>	33
6.16	<i>Emergencies</i>	33
6.17	<i>Shop Drawings and Samples</i>	33
6.18	<i>Continuing the Work</i>	35
6.19	<i>Contractor's General Warranty and Guarantee</i>	35
6.20	<i>Indemnification</i>	35
6.21	<i>Delegation of Professional Design Services</i>	37
6.22	<i>Excavations Near Underground Utility Facilities</i>	37
6.23	<i>Sanitary Regulations</i>	38
ARTICLE 7 – OTHER WORK AT THE SITE		
7.01	<i>Related Work at Site</i>	38
7.02	<i>Coordination</i>	39
7.03	<i>Legal Relationships</i>	39
ARTICLE 8 – OWNER'S RESPONSIBILITIES		
8.01	<i>Communications to Contractor</i>	39
8.02	<i>Replacement of Engineer</i>	39
8.03	<i>Furnish Data</i>	39
8.04	<i>Pay When Due</i>	39
8.05	<i>Lands and Easements; Reports and Tests</i>	39
8.06	<i>Insurance – NOT USED</i>	40
8.07	<i>Change Orders</i>	40
8.08	<i>Inspections, Tests, and Approvals</i>	40
8.09	<i>Limitations on Owner's Responsibilities</i>	40
8.10	<i>Undisclosed Hazardous Environmental Condition</i>	40
8.11	<i>Evidence of Financial Arrangements – NOT USED</i>	40
8.12	<i>Compliance with Safety Program</i>	40
ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION		
9.01	<i>Owner's Representative</i>	40
9.02	<i>Visits to Site</i>	40
9.03	<i>Project Representative</i>	41

This document has been modified from its original form as an EJCDC document.

9.04	<i>Authorized Variations in Work</i>	41
9.05	<i>Rejecting Defective Work</i>	41
9.06	<i>Shop Drawings, Change Orders and Payments</i>	41
9.07	<i>Determinations for Unit Price Work</i>	41
9.08	<i>Decisions on Requirements of Contract Documents and Acceptability of Work</i>	41
9.09	<i>Limitations on Engineer's Authority and Responsibilities</i>	42
9.10	<i>Compliance with Safety Program</i>	42
ARTICLE 10 – CHANGES IN THE WORK; CLAIMS		42
10.01	<i>Authorized Changes in the Work</i>	42
10.02	<i>Unauthorized Changes in the Work</i>	43
10.03	<i>Execution of Change Orders</i>	43
10.04	<i>Notification to Surety</i>	43
10.05	<i>Claims</i>	43
ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK		44
11.01	<i>Cost of the Work</i>	44
11.02	<i>Allowances</i>	46
11.03	<i>Unit Price Work</i>	47
ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES		47
12.01	<i>Change of Contract Price</i>	47
12.02	<i>Change of Contract Times</i>	48
12.03	<i>Delays</i>	49
ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK		49
13.01	<i>Notice of Defects</i>	49
13.02	<i>Access to Work</i>	49
13.03	<i>Tests and Inspections</i>	49
13.04	<i>Uncovering Work</i>	50
13.05	<i>Owner May Stop the Work</i>	50
13.06	<i>Correction or Removal of Defective Work</i>	51
13.07	<i>Correction Period</i>	51
13.08	<i>Acceptance of Defective Work</i>	52
13.09	<i>Owner May Correct Defective Work</i>	52
ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION		52
14.01	<i>Schedule of Values</i>	52
14.02	<i>Progress Payments</i>	52
14.03	<i>Contractor's Warranty of Title</i>	56
14.04	<i>Substantial Completion</i>	57
14.05	<i>Partial Utilization</i>	57
14.06	<i>Final Inspection</i>	58
14.07	<i>Final Payment</i>	58
14.08	<i>Final Completion Delayed</i>	59
14.09	<i>Waiver of Claims</i>	59
ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION		59
15.01	<i>Owner May Suspend Work</i>	59

This document has been modified from its original form as an EJCDC document.

15.02	<i>Owner May Terminate for Cause</i>	60
15.03	<i>Owner May Terminate For Convenience</i>	61
15.04	<i>Contractor May Stop Work or Terminate</i>	61
ARTICLE 16 – DISPUTE RESOLUTION		61
16.01	<i>Methods and Procedures</i>	62
ARTICLE 17 – MISCELLANEOUS		62
17.01	<i>Giving Notice</i>	62
17.02	<i>Computation of Times</i>	62
17.03	<i>Cumulative Remedies</i>	62
17.04	<i>Survival of Obligations</i>	63
17.05	<i>Controlling Law</i>	63
17.06	<i>Headings</i>	63
17.07	<i>Addresses</i>	63
17.08	<i>Wage Rates</i>	63
17.09	<i>Revenue Services Certificate and State Treasurer Statement</i>	63
17.10	<i>Severability</i>	64
17.11	<i>Price Reduction for Defective Cost or Pricing Data</i>	64
17.12	<i>Audit; Access to Records</i>	64
17.13	<i>Covenant Against Contingent Fees</i>	65
17.14	<i>Gratuities</i>	65
17.15	<i>Significantly Important Archaeological Resources</i>	65

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*-Written or graphic instruments issued by the Owner prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*-The written instrument between the Owner and the Contractor evidencing the agreement between Owner and Contractor regarding the Work.
 3. *Application for Payment*-The document in the form acceptable to the Engineer which shall be completed and submitted by Contractor during the course of the Work, along with all supporting documentation required pursuant to the Contract Documents, to request progress or final payments.
 4. *Asbestos*-Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*-The offer or proposal of a Bidder submitted in the form and in such detail as is prescribed by the Owner setting forth the prices for the Work to be performed by the Bidder.
 6. *Bidder*-The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*-The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*-The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*-A document issued on or after the Effective Date of the Agreement which is signed by the Contractor and Owner authorizing an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times and which has been reviewed and recommended by the Engineer.
 10. *Claim*-A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*-The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
 12. *Contract Documents*-The Agreement and those items identified in the Agreement as “Contract Documents.” Only printed or hard copies of such items are Contract Documents. Approved Shop Drawings, other contract submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
 13. *Contract Price*-The payment to which the Contractor is entitled from the Owner for Contractor’s completion of the Work in accordance with the Contract Documents (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*-The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*-The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*-See Paragraph 11.01 for definition.
17. *Drawings*-That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*-The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*-The individual or entity named as the Engineer in the Agreement.
20. *Field Order*-A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*-Those requirements set forth in Division 1 of the Specifications.
22. *Hazardous Environmental Condition*-The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, Soil contamination or other materials in such quantities or circumstances that may adversely affect human health or the environment.
23. *Hazardous Waste*-The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*-Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*-Charges, security interests, or encumbrances upon any funds, real property, or personal property which is a part of the Project.
26. *Milestone*-A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
27. *Notice of Award*-The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*-A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*-The Metropolitan District.
30. *PCBs*-Polychlorinated biphenyls.
31. *Petroleum*-Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*-A schedule, prepared and maintained by Contractor and accepted by the Owner, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*-The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*-The documentary information compiled for use by Bidders in preparing a Bid for and performing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*-Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011, et seq.) as amended from time to time.
36. *Resident Project Representative/Inspector*-The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*-Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*-A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*-A schedule, prepared and maintained by Contractor and approved by Owner, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
40. *Shop Drawings*-All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*-Land or areas indicated in the Contract Documents upon which the Work will be performed or which Contractor may use in connection with the performance of the Work, including rights-of-way and easements providing Contractor with access thereto.
42. *Special Provisions* – The part of the Contract Documents which amends or modifies all other contract requirements.
43. *Specifications*-Those specifications set forth in Division 1 through Division 17, inclusive, of the Project Manual.
44. *Subcontractor*-An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
45. *Substantial Completion*-The state of completion of the Work (or a specified part thereof), that, in the opinion of Engineer, is sufficient, and in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.
46. *Successful Bidder*-The Bidder to whom Owner issues a Notice of Award.
47. *Supplemental Conditions*-That part of the Contract Documents which amends or supplements these General Conditions.
48. *Supplier*-A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.

49. *Underground Facilities*-All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
50. *Unit Price Work*-Work to be paid for on the basis of unit prices.
51. *Work*-The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
52. *Work Change Directive*-A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

- A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Documents or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.
- C. *Day:*
1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:*
1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - A. does not conform to the Contract Documents; or
 - B. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

- c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other location specified by Owner or Engineer) ready for use or installation and in usable or operable condition.
2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position at the Site such that said services, materials, or equipment are/is complete and ready for intended use.
3. The words "perform" or "provide," when used in connection with services, materials, or equipment shall mean to furnish and install said services, materials, or equipment at the Site such that said services, materials, or equipment are/is complete and ready for intended use.
4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor shall deliver to Owner, with copies to Engineer and each additional insured identified in the Contract Documents, certificates of insurance (and other evidence of insurance which Owner or any additional insured may reasonably request) which Contractor is required to purchase and maintain in accordance with the requirements of the Contract Documents.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to five (5) printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract time will commence to run on the date provided in the Notice to Proceed.

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 2. a preliminary Schedule of Submittals; and
 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.
- B. *Work Planning Conference:* Within five (5) business days after the submission of the schedules described in subparagraph A above and before any Work at the Site is started, a conference attended by the Owner, Contractor, Engineer, and others as appropriate, will be held to discuss in detail the means and methods proposed to be employed by the Contractor in the performance of the Work and how that impacts the proposed schedule. Particular attention will be given to such means and methods and scheduling as may have an adverse impact on traffic flow in the high traffic areas of the Work to minimize disruptions. If the Contractor has submitted value engineering proposal(s), such proposals will also be discussed.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate in the discretion of the Owner will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference, Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.
- C. If the Contractor or the Owner wishes to make a change in the designated authorized representative during the Contract period, the party wishing to make a change shall notify the other party in writing at least ten (10) business days prior to the change being made. The Contractor shall not be permitted to make such change without the written consent of the Owner. To the extent there is a change in assignment or availability of any of the Contractor's designated authorized representatives, which change is beyond the control of the Contractor, Contractor shall notify the Owner in writing no later than forty-eight (48) hours of such change in assignment or availability. As a result of such change, the Owner shall have the right, in its sole and absolute discretion, to terminate the Contract if it believes such termination to be in the best interests of the Owner.
- D. At this conference Contractor shall designate a representative who will act as the onsite Competent Person as defined by OSHA who has the ability to identify hazardous conditions and must have the authority to take action to maintain a safe workplace.

2.07 *Initial Acceptance of Schedules*

- A. At least ten (10) days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional ten (10) days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until schedules submitted to Engineer are deemed acceptable by Engineer.
1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer

responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents and the following provisions:
 1. In the event of conflicts among the Contract Documents, the Contract Documents shall be construed according to the following order of precedence unless the Contract Documents expressly and specifically provide otherwise:
 - * Highest Precedence: Modifications (to the Agreement after the Agreement is executed)
 - * Second Precedence: Agreement
 - * Third Precedence: Addenda – Addendum with latest date to take precedence
 - * Fourth Precedence: Special Provisions
 - * Fifth Precedence: Supplementary General Conditions
 - * Sixth Precedence: General Conditions
 - * Seventh Precedence: Drawings and Specifications
 2. If, during the performance of the Work, the Contractor finds a conflict, error or discrepancy between or among one or more of the Sections or between or among one or more Sections and the Drawings, the Contractor shall furnish the higher performance requirement. The higher performance requirement shall be considered the equipment, material, device or installation method which represents the most stringent option, the highest quality or the largest quantity.
 3. In all cases, figured dimensions shall govern over scaled dimensions, but work not dimensioned shall be as directed by the Engineer and work not particularly shown, identified, sized, or located shall be the same as similar work that is shown or specified.
 4. Detailed Drawings shall govern over general drawings, larger scale Drawings take precedence over smaller scale Drawings, Change Order Drawings shall govern over Contract Drawings and Contract Drawings shall govern over Shop Drawings.
 5. If the issue of precedence is due to a conflict or discrepancy between the provisions of the Contract Documents and any reference standard, or code of any technical society, organization or association, the provisions of the Contract Documents will take precedence if they are more stringent or presumptively cause a higher level of performance. If there is any conflict or discrepancy between standard specifications, or codes of any technical society, the organization or association, or between Laws and Regulations, the higher performance requirement shall be binding on the Contractor, unless otherwise directed by the Engineer.

6. In the case of discrepancy between the provided Technical Specifications and the referenced municipal or State of Connecticut Department of Transportation (CTDOT) Standard Specifications, the Technical Specifications shall take precedence for the following materials, equipment or Work:
 - a. Sewer, water, combined sewer, tunnel or regulated pipelines or utilities, including related work and appurtenances including but not limited to manholes, hydrants, water and sewer services.
 - b. Sewer flow monitoring equipment and appurtenances.

Municipal or CTDOT Standard Specifications shall take precedence on the following type Work: Stormwater drainage or catch basins, pavement, sidewalks, curbing, driveway and driveway ramps, vehicular and pedestrian traffic control devices and appurtenances, street lighting, permanent signage, and miscellaneous restoration and surficial treatments.

7. In accordance with the intent of the Contract Documents, the Contractor accepts the fact that compliance with the order of precedence specified shall not justify an increase in Contract Price or an extension in Contract Time nor limit in any way, the Contractor's responsibility to comply with all Laws and Regulations at all times.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.
- D. Each and every provision of law and clause required by law to be inserted in these Contract Documents, including without limitation, that required pursuant to Connecticut Agency Regulations §22a-482-4-(g), shall be deemed to be inserted herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be physically amended to make such insertion.

3.02 *Reference Standards*

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

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

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

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 1. A Field Order;
 2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or
 3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

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

3.06 *Electronic Data*

This document has been modified from its original form as an EJCDC document.

- A. Unless otherwise stated in the Special Provisions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall provide Contractor with access to the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's providing Contractor with access to the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. If all lands and rights-of-way are not obtained as herein contemplated before Contractor commences the Work, Contractor shall begin the Work upon such land and rights-of-way as to which Owner has obtained access.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Special Provisions identify:
 - 1. those reports in the possession of Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
 - 2. those drawings in the possession of Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Special Provisions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

This document has been modified from its original form as an EJCDC document.

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Differing Site Conditions - Notice*

1. During the progress of the Work, if subsurface or latent physical conditions are encountered at the Site differing materially from those indicated in the Contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the Work provided for in the Contract, are encountered at the Site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected Work is performed.
2. Upon written notification, the Engineer will investigate the conditions, and if he/she determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of the Work, an adjustment, excluding loss of anticipated profits, will be made and the Contract modified in writing accordingly. The Engineer will notify the Contractor of his/her determination whether or not an adjustment of the Contract is warranted.
3. No Contract adjustment that results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.
4. No Contract adjustment will be allowed under this clause for any effects caused on unchanged work.
5. Note that existing utilities not shown or indicated on the drawings are not a differing site condition under the Contract. They are a normal condition generally encountered and inherent in this type of Work.

B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A.1., Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas

required by the Bidding Documents or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

- c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
- 3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Special Provisions:

- 1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
- 2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. Differing Site Conditions – Existing Utilities Not Shown or Indicated

- 1. The location of all utilities and subsurface structures were taken from survey and records of others, including, but not limited to, the Owner member towns, and other utilities, etc., and are considered approximate, as to size, number of utilities and locations and are indicated on the drawings to give Bidders a general idea of existing conditions. Contractor understands and agrees that contract shall not rely solely upon the drawings for such information, but shall make examinations in the field by various available methods and shall obtain information from municipalities, utilities and other entities as necessary as to the location of all sub-surface structures. It is not warranted that all pipes and underground structures are shown. Under NO circumstances shall the Contractor excavate in any area prior to services mark-outs by the appropriate utility. The Contractor is hereby reminded that the Connecticut General Statutes require notice of utilities of pending excavation at or near their facilities – Contractor shall call “Call Before You Dig” 1-800-922-4455 at least 72 hours prior to beginning excavation.
- 2. Further, the Contractor is hereby advised that all locations of existing pipes, conduits, utilities, foundations and utility house services are not warranted to be correct and the Contractor shall have no claim on that account should they be other than shown. Locations of existing utilities are shown in their approximate locations as represented by utility drawings. Therefore their actual locations may vary. Under no circumstances shall the Contractor excavate in any area prior to service mark-outs by the appropriate utility company.

3. In the event Contractor fails to exercise reasonable care and improperly strikes an underground facility or sub-surface structure, then, in addition to the other responsibilities set forth in this Contract and the other direct costs that may be applied to the Contractor by the respective utility company or owner of such structure, Contractor shall pay to the Owner the sum of \$2,000 for each such underground utility or sub-surface strike as liquidated damages (but not as penalty) to compensate the Owner for administrative, supervisory, engineering, overtime and other costs which are likely to be incurred as a result of the utility or sub-surface strike and which cannot be quantified.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes to or relocations of, such points without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.
- B. Engineer may check the lines, elevations, reference marks, batter boards, etc., set by Contractor, and Contractor shall correct any errors disclosed by such check. Such a check shall not be considered as approval of Contractor's work and shall not relieve Contractor of the responsibility for accurate construction of the entire Work. Contractor shall furnish personnel to assist Engineer in checking lines and grades.
- C. Contractor shall provide stationing and layout in accord with MDC Standard Policy – See Section 01050 Field engineering.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* the Special Provisions identify those reports and drawings in Owner's possession relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Special Provisions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately:
 - (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and

This document has been modified from its original form as an EJCDC document.

- in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefore as provided in Paragraph 10.05.
 - F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefore as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
 - G. NOT USED
 - H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend, and hold harmless Owner and Engineer, and the officers, directors, shareholders, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created or exacerbated by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
 - I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.
- D. In any Contract where a maintenance period or service period is not by title specified, then the Owner's Standard Specifications shall apply.

5.02 *Licensed Sureties and Insurers*

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

5.03 *Certificates of Insurance*

- A. Contractor shall provide, on such certificates of insurance, the following statement in its entirety in the section of the certificate entitled "Description of Operations/Locations/Vehicles/Special Items" -- The Metropolitan District, State of Connecticut, and the Towns of Bloomfield, East Hartford, Hartford, Newington, Rocky Hill, West Hartford, Wethersfield and Windsor (Member Towns) are named as additional insureds with respect to the insured's Commercial General Liability, Automobile Liability and Umbrella Liability Insurance Policies. All insurers waive all rights of Subrogation against the Owner. All insurance is primary for all claims covered thereby. Commercial General Liability Insurance includes contractual liability coverage.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Special Provisions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed consistent with Paragraph 5.04C. and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

This document has been modified from its original form as an EJCDC document.

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
1. provide primary coverage for all claims covered by paragraph 5.04A.3 through 5.04A.6. With respect to insurance required by Paragraph 5.04.A.6 include as additional insured Owner and Engineer, and any other individuals or entities identified in the Special Provisions, all of whom shall be listed as additional insureds and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds.
 2. include at least the specific coverages and be written for not less than the limits of liability provided in the Special Provisions or required by Laws or Regulations, whichever is greater;
 3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
 4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty (30) days' prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Special Provisions to whom a certificate of insurance has been issued except in the event of non-payment of premium, in which case such notice shall be ten (10) days (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
 5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
 6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two (2) years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Special Provisions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and two (2) years thereafter.
- C. The Contractor shall maintain at its own expense during the term of this Contract and any maintenance period provided herein the following insurance covering any claims incurred or arising during the term of or as a result of the Contractor's performance under the Contract which insurance shall be issued by an admitted carrier authorized to do business in the State of Connecticut and having agents upon whom service of process may be made in the State of Connecticut and shall contain at a minimum the following provisions, coverages and policy limits of liability:
1. The Metropolitan District, State of Connecticut, and the Member Towns are to be named as additional named insured's on Commercial General Liability, Automobile Liability and Umbrella Liability Policies.

2. The limits of liability for the following insurance required by this Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by law:
 - a. Commercial General Liability including blanket contractual and products/completed operations coverages. The limits of liability provided shall be no less than One Million Dollars (\$1,000,000) each occurrence, One Million Dollars (\$1,000,000) aggregate. X, C and U coverages must be provided if applicable. Per project aggregate must apply. The Metropolitan District, the Member Towns and the State of Connecticut shall be named as additional insureds.
 - b. Automobile Liability with limits of not less than One Million Dollars (\$1,000,000) combined single limit, including coverage for owned, non-owned, hired and/or borrowed vehicles.
 - c. Workers' Compensation as required by Connecticut law and Employer's Liability with a limit of not less than One Hundred Thousand Dollars (\$100,000) per occurrence, Five Hundred Thousand Dollars (\$500,000) disease policy limit, and One Hundred Thousand Dollars (\$100,000) disease each employee. The policy must cover employees of out of state contractors while working in Connecticut by endorsement/rider or actual policy.
 - d. Umbrella Liability in excess of Employer's Liability, Commercial General Liability, and Automobile Liability with a limit of not less than Five Million Dollars (\$5,000,000) each occurrence, Five Million Dollars (\$5,000,000) aggregate. Coverage is to be written on a following form basis.
 - e. Owners' Protective Liability for and in the name of The Metropolitan District with a per project minimum limit of liability of not less than One Million Dollars (\$1,000,000) each occurrence and One Million Dollars (\$1,000,000) aggregate. (A copy of policy must be provided).
 - f. Environmental Impairment/Pollution Liability covering liability arising out of the pollution or impairment of the environment, including clean-up costs, caused by the performance of the Work of not less than One Million Dollars (\$1,000,000).
3. The Contractor and/or any Subcontractor shall in the case of any blasting activities, provide an endorsement on same to be included on the Comprehensive General Liability policy. Such coverage shall afford the same limits and aggregates and shall be additionally supported by the Umbrella and/or following form Excess Liability Coverage.
4. The Owner may require proof of financial responsibility and/or other securities if any insurance policy indicates self-insured retention below the minimum level of insurance required by the Contract.
5. The acceptance by the Owner of certificates indicating the limits of coverage under any policy or policies shall not limit the liability of the Contractor.
6. The Contractor shall furnish to the Owner a Certificate of Insurance, for each of the above-referenced policies within **ten (10) business days** from the date of its receipt of the notification of award. Failure to do so shall be a default hereunder, entitling the Owner to terminate the Contract. Such certificates must contain information regarding the policies in force, policy numbers, limits, policy periods, and the following provisions; thirty (30) days' prior written notice of any material policy change, nonrenewal, or cancellation shall be given to the Owner, by certified mail, except in the event of non-payment of premium, in which case notice will be ten (10) days. If any insurance policy is cancelled for non-payment of premiums, the Owner shall have the right to pay any such premiums and deduct the amount thereof from amounts due to the Contractor under the Contract.
7. The Contractor shall, prior to commencing the Work, also provide to the Owner a statement from the State Treasurer pursuant to Connecticut General Statutes ("C.G.S.") Section 31-286a that the Contractor is not liable for any workers' compensation payments made pursuant to C.G.S. Section 31-355. The State Treasurer's statement shall be provided to the Owner within fifteen (15) business

days from the date of receipt of the notification of award. Failure to do so shall be a default hereunder entitling the Owner to terminate the Contract.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance – NOT USED*

5.07 *Waiver of Rights*

- A. All insurance policies provided by the Contractor shall contain provisions to the effect that the insurer waives all rights of subrogation against Owner, Engineer any of the insured, and additional insureds (and the officers, directors, shareholders, partners, employees, agents, consultants and subcontractors of each and any of them).
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds – NOT USED*

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

- A. If Owner has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by Contractor in accordance with this Article 5 on the basis of its not complying with the Contract Documents, Owner will notify Contractor in writing thereof within ten (10) days of the date of delivery of such certificates to Owner in accordance with Paragraph 2.01. Contractor will provide such additional information in respect of insurance provided by Contractor as Owner may reasonably request.

5.10 *Partial Utilization, Acknowledgment of Property Insurer – NOT USED*

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible

This document has been modified from its original form as an EJCDC document.

for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

1. Connecticut General Statutes Title 20 Chs. 391 and 393 and the Regulations of Connecticut State Agencies, Title 20: Professional Licenses, Department of Consumer Protection (4) Occupational Licenses, Sec. 20-332 require certain tradesmen to be licensed to perform their work. One or more of those trades may be needed to perform this Project. Prior to performing Work requiring a license, the Contractor shall provide the Owner a list of the names, addresses, effective and expiration dates and license number and a copy of the license for each tradesman holding a contractors or journeyman's license as may be required.
 2. Trades requiring licenses include Plumbing, Electrical and Land Surveyors.
 3. Contractors are urged to consult with the Department of Consumer Protection to resolve any license questions prior to starting work.
- B. At all times during the progress of the Work, Contractor shall assign a competent full time resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. This individual shall be capable of effectively communicating with the Owner, Engineer and others working at the Site or otherwise involved in the Project. It is a substantial and material obligation of the Contractor under the Contract Documents that the Contractor provide competent personnel to supervise the performance of, and to perform, the Work at all times throughout the term of this Contract.
1. Owner shall have the right to reject a superintendent for cause. Contractor shall submit qualifications for review and approval of the Owner both prior to proceeding with the Work and also for any proposed replacement superintendent during the progress of the Work.
- C. Whenever the award for the Base Bid Plus Accepted Alternates is \$2,000,000 or greater, the Contractor shall also employ a competent and qualified full time resident Project Manager for the Project (in addition to a full time resident Superintendent) who shall be dedicated to the Project full time and who shall be acceptable to the Owner. Contractor shall submit Project Manager qualifications for review and approval of the Owner both prior to proceeding with the Work and also for any proposed replacement Project Manager during the progress of the Work. The Project Manager shall represent the Contractor and any communications given to the Project Manager shall be binding as if given to the Contractor. The Project Manager will be assigned to and located at the Project site during and for the duration of the Work

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.
1. The Owner's holidays are as follows:
 - a. New Year's Day
 - b. Martin Luther King Jr. Day
 - c. President's Day
 - d. Good Friday
 - e. Memorial Day
 - f. Independence Day

This document has been modified from its original form as an EJCDC document.

- g. Labor Day
 - h. Columbus Day
 - i. Veteran's Day
 - j. Thanksgiving Day
 - k. Day after Thanksgiving
 - l. 1/2 Day before Christmas
 - m. Christmas Day
 - n. 1/2 Day before New Year's Day
2. The Contractor shall obtain from the Owner a listing of dates when holidays are observed in order to schedule and coordinate all work with the Owner, including all necessary notifications provided in this Contract.
- C. Regular working hours are defined as 8 hours per day, Monday through Friday, excluding Owner's holidays, between the hours of 7:00 AM and 5:00 PM. Note that certain Projects within the City of Hartford/Towns may have more restrictive Permit conditions with respect to start and finish times and working hours. Also note that State Roads may have special work restrictions and requirements for days before and after a Holiday. Requests to work other than regular working hours shall be submitted to Engineer not less than 48 hours prior to any proposed weekend work or scheduled extended work weeks. Occasional unscheduled overtime on weekdays may be permitted provided two hours notice is given to Engineer.
- 1. Requests to work fixed hours other than regular working hours (four 10-hour days, for example) will not be considered until the baseline schedule has been approved. Unless otherwise noted, the baseline schedule shall include regular working hours. Requests to work fixed hours other than regular hours shall include a revised baseline schedule showing a proposed reduction in Contract Time and a narrative explaining the proposed reduction in contract length, benefits to the Project, community, and Owner, etc. Requests to work fixed hours other than regular hours shall be submitted to the Owner for approval in accordance with the Conditions of the Contract. The Owner reserves the right to retract the approval based on performance of the Contractor.
- D. Contractor shall reimburse the Owner for additional engineering, inspection, and/or police costs incurred as a result of overtime work in excess of the regular working hours stipulated in Paragraph 6.02.C. At Owner's option, overtime costs may either be deducted from the Contractor's monthly payment request or deducted from the Contractor's retention prior to release of final payment. Overtime costs for the Owner's personnel shall be based on the individual's current overtime wage rate. Overtime costs for personnel employed by the Engineer or Owner's independent testing laboratory shall be calculated in accordance with the terms of their respective contracts with the Owner.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.
- D. This Agreement is subject to the applicable provisions of the Contract Work Hours and Safety Standards Act, Public Law 87-581, 87th Congress. No Contractor or Subcontractor contracting for any part of the

This document has been modified from its original form as an EJCDC document.

Work shall require or permit any laborer or mechanic to be employed on the Work in excess of forty hours in any work week unless such laborer or mechanic receives compensation at a rate not less than one and one-half times that person's basic rate of pay for all hours worked in excess of forty hours in such work week.

- E. Contractor shall employ only competent persons to do the Work and whenever Owner shall notify Contractor, in writing, that any person on the Work appears to be incompetent, disorderly, or otherwise unsatisfactory, such person shall be removed from the Project and shall not again be employed on it except with the consent of Owner.
- F. Contractor and Subcontractors shall, insofar as practicable, give preference in the hiring of workers for the Project to qualified local residents with first preference being given to citizens of the United States who have served in the armed forces of the United States and have been honorably discharged therefrom or released from active duty therein.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
 - 1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and

- 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
 - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the

Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not subcontract or assign any portion of the Work required by this Contract without the prior written approval of the Owner except for any subcontracted Work identified herein. Contractor shall not employ any Subcontractor, Supplier or other person or organization, (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom Owner may have reasonable objection. Acceptance of any Subcontractor, other person or organization by Owner shall not constitute a waiver of any right of Owner to reject defective Work. Contractor shall not be required to employ any Subcontractor, other person or organization against whom Contractor has reasonable objection.
- B. NOT USED
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 - 2. shall create an obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor. Owner and Engineer may furnish to any such Subcontractor, Supplier or other person or organization, to the extent practicable, information about amounts paid on their behalf to Contractor in accordance with Contractor's Applications for Payment.

This document has been modified from its original form as an EJCDC document.

- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- H. Prior to the commencement of any portion of the Work by a Subcontractor whose subcontract value is equal to or greater than \$500,000, the Contractor shall provide to the Owner a current DAS Contractor Prequalification Certificate for such Subcontractor along with an Update (Bid) Statement.

6.07 *Patent Fees and Royalties*

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

6.08 *Permits*

- A. Unless otherwise provided in the Special Provisions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

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

6.10 *Taxes*

- A. Contractor shall pay all property, sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work. Only the materials and supplies to be used and incorporated in the Work of this Contract are exempt from the Sales and Use Tax of the State of Connecticut. This exemption does not apply to the rental of equipment and use of certain services such as traffic control (flaggers) etc. Contractor is responsible to determine for itself if the exemption applies. Contractor shall obtain the proper certificates, maintain the necessary records and otherwise comply with the requirements of State of Connecticut. Owner will, upon written request, provide documentation of this exemption.

6.11 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend, and hold harmless Owner and Engineer, and the officers, directors, shareholders, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by, arising out of, or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

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

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for the safety and security of the Site, the Work on the Site and for all persons who enter the Site. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs. Refer to Section 00470 for The Metropolitan District Contractor Safety Program. The Special Provisions identify any additional Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to a defect in the Drawings or Specifications of which the Contractor had no knowledge prior to such damage or loss or to the acts or omissions of Owner or Engineer or anyone employed by either of them, or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them or for whose acts any of them may be liable).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- G. The Contract Documents, and the joint and several phases of construction hereby contemplated are to be governed, at all times by applicable provisions of the Federal Law(s), including, but not limited to, the latest amendments of the following:

1. Williams-Steiger Occupational Safety and Health Act of 1970, Public Law 91-596;
 2. 29 CFR Part 1910 - Occupational Safety and Health Standards for General Industry;
 3. 29 CFR Part 1926 - Safety and Health Regulations for Construction;
- H. Contractor is further required under C.G.S. §31-53b(a) to furnish proof with the weekly certified payroll form for the first week each employee begins work on such Project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration within five (5) years from the start of the Project.
1. Contractors are urged to make themselves familiar with the requirements of these regulations.
- 6.14 *Safety Representative*
- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
- 6.15 *Hazard Communication Programs*
- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.
- 6.16 *Emergencies*
- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that the incident giving rise to the emergency action was not the responsibility of the Contractor and that a change in the Contract Documents is required because of the action taken by the Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.
- 6.17 *Shop Drawings and Samples*
- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.
1. *Shop Drawings:*
 - a. Submit number of copies specified in the General Requirements.
 - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.
 2. *Samples:*
 - a. Submit number of Samples specified in the Specifications.

- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures:

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

D. Engineer's Review:

- 1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
- 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
- 3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures:

This document has been modified from its original form as an EJCDC document.

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, including but not limited to changes in the Work, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

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

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall defend, indemnify and hold harmless Owner, any municipality included therein, the State of Connecticut, Engineer, and the officers, directors, shareholders, members, partners, employees, agents, consultants and subcontractors of each and any of them (collectively, the "Indemnitees") from and against all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance (or attempted performance) of the Work, including any maintenance or warranty Work and the use, misuse, or failure of any machinery or equipment (including but not limited to scaffolding, ladders, hoists, rigging and supports) whether or not such machinery was furnished, rented, or loaned by

the Owner or any other Indemnatee. This indemnity shall survive the termination or expiration of this Contract and shall cover all matters arising thereunder or in connection therewith, including but not limited to the following:

1. bodily injury, sickness, disease or death or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, sustained or allegedly sustained by any of the Indemnitees, the Indemnitors (as hereinafter defined), the public, any person on or near the Work, or any other person or property, real or personal (including property of Owner); and caused or allegedly caused in whole or in part by any act, omission or negligence of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable (collectively, the "Indemnitors"), regardless of whether or not caused in part by any act, omission or negligence of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such indemnified party unless caused by the sole negligence of a party indemnified hereunder. If through the acts, omissions or negligence on the part of Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the Work, Contractor shall settle with such other Contractor or Subcontractor by agreement or arbitration if such other Contractor or Subcontractor will so settle. If such other Contractor or Subcontractor shall assert any claim against s any one or more of the Indemnitees on account of any damage alleged to have been sustained, Owner shall notify Contractor, who shall indemnify, defend and save harmless such Indemnitees against any such claims.
 2. Failure of Contractor in any way to comply with the requirements of the Fair Labor Standards Act, as amended, and all other applicable Laws and Regulations (including but not limited to the Occupational Safety and Health Act of 1970) or any term or provision of the Contract or General Conditions.
- B. Contractor shall indemnify, defend and save harmless the Indemnitees, from all claims for payment of labor used on and materials furnished for the Work, including taxes applicable thereto, all claims for damages sustained or alleged to be sustained in consequence of any improper materials, implements or labor used, or resulting from any violation by the Contractor, its employees, subcontractors, material suppliers or agents of any law, municipal ordinance or any regulation, decree or order of any governmental agency having jurisdiction over the Work or any part thereof, or because of pauper or indigent employees brought to any city or town for the performance of the Work and having no settlement therein and all claims against the Indemnitees for alleged infringement of patents by the Indemnitees or by reason of any method of construction used in the Work or the use of any appliance, process, apparatus or material which may be furnished under the Contract.
- C. In any and all claims against any of the Indemnitees by any employee (or the survivor or personal representative of such employee) of any of the Indemnitors, the indemnification obligation under Paragraphs 6.20.A and 6.20.B shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- D. The indemnification obligations of Contractor under Paragraphs 6.20.A and 6.20.B shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.
- E. If Contractor fails to defend any Indemnatee hereunder, such Indemnatee may defend any suit, action or other legal proceeding and the costs thereof (including, without limitation, attorneys' fees) shall be

included as part of the loss, cost, damage and expense covered by the foregoing indemnities of Contractor.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance criteria or design criteria contained in the Contract Documents.

6.22 *Excavations Near Underground Utility Facilities*

A. GENERAL

- 1. In compliance with the State of Connecticut Public Act No. 87-71 and section 16-345 of the Regulations of Connecticut State Agencies (RCSA) and any modifications or updates thereto, "An Act Concerning Excavations Near Underground Utility Facilities", the Contractor shall not start any kind of excavation and/or blasting of rock activity near the location of any kind of public utility facility without having first ascertained the location of all such utilities in the area.
- 2. For this, Contractor shall notify CBYD (Call Before You Dig, Inc.)(Toll Free No. 1-800-922-4455) at least two (2) full working days in advance (excluding Saturday, Sunday and Holidays), but not more than one (1) month before starting any such work. Such notice shall include the name, address and telephone number of the person/agency performing the Work and the date and type of excavation. The CBYD will immediately transmit such information to the utility companies whose facilities may be affected. Utility companies receiving notice shall mark-up the locations of their utilities on site and/or inform the Contractor if they do not have their utilities in the area. If the Contractor does not receive any information or mark-up of the locations on site, Contractor shall contact CBYD and verify if the utility companies have responded to Contractor's call. Under no circumstances, shall the Contractor be allowed to start any kind of excavation and/or blasting work prior to **obtaining all the necessary information regarding the location of underground utilities at the Site**. It will be the Contractor's responsibility to contact and have all utilities marked on Site prior to starting the Work. Contractor shall coordinate construction activities with all utility company facility relocations and replacements. Contractor shall provide adequate support and protection of all existing facilities in accordance with the utility companies' standards. All utility relocations and replacements on municipal property shall be paid for by the respective utility

company. All utility facility relocations and replacements on private property shall be at the Contractor's expense.

3. In addition to contacting the CBYD, the Contractor shall also contact the applicable water company 48 hours prior to any blasting of rock or work in close proximity to the water main facilities.
4. Contractor should be aware that the Contract Drawings may not indicate all subsurface structures or utilities. Contractor shall be responsible for making all necessary investigations including exploratory excavations, by hand digging, as Contractor deems necessary to uncover and determine the exact locations of utilities and structures and shall have no claims for delay damages due to encountering subsurface structures or utilities shown or not shown on the Contract Drawings.

6.23 *Sanitary Regulations*

- A. Adequate sanitary conveniences for use of workers on the Site, properly secluded from public observation, shall be provided and maintained by the Contractor in accordance with the requirements of local and State health authorities and in such manner and at such points as shall be approved and their compliance with this paragraph shall be strictly enforced. Sanitary waste shall be treated and disposed of in a manner satisfactory to and as directed by the Owner and the local and State health authorities; under no circumstances shall sanitary wastes be allowed to flow on the surface of the ground.
- B. Contractor shall rigorously prohibit the committing of nuisances upon the lanes or rights-of-way of the Owner, about the Project or upon adjacent public or private property.
- C. The cost of the sanitary conveniences and maintaining same will not be paid for separately, but compensation will be considered to be included in the prices stipulated for the appropriate items of Work as listed in the Bid.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 1. written notice thereof will be given to Contractor prior to starting any such other work; and
 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefore as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for

the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Special Provisions:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Special Provisions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

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

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing access to lands and easements thereto and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of

This document has been modified from its original form as an EJCDC document.

subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance – NOT USED*

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements – NOT USED*

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

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

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or

have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. Engineer may furnish a Resident Project Representative and assistants to assist Engineer in observing the performance of the Work. If the Engineer is a consultant to the Owner, the duties and responsibilities of the Resident Project Representative will be as enumerated in the Engineer's Contract and will be made available to Contractor at the start of the Work.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefore as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

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

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

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

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the

interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. The Engineer will issue and sign a Work Change Directive (WCD) to the Contractor outlining the scope of the change and addressing the Basis of Payment for the changed work whether agreed or to be negotiated. Upon receipt of any such document, Contractor shall promptly proceed with

This document has been modified from its original form as an EJCDC document.

the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefore as provided in Paragraph 10.05.
- C. Additional bond premium associated with the cost of Change Orders may be charged at an allowance rate of 1.5% of the cost of the authorized change. The total sum of all bond premiums so charged will be adjusted in the final Application for Payment as supported by written documentation from the surety of the actual premium increases charged and that the penal sum of the original bonds was increased. Should no documentation be provided, all premiums paid shall be refunded.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.
- B. The Contractor shall notify the bonding company at each \$250,000 increase to the contract value as the cumulative result of Change Orders. A copy of the Consent of Surety must be provided to the Owner prior to the execution of any Change Order which exceeds each cumulative \$250,000.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start

- of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include one foreman per crew (unless agreed by the Owner and the Contractor prior to beginning Work). Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

- a. Before starting work at the site, Contractor shall submit to the Owner and Engineer the Direct Labor Cost percentage. This percentage, where approved by Owner, will be used in the determination of the Direct Labor Cost listed in the Change Order Form. The Direct Labor Costs are defined to include social security contributions, unemployment, excise and payroll taxes, workers' and workmen's compensation, health and retirement benefits, sick leave, vacation and holiday pay, and cost of premiums for all additional insurance required because of changes in the Work.
2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors, including all associated costs and fees. If required by Owner, Contractor shall obtain competitive bids from Subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. All supplemental Costs are subject to the Owner's prior approval. Supplemental Costs shall include the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Payment for rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others. With respect to changes or price adjustments, the calculation of payment shall be the lesser of any rental agreement effective for the Project or the fair rental price provided in the latest edition, at the time the Work is performed, of the "Rental Rate Blue Book" as prepared and published by Equipment Watch, a copy of which is on file in the office of the Engineer. It is agreed that this rate includes any and all overhead and profit and no additional markup will be approved. The maximum hourly rate to be used in paying for equipment shall be the applicable monthly rate in the Rental Rate Blue Book, divided by 176 (176 working hours per month). For idle equipment, compensation shall be no greater than 50% of the applicable rate (exclusive of operating costs). If the equipment is used to perform work for more than eight (8) hours in a day, the applicable hourly rate will apply to actual time of use; however a piece of equipment shall not be considered idle beyond eight (8) hours during a given day.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work, provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telephone service at the Site, express and courier services and similar petty cash items incurred in the performance of the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

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

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- 6. Any incurred state, municipal, or personal property taxes or other assessments.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

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

B. *Cash Allowances:*

1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 2. there is no corresponding adjustment with respect to any other item of Work; and
 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

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

12.01 *Change of Contract Price*

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

- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor based on subcontractor's Cost of the Work;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five (5) percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.
 - g. The overhead and profit fees stated include all overhead cost, including home office and general administrative costs.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefore as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

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

13.01 *Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

This document has been modified from its original form as an EJCDC document.

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
 - D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
 - E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
 - F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefore as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefore as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

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

Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

- B. If Owner stops Work under Paragraph 13.05A, Contractor shall not be entitled to an extension of Contract Time or an increase in Contract Price.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefore as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefore as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

This document has been modified from its original form as an EJCDC document.

A. Applications for Payments:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. Applications for Payment submitted by the Contractor shall be for the monthly period ending on the last day of each month. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. Prior to the Work being 50% (percent) complete, progress payments will be in an amount equal to 95% of the value of the Work completed, less, the aggregate of payments previously made. At the time that the Work is 50% complete, provided the Contractor is making satisfactory progress, the percentage of progress payments previously retained shall be reduced from 5% to 2% and, until such time as Substantial Completion of the Work is achieved, further progress payments shall be in an amount equal to 98% of the value of the Work completed, less, the aggregate of payments previously made. Note that satisfactory progress will be determined, in part, on the Contractor in-progress 50% Completion Evaluation.
4. Each Application for Payment submitted by the Contractor shall include a statement that complies with the requirements of C.G.S. § 49-41a(b) as it relates to pending construction change orders, other pending change directives and approved changes to the original contract or subcontract. If the Owner determines, in its sole and absolute discretion, that the Contractor is not making satisfactory progress on the Work or there is other specific cause, the Owner may continue with or reinstate the retention from progress payments up to 5%.
5. Each Application for Payment submitted by Contractor shall include certified payrolls from the Contractor and each Subcontractor. If a Subcontractor's work has been completed during the period covered by the Application for Payment, such Subcontractor's certified payroll shall be marked "final". If the Contractor or a Subcontractor has not completed its work on the Project but performed no work during the period covered by the Application for Payment, the certified payroll submitted by the Contractor or such Subcontractor shall reflect that no work was performed.
6. Non-recurring costs will be paid at the time of occurrence. Recurring costs will be paid in proportion to the percent of completion of the Project.
7. The Owner will pay for materials stored and not yet incorporated into the Work only under special circumstances and at its sole discretion. In the event that the Owner does elect to pay for stored materials, such payment will be in accordance with the following conditions:
 - a. It will be expressly understood and agreed the following documentation will be provided:
 1. List of materials being stored
 2. Location of where materials are being stored
 3. Certificate of Insurance naming Owner and Agency Cities and Towns as additional insureds as in MDC Insurance Form INS390.

4. Written Consent of Surety to payment for stored materials in accord with Standard Form 1414 (Rev. 5-97).
5. Invoice for the material from the supplier.
- b. It is expressly understood and agreed that the ownership of the material shall remain with the Contractor, as shall be the responsibility and cost for storage, maintenance, handling, insurance, etc. The balance of payment for this item will be made when the material is installed and approved for payment by the Owner in the normal manner. The Contractor hereby warrants and guarantees that payment for this material does not relieve Contractor and its Supplier of any responsibility for same and that their bonding company has been notified of this Agreement and consents to payment being made under these terms.
- c. Further, in the event the Contractor defaults or is otherwise terminated, for any reason, pursuant to the Contract, ownership of the material shall immediately vest in the Owner without any claim of the Contractor. The Owner reserves the right, in the event of termination, to seek damages against the Contractor for reimbursement of the monies paid under this sub-line item if the materials are not turned over to the Owner or for damages if the materials are not in good condition upon being turned over to the Owner.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or

- b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

1. The Contractor shall be entitled to payment in accordance with the Engineer's recommendations thirty (30) days after Engineer's approval of Contractor's Application for Payment. Payment shall be subject to the provisions of Paragraph 14.02.D. The Contractor shall review a pencil copy of the proposed Application for Payment with the Engineer prior to the formal submission of the monthly Application for Payment. The Engineer will review the Application for Payment and will be responsible for approval or rejection of the Application for Payment.
2. Contractor shall pay all subcontractors within fifteen (15) days after Contractor receives payment from the Owner for Work performed by such Subcontractors and included in the submitted Application for Payment. The Owner has the right to request and the Contractor shall promptly supply, evidence satisfactory to the Owner that Subcontractors required to be paid hereunder have in fact been paid. If the Contractor fails to provide such evidence of payment upon Owner's request, the Owner shall be entitled to withdraw previous approvals and deduct the amount of such un evidenced payment from the next submitted Application for Payment. To the extent that the Contractor is entitled under the Contract to submit an Application for Payment for materials and equipment stored and not yet incorporated, the provisions of this paragraph shall apply. CONTRACTOR agrees to include in its subcontracts a provision requiring each Subcontractor to pay any amounts due any of its Subcontractors, whether for labor performed or materials furnished, within thirty (30) days after such Subcontractor receives a payment from the Contractor which encompasses labor or materials furnished by such Subcontractor.
3. Should Owner receive written notice from any Subcontractor that the Contractor has failed to make payment to the Subcontractor as required hereunder, Owner shall deliver to the Contractor a copy of such notice. If the Contractor fails to either (i) make payment to the Subcontractor; or (ii) provide to the Owner a satisfactory written explanation of Contractor's legitimate and good faith defense to payment within thirty (30) days after delivery of a copy of such notice, Owner may pay

such claim and deduct the amount thereof from the balance due Contractor. Owner may also, with the written consent of Contractor, use any monies retained, due, or to become due under this Contract for the purpose of paying for both labor and materials for the Work.

4. Security is provided both by the Payment Bond and the power of Owner to retain any monies for payments to Subcontractors, but payment by one shall in no way impair or discharge the liability of the other.
5. To the extent that lien rights exist in favor of any Subcontractor, if any, all liens for work and materials may be paid off by Owner within a reasonable time after filing for record in accordance with State and local laws a notice of such liens except where the claim on which the lien is filed is being litigated by Contractor. In such case, owner may pay the amount of any final judgment or decree or any such claim of nonpayment within a reasonable time after such final judgment or decree shall be rendered.
6. All monies paid by Owner in settlement of claims of nonpayment made by Subcontractors or liens as aforesaid, with the costs and expenses incurred by Owner in connection therewith, shall be charged to Contractor, shall bear interest at the rate of three percentage points above the rediscount rate then charged by the Federal Reserve Bank, and shall be deducted from the next payment due Contractor under the terms of this Contract.

D. Reduction in Payment:

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 Contractor's Warranty of Title

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.
- B. No materials or supplies for the Work shall be purchased by Contractor or Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. Contractor warrants that Contractor has good title to all materials and supplies used by Contractor in the Work, free from all liens, claims or encumbrances.
- C. Contractor shall defend, indemnify and save Owner and Engineer harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of

machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. Contractor shall at Owner's request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If Contractor fails to do so, then Owner may, after having served written notice on the said Contractor either pay unpaid bills, of which Owner has written notice, direct, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to Contractor shall be resumed, in accordance with the terms of this Contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon Owner to either Contractor or Contractor's Surety. In paying any unpaid bills of the Contractor, Owner shall be deemed the agent of Contractor and any payment so made by Owner shall be considered as payment made under the Contract by Owner to Contractor and Owner shall not be liable to Contractor for any such payment made in good faith.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees including the sums to be set aside for warranty completion work. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete.

If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. NOT USED

14.06 *Final Inspection*

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

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

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

This document has been modified from its original form as an EJCDC document.

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation - all as required by the Contract Documents, Engineer will confirm the reasonable sum, no less than 1%, to be held as retainage to assure the completion of warranty work as may be required under Section 13.07. Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. Thereupon, Engineer will give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment. If the Application for Payment and accompanying documentation are in compliance with the requirements of the Contract Documents both as to form and substance, Owner shall, in accordance with the applicable State or local law, pay Contractor the amount recommended by Engineer.

C. Payment Becomes Due:

1. Thirty days (30) after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.
2. Provided that any work required under Section 13.07 has been completed or not required, the warranty retainage held shall be paid one year from the date of Substantial Completion or one year from the completion of warranty work, whichever is later, less any costs collectible under Section 13.07.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

This document has been modified from its original form as an EJCDC document.

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than ninety (90) consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.
- B. Should Contractor be shut down at any time for more than one (1) week, Contractor is required to remove all equipment from the Project. Equipment shall not be stored on public or private property without written approval from the Owner. No payments will be made for equipment not used during shutdown.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 - 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 - 3. Contractor's repeated disregard of the authority of Engineer; or
 - 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
 - 5. If Contractor abandons the Work, or sublets this Contract or any part thereof, without the previous written consent of Owner, or if the Contract or any claim thereunder shall be assigned by Contractor otherwise than as herein expressly permitted.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
 - 1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 - 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 - 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.
- C. Should Contractor elect to shut down at any time for more than one week, Contractor is required to remove all equipment from the Project. Equipment shall not be stored on public or private property without written approval from the Owner. No payments will be made for equipment not used during shutdown.

ARTICLE 16 – DISPUTE RESOLUTION

This document has been modified from its original form as an EJCDC document.

16.01 *Methods and Procedures*

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of this Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association (or such other recognized dispute resolution organization as is mutually satisfactory to the parties hereto) and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 - 1. elects in writing to invoke any dispute resolution process provided for in the Special Provisions; or
 - 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 - 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.
- D. Contractor shall carry on the Work and maintain the progress schedule during the dispute resolution proceedings, unless otherwise agreed by Contractor and Owner in writing.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

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

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

17.07 *Addresses*

- A. Both the address given in the Bid Form upon which this Agreement is founded, and Contractor's office at or near the site of the Work are hereby designated as places to either of which notices, letters, and other communications to Contractor shall be certified, mailed, or delivered. The delivering at the above named place, or depositing in a postpaid wrapper directed to the first-named place, in any post office box regularly maintained by the post office department, of any notice, letter or other communication to Contractor shall be deemed sufficient service thereof upon Contractor; and the date of said service shall be the date of such delivery or mailing. The first-named address may be changed at any time by an instrument in writing, executed and acknowledged by Contractor, and delivered to Owner and Engineer. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter, or other communication upon Contractor personally.

17.08 *Wage Rates*

- A. The requirements and provisions of all applicable laws and any amendments thereof or additions thereto as to the employment of labor, and to the schedule of minimum wage rates established in compliance with laws shall be a part of these Contract Documents. Copies of the wage schedules are included in the Special Provisions. If, after the Notice of Award, it becomes necessary to employ any person in a trade or occupation not classified in the wage determinations, such person shall be paid at not less than such rates as shall be determined by the officials administering the laws mentioned above. Such approved minimum rate shall be retroactive to the time of the initial employment of such person in such trade or occupation. Contractor shall notify Owner of Contractor's intention to employ persons in trades or occupations not classified in sufficient time for Owner to obtain approved rates for such trades or occupations.
- B. The schedules of wages referred to above are minimum rates only, but Owner will not consider any claims for additional compensation made by Contractor because of payment by Contractor of any wage rate in excess of the applicable rate contained in these Contract Documents. All disputes in regard to the payment of wages in excess of these specified in the schedules shall be resolved by Contractor.
- C. The said schedules of wages shall continue to be the minimum rates to be paid during the life of this Agreement and a legible copy of said schedules shall be kept posted in a conspicuous place at the site of the Work.

17.09 *Revenue Services Certificate and State Treasurer Statement*

- A. COMMISSIONER OF REVENUE SERVICES CERTIFICATE. The successful Bidder, if a non-resident Contractor shall obtain prior to commencing the Work a certificate from the Commissioner of Revenue Services that the requirements of C.G.S. Section 12-430(7), which require a non-resident Contractor to deposit a sum equivalent to five percent (5%) of the total amount of the contract or a guaranty bond in a like amount with the Commissioner of Revenue Services to secure payment of the sales and use tax, have been met or do not apply to the Work.

This document has been modified from its original form as an EJCDC document.

- B. In addition, the successful Bidder, if a non-resident Contractor, must comply with the conditions set forth in C.G.S. Section 31-225(I) regarding the filing of a bond with the Labor Commissioner to secure the payment of unpaid unemployment compensation contributions, interest and penalties due and attributable to the Work and must submit proof such compliance prior to commencing the Work.
- C. STATEMENT OF STATE TREASURER. The successful Bidder shall provide to the Owner a statement from the State Treasurer pursuant to C.G.S. Section 31-286a that the successful Bidder is not liable for any workers' compensation payments made pursuant to C.G.S. Section 31-355.

17.10 *Severability*

- A. If any term or provision of this Contract shall be found to be illegal or unenforceable then such term or provision shall be deemed stricken and the remaining portions of this Contract shall remain in full force and effect.

17.11 *Price Reduction for Defective Cost or Pricing Data*

- A. The Contractor and Subcontractor, where appropriate, warrant that cost and pricing data submitted for evaluation with respect to negotiation of prices for negotiated contracts, lower tier subcontracts and change orders is based on current, accurate, and complete data supported by their books and records. If the Owner determines that any price (including profit) negotiated in connection with this Contract, any lower tier subcontract, or any amendment thereunder was increased by any significant sums because the data provided was incomplete, inaccurate, or not current at the time of submission, then such price, cost, or profit shall be reduced accordingly, and the Contract shall be modified in writing to reflect such reduction. Failure to agree on a reduction shall be subject to the claims provision of this Agreement.

17.12 *Audit; Access to Records*

- A. The Contractor shall maintain books, records, documents, and other evidence directly pertinent to performance on grant work under this Contract in accordance with generally accepted accounting principles and practices consistently applied. The Contractor shall also maintain the financial information and data used by the Contractor in the preparation or support of the cost submission required under RCSA Section 22a-482-4(i)(6) for any negotiated contract or change order and a copy of the cost summary submitted to the Owner. The Owner or any authorized representatives shall have access to all such books, records, documents, and other evidence for the purpose of inspection, audit and copying during normal business hours. The Contractor will provide proper facilities for such access and inspection.
- B. If this is a formally advertised, competitively awarded, fixed price Contract, the Contractor agrees to make subparagraphs (A) to (F), inclusive, of this paragraph applicable to all negotiated change orders and contract amendments affecting the Contract Price. In the case of all other types of prime contracts, the Contractor agrees to include subparagraphs (A) to (F), inclusive, of this paragraph in all his subcontracts in excess of \$10,000 and to make subparagraphs (A) through (F), inclusive, of this paragraph applicable to all change orders directly related to Project performance.
- C. Audits conducted under this paragraph shall be in accordance with generally accepted auditing standards and established procedures and guidelines of the reviewing or audit departments and shall meet the requirements of C.G.S. Section 7-396a.
- D. The Contractor agrees to disclose all information and reports resulting from access to records under subparagraphs (A) and (B) of this paragraph to any of the parties referred to in subparagraph (A) of this paragraph.
- E. Records under subparagraphs (A) and (B) of this paragraph shall be maintained and made available during performance on assisted work under this Contract and until three years from the date of final state payment for the Project. In addition, those records which relate to any dispute appeal arising under a grant assistance agreement, to litigation, to the settlement of claims arising out of such performance, or

to costs or items to which an audit exception has been taken, shall be maintained and made available until three years after the date of resolution of such appeal, litigation, claim, or exception.

- F. This right of access provision (with respect to financial records) applies to: (i) negotiated prime subagreements; (ii) negotiated change orders or contract amendments in excess of \$10,000 affecting the price of any formally advertised, competitively awarded, fixed price Contract; and (iii) subcontracts or purchase orders under any Contract other than a formally advertised, competitively awarded, fixed price Contract. However, this right of access does not apply to a prime Contract, lower tier subcontract, or purchase order awarded after effective price competition, except with respect to records pertaining directly to Contract performance, (excluding any financial records of the Contractor), if there is any indication that fraud, gross abuse, or corrupt practices may be involved or if the Contract is terminated for default or for convenience.

17.13 *Covenant Against Contingent Fees*

- A. The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this Contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty the Owner shall have the right to annul this Agreement without liability or, at its discretion, to deduct from the Contract Price or consideration, or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

17.14 *Gratuities*

- A. If the Owner finds, after a notice and hearing, that the Contractor, or any of the Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of the Owner or the state, in an attempt to secure a contract or favorable treatment in awarding, amending, or making any determinations related to the performance of the Contract, the Owner may, by written notice to the Contractor, terminate the Contract. The Owner may also pursue other rights and remedies that the law or the Contract provides. However, the existence of the facts on which the Owner bases such findings shall be in issue and may be reviewed in proceedings under Article 16 of the Standard General Conditions.
- B. In the event this Contract is terminated, as provided in subparagraph (A) of this paragraph, the Owner may pursue the same remedies against the Contractor as it could pursue in the event of a breach of the Contract by the Contractor and, as a penalty, in addition to any other damages to which it may be entitled by law, may pursue exemplary damages in an amount (as determined by the Owner) which shall be not less than three nor more than ten times the costs the Contractor incurs in providing any such gratuities to any such officer or employee.

17.15 *Significantly Important Archaeological Resources*

- A. For the Contractor's information, the Engineer has no information suggesting that the Project sites are of archeological significance.
- B. Should the Contractor or Engineer discover evidence of remains, such as stone masonry building foundations, bones or other items of archaeological significance, Contractor shall report these findings to (1) Owner, (2) Local Historical Society, (3) State Historic Preservation Office (860) 256-2761, and (4) Resident Project Representative, and shall exercise the utmost care to ensure that these areas remain undisturbed. Contractor shall allow recovery of such finds by the authorities, shall not remove such artifacts under penalty of law, and shall prevent constriction or private vehicles from crossing over these areas. In addition, when directed by the Engineer, cover these areas with 1-ft common fill to the limits directed by the Engineer. Be advised that graves and any associated human remains are protected by Connecticut State law (C.G.S. Section 10-388 and 10-390). Any possible human skeletal remains must be reported to the State Archaeologist (860) 486-5248 and the State's Chief Medical Examiner (860) 679-3980 immediately upon discovery. If the State Archaeologist is unavailable, please contact the State Historic Preservation Office at the number above for immediate assistance.

END OF SECTION

This document has been modified from its original form as an EJCDC document.

GENERAL CONDITIONS – PART II

TABLE OF CONTENTS

STATE AND LOCAL PROVISIONS

00720	ADDITIONAL ARTICLES
00720.01-A1	REQUIRED CONNECTICUT GENERAL STATUTES (SECTION 4a-60)
00720.01-A2	CONTRACTOR’S EXEMPT PURCHASE CERTIFICATE (CERT-141)
00720.01-B	EXECUTIVE ORDER NO. 3
00720.01-C	EXECUTIVE ORDER NO. 17
00720.01-D	EXECUTIVE ORDER NO. 16
00720.02	WAGE RATE REQUIREMENTS
00728	UTILITY TELEPHONE NUMBERS
00730	DEPARTMENT OF LABOR AND OSHA REQUIREMENTS
	<i>(See Special Provisions)</i>
00760	LIST OF DRAWINGS
00773	THE METROPOLITAN DISTRICT “NO BID” RESPONSE FORM

The following subsections are set forth here as required by section 4a-60 of the Connecticut General Statutes and shall be set forth in all Subcontracts:

(a) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut. The contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved; (1) the contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the commission; (3) the contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the commission advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the contractor agrees to comply with each provision of this section and sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to sections 46a-56, 46a-68e and 46a-68f; (5) the contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of this section and section 46a-56.

(b) If the contract is a public works contract, the contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works project.

The following subsections are set forth herein as required by section 4a-60a of the Connecticut General statutes and shall be set forth in all Subcontracts:

(1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for

employment; (3) the contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to section 46a-56; and (4) the contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor which relate to the provisions of this section and section 46a-56.

Executive Orders of the Governor

This Contract and all Subcontracts are subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of this Contract as if they had been fully set forth in it. This provision shall be set forth and incorporated in all Subcontracts.

STATE AND LOCAL PROVISIONS

Federal, State and Local Government Provisions included herein, have been selected from those to which specific references have been made elsewhere in the Contract Documents. Each and every other provision of law or clause required by law to be inserted in this Contract shall be deemed to be also inserted herein in accordance with paragraph 3.01D of the General Conditions.

Education, Welfare, and Public Health Tax (Sales and Use Tax)

The CONTRACTOR's attention is called to Regulation 12-426-18 as amended, promulgated by the Sales and Use Tax Division of the State Department of Revenue Services, which provided for the exemption of the sales and use tax on the purchase of such materials and supplies as are to be physically incorporated in and become a permanent part of the project being performed under this contract. The CONTRACTOR may avail himself of the savings of this tax and shall take this exemption into account in calculating his bid for this work. The CONTRACTOR or Subcontractor shall furnish his suppliers with a completed certificate using the Department of Revenue Services CERT-141 Form attached in Section 00720.A2.

Contractor's Exempt Purchase Certificate

General Purpose: Contractors for the repair, alteration, improvement, remodeling, or construction of real property use this certificate to purchase materials and supplies to be installed or placed in a project being performed under contract with an exempt entity. The materials and supplies, including tangible personal property that remains tangible personal property after its installation or placement, must remain in the project after its completion. If the tangible personal property is not used in the manner described above, a contractor who claimed an exemption owes use tax on the total price of the tangible personal property.

Wherever the term contractor is used in this certificate, it includes subcontractors of the contractor performing a contract with an exempt entity.

Exempt entity means any person entitled to make purchases of tangible personal property exempt from sales and use taxes under the statutory authority listed in the instructions.

Name of exempt entity	Address	CT Tax Registration Number (If none, explain.)	Federal Employer ID Number
Address of project			
Type of exempt entity (See instructions.) <input type="checkbox"/> Connecticut state government: Enter the exemption number. _____ <input type="checkbox"/> Charitable or religious organization: Enter the exemption number if any. _____ <input type="checkbox"/> Other (Explain.) _____			
<input type="checkbox"/> Connecticut municipality <input type="checkbox"/> Federal government			
Name of purchaser	Address	CT Tax Registration Number (If none, explain.)	Federal Employer ID Number
Name of seller	Address	CT Tax Registration Number (If none, explain.)	Federal Employer ID Number
Provide a written description of each item purchased. Attach additional sheets if necessary.			
Check one box: <input type="checkbox"/> Blanket certificate <input type="checkbox"/> Certificate for one purchase only			

Declaration by Purchaser: The item(s) described above are tangible personal property to be installed or placed in a project being performed under contract with the exempt entity identified above and will remain in the project after its completion. I declare that the purchaser named above is a contractor under contract with the exempt entity or a subcontractor of the contractor. I acknowledge that the purchaser will be liable for Connecticut use tax, plus applicable penalty and interest as of the date of purchase, on the total purchase price of the property if any of the requirements for the exemption are not present or are not met.

I declare under penalty of law that I have examined this document (including any accompanying schedules and statements) and, to the best of my knowledge and belief, it is true, complete, and correct. I understand the penalty for willfully delivering a false return or document to the Department of Revenue Services (DRS) is a fine of not more than \$5,000 or imprisonment for not more than five years, or both.

Name of purchaser

By:

Authorized signature

Title

Date

Statutory and Regulatory Authority

- Conn. Agencies Regs. §12-426-18;
- Conn. Gen. Stat. §12-412(1) and (2), the United States, the State of Connecticut, or any political subdivisions or agencies of the State of Connecticut; for example state or municipal schools, universities, police, municipal fire departments, and state or municipal libraries. Only Connecticut state agencies have been issued an exemption number that can be entered on this form;
- Conn. Gen. Stat. §12-412(5), nonprofit charitable hospitals, nonprofit nursing homes, nonprofit rest homes and nonprofit residential care homes; and an acute care, for-profit hospital, in operation as of May 12, 2004;
- Conn. Gen. Stat. §12-412(8), Internal Revenue Code §501(c)(3) or (13) organizations exempt from federal income tax. Only charitable or religious organizations that applied to the Department of Revenue Services (DRS) prior to 7/1/95 were issued a Connecticut exemption permit number that can be entered on this form. Other charitable or religious organizations have not been issued a permit number and will leave that space blank;
- Conn. Gen. Stat. § 12-412(84), for purchases with regard to the Connecticut Technology Park;
- Conn. Gen. Stat. § 12-412(90), water companies;
- Conn. Gen. Stat. § 12-412(92), the Connecticut Resources Recovery Authority;
- Conn. Gen. Stat. § 12-412(93), tourism districts;
- Conn. Gen. Stat. § 12-412(95), solid waste-to-energy facilities;
- Conn. Gen. Stat. §7-273mm, municipal or regional resource recovery authorities; and
- Conn. Gen. Stat. § 16-344, the Metropolitan Transportation Authority or subsidiary in connection with the New Haven commuter railroad service.

Instructions for the Purchaser: Use this certificate for purchases of tangible personal property to be installed or placed in a project being performed under a contract with an exempt entity that will remain in the project after its completion. To qualify for the exemption from sales and use taxes, you must present this certificate to the retailer at the time of the purchase of the qualifying tangible personal property. For at least six years from the date it is issued, keep a copy of this certificate and records that substantiate the information entered on this certificate including records to support the contractor's use of this certificate and to show the disposition of all materials or supplies purchased.

If you are unable to designate the exact amount of materials or supplies to be installed or placed in a project being performed under contract with an exempt entity, you must estimate the amount of the purchases. You will be held strictly accountable for any use tax due the state on the purchases in the event of any use other than the permanent installation or placement of the purchases in the exempt project identified in this certificate.

Contractors are the consumers of all the tools, supplies, and equipment used in fulfilling a construction contract that are not installed or placed in the exempt job even if they are used up during the job.

Instructions for the Seller: Acceptance of this certificate, when properly completed, relieves the seller from the burden of proving that tangible personal property is not subject to sales and use taxes when the tangible personal property will be installed or placed in a project being performed under a contract with an exempt entity and will remain in the project after its completion. The certificate is valid only if taken in good faith from a contractor under contract with an exempt entity. The good faith of the seller will be questioned if the seller knows of, or should know of, facts that suggest the contractor does not intend to install or place the property in a project being performed under contract with an exempt entity.

Keep this certificate and bills or invoices to the purchaser for at least six years from the date of purchase. The bills, invoices, or records covering the purchase made under this certificate must be marked to indicate an exempt purchase was made. The words "Exempt under CERT-141" satisfy the requirement.

This certificate may be used for individual purchases, in which case the box marked "Certificate for One Purchase Only" must be checked. This certificate may also be used for a continuing line of exempt purchases for the project identified in this certificate, in which case the box marked "Blanket Certificate" must be checked. A blanket certificate remains in effect for three years unless the purchaser revokes it in writing before the period expires.

For More Information: Call Taxpayer Services at 1-800-382-9463 (Connecticut calls outside the Greater Hartford calling area only) or 860-297-5962 (from anywhere). **TTY, TDD, and Text Telephone users** only may transmit inquiries anytime by calling 860-297-4911. Visit the DRS website at www.ct.gov/DRS to preview and download forms and publications.

EXECUTIVE ORDER NO. THREE

STATE OF CONNECTICUT
BY HIS EXCELLENCY
THOMAS J. MESKILL
GOVERNOR
EXECUTIVE ORDER NO. THREE

WHEREAS, sections 4-61d (b) and 4-11a of the 1969 supplement to the general statutes require nondiscrimination clauses in state contracts and subcontracts for construction on public buildings, other public works and goods and services and

WHEREAS, section 4-61e (c) of the 1969 supplement to the general statutes requires the labor department to encourage and enforce compliance with this policy by both employers and labor unions, and to promote equal employment opportunities, and

WHEREAS, the government of this state recognizes the duty and desirability of its leadership in providing equal employment opportunity, by implementing these laws.

NOW, THEREFORE, I, THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under section twelve of article fourth of the constitution of the state, as supplemented by section 3-1 of the general statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

I

The labor commissioner shall be responsible for the administration of this Order and shall adopt such regulations as he deems necessary and appropriate to achieve the purposes of this Order. Upon the promulgation of this Order, the commissioner of finance and control shall issue a directive forthwith to all state agencies, that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be canceled, terminated or suspended by the labor commissioner for violation of or noncompliance with this Order or state and federal laws concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to such contract or subcontract.

II

Each contractor having a contracting containing the provisions prescribed in section 4-11a of the 1969 supplement to the general statutes, shall file and shall cause each of his subcontractors to file, compliance reports with the contracting agency or the labor commissioner, as may be directed. Such reports shall be filed within such times and shall contain such information as to employment policies and statistics of the contractor and each subcontractor, and shall be in such form as the labor commissioner may prescribe. Bidders or prospective contractors or subcontractors may be required to state whether they have participated in any previous contract subject to the provisions of this Order of any preceding similar Order, and in that event to submit on behalf of themselves and their proposed subcontractors compliance reports prior to or as an initial part of their bid or negotiation of a contract.

III

Whenever the contractor or subcontractor has a collective bargaining agreement or contract or understanding with a labor organization or employment agency as defined in section 31-122 of the general statutes, the compliance report shall identify the said organization or agency and the contracting agency or the labor commissioner may require a compliance report to be filed with the contracting agency or the labor commissioner, as may be directed, by such organization or agency, signed by an authorized officer or agent of such organization or agency, with supporting information, to the effect that the signer's practices and policies including but not limited to matters concerning personnel, training, apprenticeship, membership, grievance and representation, and upgrading, do not discriminate on grounds of race, color, religious creed, age, sex or national origin, or ancestry of any individual, and that the signer will either affirmatively cooperate in the implementation of the policy and provisions of this Order, or that it consents and agrees that recruitment, employment and the terms and conditions of employment under the proposed contract shall be in accordance with the purposes and provisions of the Order.

IV

The labor commissioner may by regulation exempt certain classes of contracts, subcontracts or purchase order from the implementation of this Order, for standard commercial supplies or raw materials, for less than specified amounts of money or numbers of workers or for subcontractors below a specified tier. The labor commissioner may also provide by regulation for the exemption of facilities of a contractor which are in all respect a separate and distinct from activities of the contractor related to the performance of the state contract, provided only that such exemption will not interfere with or impede the implementation of this Order, and provided further, that in the absence of such an exemption, all facilities shall be covered by the provisions of this Order.

V

Each contracting agency shall be primarily responsible for obtaining compliance with the regulations of the labor commissioner with respect to contracts entered into by such agency or its contractors. All contracting agencies shall comply with the regulations of the labor commissioner in discharging their primary responsibility for securing compliance with the provisions of contracts and otherwise with the terms of this Order and of the regulations of the labor commissioner issued pursuant to this Order. They are directed to cooperate with the labor commissioner and to furnish the labor commissioner such information and assistance as he may require in the performance of his functions under this Order. They are further directed to appoint or designate from among the personnel of each agency, compliance officers, whose duty shall be to seek compliance with the objectives of this Order by conference, conciliation, mediation, or persuasion.

VI

The labor commissioner may investigate the employment practices and procedures of any state contractor or sub-contractor and the practices and policies of any labor organization or employment agency hereinabove described, relating to employment under the state contract, as concerns nondiscrimination by such organization or agency as hereinabove described, or the labor commissioner may initiate such investigation by the appropriate contract agency, to determine whether or not the contractual provisions, hereinabove specified or statutes of the state respecting they have been violated. Such investigation shall be conducted in accordance with the procedures established by the labor commissioner and the investigating agency shall report to the labor commissioner any action taken or recommended.

VII

The labor commissioner shall receive and investigate or cause to be investigated complaints by employees or prospective employees of a state contractor or subcontractor or member or applicants for membership or apprenticeship or training in a labor organization or employment agency hereinabove described, which allege discrimination contrary to the contractual provisions specified hereinabove or state statutes requiring nondiscrimination in employment opportunity. If this investigation is conducted for the labor commissioner by a contracting agency, that agency shall report to the labor commissioner what action has been taken or is recommended with regard to such complaints.

VIII

The labor commissioner shall use his best efforts directly and through contracting agencies, or other interested federal, state and local agencies, contractors and all other available instrumentalities, including the commission on human rights and opportunities, the executive committee on human rights and opportunities, and the apprenticeship council under its mandate to provide advice and counsel to the labor commissioner in providing equal employment opportunities to all apprentices and provide training, employment and upgrading opportunities for disadvantaged workers, in accordance with section 31-51 (d) of the 1969 supplement to the general statutes, to cause any labor organization or any employment agency whose members are engaged in work under government contracts or referring workers or providing or supervising apprentice-ship or training for or in the course of work under a state contract or subcontract to cooperate in the implementation of the purposes of this Order. The labor commissioner shall in appropriate cases notify the commission on human rights and opportunities or other appropriate state or federal agencies whenever it has reason to believe that the practices of any such organization or agency violate equal employment opportunity requirements or state or federal law.

IX

The labor commissioner or any agency officer or employee in the executive branch designated by regulation of the labor commissioner may hold such hearings, public or private, as the labor commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

X

(a) The labor commissioner may hold or cause to be held hearings, prior to imposing ordering or recommending the imposition or penalties and sanctions under this Order. No order for disbarment or any contractor from further state contracts shall be made without affording the contractor an opportunity for a hearing. In accordance with such regulations as the labor commissioner may adopt, the commissioner or the appropriate contracting agency may

- (1) Publish or cause to be published the names of contractors or labor organizations or employment agencies as hereinabove described which it has concluded have complied or failed to comply with the provisions of this Order or the regulations of the labor commissioner in implementing this Order.
- (2) Recommend to the commission on human rights and opportunities that in cases in which there is substantial or material violation or threat thereof of the contractual provision or related state statutes concerned herein, appropriate proceedings be brought to enforce them, including proceedings by the commission on its own motion under chapter 563 of the general statutes and the enjoining, within the limitations or applicable law, of organizations, individuals or groups who prevent directly or indirectly or seek to prevent directly or indirectly compliance with the provisions of this Order.
- (3) Recommend that criminal proceedings be brought under chapter 939 of the general statutes.
- (4) Cancel, terminate, suspend or cause to be canceled, terminated, or suspended in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the nondiscrimination provisions of the contract. Contracts may be canceled, terminated, suspended absolutely or their continuance conditioned upon a pro-gram for future compliance approved by the contracting agency.
- (5) Provide that any contracting agency shall refrain from entering into any further contract or extensions or modifications of existing contracts with any contractor until he has satisfied the labor commissioner that he has established and will carry out personnel and employment policies compliant with this Order.
- (6) Under regulations prescribed by the labor commissioner each contracting agency shall make reasonable efforts within a reasonable period of time to secure compliance with the contract provisions of this Order by methods of convenience, conciliation, mediation or persuasion, before other proceedings shall be instituted under this Order or before a state contract shall be can-celled or terminated in whole or in part for failure of the contractor or subcontractor to com-ply with the contract provisions of state statute and this Order.

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the labor commissioner or pursuant to his regulations shall promptly notify him of such action. Whenever the labor commissioner makes a determination under this order, he shall promptly notify the appropriate contracting agency and other interested federal, state and local agencies of the action recommended. The state and local agency or agencies shall take such action and shall report the results thereof to the labor commissioner within such time as he shall specify.

XI

If the labor commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order, or submits a program for compliance acceptable to the labor commissioner, or if the labor commissioner so authorizes, to the contracting agency.

XII

Whenever a contracting agency cancels or terminates a contract, or a contractor has been disbarred from further government contracts because of noncompliance with the contract provisions with regard to nondiscrimination, the labor com-missioner or the contracting agency shall rescind such disbarment, upon the satisfaction of the labor commissioner that the contractor has purged himself of such noncompliance and will thenceforth carry out personnel and employment policies of non-discrimination in compliance with the provision of this Order.

XIII

The labor commissioner may delegate to any officer, agency or employee in the executive branch any function or duty of the labor commissioner under this Order except authority to promulgate regulations of a general nature.

XIV

This Executive Order supplements the Executive Order issued on September 28, 1967. All regulations, orders, instructions, designations and other directives issued heretofore in these premises, including these issued by the heads of various departments or agencies under or pursuant to prior order or statute, shall remain in full force and effect, unless and until revoked or superseded by appropriate authority, to the extent that they are not inconsistent with this Order.

This Order shall become effective thirty days after the date of this Order.

Dated at Hartford, Connecticut, this 16th day of June, 1971.

GOVERNOR

GUIDELINES AND RULES
OF STATE LABOR COMMISSIONER
IMPLEMENTING GOVERNOR'S EXECUTIVE
ORDER NO. THREE

SEC. 1 PERSONS AND FIRMS SUBJECT TO EXECUTIVE ORDER NO. THREE AND GUIDELINES AND RULES.

- a. Every contractor, or subcontractor as defined in Sec. 2 hereof, supplier of goods or services, vendor, bidder and prospective contractor or subcontractor, having ten or more employees as defined in Sec. 3 of these guidelines, having or entering into or bidding to enter into any type of contractual relationship with the State of Connecticut or any of its agencies, boards, commissions, departments or officers, and if the consideration, cost, subject matter or value of the goods or services exceeds \$5,000.00, shall be subject to the Governor's Executive Order No. Three and these Guidelines and Rules.
- b. A copy of the Governor's Executive Order No. Three and of these Guidelines and Rules shall be available to each said contractor, subcontractor, supplier, vendor, bidder and prospective contractor and subcontractor, and the said Executive Order No. Three and these Guidelines and Rules shall be incorporate by reference and made a part of the contract, purchase order, agreement or document concerned. A copy of the Executive Order and of these Guidelines and Rules shall be furnished to a contracting party or bidder on request.
- c. All persons, partnerships, associations, firms, corporations and other entities having less than ten employees as defined in Sec. 3 at the time of the bid and execution of the contract and continuing through the performance of the contract are exempt from the provisions of the said Executive Order and these Guidelines and Rules. All contracts, subcontracts, purchase orders and agreements wherein the consideration ins \$5,000.00 or less shall be exempt from Executive Order No. Three and from these Guidelines and Rules.

SEC. 2 SUBCONTRACTORS

As used herein, subcontractors are persons, partnerships, associations, firms or corporations or other entities having contractual relationship with a contractor who in turn has a contract with the State of Connecticut or any of its agencies, board, commissions or departments. Subcontractors below this tier are exempt from the Executive Order and from these Guidelines and Rules.

SEC. 3 EMPLOYEES

As used herein, employees are persons working full or part-time irrespective of personnel classification whose wages, salaries, or earnings are subject to the Federal Insurance Contribution Act and/or to Federal Withholding Tax as a matter of law (whether in fact or not any actual withholding occurs in a given case), in an employee-employer relationship at the time of bid, contract execution, or offer or acceptance, and/or during any time thereafter during the existence of the performance period of the contract to the conclusion thereof.

SEC. 4 REPORTS

- a. Prior to the execution of the contract or prior to acceptance of a bid, as the case may be, the contractor, subcontractor, bidder or vendor shall file a report with the State Labor Commissioner, which report shall be complete and contain all of the information therein prescribed. The report shall be on Form E.O.3-1, a facsimile of which is attached hereto and made a part hereof, or in lieu thereof the contractor, subcontractor, bidder or vendor shall submit a detailed report containing all of the information required in Form E.O. 3-1.
- b. The Labor Commissioner may require the filing of additional reports prior to final payment or prior to any renewal or extension of the contract and during the duration of the contract at such times as the Commissioner may, in his discretion, from time to time deem necessary. The Labor Commissioner may require the filing of additional information or reports, and the contractor, subcontractor, bidder or vendor shall furnish said information or report within the times prescribed by the Labor Commissioner.
- c. The Labor Commissioner may, at his discretion, also require timely statistical reports on the number of minority employees employed or to be employed in the performance of the contract, and the Labor Commissioner may de-fine such minority groups or persons.
- d. Reports filed pursuant to these Guidelines and Rules in Implementation of Executive Order No. Three are not public records subject to public inspection, but may be inspected only by federal and state officials having jurisdiction and authority to investigate matters of this type. All federal and state agencies empowered by law to investigate matters relating to Executive order No. Three shall have access to these reports for inspection or copying during regular business hours.
- e. Any person who willfully, wantonly or through negligence destroys or permits to be destroyed, alters or allows to be altered after filing any reports submitted in compliance herewith shall be subject to penalties as pre-scribed by law.

SEC. 5. MANDATORY CLAUSES IN DOCUMENTS

- a. All contracts shall contain the following provisions verbatim:

This contract is subject in the provisions of Executive Order No. Three of Governor Thomas J. Meskill promulgated June 16, 1971 and, as such, this contract may be canceled, terminated or suspended by the state labor commissioner for violation of or noncompliance with said Executive Order No. Three, or any state or federal law concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to this contract. The parties to this contract, as part of the consideration hereof, agree that said Executive Order No. Three is incorporated herein by reference and made a part hereof. The parties agree to abide by said Executive Order and agree that the state labor commissioner shall have continuing jurisdiction in respect to contract performance in regard to nondiscrimination, until the contract is completed or terminated prior to completion.

The (contractor), (subcontractor), (bidder), (vendor) agrees, as part consideration hereof, that his (order) (contract) is subject to the Guidelines and Rules issued by the state labor commissioner to implement Executive Order No. Three, and that he will not discriminate in his employment practices or policies, will file all reports as required, and will fully cooperate with the State of Connecticut and the state labor commissioner.

These provisions are in addition to and not in lieu of other clauses required by law.*

*N.B. The above paragraphs contain requirements additional to those set forth in July 16, 1971 directive to state agencies.

- b. Every purchase order or like form submitted by a vendor or bidder, as applicable, shall contain the following clause verbatim:

Vendor agrees, as part of the consideration hereof, that this order is subject to the provisions of Executive Order No. Three and the Guidelines and Rules issued by the Labor Commissioner implementing said Order as to nondiscrimination, and vendor agrees to

comply therewith.

c. Where preprinted contract forms have been prescribed by federal authority and the rules of the federal agency prohibit the alteration thereof, the compliance officer of the State agency concerned shall submit to the Labor Commissioner a suggested short form or addendum acceptable to the federal agency, and such cases, after approval by the Labor Commissioner, said clause may be substituted.

SEC. 6. COOPERATION OF STATE AGENCIES, BOARDS AND COMMISSIONS

Every agency, board, commission and departments of the State of Connecticut shall cooperate with the Labor Commissioner in the implantation of Executive Order No. Three and shall furnish such information and assistance as the Labor Commissioner may from time to time request.

SEC. 7. INVESTIGATIONS, COMPLAINTS

The Labor Commissioner may initiate an investigation upon receipt of a complaint alleging discrimination. The Labor Commissioner may request that an investigation be conducted by the State agency which is the party to the contract in question. Investigations shall be conducted in accordance with acceptable legal standards, safeguarding the rights of all parties involved, and obtaining all of the relevant facts necessary for a complete determination of the issues. If the Labor Commissioner is not satisfied with the investigation or any part thereof he may order it to continue or to proceed further.

SEC. 8. HEARINGS

The Labor Commissioner or officers designed by the heads of the State agencies, boards and commissions may conduct hearings on complaints filed. Hearings shall be held only after a report of the complaint has been filed with the Labor Commissioner and after a hearing on the complaint has been authorized or directed by the Labor Commissioner. Hearings shall be in accordance with the accepted principles of administrative law. All parties shall be afforded the opportunity to a full, fair, impartial and complete hearing, the opportunity to examine and cross examine witnesses and to be present at all sessions of the hearing. If any party is vulnerable to a charge of a violation of the law, he shall be afforded the opportunity to procure counsel who say be present at the hearing.

SEC. 9. EQUAL EMPLOYMENT OPPORTUNITIES

All State contracting agencies, employers, and labor unions shall use their best efforts to provide equal employment opportunities to all apprentices and to provide training, employment and upgrading opportunities for disadvantaged workers in accordance with section 31-51 (d) of the General Statutes.

SEC. 10. DUTIES OF CONTRACTING AGENCIES.

All State contracting agencies shall be responsible for compliance with said Executive Order and with all state and federal laws relating to equal employment opportunities. All contracting agencies conducting investigations for the Labor Commissioner pursuant to Executive Order No. Three and these Guidelines and Rules shall report to the Labor Commissioner the action taken or recommended with regard to each complaint filed. Each officer of the executive department, every commissioner, and each executive head of each State agency, board and commission in the executive branch of the State government is expected to assume the responsibility of seeing to complete compliance with the Governor's Executive Order No. Three and shall forthwith take steps to assure and guarantee that there shall be no discrimination within their departments, agencies, boards or commissions in the performance of any state contract or subcontract on the basis of race, creed, color, sex, age, national origin or national ancestry, or in any way in violation of any state or federal law relating thereto.

BY VIRTUE OF THE AUTHORITY VESTED IN ME PURSUANT TO EXECUTIVE ORDER NO. THREE EFFECTIVE JULY 16, 1971, AND THE GENERAL STATUTES OF CONNECTICUT.

Date in Wethersfield, Connecticut this 19th day of Nov. , 1971,

Jack Fusari
Labor Commissione

EXECUTIVE ORDER NO. SEVENTEEN

STATE OF CONNECTICUT
THOMAS J. MESKILL
GOVERNOR
EXECUTIVE ORDER NO. SEVENTEEN

WHEREAS, Section 31-247 of the General statutes of Connecticut as amended requires the maintaining of the established free services of the Connecticut State Employment Service to both employers and prospective employees and

WHEREAS, Section 31-5 of the General Statutes of Connecticut requires that no compensation or fee shall be charged or received directly or indirectly for the services of the Connecticut State Employment Service and

WHEREAS, large numbers of our citizens who have served in the Armed Forces of our nation are returned to civilian life in our state and seeking employment in civilian occupations and

WHEREAS, we owe a duty as well as gratitude to these returning veterans including the duty to find suitable employment for them and

WHEREAS, many of our handicapped citizens are fully capable of employment and are entitled to be placed in suitable employment and

WHEREAS, many of the citizens of our state who are unemployed are unaware of the job openings and employment opportunities which do in fact exist in our state and

WHEREAS, notwithstanding the free services of the Connecticut State Employment Service, many of our Connecticut employers do not use its free services or do not avail themselves fully of all the services offered.

NOW, THEREFORE, I, Thomas J. Meskill, Governor of the State of Connecticut, acting by virtue of the authority vested in me under the fourth article of the Constitution of the State and in accordance with Section 3-1 of the General Statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

I

The Labor Commissioner shall be responsible for the administration of this Order and shall do all acts necessary and appropriate to achieve its purpose. Upon the promulgation of this Order, the Commissioner of Finance and Control shall issue a directive forthwith to all state agencies that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be canceled, terminated or suspended by the Labor Commissioner for violation of or noncompliance with this Order, notwithstanding that the Labor Commissioner is not a party to such contract or subcontract.

II

Every contractor and subcontractor having a contract with the state or any of its agencies, boards, commissions, or departments, every individual partnership, corporation, or business entity having business with the state or who or which seeks to do business in the state, and every bidder or prospective bidder who submits a bid or replies to an invitation to bid on any state contract shall list all employees openings with the office of the Connecticut State Employment Service in the area where the work is in be performed or where the services are to be rendered.

III

All state contracts shall contain a clause which shall be a condition of the contract that the contractor and any subcontractor holding a contract directly under the contractor shall list all employment openings with the Connecticut State Employment Service. The Labor Commissioner may allow exceptions to listings of employment openings which the contractor proposes to fill from within its organization from employees on the rolls of contractor on the date of publication of the invitation to bid or the date on which the public announcement was published or promulgated advising of the program concerned.

IV

Each contracting agency of the state shall be primarily responsible for obtaining compliance with this Executive Order. Each contracting agency shall appoint or designate from among its personnel one or more persons who shall be responsible for compliance with the objectives of this Order

V

The Labor Commissioner shall be and is hereby empowered to inspect the books, records, payroll and personnel data of each individual or business entity subject to this Executive Order and may hold hearings or conference, formal or informal, in pursuance of the duties and responsibilities hereunto delegated to the Labor Commissioner.

VI

The Labor Commissioner or any agency officer or employee in the executive branch designated by regulation of the Labor Commissioner may hold such hearings, public or private, as the Labor Commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

VII

(a) The Labor Commissioner may hold or cause to be held hearings, prior to imposing, ordering, or recommending the imposition of penalties and sanctions under this Order. In accordance herewith, the Commissioner or the appropriate contracting agency may suspend, cancel, terminate, or cause to be suspended, canceled, or terminated in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the listing provisions of the contract. Contracts may be canceled, terminated, suspended absolutely or their continuance conditioned upon a program for future compliance approved by the contracting agency.

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the Labor Commissioner, shall promptly notify him of such action. Whenever the Labor Commissioner makes a determination under this Order, he shall promptly notify the appropriate contracting agency of the action recommended. The agency shall report the results to the Labor Commissioner promptly.

VIII

00720.01-C-2

If the Labor Commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order.

This Order shall become effective sixty days after the date of this Order.

Dated at Hartford, Connecticut, this 15th day of February, 1973.

Governor

EXECUTIVE ORDER NO. SIXTEEN

STATE OF CONNECTICUT
BY HIS EXCELLENCY
JOHN G. ROWLAND
GOVERNOR
EXECUTIVE ORDER NO. SIXTEEN

WHEREAS, the State of Connecticut recognizes that workplace violence is a growing problem that must be addressed; and

WHEREAS, the State is committed to providing its employees a reasonably safe and healthy working environment, free from intimidation, harassment, threats, and/or violent acts; and

WHEREAS, violence or the threat of violence by or against any employee of the State of Connecticut or member of the public in the workplace is unacceptable and will subject the perpetrator to serious disciplinary action up to and including discharge and criminal penalties.

NOW, THEREFORE, I, John G. Rowland, Governor of the State of Connecticut, acting by virtue of the authority vested in me by the Constitution and by the statutes of this state, do hereby ORDER and DIRECT:

That all state agency personnel, contractors, subcontractors, and vendors comply with the following Violence in the Workplace Prevention Policy:

The State of Connecticut adopts a statewide zero tolerance policy for workplace violence.

Therefore, except as may be required as a condition of employment ³/₄

No employee shall bring into any state worksite any weapon or dangerous instrument as defined herein.

No employee shall use, attempt to use, or threaten to use any such weapon or dangerous instrument in a state worksite.

No employee shall cause or threaten to cause death or physical injury to any individual in a state worksite.

Weapon means any firearm, including a BB gun, whether loaded or unloaded, any knife (excluding a small pen or pocket knife), including a switchblade or other knife having an automatic spring release device, a stiletto, and police baton or nightstick or any martial arts weapon or electronic defense weapon.

Dangerous instrument means any instrument, article, or substance that, under the circumstances, is capable of causing death or serious physical injury.

Violation of the above reasonable work rules shall subject the employee to disciplinary action up to and including discharge.

That each agency must prominently post this policy and that all managers and supervisors must clearly communicate this policy to all state employees.

That all manager and supervisors are expected to enforce this policy fairly and uniformly.

That any employee who feels subjected to or witnesses violent, threatening, harassing, or intimidating behavior in the workplace immediately report the incident or statement to their supervisor, manager, or human resources office.

That any employee who believes that there is a serious threat to their safety or the safety of others that requires immediate attention notifies proper law enforcement authorities and his or her manager or supervisor.

That any manager or supervisor receiving such a report shall immediately contact their human resources office to evaluate, investigate and take appropriate action.

That all parties must cooperate fully when questioned regarding violations of this policy.

That all parties be advised that any weapon or dangerous instrument at the worksite will be confiscated and that there is no reasonable expectation of privacy with respect to such items in the workplace.

That this order applies to all state employees in the executive branch.

That each agency will monitor the effective implementation of this policy.

That this order shall take effect immediately.

Dated in Hartford, Connecticut, this fourth day of August, 1999.

/s/John G. Rowland, Governor

WAGE RATE REQUIREMENTS

00720.02 **WAGE RATE REQUIREMENTS.** Wage rates on this Project shall conform to the following:

A. **CONNECTICUT REQUIREMENTS.** The State of Connecticut requires prevailing wage rates to be paid if the value of work done on this Contract exceeds \$400,000 for new construction or exceeds \$100,000 for remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project. These wage rates, if required for this Project, are included in the Special Provisions.

It is the responsibility of the contractor before bid opening to request, if necessary, any additional information on State Wage Rates for those tradespeople who are not covered by the applicable State Wage Determination but who may be employed for the proposed work under this contract.

B. **CERTIFIED PAYROLL/COMPLIANCE STATEMENT.** The Contractor may be required, for work under this Contract, to submit weekly to the Engineer a certified payroll and compliance statement consistent with the requirements of public act 93-392. (Section 31-53 of Connecticut General Statutes, as amended.) A copy of this form, if submittal is required, is included in Document 00730.

C. **NOT USED.**

D. **RATES TO BE PAID.** The minimum wage rates to be paid on this Project shall be as shown on the State of Connecticut Labor Department Wage Rate Schedule, as included in the Special Provisions. All construction on this Project shall be covered by the heavy construction rates and classifications.

DOCUMENT 00728

UTILITY TELEPHONE NUMBERS

Section 01060 of the Contract Documents is amplified for this Contract by the following:

The utility mains, ducts, poles and services in the construction area where shown on the Contract plans are at the approximate locations furnished by various utilities concerned. These locations are subject to possible errors in the source of the information and also errors in transcription.

The Contractor shall be responsible to make certain of the exact location of the mains, ducts, poles and services prior to excavation.

State law makes it mandatory to notify utilities before digging with power equipment. The Contractor shall call 1-800-922-4455 (toll free), 7:00 a.m. to 6:00 p.m., Monday through Friday, at least 48 hours prior to beginning the excavation. This “one-call” service is provided by the utility companies.

Once the call is made it is the utility company’s responsibility to analyze the Site and identify and mark its underground facilities.

The following more commonly used utility numbers are listed for the Contractor’s convenience in case additional specific information is needed.

Connecticut Natural Gas Corporation
76 Meadow Street East Hartford, CT 06108
Telephone (860) 727-3206 (or Vasant Patel (860) 727-3114 [at vpatel@ctgcorp.com](mailto:vasant.patel@ctgcorp.com))

The Metropolitan District (Water and Sewer)
555 Main Street, Post Office Box 800, Hartford, Connecticut 06142-0800
Telephone (860) 278-7850 (Press 1)

Eversource
P.O. Box 270, Hartford, CT 06141-0270
Ed Schneider (860) 665-3686 (edward.schneider@eversource.com)
Kevin O’Brien (860) 280-2445 (kevin.obrien@eversource.com)

Frontier Communications
40 Brainard Road, Hartford, CT 06114
Peter Moffett (860) 725-1842 ~~or Fred Buccieri (860) 725-4428~~

Frontier Communications ([Underground](#))
1441 North Colony Road, Meriden, CT
Stephen Barrett (203) 238-2317 (stephen.barrett@ftr.com)

Comcast
19 Tuttle Place, Middletown, CT 06457
Gary Meek (203) 721-0727 (gary_meek@cable.comcast.com)

**“INSERT ITEMS LISTED BELOW FROM THE
CONNECTICUT DEPARTMENT OF LABOR -
PREVAILING WAGE RATES AND PREVAILING WAGE
BID PACKAGE”**

(TO BE INSERTED IN SPECIAL PROVISIONS)

00730.01	CONNECTICUT DEPARTMENT OF LABOR WAGE RATES
00730.02-A	PREVAILING WAGE LAW POSTER
00730.02-B	SECTION 31-53b
00730.02-C	INFORMATIONAL BULLETIN – THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE
00730.02-D	NOTICE FOR ALL MASON CONTRACTORS
00730.02-E	CT GENERAL STATUTE 31-55a
00730.02-F	CONTRACTING AGENCY CERTIFICATION FORM
00730.02-G	CONTRACTOR’S WAGE CERTIFICATION FORM
00730.02-H	PAYROLL CERTIFICATION – PUBLIC WORKS PROJECTS
00730.02-I	OCCUPATIONAL CLASSIFICATION BULLETIN
00730.02-J	FOOTNOTES

DOCUMENT 00760

LIST OF DRAWINGS

00760.01 LIST OF DRAWINGS

Contract Drawings that have the general and detailed titles following, accompany and form part of these Specifications.

INSERT NAME OF CONTRACT

INSERT CONTRACT NUMBER

<i>Drawing No.</i>	<i>Description</i>
---------------------------	---------------------------

Additional drawings showing details in accordance with which the Work is to be constructed will be furnished from time to time by the Engineer and they shall then become a part thereof.

INTERIM GUIDANCE FOR MINORITY BUSINESS ENTERPRISE
AND WOMEN'S BUSINESS ENTERPRISE REQUIREMENT
OF 40 CFR §33.240

I. PURPOSE

This interim guidance is for Regions to assist States, EPA assistance recipients, prime contractors, consultants, minority business owners and women's business owners in complying with EPA's Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) requirements in the Agency's procurement regulations, 40 C.F.R. Part 33. This guidance provides suggestions for carrying out the affirmative steps required by Office of Management and Budget Circular A-102, Attachment O, section 9 and included in EPA procurement regulations. Also included is a description of activities to be undertaken by EPA or delegated States, as well as suggestions for MBE/WBEs to take in pursuing opportunities for work in EPA-funded projects.

II. DEFINITIONS

- A. Minority Business Enterprise (MBE) [same as definition to be in final 40 C.F.R. 33.005]: A minority business enterprise is a business which is
1. certified as a minority business enterprise by a State or Federal agency, or
 2. an independent business concern which is at least 51 percent owned and controlled (as defined below) by minority group member(s). A minority group member is an individual who is a citizen of the United States and one of the following:
 - a. Black American
 - b. Hispanic American (with origins from Puerto Rico, Mexico, Cuba, South or Central America)
 - c. Native American (American Indian, Eskimo, Aleut, native Hawaiian)
 - d. Asian-Pacific American (with origins from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, the U.S. Trust Territories of the Pacific, Northern Marianas, Laos, Cambodia, Taiwan or the Indian Subcontinent)
- B. Women's Business Enterprise (WBE) [same as definition to be in final 40 C.F.R. 33.005]: A women's business enterprise is a business which is
1. certified as such by a State or Federal agency; or
 2. an independent business concern which is at least 51 percent owned by a woman or women who also control and operate it. Determination of whether a business is at least 51 percent owned by a woman or women shall be made without regard to community property laws. For example, an otherwise qualified WBE which is 51 percent owned by a married woman in a community property state will not be disqualified because her husband has a 50 percent interest in her share. Similarly, a business which is 51 percent owned by a married man and 49 percent owned by an unmarried woman will not become a qualified WBE by virtue of his wife's 50 percent interest in his share of the business.
- C. Ownership and control
1. The minority or woman ownership's interest in the firm must be real, substantial and continuing. Such interest may include:
 - a. risk of loss/share of profit commensurate with the proportional ownership; and

- b. receipt of the customary incidents of ownership, such as salary and/or intangible benefits.
- 2. A minority or woman owner must have and exercise the authority to independently control the business. The minority or woman owner need not be continually present to be deemed in control. Characteristics of control may include:
 - a. authority to sign bids and contracts,
 - b. making decisions in price negotiations,
 - c. incurring liabilities for the firm,
 - d. making final staffing decisions,
 - e. policy-making; and
 - f. making general company management decisions.
- 3. Only those firms performing a useful business function according to custom and practice in the industry are qualified as MBE's or WBE's. A merely as a passive conduit of funds to some other, non-minority firm where such activity is unnecessary to accomplish the project does not constitute a "useful business function according to custom and practice in the industry."
- D. Recipient – A party receiving federal financial assistance under an EPA program pursuant to a grant or cooperative agreement.
- E. Project – The scope of work from which a cooperative agreement, grant or grant amendment is awarded.
- F. Bidder – A party seeking to obtain a contract with a recipient through a competitive, advertise, sealed bid process.
- G. Offeror – A party seeking to obtain a contract with a recipient through a negotiated procurement process.

IV. EPA RESPONSIBILITIES

- A. Headquarters.
 - 1. The officer in charge of the assistance program (program office) has primary responsibility for implementation of the MBE/WBE program, in cooperation with the Office of Small and Disadvantaged Business Utilization (OSDBU).
 - 2. OSDBU is responsible for serving as the Agency focal point for inquiries on the MBE/WBE program, providing explanation of the program and guidance to MBEs and WBEs interested in working on EPA funded projects.
- B. Regional Responsibilities
 - 1. Provide guidance and advice to recipients as requested.
 - 2. Maintain lists* of those MBE and WBE firms which have participated in EPA funded projects. The Region may also add MBEs and WBEs requesting to be included on source lists. Such lists are for information purposes only, and shall carry a clear and prominent statement that the firms listed are neither endorsed nor guaranteed by EPA as bona fide, MBE//WBEs. It is not necessary to be on any list in order to qualify as a bona fide MBE/WBE.
 - 3. Monitor recipients for compliance with MBE/WBE requirements and for determining levels of MBE/WBE participation.

*Lists are available for review at the offices of the Owner, Engineer and DEP.

V. RECIPIENT RESPONSIBILITIES

- A. The recipient shall take affirmative steps to contract with MBEs and WBEs and ensure that its contractors and consultants take affirmative steps to contract with MBEs and WBEs during all phases of work funded or to be funded under an EPA assistance agreement. The recipient's affirmative steps as defined in EPA procurement regulations are the following:
 1. When feasible, dividing the total work to be contracted into smaller tasks in the solicitation documents to permit MBE/WBE participation.
 2. Including qualified MBEs and WBEs on solicitation lists by drawing from the source lists of EPA Regional Offices and appropriate minority/women's business associations and agencies.
 3. Assuring that MBEs and WBEs are solicited whenever they are potential sources of services and supplies, for example, by:
 - a. Holding pre-bid conferences, with interested MBEs and WBEs in attendance when possible, to highlight the requirements of this program to prospective bidders,
 - b. Including this MBE/WBE interim guidance in request for proposals (RFP) and invitations for bids (IFB),
 - c. Publishing announcements of MBE/WBE opportunities for work in EPA funded projects,
 - d. Developing a source list of MBE/WBEs and providing its list to prospective bidders/offerors.
 1. The recipient may wish to engage an MBE/WBE liaison to compile the list.
 2. The recipient may wish to use available lists such as those of the EPA Regional Office, adjacent municipalities, appropriate minority/women associations and agencies, and available industry associations. Names of these agencies with address and phone number should also be included on the recipient source list.
 - e. Providing necessary and appropriate liaison services between MBE/WBEs and prospective bidders/offerors. (Liaison services should not be delegated to consultants where a potential for conflict of interest exists).
 4. When project requirements permit, establishing delivery schedules which encourage participation of MBE/WBEs.
 5. Using the services and assistance of the Small Business Administration (SBA), the Minority Business Development Agency (MBDA), and other federal, State and local agencies when appropriate.
- B. Unless otherwise provided in the specifications, compliance with the MBE/WBE requirements in the regulations is a matter of bidder/offeror responsibility.
- C. The recipient is responsible for monitoring work in progress to insure that MBE and WBE subcontractors and joint ventures are actually participating in the performance of the subcontract or joint venture contract and to insure that the consultant/contractor is fulfilling its obligations with respect to MBE/WBE requirements under the contract.
- D. As part of the documentation required under 40 C.F.R. 33.250, the recipient shall maintain and update records of MBE/WBE participation and supply data to the Region or delegated State when requested. Such records may include:

1. name of MBE/WBEs being utilized;
2. work designated to be performed by MBE/WBE;
3. dollar value of that work;
4. portion of project being performed by MBEs and WBEs

VI. BIDDER AND OFFEROR RESPONSIBILITIES

- A. Affirmative Steps: Activities during preparation of bids and offers. Bidders/offerors shall take affirmative steps in compliance with the regulations, prior to submission of bids or closing date for recipient of initial offers, to encourage participation in projects by MBEs and WBEs. Such efforts include:
 1. When feasible, segmenting total work requirements to permit maximum MBE/WBE participation.
 2. Assuring that MBEs and WBEs are solicited whenever they are potential sources of goods or services. This step may include:
 - a. Sending letters or making other personal contacts with MBEs and WBEs (e.g., those whose names appear on lists prepared by EPA or the recipient and other MBE/WBEs known to the bidder/offeror). MBEs and WBEs should be contacted when other potential subcontractors are contacted, within reasonable time prior to bid submission or closing date for receipt of initial offers. Those letters or other contacts should communicate the following:
 1. Specific description of the work to be subcontracted,
 2. How and where to obtain a copy of plans and specifications or other detailed information needed to prepare a detailed price quotation,
 3. date the quotation is due to the bidder/offeror,
 4. name, address, and phone number of the person in the bidder/offeror's firm whom the prospective MBE/WBE subcontractor should contract for additional information.
 - b. Sending letters or making other personal contacts with local, State, federal and private agencies and MBE/WBE associations relevant to the project. Such contacts should provide the same information provided in the direct contacts to MBE and WBE firms.
 3. Where feasible, establishing delivery schedules which will encourage participation by MBEs and WBEs.
- B. Bidders/offerors must demonstrate compliance with MBE/WBE requirements in order to be deemed responsible. Demonstration of compliance may include the following information, however the recipient may specify other methods of demonstrating compliance:
 1. Names, addresses and phone numbers of MBE/WBEs expected to perform work;
 2. Work to be performed by the MBE and WBEs;
 3. Aggregate dollar amount of work to be performed by MBEs and WBEs, showing aggregate to MBEs and aggregate to WBEs separately;
 4. Description of contacts to MBE and WBE organizations, agencies and associations which service MBEs/WBEs, including names of organizations, agencies and associations and dates of contacts;
 5. Description of contacts to MBEs and WBEs, including number of contacts, fields, (i.e., equipment or material supplier, excavators,

transport services, electrical subcontractors, plumbers, etc.) and date of contacts.

- C. Successful bidders/offerors should take reasonable affirmative steps to subcontract with MBEs and WBEs whenever additional subcontracting opportunities arise during the performance of the contract.

VII. MBE AND WBE RESPONSIBILITIES

MBEs and WBEs are responsible for promoting themselves and taking the initiative to obtain contracts and subcontracts, and for encouraging joint venture arrangements. MBEs/WBEs interested in working on EPA funded projects are strongly encouraged to take the following steps:

- A. Submit information to take the recipients to identify status as a MBE/WBE.
- B. Become certified as MBE/WBE under available State or federal agency procedures.
- C. Contact federal, State, and local MBE/WBE liaison offices to obtain information on potential jobs.
- D. Provide capability statements to State agencies, recipients, consulting engineers, and contractors stating type(s) of work performed by the firm, size of job that the firm could handle, bonding information, and any special skills.
- E. Make every effort to establish contacts and relationships with contractors for potential future business, including attending pre-bid conferences and subscribing to industry and trade journals.
- F. Contact EPA Regional offices or appropriate State offices to obtain information on planned EPA-funded projects.
- G. Respond promptly to solicitation requests.

VIII. REMEDIES FOR NONCOMPLIANCE

- A. Protests. A bidder/offeror for EPA funded work or MBE/WBE with an adversely affected direct financial interest may file a bid protest with the recipient pursuant to EPA procurement regulations (40 C.F.R. 33.1106 *et. seq.*). These procedures are available to protest alleged violation of federal MBE/WBE requirements and may not be used to enforce local or State MBE/WBE requirements.
- B. Upon a finding by EPA that a recipient, bidder/offeror, consultant, contractor or subcontractor has not complied with the MBE/WBE requirements of EPA regulations, EPA may invoke any and all sanctions and remedies specified in EPA regulations.

IX. STATE OR LOCAL LAW

Nothing in this program prevents a State or recipient from applying more stringent MBE/WBE requirements or procurement obligations which pertain to bid responsiveness or percentage of MBE and WBE participation.



The Metropolitan District
RFQ/P/Contract #

“NO BID” RESPONSE FORM

**NOTE: COMPLETE AND RETURN THIS FORM
ONLY IF YOU DO NOT WANT TO SUBMIT A FORMAL PROPOSAL**

If you do not want to submit a proposal for this requirement, we are interested in knowing why. Please remove this form, complete the requested information and return it to the Procurement Department. Mail to: The Metropolitan District Commission, 555 Main Street, Hartford Connecticut 06142-0800. If you would rather FAX your response, the FAX number is 860-560-4030. If you have any questions, please call the Manager of Procurement at 860-278-7850 ext. 3349.

“NO BID” QUESTIONNAIRE”
(Please complete all items that apply)

We do not sell products/services call for in this request for qualification/proposal/contracts, but we want to stay on the District’s Bid List. Please send necessary information so that products and services we do provide can be updated on the District’s Bid List.

We have reviewed your bid package requirement and we are not interested in submitting a bid on this requirement because:

Other reasons/comments:

Date: _____

(Business Name)

Phone: _____

(Street Address/P.O. Box)

Contract No. _____

(City, State, Zip Code)

SUPPLEMENTARY CONDITIONS (00800)

This page is Intentionally Left Blank

Any changes or additions to Section 00700 shall be addressed here in the Special Provisions.

Division 1 – General Requirements

THE METROPOLITAN DISTRICT

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 LOCATION OF WORK

- A. The Work of this Contract is located in the City/Town of [REDACTED], Connecticut approximately between the area of [REDACTED] and [REDACTED].

1.02 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and perform the Work in its entirety as shown on the Contract Drawings and as specified herein.
- B. The Work includes, but is not necessarily limited to, the following major items:
[REDACTED]

1.03 WORK BY OTHERS

- A. The following work will be performed by others prior to the initiation of the Work of this Contract:
 - 1. (Utility Relocation)
 - 2. [REDACTED]
- B. The following work will be performed by others concurrently with the Work of this Contract.
 - 1. [REDACTED]
 - 2. [REDACTED]
- C. The following work will be performed by others after completion of the Work of this Contract.
 - 1. [REDACTED]
 - 2. [REDACTED]
- D. Refer to Article 7 of the General Conditions for additional requirements related to Other Work at the Site.

1.04 SEQUENCE OF WORK

- A. Operation of the existing water, sewer and drainage system in the project area must be maintained by the Contractor throughout the duration of the project; and,

THE METROPOLITAN DISTRICT

use of portions of the new work may be required prior to completion of the project to maintain operation. A suggested construction phasing plan may be noted in the Contract Documents. The Contractor may use the suggested sequence or develop a different plan; however, he will be responsible for the continuous flow of storm water, sewage and drinking water throughout the project. Refer to Section 01044 for details regarding sequence of the Work.

1.05 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit the use of the premises for the performance of the Work and storage of materials and equipment to allow for the Owner's use in operating and maintaining the existing water, sewer and drainage system and facilities within the project area.
- B. Locations where the Owner has secured temporary or permanent easements which the Contractor can utilize for performance of the Work have been noted on the Contract Documents.
- C. Contractor shall coordinate with Owner necessary access for normal maintenance requirements.
- D. Contractor shall assume full responsibility for security of all his and his subcontractors' materials and equipment stored on the site.
- E. If directed by the Owner, Contractor shall move any stored items which interfere with operations of Owner.
- F. The Contractor shall obtain, maintain, restore, and pay for use of any additional storage, staging, lay-down or other work areas necessary for the completion of the Work. The Contractor shall not utilize or disrupt privately owned properties without prior written authorization from the property owner. Copies of agreements for use of private properties shall be submitted to the Engineer prior to any use of the property. Owner shall be held harmless for any damage to property during the project duration.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1- GENERAL

1.01 METHODS FOR MEASUREMENT AND ESTIMATING

- A. At appropriate points in this text, specifications are given with respect to measuring or estimating certain quantities and the sums due for the same. Except as otherwise provided, the Engineer shall determine the appropriate method for measuring and computing each quantity, and for estimating the sums due for the various kinds of Work and material, using such methods, tools, and degrees of precision as are suitable for the particular measurement, Item, or computation. When so requested by the Engineer, assistance in measuring or determining quantities shall be provided by furnishing the help of unskilled laborers on the site, by furnishing copies of invoices, or by other means.
- B. For estimating quantities in which the computations of areas by analytic and geometric methods would be laborious, as determined by the Engineer, it is stipulated and agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of such areas and may be used for this purpose.

1.02 PAYMENT

- A. In general, payment shall be made for all Contract Work satisfactorily completed and accepted through the end of the previous month. No payment shall be made for stored materials. The payment shall include any additional Work which has been completed and approved and change order Work agreed upon by the Owner and Contractor which has been completed and approved and for which a change order has been fully executed by all parties.
- B. Retainage shall be withheld from each monthly payment in accordance with the terms of the Agreement.
- C. Monthly estimates of payment shall also indicate reduction or increase of the total Contract price when an approved change order results in a net reduction or net increase in the cost and quantity of Work to be performed under the Contract.
- D. Special billings and charges against the Contract as credit or payment to the Owner, that are not for change order Work, may be subtracted from monies due on any monthly estimate of payment but shall not serve to reduce the total Contract price.
- E. Monthly payments will not be made until there is an approved Base Line Schedule.

THE METROPOLITAN DISTRICT

1.03 CONTRACT UNIT BID PRICES

- A. No separate measurement or payment shall be made for Work called for in the Contract Specifications, unless specifically covered under the Bid Items. All costs associated with this Work shall be considered incidental to the Contract Bid price, and included in unit price Items.
- B. The Work shall be measured and paid for at the Contractor's unit Bid price cost as indicated on the Schedule of Prices. Those payable Work Items, and related prices as Bid, shall be the basis for all compensation to the Contractor for Work performed under this Contract. Work not specifically included as a Bid Item, but which is required to properly and satisfactorily complete the Work is considered ancillary and incidental to the Bid Item, and payment for such Work is considered to be included in the values as Bid for payable Items. Compensation for all unit Bid price Work shall be made based on the measured quantity of Work and the Payment limits (where appropriate).
- C. The Owner reserves the right to withhold or to reduce payments due for payable Items of Work under the Contract where, in the opinion of the Owner, Work ancillary and incidental to the payable Work is not completed in a satisfactory or timely manner.
- D. Payment shall be computed on the basis of the Contract unit bid prices bid in the Schedule of Prices for each Item and the quantity of units completed. Unit prices are to include cost of all necessary materials, labor, equipment, overhead, profit and other applicable costs.
- E. The Owner reserves the right to increase or decrease the scope of the Contract Work by twenty-five percent (25%) of the original scope per Item.
- F. For all Contracts, requests to evaluate existing unit prices shall conform to the Regulations of Connecticut State Agencies Section 22a-482-4(k)(2)(A)(i). Either party to the Contract may request a review or appropriate revised Contract consideration, if warranted, when the quantity of any Item contained in the Schedule of Prices which constitutes more than ten percent (10%) of the Contract value of the Work increases or decreases by more than fifteen percent (15%).

1.04 LUMP SUM PRICES

- A. Payment shall be computed on the basis of the percentage of Work completed based on the dollar amount of the overall Contract for each lump sum Item in the Contract Schedule of Prices. Lump sum prices are to include the cost of all necessary materials, labor, equipment, overhead, profit and other applicable costs.

1.05 SCHEDULE OF VALUES

Refer to 01370

THE METROPOLITAN DISTRICT

1.06 ALLOWANCES

Refer to 01030

1.07 FIXED PRICES

- A. Refer to 00300 for general terms of use. When Fixed Prices are ordered by the Engineer, a change order will be created for the amount and type of Fixed Price item ordered, in accordance with the General Conditions. Refer to paragraph 1.02 for general terms of payment.

PART 2 – BID ITEMS

2.01 MISCELLANEOUS WORK (Part A)

A. MOBILIZATION, DEMOBILIZATION AND RELATED EXPENSE (Item G-1)

1. Method of Measurement. Mobilization, demobilization and related expense shall be a lump sum. This Item is meant for non-recurrent expenses related to establishment and close out of the Work.
2. Basis of Payment. Mobilization, demobilization and related expense shall be paid for on a lump sum basis. This price and payment shall be full compensation for all costs associated with initiating and completing the Contract, exclusive of the cost of materials. Payment shall include compensation for all expenses related to moving plant and equipment onto and away from the jobsite, performance and payment bonds and other securities required, insurances, necessary permits and fees, MDC project sign(s), pre-construction surveys, field office installation including utilities, site preparation and the general costs associated with initiating the Work on site to assure that it is proceeding in a continuous manner. No additional payment shall be made for interim mobilization or demobilization associated with shutdown of Work by Contractor or Owner.
 - a. Payments shall be made in three equal installments. The first two (2) installments shall coincide with the first two (2) monthly payment requisitions, contingent upon Owner acceptance of the baseline construction schedule and demonstration of satisfactory construction progress, as determined by the Engineer. The third installment shall be made when the Contractor has completed all construction activity, including final cleanup, punch list Items, and satisfactory submission of As-Built documentation.
 - i. Insurance and bond premiums and permit fees shall be paid in full at the time the cost is incurred reducing the payment amount of the three equal installments stated above in Paragraph a.
 - b. The cost for this Item shall not exceed five percent (5%) of the Total Bid Price, excluding this Item itself and Item G-2.

THE METROPOLITAN DISTRICT

B. GENERAL REQUIREMENTS (Item G-2)

1. Method of Measurement. General requirements shall be a lump sum. This Item is meant for costs related to administration and proper supervision of the Contract that may be one-time expenses or recurrent over the term of the Work.
2. Basis of Payment. General requirements shall be paid for on a lump sum basis. This price and payment shall be full compensation for furnishing construction schedules including baseline and periodic updates, project superintendent, project manager, field office wages, Engineers field office and recurring field office expenses following initial mobilization, dumpsters, security, fencing, utility charges, progress photographs, testing and laboratory analysis, pest control, dust control, snow removal within work zone, ongoing maintenance of as-built documents, equipment maintenance, surveying, survey controls, staking out of easements, project closeout costs and all temporary facilities, labor, equipment and materials required for or incidental to the Work for which separate payment is not provided under other Items.
 - a. Payment shall be made as determined by the Owner on a percent complete basis in accordance with the accepted Schedule of Values.
 - b. The cost for this Item shall not exceed ten percent (10%) of the Total Bid Price, excluding this Item itself and Item G-1.

C. EROSION AND SEDIMENTATION CONTROL (Item G-3)

1. Method of Measurement. Erosion and sedimentation control shall be lump sum. This Item shall include costs related to erosion and sedimentation control that may be required over the term of the Work for the entire Contract.
2. Basis of Payment. Erosion and sedimentation control shall be paid for on a percent complete basis for the lump sum or as determined by the Owner in accordance with the accepted Schedule of Values. This price and payment shall be full compensation for furnishing, installing, maintaining, and removal of the erosion and sedimentation control, all labor, equipment, and materials required for, or incidental to, the control of erosion and sedimentation not covered by other Items.

D. CATCH BASIN SEDIMENTATION CONTROL (Item G-4)

1. Method of Measurement. Catch basin sedimentation control shall be measured by actual number of catch basin sedimentation controls furnished and installed, complete and in place as shown, specified or as directed and accepted by the Engineer.
2. Basis of Payment. Catch basin sedimentation control shall be paid for at the Contract unit price bid for each catch basin sedimentation control installed and accepted by the Engineer. This price and payments shall be full

THE METROPOLITAN DISTRICT

compensation for installation, maintenance, and removal of the hay bales and geotextile fabric, including removal of sediment buildup, thorough cleaning of the catch basins and all labor, equipment, materials, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

E. CLEARING AND GRUBBING (Item G-5)

1. Method of Measurement. Clearing and grubbing shall be measured as the number of square yards for the Work completed as shown.
2. Basis of Payment. Clearing and grubbing shall be based upon a square yard basis for Work completed as shown. Payment shall be made for full compensation of all labor, equipment and materials required for removing and disposing of all trees, stumps, bushes, shrubs, vegetation, logs, rubbish, and other objectionable material and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - a. Trees located within the limits of clearing and grubbing (G-5) will not be measured individually for payment.

F. REMOVE TREE (Item G-6)

1. Method of Measurement. Remove trees disturbed during construction shall be measured by the diameter at breast height of the total amount of trees removed for the Work completed as shown.
2. Basis of Payment. Each removed tree shall be paid for at the Contract unit price bid for the total diameter at breast height. Payment shall be made for full compensation of all labor, equipment and materials required for removing and disposing of all trees, stumps, bushes, shrubs, vegetation, logs, rubbish, and other objectionable material, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - a. Trees removed in Item G-6 shall be outside the clearing and grubbing (G-5) limits.

2.02 SEWERS AND APPURTENANCES (Sections 02605, 02610, 02612, 02615, 02622, 02720, and 02721) (Part B)

A. MANHOLES (Items S-1, S-2, and S-3)

1. Method of Measurement. Manholes shall be measured by the actual number of manholes furnished and installed, complete and in place as shown, specified or as directed and accepted by the Engineer.

THE METROPOLITAN DISTRICT

2. Basis of Payment. Manholes shall be paid for at the Contract unit price bid for each manhole complete in place in the following depth classifications from the frame to the invert of the structure: 0 to 10 feet (S-1), greater than 10 feet up to 15 feet (S-2), and greater than 15 feet (S-3). This price and payment shall be full compensation for saw-cutting of pavement, excavation (except for rock and boulder removal), disposal of non-regulated excavated material, support of excavation, dewatering, diversion and or maintenance of sewage flows, precast sections and bases, masonry materials, manhole rungs, frames and covers, furnishing and installing bedding and backfill materials, geotextile fabric, inverts, testing, and all costs, labor, materials, equipment and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

B. DOGHOUSE MANHOLE CONSTRUCTED OVER EXISTING SEWER (Items S-4, S-5, and S-6)

1. Method of Measurement. Doghouse manholes shall be measured by the actual number of manholes furnished and installed, complete and in place, as shown specified or as directed and accepted by the Engineer.
2. Basis of Payment. Doghouse manholes shall be paid for at the Contract unit price bid for each doghouse manhole complete in place in the following depth classifications from the frame to the invert of the structure: 0 to 10 feet (S-4), greater than 10 feet up to 15 feet (S-5), and greater than 15 feet (S-6). This price and payment shall be full compensation for saw-cutting of pavement, excavation (except for rock and boulder removal), disposal of non-regulated excavated material, removal of sewer pipe, support of excavation, dewatering, diversion and or maintenance of sewage flows, support of existing sewer and other utilities, furnishing and installing concrete cast in place or precast concrete manhole base and installation of upper sections, non-shrink grout, concrete blocks; all forms, reinforcing, concrete and masonry materials, manhole rungs, frame and cover, inverts, furnishing and installing bedding and backfill materials, geotextile fabric, compaction, testing and all material, equipment, tools, and labor and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

C. SEWER PIPE AND FITTINGS (Items S-7, S-8, S-9, and S-10)

1. Method of Measurement.
 - a. Sewer pipe and fittings shall be measured by the linear feet of storm, sanitary, or combined sewer pipe and fittings installed in the following depth classifications from the ground surface to the invert of the pipe: 0 to 8 feet (S-7), greater than 8 feet up to 12 feet (S-8), greater than 12 feet up to 16 feet (S-9), and greater than 16 feet (S-10), complete as shown, specified or as directed by the Engineer.

THE METROPOLITAN DISTRICT

- b. This Work shall be measured for payment between terminal points as follows:
 - i. For pipe beginning and ending at manholes or catch basins, the length of pipeline to be measured shall be the actual number of linear feet installed, measured or computed along the invert of the pipe, from centerline to centerline of the manhole or catch basin.
 - ii. For pipes beginning and ending at an existing pipe, or a structure other than a junction box, sanitary chamber, manhole or catch basin, the length of pipeline to be measured shall be the actual number of linear feet installed, measured or computed along the invert of the pipe, between the terminal faces of the pipe installed.
 - iii. Pipelines beginning and ending in other combinations of the above terminal points shall be measured in accordance with the above procedure.

2. Basis of Payment.

- a. Sewer pipe and fittings shall be paid for at the Contract unit price bid per linear foot for the designated size, type and depth classification of storm, sanitary or combined sewer pipe, complete in place. The price and payment shall be full compensation for furnishing, laying and jointing the pipe, fittings, couplings, saw-cutting of pavement, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation and protection of the sewer, existing utilities and structures, dewatering, furnishing and installing bedding and backfill materials, geotextile fabric, compaction, coring of existing structures, reconfiguring and reconstructing inverts of existing structures, watertables and walls of existing structures and chambers, connecting to existing pipes, PVC or DI wyes and tees, utility identification tape, cleaning and testing the pipe (including conducting CCTV inspection of main line pipe from manhole to manhole in accordance with NASSCO PACP standards prior to acceptance and at the end of the warranty period), diversion and/or maintenance of existing flows, control of groundwater and surface or drainage waters, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
- b. No direct payment shall be made for any Work done or materials used in making the pipeline tight.

D. CROSS COUNTRY SEWER PIPE AND FITTINGS (Items S-11, S-12, S-13, and S-14)

1. Method of Measurement.

THE METROPOLITAN DISTRICT

- a. Cross country sewer pipe and fittings shall be measured by the linear feet of storm, sanitary, or combined sewer pipe and fittings installed in the following depth classifications from the ground surface to the invert of the pipe: 0 to 8 feet (S-11), Greater than 8 feet up to 12 feet (S-12), Greater than 12 feet up to 16 feet (S-13), and Greater than 16 feet (S-14), complete as shown, specified or as directed by the Engineer.
 - b. This Work shall be measured for payment between terminal points as follows:
 - i. For pipe beginning and ending at manholes or catch basins, the length of pipeline to be measured shall be the actual number of linear feet installed, measured or computed along the invert of the pipe, from centerline to centerline of the manhole or catch basin.
 - ii. For pipes beginning and ending at an existing pipe, or a structure other than a junction box, sanitary chamber, manhole or catch basin, the length of pipeline to be measured shall be the actual number of linear feet installed, measured or computed along the invert of the pipe, between the terminal faces of the pipe installed.
 - iii. Pipelines beginning and ending in other combinations of the above terminal points shall be measured in accordance with the above procedure.
2. Basis of Payment.
- a. Cross country sewer pipe and fittings shall be paid for at the Contract unit price bid per linear foot for the designated size, type and depth classification of storm, sanitary or combined sewer pipe, complete in place. The price and payment shall be full compensation for furnishing, laying and jointing the pipe, fittings, couplings, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation and protection of the sewer, existing utilities and structures, dewatering, geotextile fabric, furnishing and installing bedding and backfill materials, compaction, coring of existing structures, reconfiguring and reconstructing inverts of existing structures, watertables and walls of existing structures and chambers, connecting to existing pipes, PVC or DI wyes and tees, utility identification tape, cleaning and low pressure air testing the pipe (including conducting CCTV inspection for main line pipe from manhole to manhole in accordance with NASSCO PACP standards prior to acceptance and at the end of the warranty period), diversion and or maintenance of existing flows, control of groundwater and surface or drainage waters, coordination with Owners of private property, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

THE METROPOLITAN DISTRICT

- b. No direct payment shall be made for any Work done or materials used in making the pipeline tight.

E. FORCE MAIN AND FITTINGS (Item S-15)

1. Method of Measurement.

- a. Ductile iron pipe shall be measured by the number of linear feet of ductile iron pipe and fittings installed, complete as shown, specified or as directed by the Engineer. The length of pipe and fittings to be measured shall be the length of the line after the pipes and fittings have been installed, measured or computed along the center line of the pipe and fittings from the center line of the main line to the face of the terminal pipe or fitting, as shown on the Contract Drawings.
- b. The fittings including mechanical joint bends, tees, crosses, sleeves, reducers, mechanical joint caps and plugs and joint restraint along the pipe as shown in the Contract Drawings shall not be separately measured for payment, but shall be considered as included in the Contract unit bid price bid per linear foot of pipeline.

2. Basis of Payment.

- a. Ductile iron pipe shall be paid for at the Contract unit price bid per linear foot for the designated size and type of force main pipe, complete in place. The price and payment shall be full compensation for furnishing, laying and jointing the pipe, fittings, couplings, saw-cutting of pavement, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, cut, cap bulkhead or otherwise abandon existing pipes, support of excavation and protection of the force main, existing utilities and structures, dewatering, geotextile fabric, furnishing and installing bedding and backfill materials, compaction, reconfiguring and reconstructing inverts, watertables and walls of existing structures and chambers, connecting to existing pipes, utility identification tape, cleaning and testing the pipe, resetting miscellaneous Items removed for the Contractor's convenience and subsequently reinstalled, diversion and/or maintenance of existing flows, control of groundwater and surface or drainage waters and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
- b. No direct payment shall be made for any Work done or materials used in making the pipeline tight.

F. 6-INCH DI OR PVC SEWER SERVICE PIPE (Item S-16)

- 1. Method of Measurement. 6-inch PVC or DI sewer service pipe shall be measured by the linear feet of service pipe installed from the wye, tee or

THE METROPOLITAN DISTRICT

chimney connection at the centerline of mainline to the location shown on the Contract Drawings or location directed by Engineer.

2. Basis of Payment. 6-inch PVC or DI sewer service pipe shall be paid for at the Contract unit price bid per linear foot for the designated type of service pipe complete in place. The price and payment shall be full compensation for cutting and removing existing pavement, trench excavation (except for rock and boulder excavation), furnishing, laying, jointing, bedding, cleaning, and testing the pipe, fittings, couplings restrained joints, mechanical joints (where required), coring of existing structures, saddles, insertion tees, disposal of non-regulated excavated materials, cut, cap bulkhead or otherwise abandon existing pipes, support of excavation and protection of the sewer, existing utilities and structures; dewatering, geotextile fabric, furnishing and installing bedding and backfilling materials, compaction, temporarily plugging open ends, or providing a permanent plug on future service connections, bracing the plug, furnishing and installing a wood marker at the end of pipe, utility identification tape, restoring trench surface to grade, temporary grass seed, resetting miscellaneous Items removed for the Contractor's convenience and subsequently reinstalled, diversion and/or maintenance of existing flows, control of groundwater and surface or drainage waters and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - a. PVC and DI wyes and tees shall be paid for under Items S-7, S-8, S-9, S-10, S-11, S-12, S-13, and S-14.
 - b. C-900 sewer connections at precast concrete chimneys shall be paid for under Item S-16-DI.

G. PRECAST SEWER CHIMNEYS (Item S-17)

1. Method of Measurement. Precast sewer chimneys shall be measured by the number of vertical feet installed from the invert of the sewer mainline to the invert of the lateral at the point where it connects to the wye/tee.
2. Basis of Payment. Precast sewer chimneys shall be paid for at the Contract unit price bid per vertical foot for chimneys complete in place. This price and payment shall be full compensation for all labor, furnishing and installing materials including the precast chimney riser and base, all gaskets, reinforcing steel, PVC risers, couplings, captive seals, equipment and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - a. C-900 sewer connections at precast concrete chimneys shall be paid for under Item S-16-DI.

THE METROPOLITAN DISTRICT

H. AIR RELEASE/INLET MANHOLES (Item S-18)

1. Method of Measurement. Air release/inlet manholes shall be measured by the actual number of air release/air inlet manholes furnished and installed, complete and in place, as shown, specified or as directed by the Engineer.
2. Basis of Payment. Air release/inlet manholes shall be paid for at the Contract unit price bid for each air release/inlet manhole complete in place. This price and payment shall be full compensation for saw-cutting of pavement, excavation (except for rock and boulder removal), disposal of non-regulated excavated material, support of excavation, dewatering, diversion and or maintenance of sewage flows, valves required, drain and wye/tee connections, internal and external piping, vent, concrete thrust blocks, furnishing and installing precast sections and bases, masonry materials, manhole rungs, frames and covers, geotextile fabric, furnishing and installing bedding and backfill materials, compaction, inverts, cleaning, testing, and all costs, labor, materials, equipment and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

I. CATCH BASINS (Items S-19 through S-28)

1. Method of Measurement. Catch basins shall be measured by the actual number of catch basins complete and in place as shown on the Contract Drawings for all depths.
2. Basis of Payment. Catch basins shall be paid for at the Contract unit price bid for the designated size and type of catch basins, complete and in place, as shown, specified or as directed by the Engineer. This price and payment shall be full compensation for saw-cutting of pavement trench, excavation (except for rock and boulder removal), removal and disposal of non-regulated excavated material, support of excavation, dewatering, diversion and or maintenance of stormwater flows, furnishing and installing sump, walls, riser and curbed sections, furnishing and installing bedding and backfill materials, geotextile fabric, compaction, connection and installation of existing and proposed pipes, installation of frames and grates, concrete curb, granite curb and granite curb inlets, testing, and all costs, labor, materials, equipment and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

J. REMOVAL OF EXISTING MANHOLE OR CATCH BASIN (Item S-29)

1. Method of Measurement. Removal of existing manhole or catch basin shall be measured by the actual number of manholes or catch basins removed and disposed of properly as shown on the Contract Drawings or directed by Engineer for all depths.
2. Basis of Payment. Removal of existing manhole or catch basin shall be paid for at the Contract unit price bid for each manhole or catch basin removed as

THE METROPOLITAN DISTRICT

shown, specified or as directed by the Engineer. This price and payment shall be full compensation for saw-cutting of pavement, excavation, removal and disposal of non-regulated excavated material, removal of existing structures, bulk heading of existing pipes, support of excavation, dewatering, diversion and or maintenance of sewer or stormwater flows, diversion and/or maintenance of existing flows, control of groundwater and surface or drainage waters, furnishing and installing backfill materials, compaction, disposal of manhole or catch basin, delivery of frame and cover to Owner, and all costs, labor, materials, equipment and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.

K. ABANDONMENT OF EXISTING SEWER WITHOUT CLSM (Item S-30)

1. Method of Measurement. Abandonment of existing sewer shall be on a lump sum basis.
2. Basis of Payment. Abandonment of existing sewer shall be paid for on a lump sum basis. The price and payment shall be full compensation for cutting and removing existing pavement, trench excavation (except for rock and boulder excavation), disposal of non-regulated excavated materials, abandonment of pipe, support of excavation and protection of existing utilities and structures; dewatering, furnishing and installing backfill materials, plugging open ends, restoring trench surface to grade, temporary grass seed and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

L. ABANDONMENT OF EXISTING SEWER WITH CLSM (Item S-31)

1. Method of Measurement. Abandonment of existing sewer with CLSM shall be measured by the actual length of sewer abandoned on a linear foot basis.
2. Basis of Payment. Abandonment of existing sewer with CLSM, all sizes, all depths shall be paid for at the Contract unit price for the amount of sewer abandoned. The price and payment will be full compensation for cutting and removing existing pavement, trench excavation (except for rock and boulder excavation), disposal of non-regulated excavated materials, abandonment of pipe, fill pipe with pumpable controlled low strength material (CLSM), support of excavation and protection of existing utilities and structures; dewatering, furnishing and installing backfill materials, plugging open ends, restoring trench surface to grade, temporary grass seed and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

M. REMOVAL OF EXISTING SEWER (Item S-32)

1. Method of Measurement. Removal of existing sewer shall be measured by the actual length of sewer removed on a linear foot basis.

THE METROPOLITAN DISTRICT

2. Basis of Payment. Removal of existing sewer shall be paid for at the Contract unit price bid per linear foot for the amount of sewer removed. The price and payment shall be full compensation for removal of existing pipe, excavation, furnishing and installing backfill materials, compaction, proper disposal of existing pipe and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

2.03 SEWER REHABILITATION (Part C)

A. CURED-IN-PLACE PIPE (Items R-1 and R-2)

1. Method of Measurement. Cured-in place pipe (CIPP) shall be measured by the actual number of linear feet of CIPP installed, measured in place along the centerline of the pipe from center of manhole to center of manhole of the various sizes indicated. Measurement shall be to the nearest tenth of a foot. The various items of Work necessary to bypass pump wastewater flows, dewater, clean, TV inspect and sample testing, public notification, removal of protruding laterals and any other obstructions, and other Work required as part of the liner installation shall not be measured for separate payment. No separate payment shall be made for unclogging service laterals as a result of the operation.
2. Basis of Payment. Cured-in place pipe shall be paid for by the respective quantities, at the sizes defined, as determined above at the Contract unit price bid. This price and payment will be full compensation for furnishing all materials, labor, tools, equipment and appurtenances required or otherwise necessary to satisfactorily complete the Work including light hydraulic cleaning, immediate post-construction television inspection from manhole to manhole and post-construction television inspection one year after CIPP installation from manhole to manhole (in accordance with NASSCO PACP standards), stopping of active leaks that would interfere with the integrity of the line to be installed, removal and disposal of debris, removing protruding taps and any other obstructions, obtaining water, repairs to private property, public notification, sewer flow control; maintenance of flow in existing sewer, maintenance of flow in existing sewers including bypass pumping and plugs; hydrophilic end seals; acceptance testing, preconstruction video of project site, care and protection of property; and all costs, labor, materials, and equipment incidental thereto, for which separate payment is not provided under other Items in the Schedule of Prices.

B. HEAVY HYDRAULIC CLEANING (Items R-3 and R-4)

1. Method of Measurement. Heavy hydraulic cleaning and root removal shall be measured by the actual number of linear feet of pipe cleaned as approved by the Engineer. Pipe shall be measured in place along the centerline of the pipe from the center of manhole to center of manhole of each pipe. Measurement

THE METROPOLITAN DISTRICT

shall be to the nearest tenth of a foot of the actual footage of what was cleaned.

2. **Basis of Payment.** Heavy hydraulic cleaning and root removal of the existing sewer pipe shall be paid for the respective quantities as determined at the Contract unit price bid. This price and payment shall be full compensation for locating existing manholes, the removal, transportation, and disposal of debris within the sewers in accordance with these Specifications, for obtaining water, maintenance of flow in existing sewers including bypass pumping and plugs necessary for heavy hydraulic cleaning and root removal, and all else incidental thereto for which separate payment is not provided for under other Items in the Schedule of Prices.

C. RECONNECT ACTIVE SERVICE LATERALS (Items R-5 and R-6)

1. **Method of Measurement.** Reconnection of active service laterals shall be measured by the actual number of laterals reconnected as determined by the Engineer.
2. **Basis of Payment.** Reconnection of active service laterals shall be paid for each building lateral reconnected as determined above at the Contract unit price bid.

D. CURED-IN-PLACE SPOT REPAIR (Items R-7 and R-8)

1. **Method of Measurement.** Cured-in place spot repairs shall be measured by the actual number of cured-in-place spot liners installed and accepted by the Engineer. Each cured-in-place spot repair shall be considered as a minimum length of 3 linear feet to a maximum length of 10 linear feet.
2. **Basis of Payment.** Cured-in place spot repairs shall be paid for respective quantities at the sizes defined, as determined above at the Contract unit price bid. This price and payment shall be full compensation for furnishing all materials, labor, tools, equipment and appurtenances required or otherwise necessary to satisfactorily install the cured-in-place spot repairs, including light hydraulic cleaning, immediate post-construction television inspection from manhole to manhole and post-construction television inspection one year after CIPP instillation from manhole to manhole (including conducting CCTV inspection of main line pipe from manhole to manhole in accordance with NASSCO PACP standards prior to acceptance and at the end of the warranty period), stopping at active leaks that would interfere with the integrity of the line to be installed, removal and disposal of debris, removal of protruding taps, obtaining water, repairs to private property, public notification, sewer inflow control; maintenance of flow in existing sewer, maintenance of flow in existing sewers including bypass pumping and plugs, hydrophilic end seals at manholes, acceptance testing, preconstruction video, care and protection of property; all costs, labor, materials and equipment incidental thereto, for which separate payment is not provided under other items in the Schedule of Prices.

THE METROPOLITAN DISTRICT

E. PVC POINT REPAIRS (Items R-9, R-10, R-11 and R-12)

1. Method of Measurement. PVC sewer point repairs for sanitary sewer mains shall be measured as the number actually installed in the completed project and accepted by the Engineer in the following depth classifications from the ground surface to the invert of the pipe: 0 to 16 feet (R-9 and R-11) and greater than 16 feet (Items R-10 and R-12). Each point repair shall be considered as a minimum length of 10 linear feet to a maximum length of 26 linear feet of sanitary sewer for each point repair within that sewer reach. Repairs beyond the 26-linear foot length shall be measured as a point repair and the additional footage of pipe required over the 26 linear feet shall be on a linear foot basis for sewer pipe size specified on the Schedule of Prices (S-7, S-8, S-9, S-10, S-11, S-12, S-13, or S-14). Measurement shall be made along the horizontal centerline of the pipe with no deduction for fittings and shall be to the centerline of the adaptor at connections to existing pipe and/or to the centerline of the manhole when repair is tied into manhole.
2. Basis of Payment. PVC sewer point repairs shall be paid for the respective quantities as determined above at the Contract unit price bid. The price and payment shall be full compensation for furnishing, laying and jointing the PVC pipe, fittings, couplings, removal and disposal of existing pipe types to be replaced, including removal and proper disposal of AC pipe, saw-cutting of pavement, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation and protection of the sewer, existing utilities and structures, dewatering, furnishing and installing bedding and backfill materials, geotextile fabric, compaction, connections to existing and/or new manholes including coring of existing manholes, reconfiguring and reconstructing inverts of existing structures, watertables and walls of existing structures and chambers, hydrophilic end seals at manholes, preconstruction video, connecting to existing pipes, PVC or DI wyes and tees, utility identification tape, cleaning and testing the pipe (including conducting CCTV inspection of main line pipe from manhole to manhole in accordance with NASSCO PACP standards prior to acceptance and at the end of the warranty period), diversion and/or maintenance of existing flows, control of groundwater and surface or drainage waters, protection, crossing, supporting of existing structures and utilities; replacement of existing utilities disturbed during construction; care and protection of property; coordination with other contractors and utilities; and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - a. Ductile iron (DI) wyes or tees shall be used along point repair at all sewer service connections on mainline when pipe segment is scheduled to be CIPP lined after completion of point repair.

THE METROPOLITAN DISTRICT

F. PRE-CCTV (Items R-13 and R-14)

1. Method of Measurement. Television inspection of the existing sewer pipe shall be measured in place on a linear foot basis to the nearest foot. Measurement shall be along the horizontal centerline of the pipe with no deductions for manholes and shall be from center of manhole to center of manhole.
2. Basis of Payment. Television inspection of the existing sewer pipe shall include, but not be limited to providing all equipment, materials and labor for inspecting the sewer pipe; maintenance of flow in existing sewers including bypass pumping and plugs; light cleaning and disposal of all debris; creating copies of the inspection on digital video external USB/portable hard drive to be delivered to the Owner and Engineer; creating copies of inspection logs to be delivered to the Owner and Engineer; and all else incidental thereto for which separate payment is not provided under other Items in the Schedule of Prices.
 - a. PRE-CCTV shall be utilized prior to any work on the pipe. All CCTV required after the completion of work and at the warranty period is included in the respective Items in the Schedule of Prices.

G. SERVICE LATERAL CONNECTION LINER (TOP HAT) (Items R-15 and R-16)

1. Method of Measurement. Service lateral connection liner (top hat), shall be measured by the actual number of service lateral connection liners installed and accepted as determined by the Engineer.
2. Basis of Payment. Service lateral connection liner (top hat), shall be paid for the respective quantities as determined at the Contract unit prices bid. This price and payment shall be full compensation for project notices; coordination with property owners and the Owner; cleaning existing services; removal and disposal of debris; performing pre- and post-construction television inspection of both the sewer main and each sewer service lateral; furnishing written logs and videos on an external USB/portable hard drive; stopping active infiltration; furnishing and installing the service lateral connection liners (top hat) as specified in Section 02677, including re-cutting of service connections at previously installed lining locations; bypass pumping, materials testing, post-installation inspection, including television inspection of both the sewer main and each sewer service lateral; and all else incidental thereto for which separate payment is not provided under other Items in the Schedule of Prices.

H. SEWER SERVICE LATERAL CURED-IN-PLACE LINER FROM 0-FT TO 5-FT (Items R-17 and R-18)

1. Method of Measurement. Sewer service lateral cured-in-place liner from 0 to 5 feet, shall be measured by the actual number of service lateral connection liners installed and accepted as determined by the Engineer. All work

THE METROPOLITAN DISTRICT

necessary to bypass pump wastewater flows, dewater, clean, TV inspect and sample testing, public notification, removal of protruding laterals, and other work required to complete the liner installation shall not be measured for separate payment. No separate payment shall be made for unclogging service laterals as a result of the operation.

2. Basis of Payment. Sewer service lateral cured-in-place liner from 0 to 5 feet, shall be paid for the respective quantities as determined at the Contract unit prices bid. This price and payment shall be full compensation for project notices; coordination with property owners and the Owner; cleaning the existing service pipe and connection, including root removal and removal of obstructions; removal and disposal of debris; performing pre- and post-construction television inspection (from sewer main to building); furnishing written logs and videos on an external USB/portable hard drive; stopping active infiltration; furnishing and installing the cured-in-place pipe liners as specified in Section 02677; maintenance of flow in existing sewers including bypass pumping and plugs, materials testing and acceptance, environmental protection; and all else incidental thereto for which separate payment is not provided under other Items in the Schedule of Prices.

I. SEWER SERVICE LATERAL CURED-IN-PLACE LINER FOR ADDITIONAL FOOTAGE (Items R-19 and R-20)

1. Method of Measurement. Sewer service lateral cured-in place liner for additional footage required shall be measured in place on a linear foot basis to the nearest tenth of a foot. Measurement shall be made along the ground surface above the horizontal centerline of the mainline pipe as approved by the Engineer.
2. Basis of Payment. Sewer service lateral cured-in-place liner, for additional footage required, shall be paid for the respective quantities as determined at the Contract unit price bid. This price and payment shall be full compensation for cleaning the existing service, including root removal and removal of obstructions; removal and disposal of debris; performing pre- and post-construction television inspection; furnishing written logs and videos on an external USB/portable hard drive; stopping active infiltration; furnishing and installing the cured-in-place pipe liners as specified in Section 02677; maintenance of flow in existing sewers including bypass pumping and plugs, materials testing and acceptance, environmental protection; and all else incidental thereto for which separate payment is not provided under other Items in the Schedule of Prices.

J. SEWER SERVICE LATERAL CLEANOUTS (Items R-21 and R-22)

1. Method of Measurement. Sewer service lateral cleanouts and risers (Items R-21 and R-22) shall be measured for payment by the actual number of cleanouts and risers installed.

THE METROPOLITAN DISTRICT

2. Basis of Payment. Sewer service lateral cleanouts and risers (Items R-21 and R-22) shall be made for the respective quantities as determined at the unit price bid. This price and payment shall be full compensation for coordination with property owners and the Owner; excavation using the approved excavation method at each cleanout location; furnishing and installing the new cleanout and PVC riser pipe, including new PVC pipe saddle and sealant to connect to the existing service pipe; all fittings required; maintenance of sewer service flow; cleaning, removal and disposal of debris; furnishing and installing sand and gravel backfill; compaction; pre- and post-construction television inspection; concrete pad for installation in paved areas; new cleanout ferrule and housing; and all else incidental thereto for which separate payment is not provided under other Items in the Schedule of Prices.

- a. Payment for sewer service lateral cleanouts and risers installed in lawn/unpaved areas shall be made under Item R-21.
- b. Payment for sewer service lateral cleanouts and risers installed in paved areas shall be made under Item R-22.

K. REMOVE AND REPLACE MANHOLE FRAME AND COVERS (Items R-23 through R-28)

1. Method of Measurement. Sewer manhole frames and covers for removal of existing sewer manhole frames and covers and replacement with new sewer manhole frames and covers, shall be measured by the actual number of new sewer manhole frames and covers installed.
2. Basis of Payment. Sewer manhole frame and covers shall be paid for the respective quantities as determined above at the Contract unit price bid. This price and payment shall be full compensation for saw-cutting of pavement and/or concrete, excavation (except for rock and boulder removal), disposal of non-regulated excavated material, support of excavation, removal and disposal of the existing manhole frame and cover; furnishing and installing the new sewer manhole frame and cover; furnishing and installing backfill materials, compaction; and all costs, labor, materials, and equipment incidental thereto, for which separate payment is not provided under other Items in the Schedule of Prices.

L. REMOVAL OF EXISTING CHIMNEY AND REPLACEMENT WITH NEW CHIMNEY (Items R-29 and R-30)

1. Method of Measurement. Removal of existing sewer manhole chimneys and replacement with new chimneys shall be measured by the total number of inches of chimney removed and replaced and accepted by the Engineer.
2. Basis of Payment. Removal of existing sewer manhole chimneys and replacement with new chimneys shall be paid for the respective quantities as determined above at the Contract unit price bid. This price and payment shall

THE METROPOLITAN DISTRICT

be full compensation for saw-cutting of pavement and concrete, excavation (except for rock and boulder removal), disposal of non-regulated excavated material, support of excavation, removal and disposal of the existing manhole chimney; support of excavation; all forms; reinforcing; concrete and masonry materials; furnishing and installing backfill materials, compaction; all labor, materials and equipment required to install brick and mortar chimneys, and all work incidental thereto for which payment is not provided under other Items in the Schedule of Prices.

M. REMOVE AND REPLACE INTERNAL MANHOLE DROP CONNECTIONS (Items R-31 and R-32)

1. Method of Measurement. Internal drop connections for sewer manholes shall be measured by the actual number of vertical drops replaced, as shown on the Drawings, but shall not be less than 3-ft for each drop connection. Internal drops shall be removed and replaced where manholes with existing internal drops are being replaced or lined.
2. Basis of Payment. Internal drop connections for sewer manholes shall be paid for the quantity as above determined at the Contract unit price bid. This price and payment shall be full compensation for removal of the existing internal drop connection, furnishing and installing the pipe, fittings, appurtenances, cutting into manhole wall and all else incidental thereto for which separate payment is not provided under other Items in the Schedule of Prices.

N. REPAIR AND REBUILD EXISTING MANHOLE INVERTS (Items R-33 and R-34)

1. Method of Measurement. Repair or rebuild of existing manhole inverts shall be measured by the actual number of manhole inverts repaired or rebuilt.
2. Basis of Payment. Repair or rebuild of existing manholes inverts shall be paid for at the Contract unit price bid. This price and payment shall be full compensation for all labor, materials, equipment, cleaning, maintenance of flow in existing sewers including bypass pumping and plugs, repair and rebuild manhole inverts as directed by the Engineer and all incidentals thereto, for which separate payment is not provided under other Items in the Schedule of Prices.

O. SEWER MANHOLE MONOLITHIC CEMENTITIOUS LINING (Items R-35, R-36, R-37, and R-38)

1. Method of Measurement. Sewer manhole monolithic lining for sealing of existing sewer manholes using monolithic surfacing system, shall be measured in place on a vertical foot basis from the invert of the lowest pipe of the manhole to the top of the manhole and chimney interface.
2. Basis of Payment. Sewer manhole monolithic lining for sealing of existing manholes using monolithic lining system, shall be paid for the quantity as above determined at the Contract unit price bid. This price and payment shall

THE METROPOLITAN DISTRICT

be full compensation for preparatory cleaning of the manhole walls and invert; sealing pipe connections and stopping active leaks in manhole; maintenance of flow in existing sewers including bypass pumping and plugs; furnishing and installing the manhole monolithic lining system as specified in Section 02768; reopening all active manhole connections; proper disposal of cleaning solvents; materials testing; environmental protection; final acceptance testing and all else incidental thereto for which separate payment is not provided under other Items in the Schedule of Prices.

- a. Connections to be abandoned shall be determined in the field by the Engineer and shall be plugged with bricks and mortar prior to rehabilitating the manhole.
- b. The Contractor shall accurately field measure and size each individual manhole. The Contractor is reminded that each existing sewer manhole designated to receive a monolithic surfacing may have a different configuration and varying field dimensions.

P. SEWER MANHOLE CHIMNEY LINING (Items R-39 and R-40)

1. Method of Measurement. Sewer manhole chimney lining for sealing of existing sewer manhole chimneys using an internal chimney lining system shall be measured in place on a per manhole basis. Measurement shall be based on completion of each chimney, including the replacement of broken or cracked bricks, the application of cementitious mortar to structurally restore the chimney, and preparation of the chimney for the installation of the internal chimney lining system.
2. Basis of Payment. Sewer manhole chimney lining shall be paid for the quantity as above determined at the Contract unit price bid. This price and payment shall be full compensation for removal and disposal of all unsuitable materials; furnishing and installing bricks and cementitious mortar to structurally restore the chimney; stopping all active leaks; cleaning, sandblasting; preparation of the chimney for lining; furnishing and installing the internal chimney lining system and all else incidental thereto for which separate payment is not provided under other Items in the Schedule of Prices.

2.04 WATER MAIN AND APPURTENANCES (Sections 02641, 02642, 02644, 02645, 02651, 02653, 02656, 02657, 02659, and 02669) (Part D)

A. DUCTILE IRON PIPE AND FITTINGS – WATER MAIN (Item W-1)

1. Method of Measurement.
 - a. Ductile iron pipe shall be measured by the actual number linear feet of ductile iron pipe and fittings installed, complete as shown, specified or as directed by the Engineer. The length of pipe and fittings to be measured shall be the length of the line after the pipes and fittings have been installed, measured or computed along the center line of the pipe and

THE METROPOLITAN DISTRICT

fittings from the center line of the main line to the face of the terminal pipe or fitting, as shown on the Contract Drawings.

- b. The fittings including mechanical joint bends, tees, crosses, sleeves, reducers, mechanical joint caps and plugs and joint restraint along the pipe as shown in the Contract Drawings shall not be separately measured for payment, but shall be considered as included in the Contract unit price bid per linear foot of pipeline.
- c. Pipe installed on blow-off assemblies (W-6) and hydrants (W-7) shall not be separately measured for payment regardless of the pipe length connecting the blow-off or hydrant assembly to the main, however, all costs therefore shall be considered as having been included in the Contract unit price bid for the respective Bid Items.

2. Basis of Payment.

- a. Ductile iron pipe shall be paid for at the Contract unit price bid per linear foot for the designated size of ductile iron pipe installed, completed, and in place. This price and payment shall be full compensation for all coordination with the Owner for Work on the existing system, isolating the water main, cutting the main, furnishing and installing all pipes, joints, joint restraint, thrust blocks, restraining rods, specials, and fittings, including saw-cutting of pavement trench, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation and protection of the water main and existing utilities and structures, dewatering, furnish and installing bedding materials, furnishing and installing backfill materials to subgrade, compaction, connecting to existing pipes, utility identification tape, pressure testing the pipe, disinfecting and flushing, water quality testing, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
- b. No claim shall be allowed because the number of pipes and joints may be greater than estimated by the Contractor.
- c. No direct payment shall be made for any Work done or materials used in making the pipeline tight.
- d. Additional fittings not shown on the drawings required and ordered by the Engineer shall be paid for under Item F-16.
- e. Additional pipe restraining not shown on the drawings required and ordered by the Engineer shall be paid for under Item F-21.
- f. Tee fittings required on the water main for services shall be included in this Item.

THE METROPOLITAN DISTRICT

- g. Corporation stops for services shall be provided by the Owner. Contractor required to coordinate with the Owner at these locations.

B. 12-INCH AND SMALLER GATE VALVES (Item W-2)

1. Method of Measurement. Gate valves shall be measured on a per each basis for gate valves of the designated size indicated, complete with gate box and extension stem if required, installed as shown, specified or as directed by the Engineer.
2. Basis of Payment.
 - a. Gate valves shall be paid for at the Contract unit price bid for 12-inch and smaller gate valves complete in place. This price and payment shall be full compensation for furnishing and installing gate valves and boxes with covers and extension stem (if required) of the types and sizes indicated, setting and adjustment of gate boxes with covers, jointing, furnishing and installing restrained joints and fittings, clearing, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation, dewatering, furnishing and installing bedding and backfill materials, compaction, furnishing the additional materials for refilling, grading, bracing, testing, disinfecting and flushing as specified, gate valve testing and acceptance, including all labor, material and equipment needed to incorporate them into the Work and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - b. Gate valves installed on water services shall be paid for under this Item.
 - c. Gate valves installed on blow off assemblies shall be paid for under Contract Item W-6 Blow-Off Assembly.
 - d. Gate valves installed on hydrant laterals shall be paid for under Contract Item W-7 Fire Hydrant and Assembly.
 - e. Tapping sleeves and gate valves shall be paid for under Contract Item W-4 for Tapping Sleeve and Gate Valves for the required size.

C. 16-INCH AND LARGER BUTTERFLY VALVES (Item W-3)

1. Method of Measurement. Butterfly valves shall be measured on a per each basis for 16-inch and larger butterfly valves of the designated sizes, complete with gate box and extension stem if required, installed as shown, specified or as directed by the Engineer.
2. Basis of Payment. Butterfly valves shall be paid for at the Contract unit price bid for each 16-inch and larger butterfly valves complete in place. This price and payment shall be full compensation for furnishing and installing butterfly valves with gate boxes and extension stem, if required, of the sizes indicated

THE METROPOLITAN DISTRICT

including setting and adjustment of gate boxes with covers, jointing, furnishing and installing restrained joints and fittings, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation, dewatering, furnishing and installing bedding and backfill materials, compaction, furnishing the additional materials for refilling, grading, bracing, testing, disinfecting and flushing as specified, butterfly valve testing and acceptance, including all labor, material and equipment needed to incorporate them into the Work and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

D. TAPPING SLEEVES AND GATE VALVES (Item W-4)

1. Method of Measurement. Tapping sleeve and gate valve assemblies shall be measured by the actual number of tapping sleeve and gate valve assemblies, complete with gate box and extension stem if required, installed as shown, specified or as directed by the Engineer.
2. Basis of Payment.
 - a. Tapping sleeves and gate valves shall be paid for at the Contract unit price bid each for tapping sleeve and gate valve assembly complete in place. This price and payment shall be full compensation for coordinating tapping of main with the Owner, furnishing and installing tapping sleeve, gate valve and gate box assemblies, restrained joints and fittings, thrust blocks, all material, labor and equipment to incorporate them into the Work, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation, dewatering, furnishing and installing bedding and backfill materials, compaction, furnishing the additional materials for refilling, grading, bracing, disinfecting and flushing as specified, testing and acceptance, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - b. No direct payment shall be made for any Work done or materials used in making the assembly tight.

E. AIR VALVE/CHLORINATION INLET/BLOW-OFF (Item W-5)

1. Method of Measurement. Air valves/chlorination inlet/blow-off shall be measured by the actual number of air valves, chlorination inlet, chlorination blow-offs or other related assemblies, complete with gate boxes, installed as shown, specified or as directed by the Engineer.
2. Basis of Payment. Air valves/chlorination inlets/blow-off shall be paid for at the Contract unit price bid for air valve assemblies complete in place. This price and payment shall be full compensation for the excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation, dewatering, furnishing and installing bedding

THE METROPOLITAN DISTRICT

and backfill materials, compaction, furnishing the additional material for refilling, grading, bracing, including all labor and equipment to incorporate them into the Work, removal of wedge valve and abandonment of corporation if not converted to an air valve and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

- a. The Item shall not be remeasured for payment if converted from a Chlorination Inlet/Blow off to an air valve.

F. BLOW-OFF ASSEMBLY (Item W-6)

1. Method of Measurement. Blow-off assemblies shall be measured on a per each basis for the number of blow-off assemblies, complete with gate valve and gate box, installed as shown, specified or as directed by the Engineer.
2. Basis of Payment. Blow-off assemblies shall be paid for at the Contract unit price bid for each blow-off assemblies complete in place. This price and payment shall be full compensation for furnishing and installing the blow-off assembly including tee or other fittings, ductile iron pipe, gate valve, gate box, extension stem if required, all material, labor and equipment to incorporate them into the Work, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation, dewatering, furnishing and installing bedding and backfill materials, crushed stone drain pocket, compaction, furnishing the additional materials for refilling, grading, harnessing, bracing, pipe restraints and utility identification tape, disinfecting and flushing as specified (including coordination with Owner), providing and maintaining erosion and sedimentation controls for flushing, blow-off assembly testing and acceptance, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - a. No direct payment shall be made for any Work done or materials used in making the assembly tight.

G. FIRE HYDRANT ASSEMBLY (Item W-7)

1. Method of Measurement. Fire hydrant assemblies shall be paid for on a per each basis for the number of fire hydrant assemblies installed as shown, specified or as directed by the Engineer.
2. Basis of Payment. Fire hydrant assemblies shall be paid for at the Contract unit price bid for each fire hydrant assemblies complete in place. This price and payment shall be full compensation for furnishing and installing the hydrant assembly, gate valve and gate box, extension stem if required, ductile iron pipe, fittings, saw-cutting, clearing, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation, dewatering, furnishing and installing bedding and backfill materials, compaction, furnishing the additional materials for refilling, concrete

THE METROPOLITAN DISTRICT

collar, crushed stone drain pocket, resetting miscellaneous Items, utility identification tape, grading, harnessing, bracing, testing, disinfecting and flushing (including coordination with Owner and Fire Marshall), providing and maintaining erosion and sedimentation controls for flushing, specified, hydrant assembly testing and acceptance, including all labor, material and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

- a. No direct payment shall be made for any Work done or materials used in making the hydrant assembly tight.

H. REMOVE EXISTING FIRE HYDRANT ASSEMBLY (Item W-8)

1. Method of Measurement. Removal of existing hydrant assemblies shall be measured on a per each basis of each hydrant removed and deactivated at the main complete with hydrant gate box and pipe removal as specified or as directed by Engineer.
2. Basis of Payment. Removal of existing hydrant assemblies shall be paid for at the Contract Unit bid price for each hydrant assembly removed and deactivated from the existing water main shall include removing hydrant gate box from the existing water main, installation of a water tight cap and thrust block if existing water main shall be subject to system pressure, cap, delivery of old hydrant to the Owner's yard (at Maxim Road), coordination with Owner and Fire Marshall, providing and maintaining erosion control or as directed, and all labor, equipment and materials required or incidental to the Work.

I. COPPER WATER SERVICE OR FIRE SERVICE (SMALLER THAN 4-INCH DIAMETER) (Item W-9)

1. Method of Measurement. Copper water and fire services smaller than four (4) inches in diameter including fittings shall be measured on a per linear foot basis for the length of service pipe from the corporation stop to the curb stop in a straight horizontal line or point of connection to existing service.
2. Basis of Payment. Copper water and fire services smaller than four (4) inches in diameter shall be paid for at the Contract unit price bid per linear foot for each water and fire service complete in place. This price and payment shall be full compensation for furnishing and installing the copper pipe and fittings, furnishing and installing the curb stop, curb box, and appurtenances, saw-cutting, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, removal and disposal of existing service pipes, removal and disposal of existing curb stop and box, making connections to existing service pipes, support of excavation, dewatering, furnishing and installing bedding and backfill materials, compaction, furnishing the additional materials for refilling, resetting miscellaneous items, utility identification tape, harnessing, bracing, testing, disinfecting and flushing as specified, coordination with property owner, Owner and Fire Marshall, restoring trench surface to grade, temporary grass seed, all labor, material

THE METROPOLITAN DISTRICT

and equipment needed to incorporate them into the Work and all other items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

- a. No direct payment shall be made for any Work done or materials used in making the water or fire service pipe tight.
- b. No payment shall be made under this Item for valved, plugged, or blind flanged outlets or branches which contain no pipe.
- c. Corporation stops for services shall be provided by the Owner. Contractor required to coordinate with the Owner at these locations.
- d. Curb stops, curb boxes, and appurtenances shall be included in this item.

J. DUCTILE IRON WATER SERVICE OR FIRE SERVICE (4-INCH DIAMETER AND GREATER) (Item W-10)

1. Method of Measurement. Ductile iron water and fire services four (4) inches in diameter and greater shall be measured on a per linear foot basis for the designated size to be measured in-place in the trench as a straight run from the mainline point of connection to the existing service or property line.
2. Basis of Payment. Ductile iron water and fire services four (4) inches or greater in diameter shall be paid for at the Contract unit price bid for each water and fire service complete in place. This price and payment shall be full compensation for furnishing and installing the DI pipe and fittings, saw-cutting, excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, removal and disposal of existing service pipes, making connections to existing service pipes, support of excavation, dewatering, furnishing and installing bedding and backfill materials, compaction, furnishing the additional materials for refilling, resetting miscellaneous items, utility identification tape, harnessing, bracing, testing, disinfecting and flushing as specified, coordination with property owner, Owner and Fire Marshall, restoring trench surface to grade, temporary grass seed, , including all labor, material and equipment needed to incorporate them into the Work and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - a. No direct payment shall be made for any Work done or materials used in making the water or fire service pipe tight.
 - b. No payment shall be made under this Item for valved, plugged, or blind flanged outlets or branches which contain no pipe.
 - c. Tee fittings required on the water main for services shall be included in Item W-1.

THE METROPOLITAN DISTRICT

- d. Gate valves required on water services shall be paid for under the Contract Item W-2 Gate Valves for the required size.

K. TEMPORARY WATER MAIN SYSTEM (Item W-11)

1. Method of Measurement.

- a. Temporary water main system and associated service piping and appurtenances shall be measured on a linear foot basis for temporary water main installed or as directed by the Engineer.
- b. Additional work and coordination with the Owner to modify the existing water system shall not be measured separately for payment, but all costs therefore shall be considered as included in the Contract unit price bid for all of the Work contemplated under this Section of the Specifications and all other related Sections as may be referenced herein.
- c. Disinfection and testing of temporary service bypass water system shall not be measured separately for payment, but all costs therefore shall be considered as included in the Contract unit bid price for the installation of temporary water main.
- d. Temporary and permanent paved and unpaved surface restoration and resetting miscellaneous items and maintenance and protection of traffic, environmental protection and security services shall not be measured for payment, but shall be considered as included in the Contract unit price bid for temporary water main system where the Work is not included for payment under other Items in the Schedule of Prices.

- 2. Basis of Payment. Temporary water main piping and fittings shall be paid for at the Contract bid price per linear foot for temporary water main system, which price shall include all excavation (except for rock and boulder removal) and furnishing and installing bedding and backfill materials, pipe cutting and repair, installation of temporary water main and water service connection piping, temporary hydrants, blow-off assemblies, air valves, standpipes, pressure gages, provisions for injecting liquid hypochlorite, disinfection testing provisions, connections of piping to existing hydrants with proper backflow prevention devices, valves, testing and disinfection, disinfection tests, temporary and permanent paved and unpaved surface restoration of all surfaces, removal of temporary water main and service piping and fittings, environmental protection, maintenance and protection of traffic, security services, notifications to property owners, coordination with the Owner, materials, de-chlorination and disposal of neutralized water, equipment, tools, labor and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

THE METROPOLITAN DISTRICT

L. ABANDONMENT OF EXISTING WATER MAIN WITHOUT CLSM (Item W-12)

1. Method of Measurement. Abandonment of existing water main shall be on a lump sum basis.
2. Basis of Payment. Abandonment of existing water main shall be paid for at the Contract unit price bid. The price and payment shall be full compensation for cutting and removing existing pavement, trench excavation (except for rock and boulder excavation), disposal of non-regulated excavated materials, abandonment of pipe, removal of all water main appurtenances such as gate boxes, blow-offs and manholes; support of excavation and protection of existing utilities and structures; dewatering, furnishing and installing backfill materials, plugging open ends, restoring trench surface to grade, temporary grass seed and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

M. ABANDONMENT OF EXISTING WATER MAIN WITH CLSM (Item W-13)

1. Method of Measurement. Abandonment of existing water main shall be measured by the length of actual water main abandoned on a linear foot basis.
2. Basis of Payment. Abandonment of existing water main shall be paid for at the Contract unit price bid per linear foot for the amount of water main abandoned. The price and payment shall be full compensation for cutting and removing existing pavement, trench excavation (except for rock and boulder excavation), disposal of non-regulated excavated materials, abandonment of pipe, removal of all water main appurtenances such as gate boxes, blow-offs and manholes; fill pipe with controlled low strength material (CLSM), support of excavation and protection of existing utilities and structures; dewatering, furnishing and installing backfill materials, plugging open ends, restoring trench surface to grade, temporary grass seed and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

N. REMOVAL OF EXISTING WATER MAIN (Item W-14)

1. Method of Measurement. Removal of existing water main shall be measured by the length of actual water main removed on a linear foot basis.
2. Basis of Payment. Removal of existing water main shall be paid for at the Contract unit price bid per linear foot for the amount of water main removed. The price and payment shall be full compensation for removal of existing pipe, proper disposal of existing pipe and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

THE METROPOLITAN DISTRICT

1. This item shall include removal of existing reinforced concrete thrust blocks, concrete thrust blocks, or concrete anchors of up to or equal to 1 cubic yard. Removal of all existing thrust blocks or anchors over 1 cubic yard shall be paid for under items E-3-M, E-3-B, F-3-M or F-3-B.

O. DUCTILE IRON PIPE INSULATION (Item W-15)

1. Method of Measurement. Ductile iron pipe insulation shall be measured by the actual number of linear feet of ductile iron pipe and fittings installed with insulation regardless of pipe size. The length of pipe and fittings to be measured shall be the length of the line after the pipes and fittings have been installed, measured or computed along the center line of the pipe and fittings from the center line of the main line to the face of the terminal pipe or fitting, as shown on the Contract Drawings or as directed by the Engineer.
2. Basis of Payment. Ductile iron pipe insulation shall be paid for at the Contract unit price per linear foot for the linear feet of ductile iron pipe installed with the insulation, completed, and in place regardless of the pipe size. This price and payment shall be full compensation for furnishing and installing all insulation, jackets, covers, sealers/adhesives, pipe wrap, transporting materials, cleaning and preparing pipe surfaces, for all coordination with the Owner, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

P. POLYETHYLENE ENCASEMENT TUBING (Item W-16)

1. Method of Measurement. Polyethylene encasement tubing shall be measured by the actual number of linear feet of ductile iron pipe and fittings installed with polyethylene encasement tubing regardless of pipe size. The length of pipe and fittings to be measured shall be the length of the line after the pipes and fittings have been installed, measured or computed along the center line of the pipe and fittings from the center line of the main line to the face of the terminal pipe or fitting, as shown on the Contract Drawings or as directed by the Engineer.
2. Basis of Payment. Polyethylene encasement tubing shall be paid for at the Contract unit price per linear foot for the linear feet of ductile iron pipe installed with polyethylene encasement tubing, completed, and in place regardless of the pipe size. This price and payment shall be full compensation for furnishing and installing all polyethylene encasement tubing, sealers/adhesives, pipe wrap, for all coordination with the Owner, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

THE METROPOLITAN DISTRICT

2.05 EXCAVATION AND BACKFILL (Sections 02011, 02160, 02200, 02201, 02202, 02210, 02213, and 03302) (Part E)

A. EXCAVATED TEST PITS (Item E-1-E)

1. Method of Measurement. Excavated test pits shall be measured for on a per cubic yard basis for the number of cubic yards of test pit excavated in accordance with the following established volume rates:

<u>Test Pit Depth</u>	<u>Cu. yds. per vert. ft.</u>
0 to 8 ft	1.5
Over 8 ft	2.0

2. Basis of Payment. Excavated test pits shall be paid for at the Contract unit price bid for which price shall include all the necessary labor, equipment, tools and materials required for saw-cutting of pavement trench, excavating (including hand excavation), disposing of non-regulated excavated materials, furnishing and installing backfill materials, temporary pavement trench repair or other restoration specified or as directed by Engineer, compaction, bracing, dewatering, obtaining field measurements and sketches, photographs, and all incidental Work required to complete the test pits and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - a. It is the intent of these Specifications that the test pit be permanently restored only once, along with the permanent surface restoration for the entire Work.
 - b. In areas where reinforced concrete sub-base exists, removal and installation of the reinforced concrete base shall be paid for under Items E-4 and P-4.

B. VACUUMED TEST PITS (Item E-1-V)

1. Method of Measurement. Vacuumed test pits shall be measured for on a vertical foot for each test pit excavated.
2. Basis of Payment. Vacuumed test pits shall be paid for at the Contract unit price for which price shall include all the necessary labor, equipment, tools and materials required for saw-cutting of pavement trench, vacuum excavating (including hand excavation), disposing of non-regulated excavated materials, furnishing and installing backfill materials, temporary pavement trench repair or other restoration specified or as directed by Engineer, compaction, bracing, dewatering, obtaining field measurements and sketches, photographs, and all incidental Work required to complete the test pits and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

THE METROPOLITAN DISTRICT

- a. It is the intent of these Specifications that the test pit be permanently restored only once, along with the permanent surface restoration for the entire Work.
- b. In areas where reinforced concrete sub-base exists, removal and installation of the reinforced concrete base shall be paid for under Items E-4 and P-4.

C. EXCAVATION SUPPORT SYSTEM LEFT IN PLACE (Item E-2)

1. Method of Measurement. Excavation support systems left in place shall be measured on a square foot basis for sheeting left in place or another permanent support system required by the Contract Documents or as ordered by the Engineer.
 - a. The number of square feet shall be calculated by multiplying the vertical distance from the bottom of the excavation to the top of the cut-off sheeting or shoring as shown on the Contract Drawings or approved by the Engineer, by the horizontal length of the driven sheeting or soldier piling and lagging installed on each side of the trench. Neither the toe-in nor the cut-off shall be measured for payment.
 - b. Excavation support systems left in place for convenience of Contractor shall not be measured for payment.
2. Basis of Payment. Excavation support systems left in place shall be paid for at the Contract unit price for sheeting or shoring left in place. This price and payment shall be full compensation for all subsurface investigation beyond that provided in the Contract Documents, design, materials, accessories, labor, equipment and tools necessary to acceptably complete this Work including cutting off installed sheeting or soldier piling and lagging to the elevations shown or directed by Engineer, proper removal and disposal of all excess materials from this site and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

D. ROCK EXCAVATION AND DISPOSAL (Item E-3)

1. Method of Measurement
 - a. Rock excavation and disposal shall be measured by the number of cubic yards of rock, measured in place by the Engineer before excavation. Where rock is encountered, it shall be uncovered but not excavated until measurement has been made by the Engineer. Measurement of rock excavation in pipe trenches shall extend to the width specified below:

THE METROPOLITAN DISTRICT

Depth to Pipe <u>Invert (FT)</u>	0-12" Pipe <u>TPW (FT)</u>	Greater than 12" <u>Pipe TPW (FT)</u>
0-8	6.0	Pipe I.D. + 5
8-12	7.0	Pipe I.D. + 6
12-16	8.0	Pipe I.D. + 7
Greater than 16	9.0	Pipe I.D. + 8

- b. Rock at a stub, Y-branch, chimney, or other provision for a future connection in the pipeline in rock cut, and at the ends of all house connection laterals in rock cut, shall be removed, if directed by the Engineer, for a minimum distance of two (2) feet, horizontally from the end of the pipe or branch, and in the direction which the future extension or connection may be expected to take. This additional rock excavation shall be measured and paid for to the lines ordered by the Engineer.
- c. Boulders less than one (1) cubic yard shall not be measured for payment.

2. Basis of Payment

- a. Rock excavation and disposal shall be paid for each in-place cubic yard of rock or ledge material removed by drilling, boring, wedging, barring, "hoe-ram", or blasting, if allowed, at the Contract unit price for rock excavation and disposal. Payment limits are indicated on the Contract Drawings or as specified in this Contract for the type of Work that requires the rock removal (e.g. manhole, pipe trench, etc.) and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
- b. Boulders removed and disposed of during the course of excavation of one (1) cubic yard or greater in volume shall be paid for at the Contract unit price for rock excavation and disposal.
- c. The Contract unit price for rock excavation and disposal shall include all costs for performing such Work to fulfill the intent of these specifications including procuring permits, surveys, pre-blast surveys, licenses, insurance, vibration monitoring, crack surveys, drilling or other mechanical means of rock removal, blasting operations if allowed, excavation, removal, disposal and all other ancillary Work.
- d. No additional payment shall be made for any restoration of damage to pavement, curb, sidewalks, storm drainage pipes or structures, utility conduits, pipes or structures or any other public or private property outside of the payments limits specified in this Contract, regardless of the actual elevation of the rock encountered during construction.
- e. Removal of all existing thrust blocks or anchors over 1 cubic yard shall be paid for under items E-3.

THE METROPOLITAN DISTRICT

E. REMOVAL AND DISPOSAL OF EXISTING REINFORCED CONCRETE ROAD BASE (Item E-4)

1. Method of Measurement. Removal and disposal of existing reinforced concrete road base shall be measured for the number of cubic yards of material removed and disposed of properly.
2. Basis of Payment. Removal and disposal of existing reinforced concrete road base shall be paid for at the Contract unit price. This price and payment shall be full compensation for removal of concrete by hand to expose existing reinforcement, protection of existing reinforcement, disposal of all concrete and reinforcement removed from the trench, dust control and performing all finishing Work and all else incidental thereto.

F. REMOVAL AND DISPOSAL OF POLLUTED OR CONTAMINATED SOIL (Item E-5)

1. Method of Measurement. Removal and disposal of polluted or contaminated soil shall be measured by the number of tons of material removed and disposed of properly. Measurement of removal and disposal of polluted or contaminated soil in pipe trenches will be extended to the width specified below:

<u>Depth to Pipe Invert (FT)</u>	<u>0-12" Pipe TPW (FT)</u>	<u>Greater than 12" Pipe TPW (FT)</u>
0-8	6.0	Pipe I.D. + 5
8-12	7.0	Pipe I.D. + 6
12-16	8.0	Pipe I.D. + 7
Greater than 16	9.0	Pipe I.D. + 8

2. Basis of Payment. Removal and disposal of polluted or contaminated soil shall be paid for at the Contract unit price based upon approved invoices and proof of payment. Payment shall be made for costs associated with excavation hauling including excavated materials included in other items, stockpiling, testing, and proper off-site disposal of the material, including any labor, equipment, materials, and documentation required for, or incidental to, the Work and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

G. PROCESSED STONE BASE (Item E-6)

1. Method of Measurement. Processed stone base shall be measured for by the number of cubic yards of material furnished and measured in place after compaction as ordered by the Engineer.
2. Basis of Payment. Processed stone base shall be paid for at the Contract unit price after compaction for each type of backfill material ordered by the

THE METROPOLITAN DISTRICT

Engineer. This price and payment shall include all furnishing, installing, and compacting all materials, labor, and equipment incidental thereto and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

H. CONTROLLED LOW STRENGTH MATERIAL (CLSM) (Item E-7)

1. Method of Measurement. Controlled low strength material (CLSM) shall be measured for by the number of cubic yards of material furnished and measured in place after compaction as ordered by the Engineer outside the pay limits for normal excavation as indicated on the Contract Drawings.
2. Basis of Payment. Controlled low strength material (CLSM) shall be paid for at the Contract unit price after compaction for each type of CLSM ordered by the Engineer. This price and payment shall include all furnishing and installing all materials, labor, and equipment incidental thereto and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

I. MISCELLANEOUS CONCRETE (Item E-8)

1. Method of Measurement. Miscellaneous concrete shall be measured by the number of cubic yards of concrete placed, complete as shown, specified or as directed by the Engineer.
2. Basis of Payment. Miscellaneous concrete shall be paid for at the Contract unit price for miscellaneous concrete, complete in place as shown, specified or as directed by the Engineer. This price and payment shall be full compensation for all excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation, dewatering, form work, cleaning areas to receive concrete, furnishing, placing and compacting of subbase, furnishing and placing concrete and reinforcing steel as detailed on the Contract Drawings, miscellaneous bracing, pumping and all costs, labor, materials, equipment and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - a. Concrete encasements along pipes shall be paid for under this Item.

J. TRENCH DAMS (Item E-9)

1. Method of Measurement. Trench dams shall be measured for payment by the number of each trench dams installed on the project shown on the Contract Drawings or directed by the Engineer.
2. Basis of Payment. Trench dams shall be paid for at the Contract unit price for each trench dam, complete in place as shown, specified or as directed by the Engineer. This price and payment shall be full compensation for all excavation (except for rock and boulder removal) and disposal of non-

THE METROPOLITAN DISTRICT

regulated excavated materials, support of excavation and structures, dewatering, furnishing and placing concrete for DI and RC pipe and clay for PVC pipe, labor, equipment and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

2.06 MAINTENANCE AND PROTECTION OF TRAFFIC (Sections 01570 and 01576) (Part F)

A. MAINTENANCE AND PROTECTION OF TRAFFIC (Item T-1)

1. Method of Measurement. There shall be no measurement for maintenance and protection of traffic as this Work shall be paid on a lump sum basis.
2. Basis of Payment. Maintenance and protection of traffic shall be paid for at the contract lump sum price. This price and payment shall be full compensation for all costs associated with labor, equipment and services involved in the erection, maintenance, moving, adjusting, cleaning, replacement of damaged or worn devices, and all other Items furnished by the Contractor as well as all costs of labor and equipment involved in performing the maintenance of vehicular and pedestrian traffic in accordance with the accepted Temporary Traffic Control (TTC) plans and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

B. CONSTRUCTION SIGNS – ENCAPSULATED LENS TYPE III REFLECTIVE SHEETING (Item T-2)

1. Method of Measurement. Additional construction signs shall be measured by the number of square feet of additional encapsulated type III reflective sheeting delivered and used on the Project.
2. Basis of Payment. Additional construction signs shall be paid for at the Contract unit price for construction signs – encapsulated lens type III reflective sheeting delivered and used on the project, which price shall include the signs, portable sign supports, metal sign posts and all hardware required and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices. Each sign and support shall be paid for once, regardless of the number of times it is used. Signs may be required to be replaced for any reason, including theft, shall be replaced by the Contractor at no additional cost to the Owner.

C. CHANGEABLE MESSAGE SIGNS (Item T-3)

1. Method of Measurement. Portable changeable message signs shall be measured by the number of each portable changeable message sign in place and in operation on the project per twenty-four (24) hour day.

THE METROPOLITAN DISTRICT

2. Basis of Payment. Portable changeable message signs shall be paid for at the Contract unit price for each portable changeable message sign. This price and payment shall be full compensation for furnishing all labor and equipment required to place and move the message boards and portable changeable message signs as required to for traffic management, including upkeep, maintenance, operating costs and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

- a. Contractor is responsible for coordinating with the Owner's Traffic Department, State, and Town or City for programming.
- b. No separate payment shall be made for multiple sign relocations as directed by the Engineer.

D. 42-INCH TRAFFIC CONES (Item T-4)

1. Method of Measurement. 42-Inch traffic cones shall be measured by the number of each cone used on the project.
2. Basis of Payment. 42-Inch traffic cones shall be paid for at the Contract unit price for each traffic cone used on the project. Each cone shall be paid for once, regardless of the number of times it is used on the project. The price shall include all material, equipment, tools, labor and Work incidental to furnishing and removing of the units. Any traffic cones that are missing, damaged or defaced as determined by the Engineer shall be replaced by the Contractor at no additional cost to the Owner.

E. TRAFFIC DRUMS (Item T-5)

1. Method of Measurement. Traffic drums shall be measured by the number of each traffic drum used on the project.
2. Basis of Payment. Traffic drums shall be paid for at the Contract unit price for each traffic drum used on the project. Each drum shall be paid for once, regardless of the number of times it is used on the project. The price shall include all material, equipment, tools, labor and Work incidental to furnishing and removing of the units. Any traffic drums that are missing, damaged or defaced as determined by the Engineer shall be replaced by the Contractor at no additional cost to the Owner.

F. TYPE III CONSTRUCTION BARRICADES (Item T-6)

1. Method of Measurement. Type III construction barricades shall be measured by the number of each construction barricade used on the project.
2. Basis of Payment. Type III construction barricades shall be paid for at the Contract unit price for each barricade. The price shall include all material, equipment, tools, labor and Work incidental to furnishing and removing of the

THE METROPOLITAN DISTRICT

units. Each barricade shall be paid for once, regardless of the number of times it is used on the project.

G. BARRICADE WARNING LIGHTS (Type B) (Item T-7)

1. Method of Measurement. Barricade warning lights shall be measured for payment by the number of calendar days that each individual unit is in place and in operation, measured to the nearest day.
2. Basis of Payment. This item shall be paid for at the Contract unit price for barricade warning lights (Type B). This price and payment shall be full compensation for furnishing all labor and equipment required to place and move the warning lights as required for traffic management, including upkeep, maintenance, removal, operating costs and all other Items necessary to complete the Work as shown and/or specified but not included for payment under other Items in the Schedule of Prices.

H. TRAFFIC CONE BARS (Item T-8)

1. Method of Measurement. Traffic cone bars shall be measured by the number of each traffic cone bar used on the project.
2. Basis of Payment. Traffic cone bars shall be paid for at the Contract unit price for each traffic cone bar used on the project. Each traffic cone bar shall be paid for once, regardless of the number of times it is used on the project. The price shall include all material, equipment, tools, labor and Work incidental to furnishing and removing the units. Any traffic cone bars that are missing, damaged or defaced as determined by the Engineer shall be replaced by the Contractor at no additional cost to the Owner.

I. HOT APPLIED PAINTED PAVEMENT MARKINGS (Temporary) (Items T-9 through T-12)

1. Method of Measurement. These items shall be measured for payment by the number of linear feet of paint once on the pavement and accepted by the Engineer. Painted legend, arrows and markings shall be measured for payment by the number of square feet of paint installed on the pavement and accepted by the Engineer.
2. Basis of Payment. These items shall be paid for once at the Contract unit price per square foot for "Painted Legend, Arrows and Markings" and per linear foot of paint for "Hot Applied Painted Pavement Markings" of the width and color specified, installed on the pavement and accepted. This price shall include all pre-marking layout, cleaning off pavement, paint, glass beads, application of paint and glass beads, protection during drying and all materials, equipment, tools and labor incidental thereto to complete the work as shown and /or specified but not included for payment under other Items in the Schedule of Prices. Payment shall not be made for pavement markings affected by Contractor error and ordered removed. The Contractor may have

THE METROPOLITAN DISTRICT

to paint temporary markings more than once for maintenance or other purposes. This will be done at no additional cost to the Owner.

J. EPOXY RESIN PAVEMENT MARKINGS (Permanent) (Items T-13 through T-16)

1. Method of Measurement. These items shall be measured for payment by the number of linear feet of epoxy resin installed on the pavement and accepted. Epoxy resin legend, arrows and markings shall be measured for payment by the number of square feet of epoxy resin installed on the pavement and accepted.
2. Basis of Payment. These items shall be paid for at the Contract unit price per square foot for "Epoxy Resin Legend, Arrows and Markings" and per linear foot of "Epoxy Resin Pavement Markings" of the width and color specified, installed on the pavement and accepted by the Engineer. This price shall include all pre-marking layout, cleaning off pavement, paint, glass beads, application of paint and glass beads, protection during drying and all materials, equipment, tools and labor incidental thereto to complete the Work as shown and /or specified but not included for payment under other Items in the Schedule of Prices. Payment shall not be made for pavement markings affected by Contractor error and ordered removed.

K. LOOP VEHICLE DETECTOR (Item T-17)

1. Method of Measurement. Loop vehicle detectors shall be measured for payment by the number of loop vehicle detectors installed, operating and accepted in place by the Engineer and/or Municipality/State.
2. Basis of Payment. This item shall be paid for at the contract unit price for each loop detector installed which price shall include any necessary cables, saw cut, stranded wire, necessary fittings, flexible plastic tubing, plastic compound, splicing and connecting, equipment, labor, materials and all other Items necessary to complete the Work as shown and/or specified but not included for payment under other Items in the Schedule of Prices.

L. TRAFFIC CONTROL PERSONS (Items T-18 and T-19)

1. Method of Measurement. There shall be no measurement for uniformed police (T-18) or certified flaggers (T-19) as allowances are provided for this Work.
2. Basis of Payment. Payment for uniformed police (T-18) or certified flaggers (T-19) shall be made based upon approved invoices and proof of payment. Contractor may include a 5% markup on certified flaggers. No markup will be allowed for uniformed police. Payment shall include costs associated with furnishing traffic control persons and if needed, marked police cruisers. There shall be no direct payment for safety garments, paddles or travel time. In situations where the Uniformed Flagger is an employee on the Contractor's payroll, payment shall be made based upon approved submittal of MDC's

THE METROPOLITAN DISTRICT

Change Order Proposal Workbook/Time and Materials Daily Report. Traffic control persons utilized by the Contractor for which the owner did not approve and deemed not necessary for the proper completion of the work or at locations where traffic is unnecessarily restricted by the Contractors method of operation, shall not be considered for payment.

- a. Payment shall be made against the applicable allowances in accordance with Section 01030, Allowances.

2.07 PAVED SURFACE RESTORATION (Sections 02510, 02515, 02516, and 02575) (Part G)

A. TEMPORARY PAVEMENT (Item P-1)

1. Method of Measurement.

- a. Temporary trench pavement repair shall be measured on a square yard basis for Work complete as shown, specified or as directed by the Engineer to the payment limits shown in the details or described in the Contract Documents. Temporary pavement repair shall only be paid once for any given location, unless crossed later by another excavation required for the Contract Work.
- b. Temporary trench pavement shall be measured for payment over main line trenches (i.e. sewer, storm, water mainline and sewer and water services), blow-offs, tapping sleeves and gate valves, and fire hydrant assemblies. The length of repair shall be the actual length of the trench repaired. The width shall be the actual width of the repair made, but in no case shall payment be made for trench repair greater in width than that shown in the pay limit details on the Contract Drawings.

2. Basis of Payment. Temporary trench pavement repair, complete in place and approved by the Engineer, shall be paid for at the Contract unit price bid per square yard. This price and payment shall be full compensation for furnishing, hauling, placing and compacting the temporary bituminous concrete, maintaining the temporary repair, and all labor, materials, equipment, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
3. No additional payment shall be made for leveling courses or rework of trenches if needed due to the quality of work as directed by Engineer. No payment shall be made for normal daily cleanup Work, rework due to quality or maintenance, or for any Work not ordered in writing under this Item.
4. If the thickness of pavement ordered placed by the Engineer is greater than that specified, payment shall be prorated on the basis of the thickness of material actually ordered placed. No payment shall be made for any additional pavement not specifically ordered in writing by the Engineer.

THE METROPOLITAN DISTRICT

B. PERMANENT TRENCH PAVED SURFACE RESTORATION (Item P-2)

1. Method of Measurement.

- a. Permanent trench pavement shall be measured on a square yard basis for Work complete as shown, specified or as directed by the Engineer to the payment limits shown in the details or described in the Contract Documents.
- b. Permanent trench pavement shall be measured for payment over main line trenches (i.e. sewer, storm, water mainline and services). The length of repair shall be the actual length of the trench repaired. Permanent pavement shall also be measured for payment over service laterals, test pits, fire hydrant assemblies, blow offs, tapping sleeves and gate valves. The width shall be the actual width of the repair made, but in no case shall payment be made for trench repair greater in width than that shown on the pay limit details on the Contract Drawings.

2. Basis of Payment. Permanent trench paved surface restoration, complete in place and approved by the Engineer, shall be paid for at the Contract unit price. This price and payment shall be full compensation for saw-cutting, removal and disposal of the temporary repair and cutback materials, preparing the road base, resetting all castings, cleaning and priming the edges of existing pavement, applying bitumen tack coat, hot poured rubberized asphalt sealer, dust control, furnishing, hauling, placing and compacting the bituminous concrete, installation of the permanent repair, maintaining pavement for a period of one (1) year after final acceptance or time period required by local traffic authority or municipality and performing all finishing Work and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

3. No additional payment shall be made for leveling courses of trenches if needed. No payment shall be made for normal daily cleanup Work, or for any Work not ordered in writing under this Item.
4. If the thickness of pavement ordered placed by the Engineer is greater than that specified, payment shall be prorated on the basis of the thickness of material actually ordered placed. No payment shall be made for any additional pavement not specifically ordered in writing by the Engineer.

C. FINAL MILLING AND OVERLAY (Item P-3)

1. Method of Measurement. Milling and overlay shall be measured by square yards as installed to the limits of the existing pavement, or to the extent ordered by the Engineer. Milling and overlay for pavement that was damaged by the Contractor operations shall not be measured for payment.

THE METROPOLITAN DISTRICT

2. Basis of Payment. Milling and overlay shall be paid for at the Contract unit price. This price and payment shall be full compensation for cleaning and preparing the surface of the street, milling, disposal of the material, repairing temporary pavement where settling has occurred, installing variable depth leveling course where determined necessary by the Engineer, tack coat, keyway construction, resetting all castings, transition keyways, hot poured tar crack rubberized asphalt sealer, dust control, furnishing, hauling, placing, spreading and compacting the bituminous concrete, maintaining pavement for a period of one (1) year after final acceptance or time period required by local traffic authority or municipality and all materials, tools, equipment and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
3. No additional payment shall be made for leveling courses of trenches if needed. No payment shall be made for normal daily cleanup Work, or for any Work not ordered in writing under this Item.
4. If the thickness of pavement ordered placed by the Engineer is greater than that specified, payment shall be prorated on the basis of the thickness of material actually ordered placed. No payment shall be made for any additional pavement not specifically ordered in writing by the Engineer.

D. REINFORCED CONCRETE ROAD BASE INSTALLATION (Item P-4)

1. Method of Measurement. Reinforced concrete road base shall be measured on a cubic yard basis for Work complete as shown, specified or as directed by the Engineer to the payment limits shown in the details or described in the Contract Documents. The length of reinforced concrete road base shall be the actual length of the trench repaired. The width shall be the actual width of repair made, but in no case shall payment be made for trench repair greater in width than that shown on the pay limit details on the Contract Drawings.
2. Basis of Payment. Reinforced concrete road base installation shall be paid for at the Contract unit price. This price and payment shall be full compensation for cleaning, trimming and priming/saw-cutting the edges of the existing pavement, cleaning, preparing and compacting the subgrade, protection of existing reinforcement, furnishing, placing and leveling concrete to the depths indicated on the Contract Drawings, all forms needed to place concrete, furnishing and installing all reinforcement needed as detailed on the Contract Drawings, doweling existing concrete for the purposes of connecting new concrete base to existing base, expansion joint material, forming around new manholes and gate boxes as detailed on the Contract Drawings, and all costs, labor, materials, equipment and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

THE METROPOLITAN DISTRICT

E. 5-IN CONCRETE SIDEWALK (Item P-5)

1. Method of Measurement. Five (5) inch concrete sidewalk shall be measured as the number of square yards of new sidewalk complete as shown, specified or directed.
2. Basis of Payment. Five (5) inch concrete sidewalk shall be paid for at the Contract unit price. This price and payment shall be full compensation for excavation (except for rock and boulder removal), removal and disposal of temporary pavement and existing sidewalk, removal and disposal of earth and existing foundation material, removal and resetting existing Items and roadway signs, the formation and preparation of the subgrade, furnish and install the processed stone foundation properly compacted, shaped and fine graded to the required depth, furnish and install temporary pavement, furnish and install the five inch concrete sidewalk and all associated Work including finishing, all joints, dowel bars, wire mesh reinforcing, and expansion joint material and all saw-cutting in accordance with the project specifications and conformance to the lines, grades, thickness and typical sections shown on the Contract Drawings or as directed by the Engineer and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

F. 8-IN CONCRETE SIDEWALK AND DRIVEWAY APRON (Item P-6)

1. Method of Measurement. Eight (8) inch concrete sidewalk and driveway apron shall be measured as the number of square yards of new sidewalk and driveway apron complete as shown, specified or directed.
2. Basis of Payment. Eight (8) inch concrete sidewalk and driveway apron shall be paid for at the Contract unit price. This price and payment shall be full compensation for excavation (except for rock and boulder removal), removal and disposal of temporary pavement, removal and disposal of earth and existing foundation material, removal and resetting existing items and roadway signs, the formation and preparation of the subgrade, furnish and install the processed stone foundation properly compacted, shaped and fine graded to the required depth, furnish and install temporary pavement, furnish and install the eight inch concrete sidewalk and all associated Work including furnishing and installing all joints, wire mesh reinforcing, dowel bars, and expansion joint material and all saw-cutting in accordance with the project specifications and conformance to the lines, grades, thickness and typical sections shown on the Contract Drawings or as directed by the Engineer and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

G. SIDEWALK RAMPS (Item P-7)

1. Method of Measurement. Sidewalk ramps shall be measured as the number of square yards of new sidewalk ramp complete as shown, specified or directed.

THE METROPOLITAN DISTRICT

2. Basis of Payment. Sidewalk ramps shall be paid for at the Contract unit price. This price and payment shall be full compensation for excavation (except for rock and boulder removal), removal and disposal of existing walk, removal and disposal of temporary pavement and existing apron, removal and disposal of earth and existing foundation material, removal and resetting existing roadway signs, the formation and preparation of the subgrade, furnish and install the processed stone foundation properly compacted, shaped and fine graded to the required depth, furnish and install temporary pavement, furnish and install the ADA handicap sidewalk ramp and all associated Work finishing, tooled joints, detectable warning strips and all sidewalk joints, wire mesh reinforcing, dowel bars, and expansion joint material and all saw-cutting in accordance with the project specifications and conformance to the lines, grades, thickness and typical sections shown on the Contract Drawings or as directed by the Engineer, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

H. BITUMINOUS CONCRETE DRIVEWAYS/APRONS (Item P-8)

1. Method of Measurement. Bituminous concrete driveway shall be measured as the number of square yards of new bituminous concrete driveway complete as shown, specified or directed. The length and width of the repair shall be the actual length and width of trench repaired, but in no case shall measurement for trench repair be greater in width than that shown on the payment limit details on the Contract Drawings.
2. Basis of Payment. Bituminous concrete driveways shall be paid for at the Contract unit price. This price and payment shall be full compensation for saw-cutting, removal and disposal of existing driveway, removal and disposal of temporary pavement, furnishing, placing and compacting processed stone base, removal and disposal of all excavated material, furnish and install temporary pavement, furnishing, forming, placing and shaping the bituminous concrete driveway and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

I. REMOVE AND RESET GRANITE CURBING (Item P-9)

1. Method of Measurement. Removing and resetting granite curbing shall be measured as the linear foot of curbing removed and reset complete as shown, specified or directed.
2. Basis of Payment. Removing and resetting granite curbing shall be paid for at the Contract unit price. This price and payment shall be full compensation for the removal and disposal of existing and excess material, temporary storage/stockpiling of existing curb, furnish and install temporary pavement, concrete required for radius curbing and at joints of straight curbing, cutting of any curb required to match existing conditions, furnishing, placing, preparing

THE METROPOLITAN DISTRICT

and compacting the processed stone base, detailed on the Contract Drawings or specified herein including restoration of base courses and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

- a. If granite curbing is damaged by the Contractor, new granite curbing shall be required to be installed by the Contractor at no additional cost to the Owner.

J. REMOVE AND PROVIDE NEW GRANITE CURBING (Item P-10)

1. Method of Measurement. Removing and providing new granite curbing shall be measured as the linear foot of curbing removed and new curbing provided complete as shown, specified or directed.
2. Basis of Payment. Removing and providing new granite curbing shall be paid for at the Contract unit price. This price and payment shall be full compensation for the removal and disposal of existing material, furnishing, placing, preparing and compacting the processed stone base, furnish and install temporary pavement, installation of new curbing including concrete required for radius curbing and at joints of straight curbing and installation of new curbing, as detailed on the Contract Drawings or specified herein including restoration of base courses and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

K. REMOVE AND PROVIDE NEW BITUMINOUS CONCRETE CURBING (Item P-11)

1. Method of Measurement. Removing and providing new bituminous concrete curbing shall be measured as the linear foot of curbing removed and new curbing provided complete as shown, specified or directed.
2. Basis of Payment. Removing and providing new bituminous concrete curbing shall be paid for at the Contract unit price. This price and payment shall be full compensation for the removal and disposal of existing material, furnish and install temporary pavement, clean pavement surface, place tack coat, installation of new bituminous concrete curbing, as detailed on the Contract Drawings and/or specified herein including restoration of base courses and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

L. REMOVE AND PROVIDE NEW PRECAST CONCRETE CURBING (Item P-12)

1. Method of Measurement. Removing and providing new precast concrete curbing shall be measured as the linear foot of curbing removed and new curbing provided complete as shown, specified or directed.

THE METROPOLITAN DISTRICT

2. Basis of Payment. Removing and providing new precast concrete curbing shall be paid for at the Contract unit price. This price and payment shall be full compensation for the removal and disposal of existing material, furnish and install temporary pavement, installation of new precast concrete curbing including concrete required for radius pre-cast curbing and at joints of straight pre-cast curbing, as detailed on the Contract Drawings and/or specified herein including restoration of base courses and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

M. REMOVE AND PROVIDE NEW CONCRETE CURBING (Item P-13)

1. Method of Measurement. Removing and providing new concrete curbing shall be measured as the linear foot of curbing removed and new curbing provided complete as shown, specified or directed.
2. Basis of Payment. Removing and providing new concrete curbing shall be paid for at the Contract unit price. This price and payment shall be full compensation for the removal and disposal of existing material, furnish and install temporary pavement, installation of new concrete curbing including concrete required for radius pre-cast curbing and at joints of straight pre-cast curbing, as detailed on the Contract Drawings and/or specified herein including restoration of base courses and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

N. PAVEMENT SKIMCOAT / LEVELING (Item P-14)

1. Method of Measurement. Pavement skimcoat / leveling shall be measured in tons as installed to the limits of the existing pavement, or to the extent ordered by the Engineer.
2. Basis of Payment. Pavement skimcoat / leveling shall be paid for at the Contract unit price. This price and payment shall be full compensation for skim coat material ordered by Engineer, leveling course, Class 2 bituminous asphalt, sweeping, clearing of any leaves or debris on road, installation of riser rings for all structures, hot tack coat, replacement of pavement markings, all mobilization required including multiple mobilization efforts to skim coat only certain portions of the project as ordered by the Owner and/or Engineer, raising structures to grade, milling of this pavement skimcoat / leveling layer to prepare for final pavement, and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

O. ASPHALT PRICE ADJUSTMENT (Item P-15)

1. Method of Measurement: Each payment of pavement (monthly invoices) as covered in this Section shall be adjusted by an asphalt price adjustment formula based on the Connecticut Department of Transportation Standard

THE METROPOLITAN DISTRICT

Specifications Form 817 Section 4.06 and as listed below. Both the Contractor and Owner may be entitled to increases or decreases associated with changes in the price of the performance-graded binder component of bituminous concrete mixtures (HMA- hot mix asphalt). The mechanism for payment adjustment shall be an Allowance Item for Asphalt Price Adjustment.

- a. Asphalt price adjustments shall apply to all Part G and Part I temporary and permanent bituminous concrete pavement Items.
- b. Based on the Connecticut Department of Transportation Standard Specifications Form 817 Section 4.06.04 shall be employed to compute the relationship between pavement tonnage and pavement coverage as measured in the Contract Documents (square yards):

L = Length in feet

W = Width in feet

CT = Contract thickness in inches (as listed in the Contract Documents)

$(L \times W) / 9 \times CT \times 0.0575 = \text{HMA Tons}$

- c. The asphalt price adjustment shall be made at the time an application for payment is submitted by the Contractor as detailed below.
- d. The asphalt price adjustment shall be used for all pavement classes listed in the Contract Documents.
- e. Asphalt price adjustments shall be made upward or downward only when the Asphalt Price varies more than \$5.00 from the Asphalt Base Price.
- f. The Connecticut Department of Transportation shall post daily the Asphalt Price of the performance graded binder on its website at:
<http://www.ct.gov/dot/cwp/view.asp?a=1410&q=399708>
- g. The Asphalt Base Price shall be equal to the Asphalt Price posted by the Connecticut Department of Transportation on the day closest to the bid opening day (previous, not afterwards).
- h. The Asphalt Price, in regards to a particular Application for Payment, shall be the Asphalt Price posted by the Connecticut Department of Transportation for the day(s) of the installation of payment by the Contractor covered by such Application for Payment. Thus the calculation shall be made for each day on which pavement was installed and accepted by the Owner. The Contractor shall provide a back-up summary table, as provided at the end of this Section, of pavement installed. This summary shall include dates and tonnage and the corresponding pavement adjustment including the pertinent asphalt prices used in this

THE METROPOLITAN DISTRICT

adjustment. This summary shall be included with each Application of Payment.

- i. Neither the Contractor nor the Owner shall be entitled to an Asphalt Price Adjustment in connection with any Application of Payment unless the difference between the Asphalt Base Price and applicable Asphalt Price exceeds \$5.00.

Formula: HMA Tons x [0.05 x (Asphalt Price – Asphalt Base Price)] =\$_____

2. Basis of Payment: If the Asphalt Price Adjustment is determined to be a positive number, the amount of the payment to which the Contractor is entitled under the subject Application for Payment shall be increased by such number and if the Asphalt Price adjustment is determined to be a negative number, such payment shall be decreased by such number.
 - a. The Prices bid by the Contractor shall be considered the bid prices although such prices may be adjusted as described above. The bid prices are not to be altered in any manner by the Contractor. If the Contractor should alter the bid prices, the altered figure shall be disregarded and the original bid prices shall be used to determine the amount of the bid.
 - b. There shall be no adjustment permitted in the remaining contract items containing asphalt unless authorized by the Engineer. Because of this provision and because the Contractors are being notified before submission of bids, the adjustment being applied shall not be considered as a changed condition in the contract.

2.08 UNPAVED SURFACE RESTORATION (Sections 02905 and 02930) (Part H)

A. LOAMING AND SEEDING (Item L-1)

1. Method of Measurement. Loaming and seeding for lawn restoration shall be measured on a square yard basis for Work complete as shown, specified, and directed by Engineer to the payment limits shown in the details or described in the Contract Documents.
2. Basis of Payment. Loaming and seeding shall be paid for at the Contract unit price. This price and payment shall be full compensation for providing all labor, equipment and materials required for and incidental to the Work.
 - a. Contractor required to maintain loaming and seeding in accordance with Section 02930.

B. LOAMING AND SODDING (Item L-2)

1. Method of Measurement. Loaming and sodding for lawn restoration shall be measured for on a square yard basis for Work complete as shown, specified,

THE METROPOLITAN DISTRICT

and directed by the Engineer to the payment limits shown in the details or described in the Contract Documents.

2. Basis of Payment. Loaming and sodding shall be paid for at the Contract unit price bid per square yard. This price and payment shall be full compensation for providing all labor, equipment and materials required for and incidental to the Work.
 - a. Contractor required to maintain loaming and sodding in accordance with Section 02930.

C. LANDSCAPING (Item L-3)

1. Method of Measurement. There shall be no measurement for landscaping as an allowance is provided for this Work.
 - a. Item L-3 does not include landscaping required due to damage by the Contractor.
2. Basis of Payment. Landscaping shall be paid for based upon approved invoices and proof of payment. Payment shall be made for costs associated with any landscaping Work, including such Work as furnishing and installing trees, shrubs, etc. which is required for, or is incidental to, the Work and is beyond the loaming and seeding included in Item L-1 and the loaming and sodding included in Item L-2. Payment shall be made against the allowance in accordance with Section 01030, Allowances.

D. REMOVE AND RESET FENCING (Item L-4)

1. Method of Measurement. Removing and resetting existing fencing shall be the measured for the actual number of linear feet removed and reset as directed by the Engineer to the payment limits shown in the details or described in the Contract Documents.
2. Basis of Payment. Removing and resetting fencing shall be paid for at the Contract unit price bid per linear foot. This price and payment shall be full compensation for providing all labor, storage of existing fence, equipment and materials for and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices. If the existing fence cannot be reset, the Contractor is responsible for replacing the fence with the same material, as directed by the Engineer at no additional cost to the Owner.

2.09 FIXED PRICES (Part J)

A. EXCAVATED TEST PITS (Items F-1-E)

1. Method of Measurement. Excavated test pits shall be measured for on a per cubic yard basis for the number of cubic yards of test pit excavated in

THE METROPOLITAN DISTRICT

accordance with the following established volume rates:

<u>Test Pit Depth</u>	<u>Cu. yds. per vert. ft.</u>
0 to 8 ft	1.5
Over 8 ft	2.0

2. Basis of Payment. Excavated test pits shall be paid for at the fixed unit price for which price shall include all the necessary labor, equipment, tools and materials required for saw-cutting of pavement trench, excavating (including hand excavation), disposing of non-regulated excavated materials, furnishing and installing backfill materials, temporary pavement trench repair or other restoration specified or as directed by Engineer, compaction, bracing, dewatering, obtaining field measurements and sketches, photographs, and all incidental Work required to complete the test pits and all other Items necessary to complete the Work as directed by Engineer and specified but not included for payment under other Items in the Schedule of Prices.
 - a. It is the intent of these Specifications that the test pit be permanently restored only once, along with the permanent surface restoration for the entire Work.
 - b. In areas where reinforced concrete sub-base exists, removal and installation of the reinforced concrete base shall be paid for under Items F-10 and F-11.

B. VACUUMED TEST PITS (Item F-1-V)

1. Method of Measurement. Vacuumed test pits shall be measured for on a per day basis for all test pits excavated.
2. Basis of Payment. Vacuumed test pits shall be paid for at the fixed unit price bid, which price shall include all the necessary labor, equipment, tools and materials required for saw-cutting of pavement trench, vacuum excavating (including hand excavation), disposing of non-regulated excavated materials, furnishing and installing backfill materials, temporary pavement trench repair or other restoration specified or as directed by Engineer, compaction, bracing, dewatering, obtaining field measurements and sketches, photographs, permits, bonds, survey, and all incidental Work required to complete the test pits and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.
 - a. It is the intent of these Specifications that the test pit be permanently restored only once, along with the permanent surface restoration for the entire Work.
 - a. In areas where reinforced concrete sub-base exists, removal and installation of the reinforced concrete base shall be paid for under Items F-10 and F-11.

THE METROPOLITAN DISTRICT

C. EXCAVATION SUPPORT SYSTEM LEFT IN PLACE (Items F-2-Sh and F-2-So)

1. Method of Measurement. Excavation support systems left in place shall be measured on a square foot basis for sheeting left in place or soldier pile and lagging as ordered by the Engineer.
 - a. The number of square feet shall be calculated by multiplying the vertical distance from the bottom of the excavation to the top of the cut-off sheeting or shoring as approved by the Engineer, by the horizontal length of the driven sheeting or soldier piling and lagging installed on each side of the trench. Neither the toe-in nor the cut-off shall be measured for payment.
 - b. Excavation support systems left in place for convenience of Contractor shall not be measured for payment.
2. Basis of Payment. Excavation support systems left in place shall be paid for at the fixed unit price per square foot for sheeting or soldier piles and lagging left in place. This price and payment shall be full compensation for all subsurface investigation, design, materials, accessories, labor, equipment and tools necessary to acceptably complete this Work including cutting off installed sheeting or soldier piling and lagging to the elevations as directed by Engineer, proper removal and disposal of all excess materials from this site and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.

D. ROCK AND BOULDER EXCAVATION AND DISPOSAL (Items F-3-M and F-3-B)

1. Method of Measurement.
 - a. Rock excavation and disposal shall be measured by the number of cubic yards of rock, measured in place by the Engineer before excavation. Where rock is encountered, it shall be uncovered but not excavated until measurement has been made by the Engineer.
 - b. Rock at a stub, Y-branch, chimney, or other provision for a future connection in the pipeline in rock cut, and at the ends of all house connection laterals in rock cut, shall be removed, if directed by the Engineer, for a minimum distance of two (2) feet, horizontally from the end of the pipe or branch, and in the direction which the future extension or connection may be expected to take. This additional rock excavation shall be measured and paid for to the lines ordered by the Engineer.
 - c. Boulders less than one (1) cubic yard shall not be measured for payment.
2. Basis of Payment.
 - a. Rock excavation and disposal shall be paid for each in-place cubic yard of rock or ledge material removed by drilling, boring, wedging, barring, "hoe-

THE METROPOLITAN DISTRICT

ram", or blasting, if allowed, at the fixed unit price per cubic yard for rock excavation and disposal. Payment limits are as specified in this Contract for the type of Work that requires the rock removal (e.g. manhole, pipe trench, etc.) and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.

- b. Boulders removed and disposed of during the course of excavation of one (1) cubic yard or greater in volume shall be paid for at the fixed unit price for rock excavation and disposal.
- c. The fixed unit price for rock excavation and disposal shall include all costs for performing such Work to fulfill the intent of these specifications including procuring permits, surveys, pre-blast surveys, licenses, insurance, vibration monitoring, crack surveys, drilling or other mechanical means of rock removal, blasting operations if allowed, excavation, removal, disposal and all other ancillary Work.
- d. No additional payment shall be made for any restoration of damage to pavement, curb, sidewalks, storm drainage pipes or structures, utility conduits, pipes or structures or any other public or private property, regardless of the actual elevation of the rock encountered during construction.
- e. Removal of all existing thrust blocks or anchors over 1 cubic yard shall be paid for under items E-3.

E. EARTH EXCAVATION (Item F-4)

- 1. Method of Measurement. Additional excavation outside the payment limits ordered by the Engineer for any reason shall be measured as the number of cubic yards of material excavated beyond the pay limits for normal excavation or as described under the applicable Specifications of the Contract. Limits of normal excavation in pipe trenches shall extend to the width specified below:

Depth to Pipe Invert (FT)	0-12" Pipe TPW (FT)	Greater than 12" Pipe TPW (FT)
0-8	6.0	Pipe I.D. + 5
8-12	7.0	Pipe I.D. + 6
12-16	8.0	Pipe I.D. + 7
Greater than 16	9.0	Pipe I.D. + 8

- a. Any excavation ordered by the Engineer and not included in the Contract unit price bid for Work to be done under other Items shall be paid for under this Item.
- b. Excavation performed for the purpose of widening a trench for safety or stability shall not be measured for payment.

THE METROPOLITAN DISTRICT

- c. Any additional earth excavation ordered by the Engineer that is contaminated or polluted shall be disposed of properly and paid for under Item E-5.
 - d. Additional backfill shall be paid for under additional refill Items F-5 through F-9.
2. Basis of Payment. Additional earth excavation as ordered by the Engineer shall be paid for at the fixed unit price per cubic yard, which price shall include all necessary excavation (except for rock and boulder removal), removal and disposal of additional excavated material, support of excavation and protection of sewer and existing utilities and structures, dewatering, all other additional or incidental Work which may be incurred as ordered by the Engineer and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.

F. REFILL ITEMS (Items F-5, F-6, F-7, F-8, and F-9)

- 1. Method of Measurement. Additional refill material shall be measured for by the number of cubic yards of material furnished and measured in place after compaction as ordered by the Engineer outside the pay limits for normal excavation as indicated on the Contract Drawings.
- 2. Basis of Payment. Additional refill material shall be paid for at the fixed unit price per cubic yard in place after compaction for each type of backfill material ordered by the Engineer. This price for bank run gravel (F-5), sand (F-6), crushed stone (F-7), common fill (F-8) or controlled low strength material (CLSM) (F-9) shall include furnishing and installing all materials, labor, and equipment incidental thereto and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.

G. REMOVAL AND DISPOSAL OF EXISTING REINFORCED CONCRETE ROAD BASE (Item F-10)

- 1. Method of Measurement. Removal and disposal of existing reinforced concrete road base shall be measured for the number of cubic yards of material removed and disposed of properly.
- 2. Basis of Payment. Removal and disposal of existing reinforced concrete road base and removal of concrete trolley track subbase shall be paid for at the fixed unit price per cubic yard. This price and payment shall be full compensation for removal of concrete by hand to expose existing reinforcement, protection of existing reinforcement, disposal of all concrete and reinforcement removed from the trench, protection of nearby duct banks and conduits, dust control and performing all finishing Work and all else incidental thereto.

THE METROPOLITAN DISTRICT

H. REINFORCED CONCRETE ROAD BASE INSTALLATION, 8-IN THICKNESS (Item F-11)

1. Method of Measurement. Reinforced concrete road base shall be measured on a square yard basis for Work complete as directed by the Engineer. The length of reinforced concrete road base shall be the actual length of the trench repaired. The width shall be the actual width of repair made.
2. Basis of Payment. Reinforced concrete road base installation shall be paid for at the fixed unit price per square yard. This price and payment shall be full compensation for cleaning, trimming and priming/saw-cutting the edges of the existing pavement, cleaning, preparing and compacting the subgrade, protection of existing reinforcement, furnishing, placing and leveling concrete, all forms needed to place concrete, furnishing and installing all reinforcement needed, doweling existing concrete for the purposes of connecting new concrete base to existing base, expansion joint material, forming around new manholes and gate boxes, and all costs, labor, materials, equipment and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.

I. UNDER-DRAIN PIPE (Item F-12)

1. Method of Measurement. Under-drain pipe of the type, either perforated or non-perforated, shall be on a match-in-kind per municipality standards and shall be the size specified by the Engineer shall be measured in place on a linear foot basis. Measurement for payment does not signify that the drain line is accepted. Measurement shall be taken to the nearest tenth of a foot.
2. Basis of Payment. Under-drain pipe shall be paid for at the fixed unit price per linear foot. This price and payment shall be full compensation for trench excavation (except for rock and boulder removal), laying, jointing, cleaning, of new PVC or perforated CPP under-drain pipe, pipe adapters and fittings, flexible pipe repair coupling, furnishing and installing geotextile fabric, furnishing and installing all backfill materials, compaction, safeguarding open excavations, care and protection of property, water for construction purpose, removal of excess material, offsite disposal of all excavated material, , protection and crossing of existing structures and utilities, furnishing and installing utility identification tape, dust control, and all else incidental for which separate payment is not provided under other Items in the Schedule of Prices.

J. STANDARD RIPRAP (Item F-13)

1. Method of Measurement. Standard riprap as ordered by the Engineer shall be measured by the cubic yard.
2. Basis of Payment. This Work shall be paid for at the fixed unit price for standard riprap, complete in place, specified and directed by the Engineer. This price and payment shall be full compensation for all excavation (except

THE METROPOLITAN DISTRICT

for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation and structures, dewatering, labor, equipment and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.

K. MISCELLANEOUS CONCRETE (Item F-14)

1. Method of Measurement. Miscellaneous concrete shall be measured by the number of cubic yards of concrete placed, complete as directed by the Engineer.
2. Basis of Payment. Miscellaneous concrete shall be paid for at the fixed unit price per cubic yard for miscellaneous concrete, complete in place as directed by the Engineer. This price and payment shall be full compensation for all excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation, dewatering, form work, cleaning areas to receive concrete, furnishing, placing and compacting of subbase, furnishing and placing concrete and reinforcing steel, miscellaneous bracing, pumping and all costs, labor, materials, equipment and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.
 - a. Concrete encasements along pipes shall be paid for under this Item.

L. PAVEMENT SKIMCOAT (Item F-15)

1. Method of Measurement. Pavement skimcoat shall be measured in tons as installed to the limits of the existing pavement, or to the extent ordered by the Engineer.
2. Basis of Payment. Pavement skimcoat shall be paid for at the fixed unit price per ton. This price and payment shall be full compensation for skim coat material ordered by Engineer, leveling course, Class 2 bituminous asphalt, sweeping, clearing of any leaves or debris on road, installation of riser rings for all structures, hot tack coat, replacement of pavement markings, all mobilization required for multiple locations, raising structures to grade, milling of this pavement skim coat layer to prepare for final pavement, and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.

M. DUCTILE IRON WATER FITTINGS, ALL SIZES (Item F-16)

1. Method of Measurement. Additional ductile iron fittings ordered by the Engineer and not shown on the Contract Drawings shall be measured on a weight in US pounds (lbs) basis for each additional fitting installed as approved by the Engineer.
 - a. The additional excavation, support of excavation, filling, and disinfecting and flushing due to increase of number of fittings shall not be measured

THE METROPOLITAN DISTRICT

for payment but shall be considered as included in the fixed unit price. The Contractor shall not receive payment for equipment and labor tied up and unable to Work or delayed because of required or requested increase in the number of fittings.

2. Basis of Payment. Additional ductile iron fittings ordered by the Engineer and not shown on the Contract Drawings shall be paid for at the fixed unit price per pound (lb.) for additional fittings of the size and type as ordered by the engineer but not shown in the Contract Drawings, complete in place. This price and payment shall be full compensation for all material, labor and equipment to furnish and install the ordered bends, fittings, retainer glands, gaskets, couplings, all materials, tools, equipment and labor incidental thereto necessary to complete the Work in accordance with the Contract Drawings, the Specifications, the requirements of the Engineer there under and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.

N. PVC SEWER WYE/TEE, VARIOUS SIZES (Items F-17-A, F-17-B, F-17-C, and F-17-D)

1. Method of Measurement. PVC sewer wyes/tees of the size required shall be a count of the actual number of wyes/tees furnished and installed.
2. Basis of Payment. Payment of the fixed unit price for each wye/tee furnished and installed shall be full compensation for furnishing, installing and testing the wye/tee, connecting to the new PVC service pipe, and all labor, equipment, and materials required for or incidental to the work.

O. PRECAST SEWER CHIMNEYS (Item F-18)

1. Method of Measurement. Precast sewer chimneys shall be measured by the number of vertical feet installed from the invert of the sewer mainline to the invert of the lateral at the point where it connects to the tee/wye.
2. Basis of Payment. Precast sewer chimneys shall be paid for at the fixed unit price bid per vertical foot for chimneys complete in place. This price and payment shall be full compensation for all labor, furnishing and installing materials, equipment and all other Items necessary to complete the Work as shown and specified but not included for payment under other Items in the Schedule of Prices.

P. DROP PIPE INSTALLED IN MANHOLES (Item F-19)

1. Method of Measurement. Drop pipe installed in manholes shall be measured in vertical feet from the upper invert of the drop to the lower invert of the drop as directed by the Engineer.
2. Basis of Payment. This Work shall be paid for at the fixed unit price per vertical foot as ordered by the Engineer. This price and payment shall be full

THE METROPOLITAN DISTRICT

compensation for furnishing and installing internal drop manhole connections, including the drop pipe, fittings, concrete and/or concrete block for inlet drain, straps and anchors, cutting into the manhole wall, modifying inverts including brickwork and mortar, and all else incidental thereto for which separate payment is not provided under other Items in the Schedule of Prices.

Q. BULKHEAD – ALL SIZES (Item F-20)

1. Method of Measurement. Bulkheads installed shall be measured by inches measured on the diameter of the bulkhead as directed by the Engineer.
2. Basis of Payment. This Work shall be paid for at the fixed unit price per inch of diameter, complete in place, as ordered by the Engineer. This price and payment shall be full compensation for all labor, materials, equipment and all other Items necessary to complete the Work as specified but not included for payment under other items in the Schedule of Prices.

R. RESTRAINT JOINTS (Item F-21)

1. Method of Measurement. Additional pipe restraint on pipes 12-Inch in diameter or less ordered by the Engineer, but not shown on the Contract Drawings shall be measured on a per each basis.
2. Basis of Payment.
 - a. Additional pipe restraint on pipes 12-inch in diameter or less ordered by the Engineer, but not shown in the Contract Drawings shall be paid for at the fixed unit price per each joint ordered to be restrained by the Engineer and not shown (described or labeled) on the Contract Drawings. This price and payment shall be full compensation for all Work for harnessing the additional pipe joints or pipe length as ordered by the Engineer but not shown in the Contract Drawings including tools, equipment, maintenance and labor necessary to complete the restraining in accordance with the Contract Drawings, the Specifications, the requirements of the Engineer and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.
 - b. The price for restraint joints shall not include the price for the ductile iron pipe installation including excavation and disposal of non-regulated excavated material, support of excavation, dewatering, furnishing and installing bedding and backfill materials, geotextile fabric, utility identification tape, filling, disinfecting and flushing, field testing, traffic control since all these Items are considered as included in the price bid per linear foot of pipeline as described in the Contract Specifications.
 - c. The Contractor shall not receive any payment for equipment and labor tied up and unable to Work or delays because of increasing the number of joints to be restrained.

THE METROPOLITAN DISTRICT

S. INSERTA TEES (Item F-22)

1. Method of Measurement. Inserta tees on pipes 12-inch in diameter or less ordered by the Engineer, but not shown in the Contract Drawings shall be the actual number of inserta tees installed, as approved by the Engineer.
2. Basis of Payment.
 - a. This Work shall be paid for at the fixed unit price per each inserta tee on pipes 12-inch diameter or less ordered by the Engineer and not shown (described or labeled) on the Contract Drawings. This price and payment shall be full compensation for all Work for installing the inserta tee if ordered by the Engineer but not shown in the Contract Drawings, tools, equipment and labor necessary to complete the installation in accordance with the Contract Drawings, the Specifications, the requirements of the Engineer and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.
 - b. The price for inserta tees shall not include the price of excavation and disposal of non-regulated excavated material, support of excavation, dewatering, furnishing and installing bedding and backfill materials,, geotextile fabric, utility identification tape, field testing, traffic control since all these Items are considered as included in the price bid per linear foot of pipeline as described in the Contract Specifications.
 - c. The Contractor shall not receive any payment for equipment and labor tied up and unable to Work or delays because of installing inserta tees.

T. TRENCH DAMS (Item F-23)

1. Method of Measurement. Trench dams on pipes 24-inch diameter or less shall be measured for payment by the number of each trench dam installed on the project as directed by the Engineer.
2. Basis of Payment. Trench dams on pipes 24-inch diameter or less shall be paid for at the fixed unit price for each trench dam, complete in place, as directed by the Engineer. This price and payment shall be full compensation for all excavation (except for rock and boulder removal) and disposal of non-regulated excavated materials, support of excavation and structures, dewatering, furnishing and placing concrete for DI and RC pipe and clay for PVC pipe, labor, equipment and all other Items necessary to complete the Work as specified but not included for payment under other Items in the Schedule of Prices.

PART 3 – EXECUTION – NOT USED

END OF SECTION

**The Metropolitan District
Asphalt Adjustment**

<i>Month</i>	<i>Date</i>	<i>Pavement Width (ft)</i>	<i>Pavement Length (ft)</i>	<i>Contract Thickness (in)</i>	<i>HMA (tons)</i>	<i>Asphalt Price (\$/Ton)</i>	<i>Asphalt Price Adjustment (\$)</i>				
	1				0		\$0.00	<i>Asphalt Base Price (\$/Ton)</i>			\$0.00
	2				0		\$0.00				
	3				0		\$0.00				
	4				0		\$0.00				
	5				0		\$0.00				
	6				0		\$0.00				
	7				0		\$0.00				
	8				0		\$0.00				
	9				0		\$0.00				
	10				0		\$0.00				
	11				0		\$0.00				
	12				0		\$0.00				
	13				0		\$0.00				
	14				0		\$0.00				
	15				0		\$0.00				
	16				0		\$0.00				
	17				0		\$0.00				
	18				0		\$0.00				
	19				0		\$0.00				
	20				0		\$0.00				
	21				0		\$0.00				
	22				0		\$0.00				
	23				0		\$0.00				
	24				0		\$0.00				
	25				0		\$0.00				
	26				0		\$0.00				
	27				0		\$0.00				
	28				0		\$0.00				
	29				0		\$0.00				
	30				0		\$0.00				
	31				0		\$0.00				
						Total	\$0.00				

THE METROPOLITAN DISTRICT

SECTION 01030

ALLOWANCES

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This Section includes administrative and procedural requirements governing the following types of allowances:

- 1. Contingency allowances.

- a. Contingency allowances are stipulated amounts available as a reserve for sole use by Owner to cover certain Work within the project, as indicated in the Bid Form.

1.02 RELATED SECTIONS

- A. Section 01025, Measurement and Payment
- B. Section 01152, Applications for Payment
- C. Section 01576, Traffic Control Persons
- D. Section 02260, Handling, Transportation, and Disposal of Regulated Soil
- E. Section 02510, Temporary and Permanent Paved Surface Restoration
- F. Section 02900, Landscaping
- G. Section 02905, Unpaved Surface Restoration and Reset Miscellaneous Items

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 SCHEDULE OF ALLOWANCES

- A. Contingency Allowances:

- 1. Asphalt Price Adjustment. Refer to Section 01025 for Bid items affected by this adjustment and the method of calculating this adjustment. A contingency allowance will be used to cover any adjustments in compensation due to the Contractor or the Owner as a result of increases and decreases associated with changes in the price of the performance-graded binder component of bituminous concrete mixtures of hot-mix asphalt (HMA).

THE METROPOLITAN DISTRICT

2. Police. A contingency allowance will be used to cover costs associated with the use of uniformed police and/or official police vehicles for temporary control of vehicular and pedestrian traffic. Proof of payment shall be submitted for reimbursement with the Application for Payment. No markup shall be allowed on payments to the City, Town, or State Police Departments for police.
3. Uniformed Flaggers. A contingency allowance will be used to cover costs associated with the use of uniformed flaggers for the temporary control of vehicular and pedestrian traffic. Proof of payment shall be submitted for reimbursement with the Application for Payment. Subcontracted costs may be marked up by five percent (5%) for Contractor coordination.
4. Removal and Disposal of Hazardous Soil. A contingency allowance will be used to cover costs associated with the hauling, stockpiling, testing, and proper off-site disposal of hazardous soil encountered during excavation activities of the work. Proof of payment shall be submitted for reimbursement with the Application for Payment. Subcontracted costs may be marked up by five percent (5%) for Contractor coordination.
5. Landscaping. A contingency allowance will be used to cover costs associated with landscaping work not covered in the other bid items. Costs included shall be work such as tree removal, furnishing and installing trees, shrubs, or sod, etc. Proof of payment shall be submitted for reimbursement with the Application for Payment. Subcontracted costs may be marked up by five percent (5%) for Contractor coordination.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01035

MODIFICATION PROCEDURES

PART 1 – GENERAL

1.01 CHANGE ORDER PROCEDURES

- A. In general, Change Orders will be issued for correction of Contract documents which will eliminate errors, omissions or discrepancies in the Work; for incorporating changes in Owner requirements, including additions or deletions in the scope of Work; for unforeseen field conditions which necessitate changes in the Work; for changes in code provisions or other requirements of Federal, State and local authority requiring changes in the Work; for changes in the availability of products or for incorporating new products into the Work; and, for changes directed by the Engineer for the benefit of the Owner.
- B. Authority to execute Change Orders shall be that of the Owner and not of the Contractor. Change Orders will, in general, originate by a "Change Order Proposal Request" or by issuance of a "Work Change Directive" by the Owner.
- C. Unless authorized by the Engineer, no work shall be performed that is involved in the change until a formal Change Order is issued.
- D. To initiate a Change Order, the Engineer will forward a Change Order Proposal Request describing the proposed changes and, if required, include additional or revised Contract Drawings and Specifications soliciting a formal quotation of cost and time to incorporate and complete the proposed Change Order Work. The Contractor must respond to this request with a written proposal furnishing details of his proposed cost of the work including labor, equipment, materials and Subcontractor's cost. These costs must be submitted in a format that is acceptable to the Owner. The guidelines for Workor markups, if any, can be found in Articles 10, 11, and 12 of the Standard General Conditions. At the beginning of the project the Contractor will submit a schedule of rates for labor and equipment that he expects to use on the project. Upon reaching mutual agreement on the cost and time, the Engineer will sign his approval of the Change Order and submit it to the Contractor for his full signature of acceptance. Article 10 of the Standard General Conditions outlines the sequence of steps to be used in finalizing the cost of the changed Work. For the purposes of Change Orders involving disposal of materials, Tipping Fees are considered a Subcontractor and subject to no more than a 5% contractor markup.
- E. The Engineer may, to avoid costly removal of or alterations to present on-going work, issue a Work Change Directive (WCD) authorizing the Contractor to proceed, subject to later negotiation of the price of the change.

THE METROPOLITAN DISTRICT

- F. In the event that the Contractor requests an extension of time or makes a claim for an equitable adjustment, the request or claim shall be accompanied by a schedule which reflects the affected work and demonstrates the impact of the claimed event on the Project.
- G. Change Order format, submission guidelines, documentation and other administrative requirements shall be in accordance with the Owner's current standard procedures.

1.02 PRICE AGREEMENTS

- A. Prices agreed upon to cover the Change Orders may be either by mutual acceptance of a lump sum price, by unit prices as stated in the Contract bid form, by new negotiated unit prices or actual direct cost plus the percentages of the various proposed cost types as found in Article 12 of the General Conditions for overhead, profit, and other expenses consistent with Article 11 of the General Conditions.
- B. Method for computing the cost of the change shall be based on the net additional increase. No overhead and profit shall be deducted from prices for changes deleting work.
- C. The Change Order form document shall indicate the net adjustment (+/-) to the total Contract price as a result thereof including extension or reduction of time when applicable.

1.03 BOND REQUIREMENTS

- A. Performance, Payment, Labor, Material and Other Bonds required by the Contract shall be extended to and include all Change Orders and Modifications to the Contract. Additional bonding costs associated with Change Orders and Modifications are to be included with the costs submitted for changes and are assumed to be included if not specifically itemized as part of the change.
- B. The Contractor shall notify the bonding company upon issuance of every Change Order and Modification.
- C. In addition, the Contractor must furnish a Consent of Surety to the Owner at each \$250,000 increase to the Work value as the cumulative result of the change orders. A copy of the Consent of Surety acknowledging the increase in coverage must be provided to the Owner prior to the execution of any change order which exceeds each cumulative \$250,000 threshold.
- D. Overhead and profit is not allowed on bond costs.

THE METROPOLITAN DISTRICT

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01040

COORDINATION WITH UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Perform all coordination necessary to complete connections to the existing pipelines.
- B. Coordinate with appropriate utility companies, public or private, as well as with the Owner, where the Work crosses or is adjacent to existing utilities.
- C. Do not interfere with the operation of existing utilities, unless otherwise approved by the Owner. Operation of Owner's existing facilities will be performed by the Owner unless otherwise specified. The Owner will assist in arranging operation of any existing facilities or equipment required by the Contractor to connect to Owner's existing facilities. The Contractor shall not operate existing hydrants, valves or equipment. Only the Owner will operate Owner hydrants, valves, or equipment.

1.02 RELATED SECTIONS

- A. Section 01010, Summary of Work
- B. Section 01044, Progress and Sequence of Work
- C. Section 01310, Progress Schedules
- D. Section 02656, Tapping Sleeve and Gate Valve
- E. Section 02657, Water Service Renewal or Reconnection

1.03 UTILITY CONFLICTS

- A. Where shown on the Contract Drawings, relocation of existing utilities shall be required to address known conflicts. If the utility relocation can be performed by the Contractor, the relocation shall be performed in a timely manner to avoid delays. If the utility relocation must be performed by others, the Contractor shall coordinate the relocation with the utility company, making all arrangements with the utility company and scheduling the Work so as to avoid any delays. This may require moving the operation to another portion of the Work. The Contractor shall have no claim for delay associated with addressing utility relocations shown on the Contract Drawings.

THE METROPOLITAN DISTRICT

- B. The Contractor shall exercise extreme caution when excavating in the vicinity of utility structures to avoid any damage. The Contractor shall be responsible for coordinating and scheduling all aspects of work required by private utilities during construction, including the relocation, the protection and the support of utility infrastructures.
- C. Any damage to the utility structures that is a result of the Contractor's actions shall be the responsibility of the Contractor.
- D. Invoices issued by the utility companies shall reference the project number or purchase order and be submitted directly to the MDC Project Manager, Metropolitan District, 555 Main Street, P.O. Box 800, Hartford, CT, 06142-0800. Invoices issued by utility companies for relocating utilities that are not in direct conflict with the proposed work or are relocated for the Contractor's convenience will not be paid by the MDC and shall be paid at the Contractor's expense.
- E. During the construction of this project, other Utility Companies, including but not limited to AT&T, CL&P, CNG, COMCAST, FiberTech or Yankee Gas, may have their contractors working within the limits of this project for removing and installing utilities. The Contractor shall be responsible for coordinating his work with other contractors working within the limits of the project.
- F. Not all of the private storm drains, private sanitary services, water, gas, and electrical services, overhead utilities and other utilities to the adjacent buildings are shown. It is to be expected that each building will have service connections for the various utilities. The Contractor shall have these services located prior to making any excavation. All services shall be protected from damage, and shall be reconnected or be repaired by the Contractor at no additional cost to the Owner (unless otherwise specified in Section 01025). The Contractor shall pay particular attention to safety issues relating to electrical facilities, both overhead and underground and gas lines.
- G. Should the Contractor damage a utility that has been marked (within eighteen inches), in addition to being responsible for any and all repair costs, the Contractor shall also, as liquidated damages and not as a penalty, pay to the MDC the sum of two thousand dollars (\$2,000.00) for each incident to compensate the MDC for additional inspection, supervisory, administrative, engineering, and overtime and other costs and expenses which may be incurred.

1.04 SUBMITTALS

- A. At a minimum the Contractor shall implement the following:
 - 1. Incorporate the requirements of this Section, as well as Work which may impact the existing system operation, or the operations of any adjacent utility, in the Progress Schedule submitted under Section 01310.

THE METROPOLITAN DISTRICT

2. Submit to the affected utility company, the Owner, and the Engineer, in writing, all requests for temporary shutdowns of facilities or interruption of operations. No utility system shutdowns or interruptions to existing operations will be permitted except as outlined in this Section. Submit requests at least two weeks prior to the beginning of the Work requiring shutdown or interruption. No shutdown shall occur without the approval of the utility company and the Owner.
3. The Contractor shall submit for approval by the Owner and the Engineer detailed information including calculations, shop drawings, catalog cuts for all proposed temporary facilities and temporary pipelines and services.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 GENERAL

- A. Notify Call Before You Dig (CBYD) at 1-800-922-4455 at least two (2) full working days prior to any digging, trenching, rock removal, demolition, borings, grading, landscaping, or any other earth moving operations. Responsibility for proper notification of all utilities shall rest with the Contractor. Only the project area planned to be affected within thirty (30) days shall be designated for CBYD. CBYD shall not be utilized for preplanning purposes.
- B. Furnish all labor, materials, tools and equipment necessary to provide temporary light, ventilation, safety personnel and equipment, gas monitoring equipment, supports and braces necessary to perform the Work in a safe and secure manner. Observe all safety regulations.

3.02 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

- A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains and electric and telephone cables, TV cable and fiber optic communication lines, whether or not they are shown on the Contract Drawings. Carefully support and protect all such structures and utilities from injury of any kind. Immediately repair any damage resulting from the construction operations or coordinate repair of any damage with the appropriate utility.
- B. The Contractor shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water and gas services, drain lines and sewers). Maintain services to buildings and pay costs or charges resulting from damage thereto.

THE METROPOLITAN DISTRICT

- C. If, in the opinion of the Engineer, permanent relocation of a privately owned utility is required, the Engineer will notify the Utility to perform the Work as expeditiously as possible. Cooperate with the Utility. No claim for delay will be allowed due to such relocation.
- D. The Contractor shall coordinate the removal and replacement of traffic loops and signals, if required for the performance of the Work, at no additional cost to the Owner.

3.03 CROSSING AND PROTECTING EXISTING UTILITIES

- A. The Contractor shall support, protect and maintain all pipes, conduits, sewers, drains, wires and poles in the line of excavation or adjacent thereto which may be damaged by the Work herein contemplated.
- B. Make all arrangements with the proper utility companies for bracing and protection of all utility poles that may be damaged or endangered by the operations. Work under this Item shall include the related removal and reinstallation of guy wires, or support poles whether shown on the Contract Drawings or not.
- C. Whenever the Work involves crossing underneath or is located adjacent to gas mains, water mains, sewers, underdrains, electric ducts or poles, fiber ducts, telephone ducts or poles, or cable TV ducts and conduits, the Contractor shall notify the respective utility company of such underground structures in the vicinity of the Work and make all necessary arrangements with the company for doing any work which may affect the property of the company, or interfere with its operation. The Contractor shall take special care to avoid damage to these underground structures/utilities and shall be liable for any damage that may be caused by an act, omission or neglect on his/her part and shall pay all expenses of every kind incidental to this work.
- D. Perform all Work required in crossing culverts, water courses, including brooks and drainage ditches, storm drains, gas mains, water mains, electric, telephone, gas and water services and other utilities. This Work shall include: bracing, hand excavation, backfill, and any other work required for crossing the utility or obstruction.
- E. At pipe crossings and where designated by the Engineer, furnish and place screened gravel bedding (or other bedding as required by utility owner) so that the existing utility or pipe is firmly supported for its entire exposed length. The bedding shall extend to the mid-diameter of the pipe crossed.
- F. Whenever it becomes necessary to change the location of any underground structures such as water or gas pipes, sewers, drains, conduits, etc., not otherwise provided for in these Specifications, the Contractor shall do the whole or portion of the work of making changes as the Engineer may require in writing,

THE METROPOLITAN DISTRICT

and this work shall be paid for under the respective Item in the Bid Form. The Contractor will not receive any payment for equipment and labor tied up and unable to work because of this relocation work. If, in the opinion of the Engineer, the changes that are required can best be made by the parties owning the structures or by forces of the Owner, the Contractor shall give all reasonable facilities for doing this work in a proper manner and shall not claim or receive any payment for damages for delaying the continuance of his/her own work.

3.04 GAS PIPELINES

- A. Forty eight (48) hours prior notice must be given by the Contractor to the respective Gas Company (CNG or Yankee Gas) before starting construction activity in the vicinity of gas lines.
- B. When excavating near gas pipelines, Contractor must follow procedures as outlined in the CBYD Excavator's Manual regarding digging around combustible, hazardous fluids or gas lines (natural gas, propane or gasoline). Hand digging is required once the paved surface is removed.
- C. Material and size of gas mains, as provided by the respective Gas Company, is noted on the Contract Drawings.
- D. Any specific gas company requirements for work adjacent to the gas mains are included in the appendices. Those requirements are augmented and highlighted by the requirements in this Section. Contractor shall abide by these requirements when working in the vicinity of gas mains and service connections. Failure to abide by these requirements may render the gas main or service connections to be replaced by the Gas Company. Failure by the Contractor that leads to gas main replacement shall be at no additional cost to the Owner.
- E. No excavation shall be within twelve (12) inches of the existing cast iron gas mains.
- F. Blasting may be prohibited in the vicinity of gas pipelines; refer to gas company, local authority, and project specific blasting requirements.

3.05 COMMUNICATIONS AND ELECTRICAL CONDUITS, DUCT BANKS, AND OVERHEAD WIRES/CABLES

- A. Communications (including but not limited to cable television, fiber optic, signalization, and telephone) and electrical conduits, duct banks, and/or overhead wires/cables may be located within the project limits and may contain major transmission lines. These utilities are important to the Owners and their customers. The Contractor shall exercise caution when working in the vicinity of these utilities and is responsible for protecting these facilities. Any damage to these utilities that is a result of the Contractor's actions will be the responsibility of the Contractor.

THE METROPOLITAN DISTRICT

3.06 COORDINATION WITH THE OWNER'S OPERATIONS

- A. Notify the Owner and Engineer, in writing, a minimum of five working days in advance of commencing Work on site.
- B. Notify the Owner and Engineer, in writing, a minimum of five working days before commencing any work which may affect the Owner's operations.
- C. Perform all construction activities so as to avoid interference with operations of the existing utility systems and the work of others.
- D. Coordinate the following operations with the Owner and the Engineer:
 - 1. Operation of existing valves. The opening and closing of existing valves will be performed by the Owner.
 - 2. Testing of the new mains.
 - 3. Timing and duration of activities that impact existing utilities.
 - 4. Tapping of in-service water mains. For taps twelve (12) inches in diameter and smaller, the Owner will perform the actual tap; see Sections 02656 and 02657 regarding tapping water mains.
 - 5. Temporary water service shutdown and water meter replacement, as required for the completion of the Work. For reconnections and renewals of water service, the Owner will flush the service and replace the water meter, as necessary; see Section 02657 regarding reconnections and renewals.
- E. For water service reconnections included in the Work, any service box and rod found to be inoperable shall be excavated and replaced by the Contractor. The Owner will provide replacement materials for these service boxes and rods. This work shall be performed at no additional cost to the Owner; and, no claim for delay will be allowed due to performance of this work.
- F. The Owner has the authority to order the Work stopped or prohibited if such work could unreasonably result in stopping the necessary functions of the existing utilities. Any costs delays associated with these work stoppages due to the Contractor's operation shall be borne by the Contractor.

3.07 UNDERDRAINS

- A. Contractor is responsible for protecting, maintaining and replacing existing underdrains. When removing and replacing existing catch basins, the Contractor shall reconnect existing roadway underdrains that were connected to the existing catch basin to the new storm drain in accordance with the governing agency's requirements and as directed by the Engineer.

THE METROPOLITAN DISTRICT

3.08 FIRE PROTECTION

- A. Supply the Owner and the Engineer, as well as the local municipality, police department, fire department, school department, public transportation agency or authority with jurisdiction in the project area or affected by the Work, with the following information:
 - 1. A list of streets and intersections where work will be in progress to be supplied at intervals as required by the Engineer.
 - 2. Areas where approved detours are in effect.
 - 3. Immediate notification of any hydrant out of service, and sewer, drain, gas, and/or water main breaks.
 - 4. Emergency Command Center Telephone No. 860-513-3388.
- B. During a shutdown of a water system fire service, as required for the completion of the Work, the local municipality, fire marshal, or fire department may require a twenty-four (24) hour standby fire inspector or other preventative measures. Coordination of any such requirements or involvement of a fire sprinkler service company necessary for the shutdown or reinstatement of a fire service shall be the responsibility of the Contractor. Any work required as a result of this coordination shall be performed at no additional cost to the Owner. No claim for delay will be allowed due to such coordination.

3.09 SEQUENCE OF CONSTRUCTION

- A. Constructing the proposed improvements while maintaining existing operations will require a specific sequence of construction. Refer to Section 01044 and the Contract Drawings for specific sequences of construction, if required. The Contractor shall provide a detailed Progress Schedule as required in Section 01310.
- B. Insofar as possible, all new constructed public sewers, drains and water mains shall be tested and disinfected by the Contractor and in operating condition before the final tie-ins are made to connect new pipe to existing pipe.

3.10 TEMPORARY CONSTRUCTION ACTIVITIES

- A. The Contractor shall be responsible for providing and maintaining all temporary facilities, including bypass pumping facilities, sewer/drain collection and service systems, and temporary water mains and water services required for the completion the Work.
- B. All temporary work shall be removed by the Contractor following the construction

THE METROPOLITAN DISTRICT

of the permanent work.

3.11 SHUTDOWNS

- A. Rescheduling or reactivation of any temporary shutdowns may be required if an emergency occurs in the utility system.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01044

PROGRESS AND SEQUENCE OF WORK

PART 1 - GENERAL

1.01 TIMING OF WORK

- A. The award and the timing of the award of this Contract after the opening of bids will be subject to review by the Owner and may be subject to review by the State of Connecticut Department of Energy and Environmental Protection (DEEP) and/or the Connecticut Department of Public Health (DPH).
- B. Refer to the Agreement (Section 00500, Article 3, Contract Time) for Commencement and Completion of Work.
- C. The Owner shall issue the Notice to Proceed to the Contractor following the execution of the agreement. The calendar days for the project will begin based on the date specified in the Notice to Proceed. Refer to Section 01310 for requirements of Progress Schedules.

1.02 WORK HOURS

- A. Work hours for this Contract shall be as defined in the Standard General Conditions (Section 00700) Article 6.02 or as amended in the Supplementary Conditions.

1.03 SEQUENCE OF WORK

- A. A suggested construction phasing plan may be noted in the Contract Documents. The Contractor shall submit a detailed proposed construction phasing plan, whether the intent is to follow the suggested plan or not. The proposed sequence shall be in accordance with the Progress Schedules submitted by the Contractor, as described in Section 01310.
- B. In order that the Work may be conducted with a minimum of inconvenience to the public, and that the work on this Contract may be coordinated with other work which may be under construction or contemplated, and that the Work under the Contract may conform to conditions under which it has been undertaken or conditions attached to the rights-of-way for this work, the Engineer or Owner may determine the point or points and time or times when portions of the Work will be commenced or carried on and may issue orders pertaining thereto and relative to the rate of progress on the several portions of the work.
- C. The Contractor shall be solely responsible for contacting and coordinating with the appropriate local and state authorities concerning any public or semi-public events that may occur during the period of performance of the Work that may impact the Work. The Contractor shall be responsible for arranging the sequence of the Work

THE METROPOLITAN DISTRICT

to accommodate any restrictions on the performance of the Work that such events may impose. The Contractor shall not be entitled to any claims for extras due to delays, extra materials handling, etc. resulting from the imposition of such restrictions. However, requests for extension of time to complete the Work may be granted, at the discretion of the Owner, for delays caused by said restrictions.

- D. At any time during the Contractor's performance of the Work, the Owner may, in its discretion, direct the sequence in which the Contractor shall perform the various parts of the Work to facilitate the performance of other work by the Owner or Others, provided such direction does not unreasonably interfere with the Schedule of the Work. To the extent that such changes increase Contractor's time and costs, the Contract Price and Contract Time shall be equitably adjusted.
- E. In the event the Contractor has reason to think that there has been a delay or may be a delay by any act or omission of the Owner or any of its agents, or by any other cause beyond the control of the Contractor that could not have been anticipated by the Contractor, the Contractor shall give notice thereof, in writing, to the Engineer as provided elsewhere herein and in the Contract Agreement.
- F. In any one street, or other reasonable section of the job, as may be determined by the Engineer, the main pipeline and appurtenances shall be completed, leakage-tested, inspected, cleaned and defects corrected where necessary, ready to use, and the compaction, paving repair and cleanup work shall be done before work is started on any other street or section.
- G. Due to potential construction activities in the vicinity of this Contract, the Contractor shall coordinate the dates of milling and overlaying with the Engineer, Owner and the City, Town or CTDOT. Milling and overlaying will not be permitted without the written permission of the Owner and the City/Town or CTDOT where the work is taking place.
- H. The sequence of performing the Work shall be compatible with the Temporary Traffic Control plans as outlined in Section 01570.

1.04 SUBMITTALS

- A. Contractor shall submit, in accordance with Sections 01300, the proposed construction phasing plan for Engineer and Owner review and acceptance, at least thirty (30) days prior to commencement of any construction activities.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01046

CONTROL OF WORK

PART 1 - GENERAL

1.01 LIMITATIONS OF OPERATIONS

- A. The Contractor may not be permitted to work nighttime hours, weekends, or Owner holidays as described in the General Conditions (Section 00700).
- B. The Contractor may not be permitted to work during a winter shutdown period as described in the Agreement (Section 00500).
- C. The Contractor may also not be permitted to work during the following days and times:
 - 1. As restricted by the Municipal and CTDOT (if required) permits; refer to Section 01060, Regulatory Requirements.
 - 2. Work activities may be limited at times to accommodate traffic flow due to special events in the construction area (i.e. funerals, parades, deliveries, business activities, civic events, etc.). The Contractor may be required to clear/prepare the construction site to accommodate the special event.
 - 3. Work activities may also be limited or suspended at times at discretion of the Owner for safety, traffic congestion, weather or other reasons.
- D. In advance of inclement Weather, the Contractor may be requested to stop work and/or clean up the site, at no additional cost to the Owner. Examples of these activities include, but are not limited to:
 - 1. Secure loose items
 - 2. Secure open excavations
 - 3. Remove roadway obstructions
 - 4. Clean or remove all silt sacks
- E. No additional payment will be made for site cleanup and site preparation following inclement weather.

1.02 PERSONNEL AND EQUIPMENT

- A. The Contractor shall furnish personnel and equipment which will be appropriate to execute a satisfactory quality of work and a rate of progress which will ensure the completion of the Work within the Contract Time. If at any time such personnel and equipment appears to be inefficient, inappropriate or insufficient to

THE METROPOLITAN DISTRICT

accomplish the quality of work required or for producing the rate of progress aforesaid, the Engineer may order the Contractor to increase the efficiency, change the character or increase the personnel and/or equipment and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

- B. All personnel employed under this Contract shall be issued identification badges by their employer. These identification badges must be carried by each person at all times during the prosecution of the Work.

1.03 MULTIPLE WORK ZONES

- A. Multiple work zones may be permitted with written permission from the Owner. Multiple work zone requests will be reviewed by the Owner with approval contingent on reduction of overall project schedule. Multiple work zones may not be permitted if traffic flow is compromised. Distance between work zones must be reviewed and approved by the Owner before being established in the field. Use of multiple work zones may require the Contractor to revise/edit the Temporary Traffic Control plans at their own cost, as described in Section 01570, Maintenance and Protection of Traffic.

1.04 PRIVATE LAND

- A. The Contractor shall not enter or occupy private land outside of easements, except by permission of the land owner. Permission of the land owner shall be in writing with a copy to the Engineer.

1.05 PIPE LOCATIONS

- A. The Contractor shall locate pipelines substantially as indicated on the Contract Drawings. The Engineer reserves the right to make modifications to the locations as may be found desirable to avoid interference with existing structures or for any other reasons. Where fittings are noted on the Contract Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and joining different or additional items where required.

1.06 SHUTDOWN OR DISRUPTION NOTIFICATION REQUIREMENT

- A. Contractor shall give a minimum of seven days advance notice to the Owner and Engineer of each component proposed for shutdown or disruption, all of which will be subject to Owner approval and limitations.

1.07 EXCAVATIONS

- A. The Contractor shall adequately safeguard all open excavations by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property. Provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Remove

THE METROPOLITAN DISTRICT

bridges provided for access during construction when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of the open trench or prohibiting stacking excavated material in the street. No trench shall remain open during non-working hours.

- B. The Contractor shall take precautions to prevent injury to the public due to open trenches. Provide barricades, railings, fencing, signs, and any other necessary items to restrict the public from any open trenches. Provide adequate light at all trenches, excavated material, equipment, or other obstacles, which could be dangerous to the public at night.

1.08 TEST PITS

- A. The Contractor shall excavate test pits to locate underground pipelines or structures in advance of the construction as specified in Section 02011. Backfill test pits immediately after their purpose has been satisfied and restore and maintain the surface.

1.09 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. Unless permission to close a street is received in writing from the proper authority, the Contractor shall remove all excavated material so that vehicular and pedestrian traffic may be maintained at all times. Stockpiling in the street of excavated materials, new gravel material and all materials to be installed (pipes, manholes, castings, structures, etc) is not permitted. If the construction operations cause traffic hazards, repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the Engineer.
- B. Detours around construction will be subject to the review and approval of local traffic authority, the Owner and the Engineer. Where detours are permitted, the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic and expedite construction operations while traffic is detoured. Periods when traffic is being detoured will be strictly controlled by the Owner.
- C. The Contractor shall take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. The Contractor shall be fully responsible for damage or injuries whether or not police protection has been provided.
- D. Refer to Sections 01570 for additional requirements regarding Maintenance of Traffic.

THE METROPOLITAN DISTRICT

1.10 CARE AND PROTECTION OF PROPERTY

- A. The Contractor shall be responsible for the preservation of all public and private property and use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work on the part of the Contractor, the Contractor shall restore such property to a condition similar or equal to that existing before the damage was done, or make good the damage in other manner acceptable to the Engineer.
- B. Refer to Sections 01725 for additional requirements regarding Care and protection of Property.

1.11 TIE-IN PREPARATIONS

- A. Where new systems are to be tied-in to existing systems, which are required to be shutdown to make the tie-in, the new system shall be fully prepared in anticipation of the tie-in to minimize downtime of the existing system. The new system shall be fully tested to the maximum extent possible prior to the tie-in. Measurements shall be taken to ensure that the new system is of the correct size, length and alignment to complete the tie-in. Supply a list of all materials and equipment needed to accomplish the tie-in and review the proposed tie-in with the Engineer and Owner.

1.12 WATER FOR CONSTRUCTION PURPOSES

- A. In locations where the Owner's public water distribution system is available, the Owner may allow the Contractor to use water for construction purposes.
- B. Refer to Section 01060 Regulatory Requirements for administrative procedures, application requirements and fees associated with water usage.
- C. The Contractor shall obtain approval from the Owner prior to connection to a hydrant. Waste of water shall be sufficient cause for withdrawing the privilege. Hydrants shall only be operated under the supervision of the Owner's personnel.

1.13 MAINTENANCE OF FLOW

- A. The sewer, drainage and water system must provide continuous service during the construction period and the capacity of these systems may not be reduced by the Contractor without prior written approval from the Owner.
- B. In general, no work which affects or could affect existing system operations or service shall be performed without a specific detailed plan by the Contractor, approved in advance by the Engineer and Owner. All requests for system diversions, shutdowns, modifications, etc., shall be in writing to the Owner with a copy to the Engineer.

THE METROPOLITAN DISTRICT

- C. The Contractor shall provide for the flow of sewers, drains and water courses interrupted during the progress of the Work, and immediately cart away and remove all offensive matter. The Contractor shall submit for review and approval the entire procedure of maintaining existing flow with the Engineer well in advance of the interruption of any flow.
- D. Refer to Sections 01510 and 02150 for additional requirements regarding Maintenance of Flow in Existing Sewers and Bypass Pumping.

1.14 HOUSEKEEPING

- A. The Contractor shall not allow the accumulation of scrap, debris, waste material, and other items not required for completion of the Work. See Section 01490.
- B. The Contractor shall provide storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.
- C. Daily, or more often if necessary, the Contractor shall inspect the work areas and adjoining spaces, and pick up and store or remove all scrap, debris, and waste material.
- D. During the course of the Work, the Contractor shall keep the site of operations as clean and neat as possible. Dispose of all residue resulting from the construction work and, at the conclusion of the Work, remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operations and leave the entire site of the Work in a neat and orderly condition.
- E. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, the Contractor shall comply with all applicable Federal, State and local laws and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and in other related Sections.
- F. Disposal of excess excavated material in wetlands, stream corridors and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the Contractor or any person employed by him will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. The Contractor will be required to remove the fill and restore the area impacted at no increase in the Contract Price.

1.15 SUBMITTALS

- A. Contractor shall submit, in accordance with Section 01300, shop drawings showing details of all tie-ins to existing systems.

THE METROPOLITAN DISTRICT

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01050

FIELD ENGINEERING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall establish lines and grades and layout all work for the project.
- B. The Contractor shall be responsible for establishing elevations, lines, levels, reference marks, batter boards, etc. Contractor shall be responsible for staking easements.
- C. The Contractor shall locate and protect survey control and reference points provided by the Owner.
- D. Additional control established by the Contractor within the project area shall be protected from disturbance.
- E. Control datum for this project shall be the North American Vertical Datum of 1988 (NAVD 88).

1.02 LINES, GRADES, AND MEASUREMENTS

- A. The Contractor shall employ a Land Surveyor, licensed in the State of Connecticut, to provide field engineering services. The Land Surveyor shall utilize recognized survey practices to establish elevations, lines, levels, reference marks, etc., needed by the Contractor during the progress of the Work, and to occasionally verify such marks.
- B. The Contractor shall submit a certificate signed by the Land Surveyor registered in the State of Connecticut verifying that the elevations and locations of the Work are in conformance with the Contract Documents.
- C. The Engineer and the Owner shall be permitted at all times to check the lines, elevations, reference marks, etc., set by the Contractor, who shall correct any errors in lines, elevations, reference marks, etc., disclosed by such check. Such a check shall not be construed to be an approval of the Contractor's work and shall not relieve or diminish in any way the responsibility of the Contractor for the accurate and satisfactory construction and completion of the entire Work.
- D. The Contractor shall make, check, and be responsible for all measurements and dimensions necessary for the proper construction of and the prevention of misfittings in the Work.
- E. The Contractor shall establish and provide layout stakes and/or reference marks at a minimum of fifty (50) foot intervals along each section of Work. Layout

THE METROPOLITAN DISTRICT

stakes shall be offset two (2) feet off the curb line or at a greater distance required to assure that offsets are protected from being disturbed during construction. In addition, two (2) offset stakes shall be set at each structure. Layout shall be in accordance with MDC Cut Sheet and MDC Sewer Stakeout Policy and the MDC Water Layout Policy as attached at the end of this Section.

- F. The Contractor shall establish bench marks at a minimum separation of three hundred (300) feet along the proposed work area.
- G. The Contractor shall provide personnel to assist the Inspector with acquiring all measurements including lines, grades, etc. to ensure work conforms to MDC Specifications and to verify the quantities measured for payment.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

MDC Cut Sheet and MDC Sewer and Water Stakeout Policy

Stationing of Manholes

1. Start station 0+00 at existing manhole or first new manhole (if new MH is to be constructed over existing sewer).
2. Station consecutively along the main portion of the sewer to the next manhole.
3. The first stake out of proposed manholes shall be utilized to adjust the stationing to the next even 50' interval when the manhole station is not evenly divisible by 50'. Example Attached: The first stake from SMH 11+31 N shall be at Sta. 11+50.
4. At intersection(s) where the sewer branches off in another direction, a different station shall be used other than the one that has already been used. The new stationing shall begin with the next even thousand station. Thus, it is possible to have more than one station per manhole. Example Attached: SMH 1+22 NW and SMH 10+100 NE are the same manhole.
5. All stakes shall be offset a distance away from the proposed work to insure that they will remain following construction.
6. Two offset stakes shall be placed at each manhole.
7. Street stationing of the sewer will NOT be allowed.



SEWER
WATER

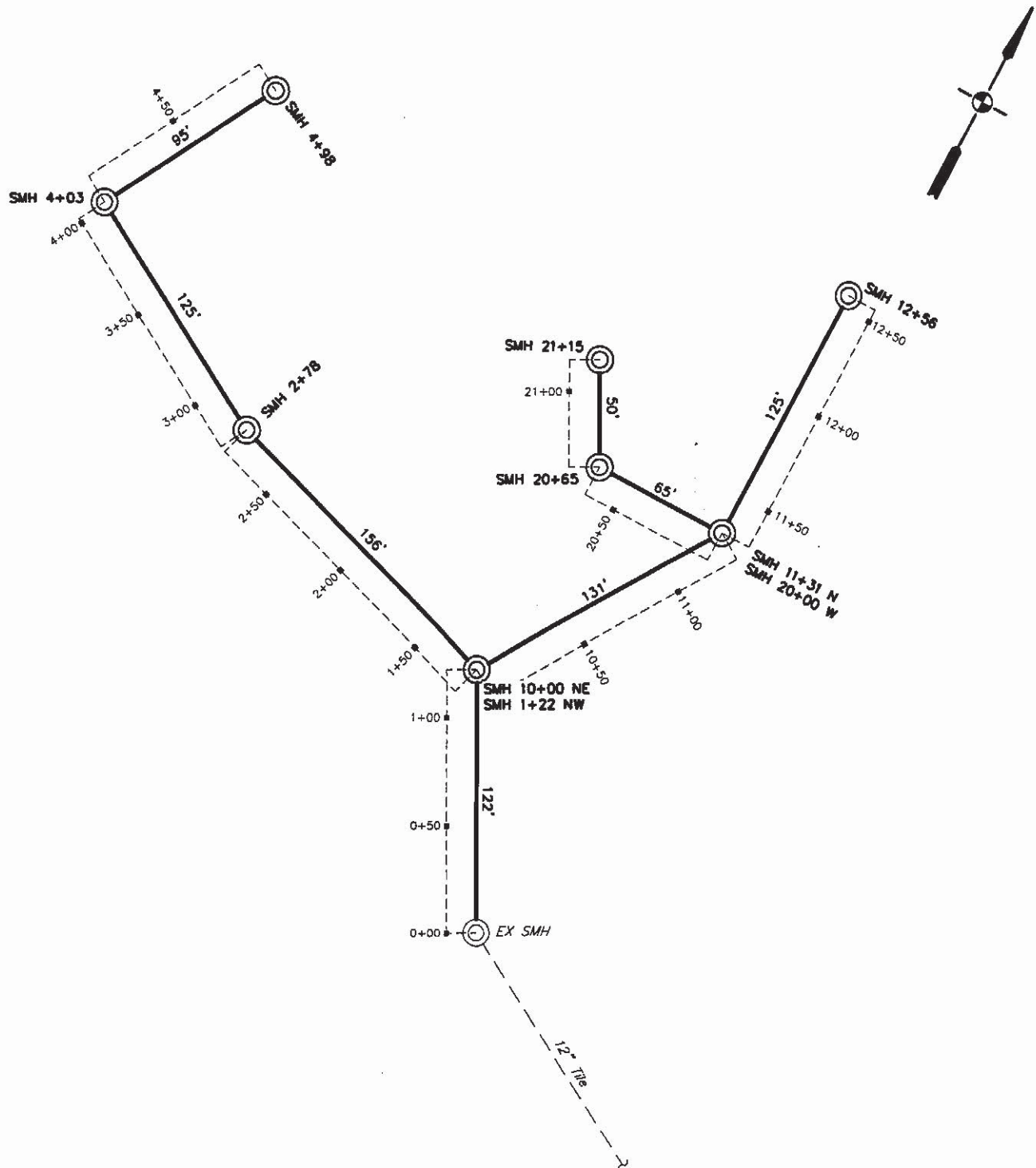
STAKED: _____ of CL at _____

[illegible]

BY:	DATE:
NOTEBOOK:	DATUM:

THE METROPOLITAN DISTRICT

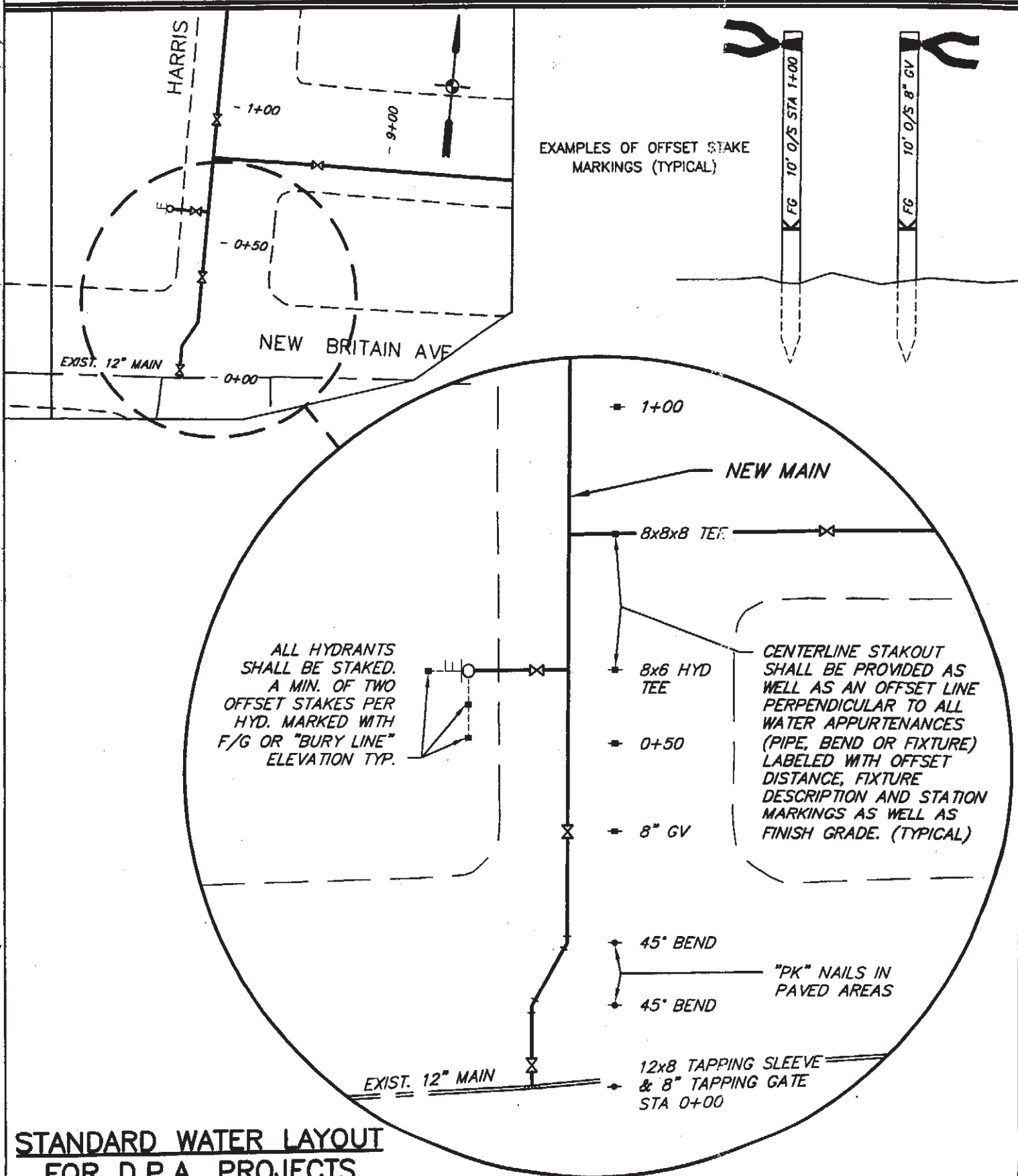
DPA SEWER INSTALLATION DETAILS



STANDARD SEWER STATIONING
FOR D.P.A. PROJECTS

THE METROPOLITAN DISTRICT

DPA WATER INSTALLATION DETAILS



STANDARD WATER LAYOUT FOR D.P.A. PROJECTS

NOT TO SCALE
REPRESENTATIVE ONLY, FIELD
CONDITIONS MAY VARY

01050A-5

Revised: 12/10/2010

THE METROPOLITAN DISTRICT

SECTION 01060

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 PERMITS

- A. The Contractor shall obtain all necessary permits from the Municipality, CTDOT, or other authority having jurisdiction over excavation in the streets, highways, or sidewalks, and all other necessary building and construction operations requiring permits. Such permits may include, but are not limited to, excavation permits and obstruction permits. Any damage caused by the operations to any street, sidewalk or existing structure either above or below the ground surface shall be repaired at no additional expense to the Owner.
- B. The costs of all permits secured shall be paid by the Contractor and such costs shall be considered as having been included in the price or prices stated or bid in the Proposal.
- C. The Contractor will be required to contact the Project Manager/Construction Manager at the Metropolitan District and coordinate any discharge of groundwater or stormwater discharges to the combined sewer system. The Contractor shall comply with the requirements of the latest revision of the MDC General Sewer Ordinance S-2, Use of Sewers.
- D. If any portion of the Work is to be performed within the City of Hartford, the Contractor shall be required to be licensed with the City prior to obtaining any required excavation permits from the City. The Contractor is referred to the City of Hartford, Rules and Specifications Regulating Curb and Walk Layers and Street Excavation Manual. Contractors requesting permits for Curb and Walk, Excavation, or Obstruction will be required to obtain a license with the City, demonstrate an understanding of the rules and regulations of such regulations, obtain, and pay all related fees for such permits, and abide by the regulations of such. All Work shall be performed in accordance with the requirements of the City permits. Contractor will also be required to coordinate with the City regarding progress of the Work, special restrictions of the City of Hartford due to seasonal or civic activities or specific notifications required due to the Work. The Contractor's attention is directed to the City of Hartford directive concerning "Use of Steel Plates Within The City Right Of Way" that is included in the Appendices. Contractor shall make himself aware of any and all required permits and applicable fees required by the governing agency related to such Work prior to the Bid. No additional compensation will be provided to the Contractor for such related Work.
- E. The Contractor shall file the required general permit applications with the Connecticut Department of Energy and Environmental Protection (DEEP) for performance of the Work. The Contractor shall be responsible for paying any

THE METROPOLITAN DISTRICT

registration fee to DEEP for the required general permits. The following permits may be required by DEEP:

1. Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. Refer to Section 02140 for details regarding this permit.
 2. General Permit for Contaminated Soil and/or Sediment (Staging and Transfer)
- F. The Contractor shall obtain a permit from the Owner's Customer Service/Utility Services for any sewer main, water main, sewer lateral, and/or water service installation, including repair, prior to construction.
- G. The Contractor shall obtain Owner approval prior to connection to the Owner's public water distribution system for water use during construction. Approval shall be obtained from the Owner's Customer Service Department. To obtain approval, the Contractor must file an Application and Tracking Document for Installation of a Temporary Hydrant Meter (see Section 01060A attached). The Contractor shall provide an Owner-approved water meter and adequate backflow prevention. Application fees and water usage fees will be waived for water use directly associated with the Work.

1.02 SUBMITTALS

- A. Submit in accordance with Section 01300.
- B. Copies of all necessary permits shall be submitted to and acknowledged by the Owner prior to starting any work for which a permit is required.

1.03 CONTACTS

- A. Municipality/CTDOT
Department of Public Works
Street
City/Town, CT Zip code
Attn: Director of Public Works
Phone
Fax
Email

1.04 ENVIRONMENTAL REQUIREMENTS

- A. The Contractor shall be responsible for preparing and submitting the DEEP General Discharge Permit application, if required, and for ensuring that all information contained within the application is accurate and complete, including certification by a Professional Engineer.

THE METROPOLITAN DISTRICT

- B. The Contractor shall be responsible for employing the necessary treatment technology to meet the permit discharge requirements. These technologies may include the use of settling tanks in series, an oil/water separator, etc.

1.05 PLANNED BYPASS REPORTING REQUIREMENTS

- A. One (1) week prior to initiating planned bypass work, the Contractor is required to submit a letter to Iliana Raffa at DEEP. The letter must include the following information about the planned bypass; where, when, why, and estimated duration. A copy of the letter must be sent to Craig Scott of the Owner's EH&S department and to the Owner's Command Center.
- B. One (1) day prior to planned bypass work, the Contractor is required to call Iliana Raffa at DEEP 860-424-3758 and inform her that the planned bypass will occur beginning the following day as outlined in the letter.
- C. Within seventy-two (72) hours of completing the planned bypass work, the Contractor must complete the Planned Bypass Reporting Form (see Section 01060B attached) and email it to the Project Manager/Construction manager and the Owner's Command Center (dispatcher@themdc.com).
- D. If a sewage spill occurs during the planned bypass activity or at any other time during the Work, the Contractor must **immediately** notify the Construction Inspector and the Owner's Command Center at 860-513-3388 so a Bypass Report can be properly filed with DEEP within prescribed time frames and any damage to Owner infrastructure or customer property can be properly assessed. The Command Center communications/protocol document is attached (see Section 01060C attached).

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION



The Metropolitan District

Year **2017**

Application and Tracking Document for Installation of a Temporary Hydrant Meter

MDC Application Number: **2017-** _____

This section to be filled in by Applicant

Name: _____

Address: _____

Date: _____

Anticipated Installation Date: _____

For what purpose will meter be used? List all uses.

Expected Removal Date: _____

☐ Road/Construction Contractor
☐ Landscape Contractor

☐ Irrigation/Farming
☐ Other (specify) _____

Location where meter will be installed: _____ street
_____ nearest intersecting street
_____ Town

Work Phone# : _____ 24 Hour Emergency # : _____

Cell Phone # : _____ Fax #: _____

email address: _____ Preferred phone # during day: _____

Signature of applicant Certifies that applicant has read and will comply with Public Health Code Cross Connection Regulation 19-13-B37, 19-13-B38a and District guidelines for safe operation of hydrant use. Applicant **MUST** notify The Metropolitan District prior to removal of hydrant meter.

Signed by: _____

Date: _____

Customer signature

This section to be filled in by Command Center/Customer Service Department:

Date: _____ Meter Number: _____ Initial Meter Reading: _____

Non-refundable \$1000 permit/inspection fee, plus an additional \$1500 hydrant meter deposit

Number: _____ Document number: _____

Signed by: _____

Manager of Customer Services or Designee

This section to be filled in by Cross-Connection Liaison/Technician (if backflow prevention is required)

Date of Test: _____ Installed by: _____

Tag # _____

Did device pass test? YES ☐ NO ☐

Approved for Use: _____ Date: _____

Cross-Connection Technician/Liaison

Approved moving of hydrant meter:

Date: _____

Location to: _____ street
_____ nearest intersecting street
_____ Town

CUSTOMER / CONTRACTOR - COPY

MDC HYDRANT METER PROCESS rev. 03-26-14

- Customer/Contractor brings completed application for Hydrant Meter; including check for \$2,500.00 to Utility Services (for MDC Contract Jobs, there may be **NO FEE** required, see Contract Specifications).
- The customer/Contractor will be made aware that any hydrant meter relocation request needs to be made to the Command Center (860.278.7850 ext. #3600) at least **ONE business day** in advance of the request.
- Customer/Contractor must provide the Command Center with a Customer Account Number or Hydrant Meter Serial Number when requesting REMOVAL / RELOCATION of hydrant meters.
- Customer/Contractor will be informed they may be charged a **FEE** for testing of the relocated hydrant meters.
- MDC reserves the right to **NOT** allow the use of certain hydrants as determined by Operations.
- **Note: MDC will install approved hydrant meters for use. A minimum of TWO business days is required for scheduling installation of hydrant meters.**
- Note: After initial installation of hydrant meter by the Hydrant Department, customers / Contractors will be allowed to remove & reinstall hydrant meter on that hydrant **ONLY**, for security purposes.
- Customer/Contractor is responsible for hydrant condition and **ANY** subsequent damage to the hydrant will be charged to that customer/Contractor.

MDC CONTRACTOR
PLANNED BYPASS REPORT FORM

City or Town: _____

TYPE OF BYPASS

_____ Raw Sewage
_____ Chlorinated Raw Sewage
_____ Sludge Spill
_____ Other: _____

CAUSE OF BYPASS

_____ Mechanical Equipment Failure
_____ Electric Utility Failure
_____ Electrical Equipment Failure
_____ Blockage of Sewer Line
_____ Approved Shutdown
_____ Other: _____

Date and Time Bypass was Initiated: _____

Date and Time Bypass was Stopped: _____

Exact Location of

Bypass: _____

Contractor Information-Name, phone, email

address: _____

Quantity/Volume of

Bypass: _____

How Quantity/Volume was

Determined: _____

If Equipment Failure, date of last inspection, maintenance or

repairs: _____

Reason for Bypass

Event: _____

PLANNED BY-PASS NOTIFICATION LOG

Time

_____ CT DEP- Iliana Raffa (860) 424-3785 (Primary DEP Contact).

*Leave voice mail message if Iliana Raffa is not available.

_____ MDC EH&S- Craig Scott (860) 278-7850, ext 3451

BY-PASS REPORT LOG

Time

Date

_____ Email to Iliana.Raffa@ct.gov

_____ Email to cscott@themdc.com

_____ Email to Dispatcher@themdc.com (MDC Command Center)

Report submitted by

(print name): _____

Title: _____

Signature: _____

Date: _____

THE METROPOLITAN DISTRICT

COMMAND CENTER / ENGINEERING / CLAIMS NOTIFICATION PROCEDURES FOR ALL MDC CONTRACTOR PROJECT AREAS

During Normal Working Hours (Day Time)

1. If the Command Center (CC) is notified from any source (customer, inspector, other) of a problem in the field:

The CC will call the Project Manager to relay the problem. The Project Manager will notify the Field Engineer and the Inspector.

If the problem is believed to be caused by a Contractor, the CC will be notified of the need for the Claims Agent.

If the Contractor cannot resolve the issue then Operations will respond and bill the labor and equipment hours as well as materials used to the project's work order, as directed by the CC claims process.

The CC will document and record all interactions in SAP and within the Customer Interaction Center Zero (CIC0) throughout the entire event.

2. If Engineering is notified from any source (customer, inspector, other) of a problem in the field then Engineering will notify the CC of the address and the issue. Engineer will then notify Contractor and their claims agent to begin process. CC and/or Claims Agent will only document interaction within CIC0 and make sure CWP contractor utilizes their insurance claims process throughout. The CC will dispatch the Claims Agent to the location to begin to process the issue. This will facilitate the flow of information in case the customer calls back the CC at a later point in time.

3. If the Inspector is onsite and a problem occurs that affects an infrastructure or a customer, the Inspector will notify the CC of the issue and whether any further action is required and if it warrants the need for CC Claims Agent.

The CC will notify Engineering and acknowledge the Claims Agent has been contacted and is in route to the site with an estimated time of arrival.

4. If a bypass of sewage occurs at a Contractor's jobsite, the Engineering department will make the necessary notifications and file all necessary reports. Copies of the bypass report will be sent via email to the required distribution list, including Operations, CC and EH&S.

THE METROPOLITAN DISTRICT

During Off Hours (nights, weekends or holidays)

1. The CC will follow normal procedures and dispatch a Shift Maintainer to investigate. If the problem is determined to be infrastructure damage or a claim issue, the CC will dispatch the Claims Agent and the Project Manager and or Field Engineer will then be notified.

If, after the CC Claims Agent or Shift Maintainer investigates, the CC determines there is a major issue requiring immediate attention, the CC will notify the Project Manager, Field Engineer or Inspector. MDC Operations will respond and work to resolve the issue or problem in the field as required, unless contractual obligations require the Contractor to rectify the problem. In this instance, the Contractor must respond within 2 hours of being notified. The Contractor is obligated to relieve MDC Operations staff of their emergency response duties and assume responsibility for the full operation until the repair/fix is completed.

In the event the contractor does not respond within 2 hours, the claim will be handled by the Claims Department. All MDC labor and equipment hours as well as materials used will be billed to a specific bill job work order created by the CC. This work order will be reconciled to the project funding.

2. Regardless of whom is responsible for performing the work (MDC Operations or the Contractor), the Project Manager will issue an Emergency Action Plan detailing the scope of the work and primary contact responsibilities.

The CC and/or Claims Agent will document all interactions within CIC0.

THE METROPOLITAN DISTRICT

SECTION 01082

PROJECT SIGNS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section includes furnishing all labor, materials, tools and equipment and performing all Work required for permitting, making, installing, and removing project signs as described below:
 - 1. MDC CIP Typical Project sign details are in Section 01082A. If the Connecticut Drinking Water Fund Project sign is required due to funding, DEEP and/or DPH project sign details are included in the Special Provisions.

PART 2 - PRODUCT

2.01 MATERIALS

- A. All materials utilized to execute the requirements of this Section shall be environmentally safe and be proven effective for the intended use.

PART 3 - EXECUTION

3.01 SIGN

- A. The signs shall be a basic non-illuminated site-sign panel and consist of one 4'-0" x 8'-0" x 3/4" single face MDO sheet (sign maker quality), face and back shall be primer painted with chromatic black-out white bulletin point. The face shall be painted with chromatic #101 Bulletin White Enamel.
- B. MDC, and DEEP/DPH if applicable, logos will be provided by the Owner. The letter message shall be painted on the surface. Cost numbers and other information will be provided to Contractor after award of Contract.
- C. The Contractor shall provide adequate support for the signs, as site conditions require. The signs shall be located at a proper distance above prevailing grade to permit public viewing, but shall not be located to create a hazardous site distance driving condition.
- D. The Contractor shall install the signs at the location of the temporary office, or as directed by the Engineer. The signs shall be installed such that they are clearly legible from nearby streets.

END OF SECTION

CIP TYPICAL PROJECT SIGN



Color Scheme:
Lettering in black
Background in white
Sign border in blue, 1-inch thickness
MDC logo is available upon request

Provide two (2) posts for adequate support for sign as site conditions may require. Keep sign a proper distance above prevailing grade to permit public viewing.

THE METROPOLITAN DISTRICT

SECTION 01090

REFERENCE STANDARDS

PART 1 - GENERAL

1.01 CODES AND STANDARDS.

- A. Any material, method, or procedure specified by reference to the number, symbol, or title of a specific code, specification, or standard, such as a Commercial Standard, American National Standard, Federal or State specification, Industry or Government Code, or a trade association code or standard, shall, unless a particular issue is designated, comply with the requirements in the latest revision thereof and any amendments or supplements thereto in effect on the date of these Contract Documents, as indicated on the cover, except as limited to type, class, or grade or modified in such reference.
- B. The code, Specification, or standard referred to, except as modified in these Specifications, shall have full force and effect as though printed in these Specifications. These codes, Specifications and standards are not furnished to the Contractor since contractors, manufacturers and trades involved are assumed to be familiar with their requirements. The District will furnish, upon request, information as to how copies of the codes, Specifications, and standards referred to may be obtained.
- C. It shall be the responsibility of the Contractor to determine and become aware of the meaning, use and intent of abbreviations when and where used under the full scope of the Contract.

1.02 METROPOLITAN DISTRICT STANDARDS.

- A. The Metropolitan District has developed the following standards and Specifications. Unless specified or shown otherwise in the Specifications and on the Contract Drawings of the Contract Documents, all materials and installation details shall conform to the requirements of the latest edition of the manuals.
 - 1. MDC Standard Details Manual – Appendix A.
 - 2. MDC Approved Materials List – Appendix B
 - 3. MDC Sanitary and Storm Sewer Service Manual.
 - 4. Water Service Connection Manual.

THE METROPOLITAN DISTRICT

1.03 OTHER REFERENCE STANDARDS.

- A. The following codes, Specifications or standards listed hereinafter, shall have full force and effect as though printed in these Specifications, except as modified for this Contract.

- | | |
|----------------------|--|
| 1. CTDOT | Connecticut Department of Transportation's "Standard Specifications for Roads, Bridges and Incidental Construction, Form 817." and amendments thereto. |
| 2. ACI | American Concrete Institute |
| 3. ANSI/AWWA | American National Standards Institute and American Water Works Association. |
| 4. ASTM | American Society of Testing Materials. |
| 5. AASHTO | American Association of State Highway and Transportation Officials. |
| 6. CGSESC | Connecticut Guidelines for Soil Erosion and Sediment Control |
| 7. CCSWC | Connecticut Council on Soil and Water Conservation. |
| 8. MUTCD | Manual on Uniform Traffic Control Devices |
| 9. NFPA | National Fire Protection Association |
| 10. USASI | United States - American Standards Institute. |
| 11. City of Hartford | Rules and Specifications Regulating Curb and Walk Layers and Street Excavations. |
| 12. City of Hartford | Standard Technical Specifications for Streets and Roads, Traffic, and Streetscape Construction. |

- B. All other standards issued by the authority where the project is executed.

1.04 QUALITY ASSURANCE

- A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of Contract Documents.

THE METROPOLITAN DISTRICT

- C. Obtain copies of standards when required by Contract Documents.
- D. Maintain copy at job site during submittals, planning, and progress of the specific work until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- F. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention of inference otherwise in any reference document.

1.05 ABBREVIATIONS

- A. Abbreviations used may include, but are not limited to, the following:

ABS	Acrylonitrile Butadiene Styrene
A.C.	Alternating Current
	Air Conditioning;
	Asbestos Cement
Adj.	Adjustable
AGA	American Gas Association
Agg.	Aggregate
Allow.	Allowance
Alum.	Aluminum
a.m.	Ante Meridiem
Amp.	Ampere
Approx.	Approximate
Asb.	Asbestos
ASCE	American Society of Civil Engineers
Attchmt.	Attachment
Avg.	Average
A.W.G.	American Wire Gauge
Bit; Bitum.	Bituminous
Bldg.	Building
Blk.	Block
Brk.	Brick
Bsn.	Basin
BTU	British Thermal Unit
C	Hundred;
	Centrigade
C/C	Center to Center
Calc.	Calculated
Cap.	Capacity
C.B.	Circuit Breaker, Catch Basin
C.C.F.	Hundred Cubic Feet
Cem.	Cement
C.F.	Cubic Feet

THE METROPOLITAN DISTRICT

CFM	Cubic Feet per Minute
CFS	Cubic Feet per Second
c.g.	Center of Gravity
C.I.	Cast Iron
C.I.P.	Cast in Place; Cast Iron Pipe
CIPP	Cured in Place Pipe
Circ.	Circuit
C.L.F.	Hundred Linear Feet
cm	Centimeter
CMP	Corr. Metal Pipe
CMU	Concrete Masonry Unit
Comb.	Combination, Combined
Conc.	Concrete
Cont.	Continuous
	Continued
Corr.	Corrugated
C.P.M.	Critical Path Method
CPVC	Chlorinated Polyvinyl Chloride
CRT	Cathode-ray Tube
C.S.F.	Hundred Square Feet
CSI	Construction Specifications Institute
Cu	Cubic
Cu. Ft.	Cubic Foot
Cwt.	100 Pounds
C.Y.	Cubic Yard (27 cubic feet)
C.Y./Hr.	Cubic Yard per Hour
Cyl.	Cylinder
D	Deep, Depth; discharge
DEEP	Department of Energy and Environmental Protection
Dis; Disch.	Discharge
Dbl.	Double
D.C.	Direct Current
DI	Ductile Iron
Distrib.	Distribution
D.S.	Double Strength
Dty.	Duty
Ea.	Each
Elec.	Electrician, Electrical
Elev.	Elevator, Elevating, Elevation
EPA	Environmental Protection Agency
Equip.	Equipment
Est.	Estimated
Excav.	Excavation
Ext.	Extension
Fr.	Frame
Ft.	Foot; Feet
Fndtn.	Foundation
Ftg.	Footing

THE METROPOLITAN DISTRICT

Gal./Min.	Gallon Per Minute
Galv.	Galvanized
Gen.	General
GPD	Gallons per Day
GPH	Gallons per Hour
GPM	Gallons per Minute
GR	Grade
H.C.	High Capacity; House Connection
H.D.	Heavy Duty; High Density
H.P.	Horsepower, High Pressure
Hr.	Hour
Hrs./Day	Hours Per Day
Ht.	Height
HVAC	Heating, Ventilating & Air Conditioning
Hvy.	Heavy
Hydr.	Hydrant
ID	Inside Diameter
I.D	Inside Dimension
	Identification
In.	Inch
Incl.	Included, Including
Int.	Interior
Inst.	Installation
Insul.	Insulation
I.P.	Iron Pipe
kg	Kilogram
Kip.	1000 Pounds
KW	Kilo Watt
KWh	Kilowatt-hour
L	Labor Only; Length; Long
Lab.	Labor
lat, Lat.	Latitude, Lateral
Lav.	Lavatory
lb.; #	Pound
Ld.	Load
L.F.	Linear Foot
L.L.	Live Load
L.P.	Low Pressure
L.S.	Lump Sum
Lt.	Light
Maint.	Maintenance
Mat.	Material
Max.	Maximum
MBE	Minority Business Enterprise.
Med.	Medium
Mfg.	Manufacturing
Mfrs.	Manufacturers
mg	Milligram

THE METROPOLITAN DISTRICT

MGD	Million Gallons per Day
MH	Manhole; Man Hour
Mi.	Mile
Min.	Minimum
Misc.	Miscellaneous
Mo.	Month
Mobil.	Mobilization
MPH	Miles per Hour
Mult.	Multi; Multiply
MUTCD	Manual on Uniform Traffic Control Devices
N	North
NEWWA	New England WaterWorks Association
NPT	National Pipe Thread
NA	Not Available, Not Applicable
No.	Number
OC	On Center
OD	Outside Diameter
O.D.	Outside Dimension
psi	pounds per square inch
psig	pounds per square inch gage
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe
s.f.	Square foot
s.y.	Square yard
SLBE	Small Local Business Enterprise
WBE	Women's Business Enterprise

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01110

ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials and equipment and perform all work required for prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Section, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.
- B. The control of environmental pollution requires consideration of air, water and land, and involves management of water discharges, air emissions, noise, hazardous materials and solid waste, as well as other pollutants.
- C. Schedule and conduct all work in a manner that will minimize erosion of soils in the areas of work. Provide erosion and sedimentation control measures such as, but not limited to temporary and permanent mulching, dust control, vegetative protection and cover, sediment barriers, slope stabilization, diversions, or other special surface treatments as required to prevent erosion and subsequent sedimentation and muddying of streams, rivers, wetlands, impoundments, ponds, lakes, etc. All measures shall be in place prior to any construction activity.
- D. This Section is intended to ensure that construction is achieved with minimum disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.
- E. All phases of erosion and sedimentation control shall comply with, and be subject to, the approval of the U.S. Environmental Protection Agency (EPA), the Connecticut Department of Energy and Environmental Protection (DEEP) and the host municipality, as further described herein. Prepare an erosion and sedimentation control plan with drawings meeting the requirements for approval by those agencies. Upon approval, furnish two copies of the approved drawings to the Engineer for information purposes only.

1.02 RELATED SECTIONS

- A. Section 01060, Regulatory Requirements
- B. Section 01562, Dust Control

THE METROPOLITAN DISTRICT

- C. Section 01725, Preservation and Restoration of Project Features
- D. Section 02140, Dewatering and Drainage
- E. Section 02145, Handling Contaminated Groundwater
- F. Section 02150, Bypass Pumping
- G. Section 02260, Handling, Transportation and Disposal of Regulated Soil
- H. Section 02270, Sedimentation and Erosion Control

1.03 APPLICABLE REGULATIONS

- A. Comply with all applicable Federal, State and local laws, regulations and permits, concerning environmental pollution control, abatement and construction. This requirement applies to all laws regulations and permits referenced in these Specifications as well as any other laws, regulations or permits not specifically referenced that apply to this construction activity.
- B. At a minimum, comply with requirements set forth by the Army Corps of Engineers, DEEP, Owner and all applicable municipalities.

1.04 NOTIFICATIONS

- A. The Engineer will notify the Contractor in writing of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and will advise the Contractor to develop proposed corrective measures to be taken. Federal, State or local agencies responsible for verification of certain aspects of the environmental protection requirements shall notify the Contractor in writing, through the Engineer, of any non-compliance with Federal, State or local requirements. After receipt of such notice from the Engineer or from the regulatory agency through the Engineer, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of time lost due to stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor, unless it is later determined that the Contractor was in compliance.

1.05 IMPLEMENTATION

- A. Prior to commencement of Work, Contractor to meet with the Engineer to develop mutual understandings relative to compliance with these provisions and administration of the environmental pollution control program.

THE METROPOLITAN DISTRICT

- B. Remove temporary environmental control features, when approved by the Engineer and incorporate permanent control features into the project at the earliest practicable time.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 EROSION AND SEDIMENT CONTROL

- A. Provide positive means of erosion and sediment control such as, but not limited to, shallow ditches to divert runoff around active construction areas and to carry off surface water, siltation basins, hay check dams, mulching, jute netting and other equivalent techniques. Flow of surface water into excavated areas shall be prevented. Water resulting from dewatering of excavated areas shall be filtered using appropriate best management practices (BMPs) prior to discharge to ditches around construction area. At the completion of the Work, ditches shall be backfilled and the ground surface restored to original condition.

3.02 PROTECTION OF STREAMS AND SURFACE WATERS

- A. Take precautions to prevent, or reduce to a minimum, damage to any stream or surface water from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near streams and surface waters. Water that has been used for washing or processing, or that contains oils or sediments, and stormwater that will reduce water quality of receiving waters, shall not be directly returned to streams or other surface waters. Divert such waters through a settling basin, filter or appropriate BMP before being directed into streams or surface waters.
- B. Do not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels.
- C. Take preventative measures to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan approved by the Engineer and DEEP. Submit two copies of approved contingency plans to the Engineer for information purposes only.
- D. Water being flushed from potable water structures or pipelines after disinfection in accordance with Section 02653 and the current version of the American Water Works Association Standard C651, that contains a chlorine (Cl₂) residual after a contact time of 24 hours, shall be treated with a dechlorination solution if the flush water is released to a surface water or stormwater system. The Cl₂ residual of the water released to a surface water should be 0.262 mg/L or less per the DEEP Water Treatment Wastewater General Permit. The dechlorination method

THE METROPOLITAN DISTRICT

shall be approved by the Engineer, prior to discharge. There is no Cl₂ residual limitation for a discharge to the MDC sewer or ground surface.

3.03 PROTECTION OF LAND RESOURCES

- A. Restore land resources within the project boundaries and outside the limits of permanent work to a condition that, after completion of clean-up, will approximate pre-construction conditions, appear to be natural, and not detract from the appearance of the project. Confine all construction activities to areas shown on the Contract Drawings. Complete project restoration activities depicted on Contract Drawings shall be implemented.
- B. Outside of areas requiring earthwork for the construction of the new facilities, do not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage. Where special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.
- C. Before beginning operations near them, protect trees that may possibly be defaced, bruised, injured, or otherwise damaged by the construction equipment, dumping or other operations, by installing boards, planks, or poles around trunks to protect against damage. Monuments and markers shall be protected similarly.
- D. Any trees or other landscape features scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to their original condition. The Engineer will decide the method of restoration to be used and whether damaged trees shall be treated and healed or removed and disposed of. If requested by the Engineer or Owner, a CT certified arborist shall conduct an inspection of damaged trees and submit recommendations for any tree repair to the Contractor. Should the services of a certified arborist be required due to tree damage caused by the Contractor, the cost for the certified arborist shall be the responsibility of the Contractor and not reimbursed by the Owner.
 - 1. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-in in diameter shall be coated as soon as possible with an approved tree wound dressing unless otherwise directed by the Engineer. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.
 - 2. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Engineer, shall be immediately removed and replaced.

THE METROPOLITAN DISTRICT

- E. The locations of the Contractor's access and parking areas, storage and staging areas and other facilities required temporarily in the performance of the Work, shall be existing paved or cleared areas on the job site, or other areas to be cleared as shown on the Contract Drawings and approved by the Engineer and shall not be within wetlands or floodplains. The preservation of the landscape shall be an imperative consideration in the selection of all sites. Drawings showing above items shall be submitted for approval of the Engineer.
- F. If the Contractor proposes to construct temporary roads or embankments or excavations for building and/or work areas, he shall submit the following for approval at least ten days prior to scheduled start of such temporary work.
 - 1. A layout site plan and details of all temporary roads, excavations, embankments and drainage to be constructed within the work area.
 - 2. Details of temporary road construction.
 - 3. Drawings and cross sections of proposed embankments and their foundations, including a description of proposed materials.
 - 4. A stamped landscaping drawing prepared by a registered professional engineer or landscape architect in the State of Connecticut showing the proposed restoration of the area. Indicate the proposed removal of any trees and shrubs outside the limits of existing clearing area. Indicate locations of guard posts or barriers required to control vehicular traffic and protect trees and shrubs to be maintained undamaged. The drawing shall show complete removal of apparent construction related work and shall provide for a natural appearing final condition of the area. No unauthorized road construction, excavation or embankment construction including disposal areas will be permitted.
- G. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess materials, or any other vestiges of construction. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon. The disturbed areas shall be prepared and seeded as described in other Sections of this Specification.
- H. All debris and excess material will be disposed of outside wetland or floodplain areas in an environmentally sound manner, and in compliance with applicable federal, state and local regulations.

3.04 PROTECTION OF AIR QUALITY

- A. Burning - The use of burning at the project site for the disposal of refuse and debris will not be permitted.

THE METROPOLITAN DISTRICT

- B. Dust Control - Maintain all excavations, embankments, stockpiles, access roads, building sites, waste areas, borrow areas and all other work areas within or without the project boundaries free from dust which could cause standards for air pollution to be exceeded and which would cause a hazard or nuisance to others. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs. See Section 01562 for approved methods for dust control.
- C. Provide systems for control of atmospheric pollutants.
 - 1. Prevent toxic concentrations of chemicals.
 - 2. Prevent harmful dispersal of pollutants into the atmosphere.

3.05 NOISE CONTROL

- A. Make every effort to minimize noises caused by the construction operations. Equipment shall be operated and equipped with silencers or mufflers designed to operate with the least possible noise.
- B. The Contractor shall comply with all municipal noise regulations and/or ordinances. If applicable, any such municipal regulations/ordinances are included for reference in the Appendices.
- C. The Contractor shall obtain all applicable municipal noise ordinance waivers for approved and required night time Work.

3.06 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

- A. Maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out, or until the material concerned has become stabilized to the extent that pollution is no longer being created.

3.07 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. Contaminated soils and liquids shall be stored, transported, and disposed of in accordance with local, State, and federal regulations and this contract.
- C. Care shall be taken to prevent, or reduce to a minimum, damage to any water resource from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such waters. Water that

THE METROPOLITAN DISTRICT

has been used for washing or processing, or that contains oils or sediments that will reduce water quality shall be diverted through an oil/water separator or filter before being discharged.

- D. No materials shall be dispersed or stockpiled in any wetland area. No excavated materials or materials to be used in backfilling shall be deposited within 100 feet of any watercourse, wetland area, or drainage facility without prior approval from the Engineer and regulatory agencies.
- E. The storage of fuel oil and refueling of equipment shall be restricted to designated areas approved by the Engineer and appropriate regulatory agencies.
- F. The removal and disposal of fuel, lubricants, grease, and other operating fluids from equipment designated for demolition or to be removed shall be done in accordance with current federal, state, and local regulations.
- G. Contractor shall not locate his storage of equipment and materials within 100 feet of wetland boundaries or floodplains.
- H. All debris and excess material will be disposed of outside the boundaries of wetland or floodplain areas in an environmentally sound manner as determined by the federal, state, and local regulations.
- I. 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.
- J. All Contractor's equipment used during construction shall conform to all current federal, state and local laws and regulations.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01120

SITE SPECIFIC HEALTH & SAFETY PLAN

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This Section describes the responsibilities of the Contractor for safety, health, and emergency response.
 - 1. Furnish all labor, equipment and materials and perform all Work in connection with monitoring air quality, decontaminating equipment and providing worker health and safety protection for all Contractor and Subcontractor personnel.
 - 2. Develop a site specific Health and Safety Plan (HASP) specifically addressing the potential hazards that may be encountered. This plan shall meet all OSHA requirements.
 - 3. Review the requirements and data presented to supplement the program with any additional measures deemed necessary to fully comply with regulatory requirements and adequately protect personnel on the site.
- B. Any disregard for the provision of these Health and Safety requirements may be deemed just and sufficient cause for termination of the Contract without compromise or prejudice to the rights of the Contractor.
- C. Maintain a comprehensive health and safety program that addresses lines of authority and responsibility for health and safety, medical monitoring, safety training, equipment safety, and health and safety recordkeeping.

1.02 REFERENCED STANDARDS AND REGULATIONS

- A. Safety and Health Standards 29 CFR 1910 (General Industry), US Department of Labor, Occupational Safety and Health Administration (OSHA).
- B. Safety and Health Standards 29 CFR 1926 (Construction Industry), US Department of Labor, OSHA.

1.03 DEFINITIONS

- A. Site Safety Officer (SSO) – The individual located on site who is responsible to the Contractor and has the authority and knowledge necessary to implement the site specific HASP and verify compliance with applicable safety and health requirements. This includes all local, state and federal health and safety standards applicable to this project.

THE METROPOLITAN DISTRICT

1.04 SUBMITTALS

- A. Submit the following to the Engineer in accordance with Section 01300 prior to the start of the project:
 - 1. Site Specific HASP including emergency action and response procedures, provisions for decontamination and a contingency plan for unforeseen emergencies. The Engineer and the Environment, Health & Safety department (EH&S) will review the submittal. The review is only to determine if the HASP meets basic regulatory requirements and the minimum requirements of this Section. The review will not determine the adequacy of the HASP to address all potential hazards, as that remains the sole responsibility of the Contractor.
 - 2. Current certification of employee's health and safety training.
 - 3. Certification of additional health and safety training for supervisors and any employees who are designated as a Competent Person.
 - 4. Qualification and experience of the SSO

1.05 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor is solely responsible for the health and safety of workers employed by the Contractor and Subcontractor and anyone directly or indirectly employed by any of them.
- B. Develop and follow a site specific HASP in accordance with the requirements of paragraph 1.06.
- C. Provide a full time SSO.
- D. Pre-arrange emergency medical care services at a nearby hospital, including establishment of emergency routes of travel.
- E. Conduct weekly safety meetings with all site personnel, documenting attendance and topics covered.
- F. At all times, prevent oil or other hazardous substances from entering the ground, sewers, drainage areas and piping systems.
- G. All Contractor and Subcontractor personnel must have completed OSHA 10-Hour Construction Safety training within the last five years.
- H. All Contractor and Subcontractor personnel entering confined spaces must have been trained in confined space entry procedures. Emergency retrieval equipment shall be provided for each confined space entry.
- I. At least one person who has been trained and certified in First Aid and CPR by the American Red Cross, or an equivalent organization, shall be present on-site during all project operations.

THE METROPOLITAN DISTRICT

- J. Provide appropriate emergency equipment, including an industrial type first aid kit for injuries and illnesses which may occur on site. Two-10 lb or larger ABC rated fire extinguishers shall be maintained on-site.
- K. If an injury, accident, an explosion or fire, or a release of a toxic material occurs during the course of the project, the Engineer shall be telephoned immediately. Complete an accident report and submit to Owner within 48 hours.

1.06 HEALTH & SAFETY PLAN (HASP) REQUIREMENTS

- A. The following items, at a minimum, shall be addressed in the HASP:
 - 1. Safety and health hazard assessment;
 - 2. Site access and accountability including sign-in and sign-out procedures;
 - 3. Procedures for emergency medical treatment and on site first aid;
 - 4. Map indicating route to hospital for emergency medical treatment;
 - 5. List of emergency contacts including home and cell phone number;
 - 6. Physical hazard evaluation and abatement including:
 - a. Personal protective equipment (PPE);
 - b. Equipment operation;
 - c. Confined space entry;
 - d. Slips and falls;
 - e. Fall protection when working at heights;
 - f. Falling debris;
 - g. Encountering unmarked utilities;
 - h. Cold and heat stress;
 - i. Hot work (cutting, welding, grinding);
 - j. Excavation and trench safety and Competent Person;
 - k. Work zone safety;
 - l. Ladder safety and inspection;
 - m. Electrical safety and ground fault circuit interrupter (GFCI) use;
 - n. Lockout/tagout procedures.

THE METROPOLITAN DISTRICT

7. Biological hazard evaluation and abatement including:
 - a. Contact with sewage;
 - b. Poison ivy.
8. Copies of Material Safety Data Sheets for all chemicals used for this project.
9. Any additional employee training that is required for this project;
10. Recordkeeping requirements including injury and accident report forms;
11. Emergency response plan that includes:
 - a. Names of three (3) Emergency Response Contractors, experienced in the removal and proper disposal of oils and hazardous chemicals that the Contractor intends to use in the event of an emergency.
 - b. Evacuation routes and procedures;
 - c. Emergency alerting and response procedures.

PART 2 - PRODUCTS

2.01 AIR MONITORING EQUIPMENT

- A. Provide and maintain at a minimum a standard 4-Gas confined space air monitor to measure oxygen content, lower explosive limit (LEL), hydrogen sulfide (H₂S), and carbon monoxide (CO).
- B. All air monitoring equipment shall be calibrated at least as often as recommended by the manufacturer.
- C. All air monitoring equipment shall remain the property of the Contractor.

PART 3 - EXECUTION

3.01 IMPLEMENTATION OF SITE SPECIFIC HASP

- A. The Contractor shall be responsible for the implementation of the HASP throughout the performance of the Work within the project limits as indicated in the Contract Documents. In work locations and areas identified as having a potential risk to worker health and safety, the Contractor shall be prepared to implement the appropriate health and safety measures, including but not limited to the use of PPE and engineering and administrative controls. The Contractor shall be responsible for the health and safety of his employees and Subcontractors throughout the project until all work is completed.

THE METROPOLITAN DISTRICT

- B. The Contractor shall prepare a written a Job Hazard Analysis (JHA) for any high hazard or abnormal task(s) that are part of the project work. The Owner or Engineer may request JHAs for any task(s) that may present special hazards.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01152

APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall submit Applications for Payment to the Engineer in accordance with the schedule established by Conditions of the Contract and Agreement between Owner and Contractor.
- B. The accepted Schedule of Values, as described in Section 01370, shall be used as the basis for the Contractor's Application for Payment.

1.02 RELATED SECTIONS

- A. Section 01035, Modification Procedures
- B. Section 01310, Progress Schedules
- C. Section 01320, Construction Photographs
- D. Section 01370, Schedule of Values
- E. Section 01700, Contract Closeout
- F. Section 01720, As-Built Documents

1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, applications typed on forms provided by the Owner, Application for Payment, with itemized data typed on 8½-in by 11-in or 8½-in by 14-in white paper continuation sheets.
- B. Provide itemized data on continuation sheet according to the format, schedules, line items, and values established in the Schedule of Values accepted by the Engineer.
- C. Each Application for Payment shall be provided with the following documents attached and will be returned to the Contractor if any such information is missing or incomplete:
 - 1. Monthly Construction Progress Report with Progress Schedule Update
 - 2. Change Order Summary and Proposed Change Order (PCO) Log
 - 3. Confirmation that as-built documents are current

THE METROPOLITAN DISTRICT

4. All required SLBE/MBE/WBE current reporting data for the same period as the Application for Payment
5. Certified Payrolls for Contractor and Sub-Contractors
6. Construction photographs, if required

1.04 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
 - a. Change Order work cannot be included in an Application for Payment until the month in which the Change Order document has been fully executed by the Owner.
2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
3. Execute certification with signature of a responsible officer of Contract firm.

B. Continuation Sheets

1. Fill in total list of all scheduled component Items of Work, with Item number and scheduled dollar value for each Item.
2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.
 - a. Round off values to nearest dollar, or as specified for Schedule of Values.
3. List each Change Order executed prior to date of submission, at the end of the continuation sheets.
 - a. List by Change Order Number and description, as for an original component Item of work.

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When the Owner or the Engineer requires substantiating data, submit suitable information, with a cover letter identifying:
 1. Project.
 2. Application number and date.
 3. Detailed list of enclosures.

THE METROPOLITAN DISTRICT

4. For stored products: Only if previously approved by the Owner as per Standard General Conditions paragraph 14.02.A.7.
 - a. Documentation as detailed in Standard General Conditions paragraph 14.02.A.7.
 - b. Description of specific material.

- B. Submit one copy of data and cover letter for each copy of application.
- C. As a prerequisite for payment, submit a "Surety Acknowledgment of Payment Request" letter showing amount of progress payment which the Contractor is requesting.
- D. Maintain an updated set of as-built drawings. As a prerequisite for monthly progress payments, exhibit the updated as-built drawings for review by the Owner and the Engineer.
- E. Invoice shall include a summary of all required SLBE/MBE/WBE expenditures.
- F. Provide all data required by Paragraph 1.03, Submittals.

1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT

- A. Fill in Application form as specified for progress payments.
- B. Payment shall be in accordance with Section 00700.
- C. Use continuation sheet for presenting the final statement of accounting as specified in Section 01700, Contract Closeout.

1.07 SUBMITTAL PROCEDURE

- A. Submit Applications for Payment to the Engineer at the times stipulated in the Agreement.
- B. Number: One (1) original and three (3) copies of each Application.
- C. When the Engineer finds Application properly completed and correct, he/she will transmit certificate for payment to Owner.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

APPLICATION AND CERTIFICATE FOR PAYMENT

Application #
Period from:
to:

Contract Date:

Vendor No.:	P.O. No.:	G/R No.:	SAP Project ID No.:
-------------	-----------	----------	---------------------

Application is made for Payment, as shown below, in connection with the Contract.
Calculation sheet(s) attached.

1. ORIGINAL CONTRACT SUM	\$0.00
2. NET CHANGE BY ASPHALT ADJUSTMENTS	\$0.00
3. NET CHANGE BY CHANGE ORDERS	\$0.00
4. CONTRACT SUM TO DATE	\$0.00
5. TOTAL COMPLETED & STORED TO DATE	\$0.00
6. RETAINAGE:	
5% OF COMPLETED WORK	\$0.00
TOTAL RETAINAGE	\$0.00
7. TOTAL EARNED LESS RETAINAGE	\$0.00

8. LESS PREVIOUS CERTIFICATES FOR PAYMENT	\$0.00
9. CURRENT PAYMENT DUE	\$0.00
10. BALANCE TO FINISH PLUS RETAINAGE	\$0.00

State of: _____
County of: _____

Subscribed and sworn to before me this _____ day of _____

Notary Public: _____ Commission Expires: _____

Manager of Construction

DATE: _____

Manager of Budgeting

DATE: _____

DATE: _____

Manager of Financial Control (CEO if over \$100,000)

Effective Date: March 28, 2013

[Contractor Name]
[Contractor Address]

MDC Contract No. xxxx-xx
[Project Name]
Payment Application No. 1

Item No.	Description	Estimated Quantity	Unit	Unit Bid Price	Scheduled Value	Completed Work			Value of Completed Work			% Complete
						Previous Periods	Current Period	Total To Date	Previous Periods	Current Period	Total To Date	
1	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
2	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
3	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
4	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
5	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
6	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
7	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
8	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
9	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
10	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
11	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
12	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
13	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
14	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
15	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
16	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
17	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
18	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
19	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
20	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
21	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
22	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
23	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
24	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
25	Item Description	100	LF	\$100.00	\$10,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
CO #1.1	Change Order #1 - Item #1 Description	10	LF	\$100.00	\$1,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
CO #1.2	Change Order #1 - Item #2 Description	10	LF	\$100.00	\$1,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
CO #2	Change Order #2 - Lump Sum Description	1	LS	\$3,000.00	\$3,000.00	0	0	0	\$0.00	\$0.00	\$0.00	0.00%
	Base Bid				\$250,000.00				\$0.00	\$0.00	\$0.00	0.00%
	Change Orders				\$5,000.00				\$0.00	\$0.00	\$0.00	0.00%
	Total				\$255,000.00				\$0.00	\$0.00	\$0.00	0.00%
	ORIGINAL CONTRACT											
	CHANGE ORDERS			\$250,000.00								
	CONTRACT TO DATE			\$255,000.00								
	TOTAL WORK TO DATE			\$0.00								
	LESS 5% RETAINAGE			\$0.00								
	TOTAL EARNED LESS RETAINAGE			\$0.00								
	LESS PREVIOUS BILLINGS			\$0.00								
	CURRENT PAYMENT DUE			\$0.00								

MDC Construction Services Invoice

MBE/WBE Summary

SAMPLE (Modify to meet contract requirements)

Contractor: _____
 Project Name: _____
 Contract Number: _____
 Invoice Date: _____
 Invoice Number: _____
 Invoice Period: From: _____ To: _____

MBE Goal (if applicable): _____
 Total MBE Contract Amount* _____

WBE Goal (if applicable): _____
 Total WBE Contract Amount* _____

SLBE Goal (if applicable): _____
 Total SLBE Contract Amount* _____

* = as revised with Task Order amendments or Change Orders.

Name of MBE Firm(s)	Amount this Period (\$)	Amount to Date (\$)	% to Date Of Prime's Contract Value subject to MBE
	\$ -	\$ -	0.0%
	\$ -	\$ -	0.0%
Total MBE	0	0	0.0%
Name of WBE Firm(s)	Amount this Period (\$)	Amount to Date (\$)	% to Date Of Prime's Contract Value subject to WBE
	\$ -	\$ -	0.0%
	\$ -	\$ -	0.0%
Total WBE	0	0	0.0%
Name of SLBE Firm(s)	Amount this Period (\$)	Amount to Date (\$)	% to Date Of Prime's Contract Value subject to SLBE
	\$ -	\$ -	0.0%
	\$ -	\$ -	0.0%
Total SLBE	0	0	0.0%

THE METROPOLITAN DISTRICT

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 PRE-CONSTRUCTION CONFERENCE

- A. A pre-construction conference, required by the Standard General Conditions paragraph 2.06, will be held between the Contractor, the Engineer, and the Owner.
- B. Date, Time, and Location: The pre-construction conference will be held after execution of the Contract and before construction is started at the site. The Owner will determine the date, time, and location of this meeting.
- C. The Engineer will prepare an agenda, preside at the meeting, and prepare and distribute a transcript of proceedings to all parties.
- D. The Contractor shall provide the following and be prepared to discuss all items on agenda.
 - 1. Construction Progress Schedule as described in Section 01310.
 - 2. Schedule of Submittals as described in Section 01300.
 - 3. Schedule of Values as described in Section 01370.
 - 4. Site Specific Health and Safety Plan as described in Section 01120.
 - 5. Traffic Control Plan as described in Section 01570.
 - 6. Shop drawings and technical submittals requiring approval prior to beginning construction.
 - 7. Copies of all permits, licenses, and Call Before You Dig ticket numbers required prior to beginning the construction.
 - 8. Excavation support plans and designs as described in Section 02160.
 - 9. Dewatering plans and designs as described in Section 02140.
 - 10. Temporary facilities proposal as described in Section 01500.
 - 11. Location of staging area(s), including a copy of any written agreements for use of private property, as described in Section 01046.
 - 12. Soil Management Plan as described in Section 02260.

THE METROPOLITAN DISTRICT

13. Rodent Control Survey and Control Plan as described in Section 01561.
14. Construction phasing plan as described in Section 01010.
15. A responsible off-hours contact person as described in Section 01040.

E. Attendance at the pre-construction conference is required by the following:

1. Contractor and major Subcontractors.
2. Owner's representative from the following departments:
 - a. Engineering
 - b. Construction
 - c. Environment, Health & Safety (EH&S)
3. Engineer.

F. The agenda for the pre-construction conference will include, but not necessarily be limited to, the following items:

1. Designation of responsible personnel.
2. Subcontractors.
3. Coordination with other contractors.
4. Construction schedule.
5. Other Submittals.
6. Processing of Shop Drawings and distribution of Submittals.
7. Processing of field decisions and Change Orders.
8. Requirements for copies of Contract Documents.
9. Insurance in force.
10. Schedule of Values.
11. Processing and Schedule of Payments.
12. Use of premises.
13. Contractor responsibility for safety and first aid procedures.
14. Security.

THE METROPOLITAN DISTRICT

- 15. Housekeeping.
- 16. Field Office.
- 17. As-Built Drawings.
- 18. Any other project related items.
- 19. Safety standards procedures and submittals.
- 20. Utility Coordination.
- 21. Right-of-Ways.

1.02 PROGRESS MEETINGS

- A. The Engineer will schedule progress meetings at least monthly. Every entity then involved in the planning, coordination or performance of the Work will be required to be properly represented at each meeting. Review each entity's present and future needs including interface requirements, time, sequence, deliveries, access, site utilization, temporary facilities and services, hours of work, hazards and risks, housekeeping, change orders and documentation of information for payment requests. Discuss whether each element of current work is ahead of schedule, on time, or behind time in relation with the updated progress schedule. Determine how behind-time work will be expedited and secure commitments from the entities involved in doing so. Discuss whether schedule revisions are required to ensure that current work and subsequent work will be completed within the Contract Time. Review everything of significance which could affect the progress of the Work.
- B. The time and location of the meetings will be determined by the Engineer.
- C. The minutes of the meetings shall be maintained by the Owner. Within three (3) days after each progress meeting date, draft meeting minutes will be distributed.
- D. Contractor shall prepare schedule look ahead for the meeting, including expected activities for the next three (3) weeks following each meeting date.
- E. Immediately following each progress meeting where revisions to the Progress Schedule have been made or recognized (regardless of whether agreed to by each entity represented), the Contractor shall revise the Schedule. Reissue revised Schedule concurrently with report of each meeting, unless extensive revisions require a longer revision period, but in any case, reissue within 10 days after meeting. At intervals matching the preparation of payment requests, revise and reissue the Schedule to show actual progress of the Work in relation to the latest revision of the Schedule.

THE METROPOLITAN DISTRICT

1.03 TAILGATE MEETINGS

- A. Daily tailgate meetings shall be held at the project site prior to the start of any significant work activity for the day. Contractor shall be prepared to discuss and explain planned work activities, traffic control, proposed detours, required submittals and other pertinent topics.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01300

SUBMITTALS

PART 1 – GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

- A. This Section specifies the general methods and requirements of submissions applicable to Shop Drawings, Product Data, and Samples. Additional general submission requirements are contained in Article 6.17 of the General Conditions. Detailed submittal requirements are specified in the technical Sections.
- B. All submittals shall be clearly identified by reference to Section Number, Paragraph, Drawing Number or Detail as applicable. Submittals shall be clear and legible and of sufficient size for presentation of data.
- C. Contractor shall prepare and maintain Schedule of Submittals. This shall be submitted to Engineer at the Pre-Construction Conference.

1.02 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

- A. Shop Drawings
 - 1. Shop drawings as specified in individual Sections include, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shop work manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the work.
 - 2. All shop drawings submitted by Subcontractors shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.
 - 3. The Contractor shall check all Subcontractor's shop drawings regarding measurements, size of members, materials and details to make sure that they conform to the intent of the Drawings and related Sections. Return shop drawings found to be inaccurate or otherwise in error to the Subcontractors for correction before submission thereof.
 - 4. All details on shop drawings shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted.

THE METROPOLITAN DISTRICT

B. Product Data

1. Product data as specified in individual Sections include, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing and printed product warranties, as applicable to the work.

C. Samples

1. Samples specified in individual Sections include, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols and units of work to be used by the Design Engineer, Engineer or Owner for independent inspection and testing, as applicable to the work.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. Review shop drawings, product data and samples, including those by Subcontractors, prior to submission to determine and verify the following:
 1. Field measurements
 2. Field construction criteria
 3. Catalog numbers and similar data
 4. Conformance with related Sections
- B. Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor: "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements." Shop drawings and product data sheets 11-in x 17-in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Resident Project Representative a copy of each transmittal sheet for shop drawings, product data and samples at the time of submittal to the Engineer. **Note:** Shop drawings may

THE METROPOLITAN DISTRICT

also be submitted electronically provided the size of the document and the electronic file size are acceptable to the Engineer.

C. The Contractor shall utilize a submittal identification numbering system in the following manner:

1. The first five digits shall be the applicable Section Number.
2. The next three digits shall be the numbers 001 to 999 to sequentially number each initial separate item or drawing submitted under each specific Section Number.
3. The last character shall be a letter, A to Z, indicating the submission, or resubmission of the same Drawing, i.e., "A=1st submission, B=2nd submission, C=3rd submission, etc. A typical submittal number would be as follows:

03300-008-B

03300	=	Section for Concrete
008	=	Eighth initial submittal under this section.
B	=	Second submission (first resubmission) of that particular shop drawing.

D. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

E. The review and approval of shop drawings, samples or product data by the Design Engineer will not relieve the Contractor from the responsibility for the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer or Design Engineer will have no responsibility therefore.

F. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

G. Project work, materials, fabrication, and installation shall conform with approved shop drawings, applicable samples, and product data.

1.04 SUBMISSION REQUIREMENTS

- A. Make submittals promptly in accordance with approved schedule and in such sequence as to cause no delay in the Work or in the work of any other contractor.
- B. Each submittal, appropriately coded, will be returned within 30 calendar days following receipt of submittal by the Engineer.

THE METROPOLITAN DISTRICT

C. Number of submittals required:

1. Shop Drawings: Eight copies.
2. Product Data: Eight copies.
3. Samples: Submit the number stated in the respective Sections.

D. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.
2. The Project title and number.
3. Contractor identification.
4. The names of:
 - a. Contractor
 - b. Supplier
 - c. Manufacturer
5. Identification of the product, with the section number, page and paragraph(s).
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the work or materials.
8. Applicable standards, such as ASTM or Federal Standards numbers.
9. Identification of deviations from Contract Documents.
10. Identification of revisions on resubmittals.
11. A blank space suitably sized for Contractor and Design Engineer stamps.
12. Where calculations are required to be submitted by the Contractor, the calculations shall have been checked by a qualified individual other than the preparer. The submitted calculations shall clearly show the names of the preparer and of the checker.

1.05 REVIEW OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- A. The review of shop drawings, data and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:
1. as permitting any departure from the Contract requirements;

THE METROPOLITAN DISTRICT

2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;
 3. as approving departures from details furnished by the Design Engineer, except as otherwise provided herein.
- B. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or Contract Time, the Engineer may return the reviewed drawings without noting an exception.
- D. Submittals will be returned to the Contractor under one of the following codes:
- Code 1 - "APPROVED" is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.
- Code 2 - "APPROVED AS NOTED" - This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.
- Code 3 - "APPROVED AS NOTED/CONFIRM" - This combination of codes is assigned when a confirmation of the notations and comments IS required by the Contractor. The Contractor may, at his own risk, release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the confirmation.
- Code 4 - "APPROVED AS NOTED/RESUBMIT" - This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the resubmittal.
- Code 5 - "NOT APPROVED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It

THE METROPOLITAN DISTRICT

may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

Code 6 - "COMMENTS ATTACHED" is assigned where there are comments attached to the returned submittal which provide additional data to aid the Contractor.

Code 7 - "RECEIPT ACKNOWLEDGED" - This code is assigned to acknowledge receipt of a submittal that is not subject to the Design Engineer's review and approval; and, is being filed for informational purposes only.

Codes 1 through 5 designate the status of the reviewed submittal with Code 6 showing there has been an attachment of additional data.

- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall identify all revisions made to the submittals, either in writing on the letter of transmittal or on the shop drawings by use of revision triangles or other similar methods. The resubmittal shall clearly respond to each comment made by the Design Engineer on the previous submission. Additionally, the Contractor shall direct specific attention to any revisions made other than the corrections requested by the Design Engineer on previous submissions.
- F. Partial submittals may not be reviewed. The Design Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor and will be considered "Not Approved" until resubmitted. The Design Engineer may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.
- G. Repetitive Review
 - 1. Shop drawings and other submittals will be reviewed no more than twice at the Owner's expense. All subsequent reviews will be performed at times convenient to the Design Engineer and at the Contractor's expense, based on the Design Engineer's then prevailing rates. The Contractor shall reimburse the Owner for all such fees invoiced to the Owner by the Design Engineer. Submittals are required until approved.
 - 2. Any need for more than one resubmission, or any other delay in obtaining Design Engineer's review of submittals, will not entitle Contractor to extension of the Contract Time.
- H. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least 7 working days prior to release for manufacture.

THE METROPOLITAN DISTRICT

- I. When the shop drawings have been completed to the satisfaction of the Design Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

1.06 DISTRIBUTION

- A. The Contractor shall distribute reproductions of approved shop drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the Engineer. Number of copies shall be as directed by the Engineer but shall not exceed six.

1.07 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

- A. If specifically required in other related Sections, submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

1.08 GENERAL PROCEDURES FOR SUBMITTALS

- A. Coordination of Submittal Times: The Contractor shall prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work of other related Sections, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

P.E. CERTIFICATION FORM

NOTE: Edit the following and insert project information as required.

The undersigned hereby certifies that he/she is a professional engineer registered in the [State] [Commonwealth] of _____ and that he/she has been employed by

_____ to design
(Name of Contractor)

(Insert P.E. Responsibilities)

in accordance with Section _____ for the
_____.
(Name of Project)

The undersigned further certifies that he/she has performed the design of the _____
_____, that said design is in conformance
(Name of Project)

with all applicable local, state and federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the Owner or Owner's representative, within seven days following written request therefor by the Owner.

P.E. Name

Contractor's Name

Signature

Signature

Address

Title

Address

THE METROPOLITAN DISTRICT

SECTION 01310

PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall submit, and revise as necessary, for the Owner's acceptance a Baseline Progress Schedule of the Work and periodic Progress Schedule Updates. The Contractor shall comply with the accepted Schedule, unless otherwise directed in writing by the Owner or unless the Contractor is entitled to an adjustment in the Contract Time pursuant to the Contract Documents.
- B. Scheduling constraints to performance of the Work due to sequencing with other parts of the Work, calendar time constraints, special testing, work procedures, and procedural constraints such as shop drawings, testing, commissioning, training, etc shall be included in the Contractor's Progress Schedule.
- C. Any special conditions, identified in the Contract Documents, related to performance of the Work that will affect the scheduling of the Work, shall be included in the Contractor's Progress Schedule.

1.02 RELATED SECTIONS

- A. Section 01010, Summary of Work
- B. Section 01040, Coordination with Utilities
- C. Section 01044, Progress and Sequence of Work

1.03 DEFINITIONS

- A. Baseline Progress Schedule shall be defined as a horizontal bar chart schedule of the Work. The Schedule shall show the dates on which the Contractor plans to commence and complete the various parts of the Work. The Schedule shall demonstrate the various locations where each part of the Work shall be performed, the duration of each part of the Work and any events, services or needs unique to each such location. The overall schedule shall include dates for Contractor's submittals and approvals and dates by which information and approvals are required from the Owner.
- B. Progress Schedule Update shall be defined as an update to the Baseline Progress Schedule reflecting actual construction progress.
- C. Construction Progress Report shall be defined as a narrative report based upon the Progress Schedule Update. The report shall include a description of the

THE METROPOLITAN DISTRICT

progress made during the previous period in terms of completed activities, an explanation of each activity that is showing a delay, a description of problem areas, current and anticipated delaying factors and their estimated impact on performance of other activities, completion dates, and an explanation of corrective action taken or proposed.

1.04 SUBMITTALS

- A. Within ten (10) working days after the date that the Contract is fully executed, the Contractor shall submit to the Owner, and, if directed, the Engineer, a proposed Baseline Progress Schedule
- B. The Contractor shall submit a Progress Schedule Update and a Construction Progress Report on a monthly basis or more frequently as appropriate given the conditions of the Work and the Project.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01320

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

1. Photographs taken at specified intervals during and after construction.

1.02 SUBMITTALS

A. The Contractor shall submit two (2) prints of each photograph.

B. The Contractor shall submit electronic files of each photograph on a CD.

1.03 QUALITY ASSURANCE

- ###### A. The Contractor shall secure the services of a professional photographer who has at least five (5) years experience in construction photography and has successfully completed a 10-hour Occupational Safety and Health Training Course in Construction Safety and Health within the last sixty (60) months from the anticipated completion of this work. (This period of 60 months shall also cover the time spent by the photographer to complete the work). Submit work samples to the Engineer if requested. The photographer shall not be changed without written approval by the Engineer.

PART 2 - PRODUCTS

2.01 CONSTRUCTION PHOTOGRAPHS

A. Provide color prints

1. Size: 4" X 6"
2. Type: Smooth surface, color glossy print, single weight paper white base.
3. Mounting: No mounting required.
4. Identification: Type on the back of the photo, the following:
 - a. Job Name
 - b. Brief description of view; location, station, direction, etc.
 - c. Date, names of Engineer, Contractor, Photographer and Photograph number.

THE METROPOLITAN DISTRICT

- B. Prints shall not be issued without written approval of the Engineer.
- C. Electronic files shall be in .jpg format.

PART 3 - EXECUTION

3.01 PROGRESS PHOTOGRAPHY

- A. The Contractor shall take construction photographs weekly of active work areas throughout the life of the Contract. The photographs shall be indicative of the work that is currently in progress. A total of 6 photographs shall be taken at each scheduled interval at each location where Work is in progress.
- B. Take 24 photographs each month throughout the life of the Contract.
- C. Take a total of 24 post construction photographs along the proposed pipeline route and a total of 5 photographs at each additional work area.
- D. Take photographs of utility abandonments.
- E. Take photographs of relocated utility connections.
- F. Take photographs of test pit locations showing exposed piping.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01321

COLOR AUDIO-VIDEO DOCUMENTATION SURVEYS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall perform color audio-video recording of existing surface features within the Zone of Influence.

1.02 DEFINITIONS

- A. Zone of Influence is defined as any area within the immediate construction site which may be affected by construction activity, equipment traffic, material stock piles, temporary staging areas including a minimum two hundred (200) feet along each side of adjoining streets to the construction site.

1.03 QUALITY ASSURANCE

- A. Personnel shall have at least five (5) years experience actively engaged in color audio-video documentation and survey projects.
- B. Recording shall be done during times of good visibility when there is no precipitation or snow cover. The Owner is not responsible for the removal of snow, leaves, debris or parked vehicles.

1.04 SUBMITTALS

- A. The Contractor shall submit a sample video within thirty (30) days of the Notice to Proceed covering a specific sample route prescribed by the Engineer. Such sample video shall cover at least five hundred (500) lineal feet and a minimum of five (5) minutes surveying time. These videos will become the property of the Engineer and will be the basis for the overall quality and conformance with this section for final survey video.
- B. Submit audio-video recording of preconstruction areas in the manner described in this section. Do not commence with construction activities until the recordings are submitted and approved.

PART 2 – PRODUCTS

2.01 FORMAT

- A. Audio-video shall be on an external USB/ portable hard drive. Video output from camera(s) used must be capable of producing NTSC-500 lines. Resolution in the Y channel, minimum five hundred (500) TV lines at center. Geometric Distortion shall not exceed two percent (2%) of picture height at any point in picture area.

THE METROPOLITAN DISTRICT

2.02 VIDEO INFORMATION

- A. The audio video recording shall have the potential to convey one (1) video track and audio track. The video and audio tracks shall be recorded simultaneously as original live recordings and shall not be copies of other audio or video recordings. These recordings shall consist of a fixed elevation video record of the Zone of Influence of construction and the commentary of the electrographer making the video record.
- B. Video recordings shall, by electronic means, display continuously and simultaneously general transparent digital information to include the date and time of recording, the engineering stationing corresponding to the stationing on the Contract Drawings or as directed by the Engineer, the name of the street, easement or building being documented, the project name, direction of travel and the viewing side. The date and time shall appear in the upper left hand corner of the picture --example:

Time 8:35:15

Date. 9/20/2009

- C. The project name, name of street or easement, house or building number, engineering stationing, direction of travel and viewing side shall appear on the lower half of the screen -- example:

N. on First St. W/E

Sta. 86+20

PART 3 - EXECUTION

3.01 CONSTRUCTION AUDIO-VIDEO PROCEDURES

- A. Audio-video recording shall be completed prior to the start of on-site construction activities to capture pre-construction conditions.
- B. Audio-video recording shall start at one hundred (100) feet beyond the end of the proposed pipeline route and shall proceed along the pipeline route viewing side to side along the direction of progress.
- C. The average rate of speed in the general direction of the conveyance used during taping shall not exceed fifty (50) feet per minute. Panning and zooming rates shall be controlled sufficiently that playback will produce optimum clarity of the objects being viewed.
- D. Coverage shall include, but not be limited to, the entire roadway pipeline route, existing driveways, sidewalks, curbs, ditches, streets (including condition of paving for full width), intersections, landscaping, trees, culverts, catch basins, head walls, fences, mailboxes, retaining walls, visible utilities and all buildings

THE METROPOLITAN DISTRICT

and structures located within the Zone of Influence. Include existing faults, defects or other imperfections exhibited by the above-mentioned surface features.

- E. Houses and buildings shall be identified visually by house or building number, when possible, in such manner that the progress of the recording and proposed construction areas may be located by reference to the houses and buildings.
- F. Recordings produced under this Contract shall be turned over to the Engineer on an every other day basis so the Owner may review and monitor quality and progress. Any portion of the video coverage deemed unacceptable by the Engineer shall be replaced at no additional cost to the Owner.
- G. External USB's/portable hard drives shall be properly identified by project number, location, project name, and become the property of the Owner. A record of the contents of each disc shall be supplied by a run sheet identifying each segment in the disc by location, i.e., track number, street or easement viewing, viewing sided, starting point, traveling direction and ending point.
- H. Conduct an interior survey of each home in which construction activity is required.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01370

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall submit to the Engineer a Schedule of Values allocated to the various portions of the Work, within seven (7) days after the effective date of the Notice to Proceed.
- B. Upon request of the Engineer, the Contractor shall submit data to substantiate the proposed Schedule of Values.
- C. The accepted Schedule of Values shall be used only as the basis for the Contractor's Applications for Payment.

1.02 RELATED SECTIONS

- A. Section 01152, Applications for Payment

1.03 SUBMITTALS

- A. Type schedule on an 8 ½-in by 11-in or 8 ½-in by 14-in white paper furnished by the District; Contractor's standard and automated printout will be considered for approval by the Engineer upon Contractor's request. Identify schedule with:
 - 1. Title of Project and location.
 - 2. Engineer and Project number.
 - 3. Name and Address of Contractor.
 - 4. Contract designation.
 - 5. Date of submission.
- B. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
- C. Identify each line item with the number and title of the respective Section.
- D. For each major line item list sub-values of major products or operations under the item.
- E. For the various portions of the Work:

THE METROPOLITAN DISTRICT

1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
 2. For items on which progress payments will be requested for stored materials, break down the value into:
 - a. The cost of the materials, delivered and unloaded, with taxes paid. Paid invoices are required for materials upon request by the Engineer.
 - b. The total installed value.
- F. The sum of all values listed in the schedule shall equal the total Contract Sum.
- G. Provide a breakdown of General Requirements cost including but not limited to the following typical items:
1. Performance and Payment Bonds and other Securities, Insurances, Permits and Fees.
 2. Superintendent, Project Manager, Field Office Wages, Dumpsters, Security, Fencing, Utility Charges, Progress Photographs, Testing and Laboratory Analysis, Pest Control, Dust Control, Snow Removal, Ongoing Maintenance of As-Built Documents, Equipment Maintenance, Survey/Layout, Project Closeout Costs and all other temporary facilities, labor, equipment and materials required for or incidental to the Work for which separate is not provided under other items.

1.04 SUBSCHEDULE OF UNIT MATERIAL VALUES

- A. Submit a sub-schedule of unit costs and quantities for:
1. Products on which progress payments will be requested for stored products. See Standard General Conditions paragraph 14.02.A.7 for requirements when submitting request for payment.
- B. The form of submittal shall parallel that of the Schedule of Values, with each item identified the same as the line item in the Schedule of Values.
- C. The unit quantity for bulk materials shall include an allowance for normal waste.
- D. The unit values for the materials shall be broken down into:
1. Cost of the material, delivered and unloaded at the site, with taxes paid.
 2. Copies of invoices for component material shall be included with the payment request in which the material first appears.

THE METROPOLITAN DISTRICT

3. Paid invoices shall be provided with the second payment request in which the material appears or no payment shall be allowed and/or may be deleted from the request.

- E. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01390

CONTRACTOR EVALUATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. In accordance with the provisions of Metropolitan District Ordinances Chapter G-5, adopted March 2, 1992 including amendments, the Contractor's Performance under this Contract will be evaluated.
 - 1. Copies of the most recent revision of Chapter G-5 may be acquired by the Contractor at the Office of the District Clerk located at 555 Main Street, Hartford, Connecticut.
 - 2. Copies of the Owner's standard evaluation forms are attached (see Sections 01390A and 01390B attached).
- B. In accordance with the requirements of C.G.S. §4a-100 and §4a-101 (if applicable to this Contract), the Contractor's performance under this Contract will be evaluated.
 - 1. A copy of DAS Form 745 is available at the DAS Prequalification Unit website.
- C. There will be no direct payment to the Contractor for these requirements; although, determination of satisfactory progress for reduction of retainage will be based, in part, upon the in-progress 50% Completion Evaluation.

1.02 FORM AND CONTENT OF REQUIREMENTS

- A. There will be a written evaluation by the Owner and Engineer at the 50% completion point of the Project using both the Owner and the DAS forms.
- B. There will be a written evaluation by the Owner and Engineer at the 100% completion point of the Project using both the Owner and DAS evaluation forms.
- C. The Owner shall submit a copy of the completed DAS Contractor Performance Evaluation Form 745 to the DAS Prequalification Unit at the completion of the Contract, if applicable.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

CONTRACTOR PERFORMANCE EVALUATION

Contract No.: **XXXX-XX**

Title:

**Name of Project
Town, CT**

Contractor:

ABC Construction

Address:

**555 Main Street
Hartford, CT
06142**

50% COMPLETION



The Metropolitan District
555 Main Street
Hartford, Connecticut 06142-0800

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

COMPETENCE

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Overall knowledge of the type of work (sewer construction, plant upgrade, water main installation, etc.) - execution of the type(s) of construction required

3

- ☐ Superior Extremely knowledgeable and efficient with a virtual command for the work required *Comment:*
- ☐ Good Skilled in the work - strong understanding for the minor details involved in the construction
- ☒ Acceptable Competent and capable to perform this type of work
- ☐ Poor Inexperienced with the type of work - lack strong understanding of necessary concepts
- ☐ Unacceptable Unskilled and unfamiliar with the type of work

2) Knowledge of the project

3

- ☐ Superior Extremely knowledgeable and well-informed about the project to the finest detail *Comment:*
- ☐ Good Knowledgeable and familiar with all aspects of the project
- ☒ Acceptable General understanding of the entire project
- ☐ Poor Lack of knowledge on specific areas of the project
- ☐ Unacceptable General lack of understanding of the project

3) Adherence to plans, specifications, and approved submittals/shop drawings

3

- ☐ Superior Strict adherence to the plans and specifications *Comment:*
- ☐ Good General conformance to the plans and specifications - very minor approved deviations
- ☒ Acceptable Occasional deviations from the plans and specifications
- ☐ Poor Deviations from the plans and specifications, inferior product submittals, design modifications
- ☐ Unacceptable Willful disregard for the plans and specifications

4) Competence and professionalism of the Project Manager and Superintendent

3

- ☐ Superior Extremely knowledgeable, cooperative, professional, organized and prepared at all times *Comment:*
- ☐ Good Knowledgeable and cooperative - easy to work with
- ☒ Acceptable Competent and capable to perform their duties
- ☐ Poor Not fully qualified to hold the position for the type of work required or size of contract
- ☐ Unacceptable Lacking skills necessary to properly perform required tasks - uncooperative, problematic and difficult to work with

5) Competence and professionalism of the work force

3

- ☐ Superior Extremely knowledgeable, efficient, skilled and courteous at all times *Comment:*
- ☐ Good Knowledgeable and efficient
- ☒ Acceptable Capable of performing the necessary construction
- ☐ Poor Unfamiliar with the proper or standard construction techniques - difficult to work with
- ☐ Unacceptable Uncooperative, problematic, and difficult - unskilled with work required

6) Project Manager Administration/Management**3**

- ☐ Superior Project Manager requires no assistance from Owner in planning of work and crews and identifies potential problems/conflicts in advance with solutions; Project Manager properly follows established chain of command for communication with Owner *Comment:*
- ☐ Good Project Manager requires no assistance from Owner in planning of work and crews; Project Manager properly follows established chain of command for communication with Owner
- ☒ Acceptable Project Manager shows adequate planning of work and crews; Project Manager properly follows established chain of command for communication with Owner
- ☐ Poor Project Manager requires Owner assistance in planning work/crews; Project Manager occasionally fails to follow established chain of command for communication with Owner
- ☐ Unacceptable Project Manager does not properly plan out work/crews requiring Owner intervention; Project Manager repeatedly fails to follow established chain of command for communication with Owner

COMPETENCE Summary

Average Score = **3.0** **Overall COMPETENCE Rating** = **Acceptable** **TOTAL**

(Total / #questions)

18

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

MANAGEMENT OF JOB SITE SAFETY

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Contractor's actions in creating and maintaining a safe job site, complying with OSHA regulations and their site specific health and safety plan (HASP) and meeting safety responsibilities of the contract.		3
<input type="radio"/> Superior Continually exceeded expectations with regards to safety compliance and safe work practices	<i>Comment:</i>	
<input type="radio"/> Good Created a safe job site and met safety responsibilities within the contract		
<input checked="" type="radio"/> Acceptable Met basic safety requirements within the contract with prompting from MDC		
<input type="radio"/> Poor Met safety responsibilities only after repeated prompting by the MDC or an OSHA citation was issued		
<input type="radio"/> Unacceptable A stop work order for non-compliance to safety had to be issued or serious or willful violations were issued by OSHA		
2) Contractor's performance in preventing injuries		3
<input type="radio"/> Superior Contractor completed project with no employee injuries	<i>Comment:</i>	
<input type="radio"/> Good Contractor completed project with only minor injuries, not requiring medical treatment		
<input checked="" type="radio"/> Acceptable Contractor completed project with employee injuries requiring minimal medical evaluation or treatment		
<input type="radio"/> Poor Contractor completed project with a severe injury or multiple injuries resulting in restricted duty or lost time		
<input type="radio"/> Unacceptable Contractor completed project with multiple preventable injuries resulting in lost work days		
3) Contractor's actions in reporting all accidents, incidents and injuries		3
<input type="radio"/> Superior Contractor immediately reported all accidents, incidents and injuries and promptly investigated and implemented corrective measures to avoid future occurrences and provided written report within 24 hours	<i>Comment:</i>	
<input type="radio"/> Good Contractor reported within 24 hours and investigated all accidents, incidents and injuries and provided written report with corrective measures within 24 hrs.		
<input checked="" type="radio"/> Acceptable Contractor reported within 24 hours and investigated all accidents, incidents and injuries and provided written report within 48 hrs.		
<input type="radio"/> Poor Contractor reported accidents, incidents and injuries only if witnessed by MDC personnel		
<input type="radio"/> Unacceptable Contractor did not report accidents, incidents and injuries or did not submit investigation reports to MDC		
<input type="radio"/> NA Not Applicable		
4) Maintenance and protection of traffic		3
<input type="radio"/> Superior Exceeded MPT plan expectations and provided a safe environment for employees, motorists and pedestrians, used well maintained signs, and followed the traffic control plan	<i>Comment:</i>	
<input type="radio"/> Good Met MPT plan requirements, provided a safe environment for employees, motorists and pedestrians, well maintained signs		
<input checked="" type="radio"/> Acceptable Met basic MPT plan requirements with prompting from MDC		
<input type="radio"/> Poor Signage was not clear to drivers, traffic patterns did not meet MPT plan requirements and/or used poor devices		
<input type="radio"/> Unacceptable Failure to provide a safe work zone environment, poor signage and work zone devices, failure to maintain signs and cones and/or MPT payments withheld		
<input type="radio"/> NA Not Applicable		
5) Contractor created a safe work environment for MDC workers working around the project and/or kept the public safe around the work area		3
<input type="radio"/> Superior Continually maintained an organized work site that provided safe work area controls that included the safety of MDC workers and/or the public	<i>Comment:</i>	
<input type="radio"/> Good Contractor provided good safety controls and housekeeping with minimal prompting from MDC		
<input checked="" type="radio"/> Acceptable Prompting from MDC required to set up safety controls and/or maintain good housekeeping		
<input type="radio"/> Poor Required frequent prompting and/or meetings to address public safety, the safety of MDC workers, or poor housekeeping issues		
<input type="radio"/> Unacceptable The District had to correct unsafe work site hazards created by the contractor.		

MANAGEMENT OF JOB SITE SAFETY Summary

Average Score (Total / #questions)	=	3.0	Overall SAFETY Rating =	Acceptable	TOTAL	15
---------------------------------------	---	------------	-------------------------	-------------------	-------	-----------

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

WORKMANSHIP

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Adherence to industry standards and quality control measures noted in the specifications

3

- ☐ Superior All work completed in strict conformance to industry standard and quality control measures *Comment:*
- ☐ Good Work generally completed in conformance with industry standards and quality control measures
- ☒ Acceptable Work meets the general intent of the specifications and follows quality control measures
- ☐ Poor Work meets industry standards but fails to meet specific quality control measures
- ☐ Unacceptable Work or portions of the work fail to meet quality control measures or industry standards

2) Effectiveness of Contractor's quality control measures

3

- ☐ Superior Work completed properly the first time without the need for re-work or punch list items *Comment:*
- ☐ Good Work completed properly without the need for District prompting.
- ☒ Acceptable Work completed with minor re-work - required minimal prompting / punch lists to correct work
- ☐ Poor Several work items requiring District intervention to meet contract requirements
- ☐ Unacceptable Contractor failed to oversee or correct work without significant prompting from the District

3) Accuracy of the work

3

- ☐ Superior All work completed in strict conformance to the plans with exacting tolerances *Comment:*
- ☐ Good All work completed in conformance to the plans - straight lines and grades
- ☒ Acceptable Work meets acceptable tolerances
- ☐ Poor Failure to meet acceptable tolerances - items slightly bent or bowed, improper slopes, etc.
- ☐ Unacceptable Items consistently or severely - misaligned, bent or bowed, reverse or flat slopes, etc.

4) Overall quality of the final product

3

- ☐ Superior Overall construction / final product is superior - exceeds industry standards *Comment:*
- ☐ Good Overall construction / final product is above average industry standards
- ☒ Acceptable Meets industry standard
- ☐ Poor Final product shows evidence of repairs, re-work, patching, etc.
- ☐ Unacceptable Final product does not meet District or commonly accepted industry standards

5) Ability of the work to pass necessary testing

3

- ☐ Superior Tests passed on the first time without the need for any corrective measures *Comment:*
- ☐ Good Majority of work passed testing the first time
- ☒ Acceptable Work is able to pass necessary testing without significant corrective work or repetitive testing
- ☐ Poor Work passes testing after significant re-work or multiple tests
- ☐ Unacceptable Majority of the work can not pass testing without significant re-work or multiple tests

WORKMANSHIP Summary

Average Score = 3.0 Overall WORKMANSHIP Rating = Acceptable TOTAL

15

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

DILIGENT PROSECUTION AND TIMELY COMPLETION OF WORK

-ORGANIZATION AND MANAGEMENT OF RESOURCES-

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Ability to progress the work without interruptions or shutdowns (work stoppages)

3

- ☐ Superior Maintains a consistent work force and work hours for the duration of the project *Comment:*
- ☐ Good Work force is adequate at all times, requires periodic overtime to meet schedule
- ☒ Acceptable Work progresses without significant shutdowns
- ☐ Poor Work stoppages required due to problems with material deliveries or subcontractors availability
- ☐ Unacceptable Project is delayed without reason or due to contractors forces working on other projects

2) Availability of staff, material and equipment to meet project requirements

3

- ☐ Superior Staff, equipment and materials were always available to meet the project schedule *Comment:*
- ☐ Good Staff, equipment and materials were generally available to meet the project schedule
- ☒ Acceptable Staff, material and equipment shortages did not result in project delays
- ☐ Poor Delays and/or multiple scheduling changes to adjust for shortage of staff, material or equipment
- ☐ Unacceptable Several delays resulting from shortage of staff, material or equipment

3) Adherence to project schedule including project completion

3

- ☐ Superior Maintains an accelerated project schedule resulting in the early completion of the project *Comment:*
- ☐ Good Completes project on time or ahead of schedule
- ☒ Acceptable Completes project within allotted contract time
- ☐ Poor Project schedule not met or adhered to - requires time extensions to complete work
- ☐ Unacceptable Consistently behind schedule - does not complete the project within allotted time

4) Submission and quality of project schedule and updates

3

- ☐ Superior Accurate and complete schedule including updates submitted in accordance with contract *Comment:*
- ☐ Good Schedule and updates submitted in timely manner - accurate and realistic updates etc.
- ☒ Acceptable Schedule and updates submitted upon request of the District
- ☐ Poor Inaccurate or unrealistic schedule requiring consistent updates
- ☐ Unacceptable Failure to provide a realistic or accurate schedule or refusal to update/follow the schedule

5) Submission of Shop Drawings to Prevent Delays in the Work

3

- ☐ Superior All submissions on time, complete and meeting requirements of the specifications *Comment:*
- ☐ Good All submissions on time and complete
- ☒ Acceptable Majority of submissions on time - project was not delayed due to shop drawing process
- ☐ Poor Late submissions requiring Contractor to request accelerated review from the Engineer
- ☐ Unacceptable Few submissions on time resulting in project delays

DILIGENT PROSECUTION AND TIMELY COMPLETION OF WORK Summary

Average Score = 3.0 Overall "Time/Prosecution" Rating = Acceptable TOTAL

(Total / #questions)

15

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

COOPERATION

~Relations with Public and Local Officials~

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Response to District directives

3

- ☐ Superior All directives are responded to immediately *Comment:*
- ☐ Good All directives are responded to in a timely manner without additional prompting
- ☒ Acceptable Most directives are responded to in a timely manner
- ☐ Poor Slow response or argumentative on several directives
- ☐ Unacceptable Non-responsive or argumentative in responding to most directives

2) Cooperation with local officials

3

- ☐ Superior Strong working relationship - worked together, coordinated inspection requirements *Comment:*
- ☐ Good Good working relationship - willingness to work with town inspection staff
- ☒ Acceptable Met all permit and or contract requirements
- ☐ Poor Difficult at times, met minimal requirements
- ☐ Unacceptable Generally uncooperative, argumentative or unprofessional

3) Cooperation and resolution to concerns of local residents and/or businesses

3

- ☐ Superior Always displayed concern for residents, planned work to minimize impact to neighborhood *Comment:*
- ☐ Good Displayed concern for residents, worked to minimize impacts to neighborhood
- ☒ Acceptable Cooperated with reasonable requests by local residents and businesses in a timely manner
- ☐ Poor Complied with reasonable requests from local residents only after District involvement
- ☐ Unacceptable Work did not consider the local residents or businesses - generally uncooperative
- ☐ NA Not Applicable

4) Management and communication with Subcontractors

3

- ☐ Superior Superior management and communication, no problems *Comment:*
- ☐ Good Good working relationships, effective management and communication, minimal problems, easily resolved, no impact on project
- ☒ Acceptable Adequate working relationships, management, and communication
- ☐ Poor Marginal working relationship, management and communication ineffective at times - problems were resolved with little impact on the project
- ☐ Unacceptable Ineffective or nonexistent management and communication resulted in a problematic environment, conflicts were not easily resolved, impacted the project
- ☐ NA Not Applicable

5) Attendance at project meetings

3

- ☐ Superior Meetings always attended by qualified personnel including subcontractors *Comment:*
- ☐ Good Meetings usually attended by qualified personnel and subcontractors
- ☒ Acceptable Sufficient representation by the contractor
- ☐ Poor Poor attendance from contractor's management staff or poor attendance from subcontractors
- ☐ Unacceptable Poor attendance and or preparation, resulting in ineffective meetings

COOPERATION Summary

Average Score
(Total / #questions)

= 3.0

Overall COOPERATION Rating =

Acceptable

TOTAL

15

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

MANAGEMENT OF JOB SITE CONDITIONS

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Compliance with defined project limits – no disturbances beyond project limit

3

- ☐ Superior Extreme care to prevent disturbance to areas outside the project limits (including site runoff) *Comment:*
- ☐ Good Above average care to mark out and or clarify the project area
- ☒ Acceptable Work generally confined to the project limits
- ☐ Poor Minor damage to areas beyond the project limits, tree, bushes, grass areas
- ☐ Unacceptable Damage to or intentional use of areas beyond the project limits

2) Compliance with erosion and sedimentation control requirements

3

- ☐ Superior Extreme care to prevent any site erosion or transportation of sediments *Comment:*
- ☐ Good Exceeded contract requirements
- ☒ Acceptable Met contract requirements with minimal intervention from District staff
- ☐ Poor Met contract requirements only after District intervention - poor maintenance of silt fencing
- ☐ Unacceptable Failure to protect adjacent properties, catch basins or maintenance of silt fencing
- ☐ NA Not Applicable

3) Contractor's ability to keep the project site clean and orderly while the work was in progress, including proper mud and dust control.

3

- ☐ Superior Exceeded expectations for a clean and orderly site *Comment:*
- ☐ Good Site was clean and organized at all times
- ☒ Acceptable Met contract requirements with minimal prompting from District staff
- ☐ Poor Met contract requirements only after repeated prompting from District staff
- ☐ Unacceptable Site not kept clean or organized, excessive mud and dust disturbed local residents/town officials

MANAGEMENT OF JOB SITE CONDITIONS Summary

Average Score
(Total / #questions)

= 3.0

Overall "Job Site" Rating

Acceptable

TOTAL

9

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

CLAIMS - FINANCIAL MANAGEMENT

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Number and cause of change orders

3

- ☐ Superior Contractor plans work in advance to mitigate changes and reduce unnecessary project costs *Comment:*
- ☐ Good Contractor works to mitigate the number of changes
- ☒ Acceptable Contractor follows contract requirements for change orders
- ☐ Poor Contractor requests change orders for incidental work - work included in bid items, number of change order requests considered excessive
- ☐ Unacceptable Contractor continually argues about the scope of work to receive unreasonable change orders - number of change order requests considered excessive

2) Notification of possible claims

3

- ☐ Superior District is notified in advance of potential claims and options to mitigate the claim *Comment:*
- ☐ Good Open communication with the District, resulting in early notice of potential claims
- ☒ Acceptable District is notified in advance of potential claims
- ☐ Poor District is notified of foreseeable claims as the situation is occurring
- ☐ Unacceptable District is notified of claims after the work has been completed
- ☐ NA Not Applicable

3) Costs associated with change order work (manner in which Contractor determines price)

3

- ☐ Superior Change order quotes are always reasonable and timely with documentation supporting costs *Comment:*
- ☐ Good Change order quotes are generally fair, willingness to compromise on a fair price
- ☒ Acceptable Willingness to negotiate and work towards an acceptable price
- ☐ Poor Negotiations are drawn out and time consuming, initial price quotes are intentionally high
- ☐ Unacceptable Difficult or unwilling to negotiate or compromise - unreasonable/unrealistic prices
- ☐ NA Not Applicable

4) Accuracy of Contractor's billing

3

- ☐ Superior No errors, accurate representation of work completed, clear and concise *Comment:*
- ☐ Good Accurate representation of work completed
- ☒ Acceptable Few minor errors, quickly resolved
- ☐ Poor Occasional minor errors, poor format, unorganized
- ☐ Unacceptable Frequent errors, difficult to resolve, misrepresentation of work completed

5) Payment to Subcontractors and/or Suppliers

3

- ☐ Superior All payments are made promptly and in accordance with the contract *Comment:*
- ☐ Good Payments are made promptly
- ☒ Acceptable No issues are raised by any Subcontractors or Suppliers regarding payment problems
- ☐ Poor Subcontractors and Suppliers notified the District of late payments for work or materials
- ☐ Unacceptable Subcontractors and Suppliers notified the District of non-payment for work or materials
- Not Applicable

CLAIMS - FINANCIAL MANAGEMENT Summary

Average Score
(Total / #questions)

= 3.0

Overall "Claims & Financial" Rating =

Acceptable

TOTAL

15

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation
SUMMARY SHEET

Contractor: ABC Construction

Project Title: Name of Project Town, CT

Contract No: XXXX-XX Evaluation: 50% Completion

Performance Category:	Total Points	Average Score	Rating
1) COMPETENCE	18	3.0	Acceptable
2) MANAGEMENT OF JOB SITE SAFETY	15	3.0	Acceptable
3) WORKMANSHIP	15	3.0	Acceptable
4) PROSECUTION & TIMELY COMPLETION OF WORK Organization and Management of Resources	15	3.0	Acceptable
5) COOPERATION Relations with Public and Local Officials	15	3.0	Acceptable
6) MANAGEMENT OF JOB SITE CONDITIONS	9	3.0	Acceptable
7) CLAIMS - FINANCIAL MANAGEMENT	15	3.0	Acceptable
TOTAL:		102	
Average Overall Score / Performance Rating:		3.0	Acceptable

OVERALL EVALUATION - PASS / FAIL

PASS

Overall Evaluation (Pass / Fail) Rating is based on the overall performance rating receiving a rating of "Acceptable" or better AND receiving a rating of "Acceptable" or better in at least six of the seven performance categories. Ratings of "Unacceptable" or "Poor" in any two performance categories results in a failure of the overall evaluation regardless of the Average Overall Score.

PREPARED BY: _____ DATE: _____
Construction Inspector

REVIEWED BY: _____ DATE: _____
Construction Manager

REVIEWED BY: _____ DATE: _____
Project Manager

REVIEWED BY: _____ DATE: _____
Manager of Construcion

APPROVED BY: _____ DATE: _____
Deputy CEO, Engineering and Operations

THE METROPOLITAN DISTRICT

CONTRACTOR PERFORMANCE EVALUATION

Contract No.: **XXXX-XX**

Title:

**Name of Project
Town, CT**

Contractor:

ABC Construction

Address:

**555 Main Street
Hartford, CT
06142**

100% COMPLETION



The Metropolitan District
555 Main Street
Hartford, Connecticut 06142-0800

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

COMPETENCE

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Overall knowledge of the type of work (sewer construction, plant upgrade, water main installation, etc.) - execution of the type(s) of construction required

3

- ☐ Superior Extremely knowledgeable and efficient with a virtual command for the work required *Comment:*
- ☐ Good Skilled in the work - strong understanding for the minor details involved in the construction
- ☒ Acceptable Competent and capable to perform this type of work
- ☐ Poor Inexperienced with the type of work - lack strong understanding of necessary concepts
- ☐ Unacceptable Unskilled and unfamiliar with the type of work

2) Knowledge of the project

3

- ☐ Superior Extremely knowledgeable and well-informed about the project to the finest detail *Comment:*
- ☐ Good Knowledgeable and familiar with all aspects of the project
- ☒ Acceptable General understanding of the entire project
- ☐ Poor Lack of knowledge on specific areas of the project
- ☐ Unacceptable General lack of understanding of the project

3) Adherence to plans, specifications, and approved submittals/shop drawings

3

- ☐ Superior Strict adherence to the plans and specifications *Comment:*
- ☐ Good General conformance to the plans and specifications - very minor approved deviations
- ☒ Acceptable Occasional deviations from the plans and specifications
- ☐ Poor Deviations from the plans and specifications, inferior product submittals, design modifications
- ☐ Unacceptable Willful disregard for the plans and specifications

4) Competence and professionalism of the Project Manager and Superintendent

3

- ☐ Superior Extremely knowledgeable, cooperative, professional, organized and prepared at all times *Comment:*
- ☐ Good Knowledgeable and cooperative - easy to work with
- ☒ Acceptable Competent and capable to perform their duties
- ☐ Poor Not fully qualified to hold the position for the type of work required or size of contract
- ☐ Unacceptable Lacking skills necessary to properly perform required tasks - uncooperative, problematic and difficult to work with

5) Competence and professionalism of the work force

3

- ☐ Superior Extremely knowledgeable, efficient, skilled and courteous at all times *Comment:*
- ☐ Good Knowledgeable and efficient
- ☒ Acceptable Capable of performing the necessary construction
- ☐ Poor Unfamiliar with the proper or standard construction techniques - difficult to work with
- ☐ Unacceptable Uncooperative, problematic, and difficult - unskilled with work required

6) Project Manager Administration/Management**3**

- ☐ Superior Project Manager requires no assistance from Owner in planning of work and crews and identifies potential problems/conflicts in advance with solutions; Project Manager properly follows established chain of command for communication with Owner *Comment:*
- ☐ Good Project Manager requires no assistance from Owner in planning of work and crews; Project Manager properly follows established chain of command for communication with Owner
- ☒ Acceptable Project Manager shows adequate planning of work and crews; Project Manager properly follows established chain of command for communication with Owner
- ☐ Poor Project Manager requires Owner assistance in planning work/crews; Project Manager occasionally fails to follow established chain of command for communication with Owner
- ☐ Unacceptable Project Manager does not properly plan out work/crews requiring Owner intervention; Project Manager repeatedly fails to follow established chain of command for communication with Owner

COMPETENCE Summary

Average Score = **3.0** **Overall COMPETENCE Rating** = **Acceptable** **TOTAL**

(Total / #questions)

18

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

MANAGEMENT OF JOB SITE SAFETY

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1)	Contractor's actions in creating and maintaining a safe job site, complying with OSHA regulations and their site specific health and safety plan (HASP) and meeting safety responsibilities of the contract. <input type="radio"/> Superior Continually exceeded expectations with regards to safety compliance and safe work practices <i>Comment:</i> <input type="radio"/> Good Created a safe job site and met safety responsibilities within the contract <input checked="" type="radio"/> Acceptable Met basic safety requirements within the contract with prompting from MDC <input type="radio"/> Poor Met safety responsibilities only after repeated prompting by the MDC or an OSHA citation was issued <input type="radio"/> Unacceptable A stop work order for non-compliance to safety had to be issued or serious or willful violations were issued by OSHA	3
2)	Contractor's performance in preventing injuries <input type="radio"/> Superior Contractor completed project with no employee injuries <i>Comment:</i> <input type="radio"/> Good Contractor completed project with only minor injuries, not requiring medical treatment <input checked="" type="radio"/> Acceptable Contractor completed project with employee injuries requiring minimal medical evaluation or treatment <input type="radio"/> Poor Contractor completed project with a severe injury or multiple injuries resulting in restricted duty or lost time <input type="radio"/> Unacceptable Contractor completed project with multiple preventable injuries resulting in lost work days	3
3)	Contractor's actions in reporting all accidents, incidents and injuries <input type="radio"/> Superior Contractor immediately reported all accidents, incidents and injuries and promptly investigated and implemented corrective measures to avoid future occurrences and provided written report within 24 hours <i>Comment:</i> <input type="radio"/> Good Contractor reported within 24 hours and investigated all accidents, incidents and injuries and provided written report with corrective measures within 24 hrs. <input checked="" type="radio"/> Acceptable Contractor reported within 24 hours and investigated all accidents, incidents and injuries and provided written report within 48 hrs. <input type="radio"/> Poor Contractor reported accidents, incidents and injuries only if witnessed by MDC personnel <input type="radio"/> Unacceptable Contractor did not report accidents, incidents and injuries or did not submit investigation reports to MDC <input type="radio"/> NA Not Applicable	3
4)	Maintenance and protection of traffic <input type="radio"/> Superior Exceeded MPT plan expectations and provided a safe environment for employees, motorists and pedestrians, used well maintained signs, and followed the traffic control plan <i>Comment:</i> <input type="radio"/> Good Met MPT plan requirements, provided a safe environment for employees, motorists and pedestrians, well maintained signs <input checked="" type="radio"/> Acceptable Met basic MPT plan requirements with prompting from MDC <input type="radio"/> Poor Signage was not clear to drivers, traffic patterns did not meet MPT plan requirements and/or used poor devices <input type="radio"/> Unacceptable Failure to provide a safe work zone environment, poor signage and work zone devices, failure to maintain signs and cones and/or MPT payments withheld <input type="radio"/> NA Not Applicable	3
5)	Contractor created a safe work environment for MDC workers working around the project and/or kept the public safe around the work area <input type="radio"/> Superior Continually maintained an organized work site that provided safe work area controls that included the safety of MDC workers and/or the public <i>Comment:</i> <input type="radio"/> Good Contractor provided good safety controls and housekeeping with minimal prompting from MDC <input checked="" type="radio"/> Acceptable Prompting from MDC required to set up safety controls and/or maintain good housekeeping <input type="radio"/> Poor Required frequent prompting and/or meetings to address public safety, the safety of MDC workers, or poor housekeeping issues <input type="radio"/> Unacceptable The District had to correct unsafe work site hazards created by the contractor.	3

MANAGEMENT OF JOB SITE SAFETY Summary

Average Score (Total / #questions)	=	3.0	Overall SAFETY Rating =	Acceptable	TOTAL	15
---------------------------------------	---	------------	-------------------------	-------------------	-------	-----------

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

WORKMANSHIP

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Adherence to industry standards and quality control measures noted in the specifications

3

- ☐ Superior All work completed in strict conformance to industry standard and quality control measures *Comment:*
- ☐ Good Work generally completed in conformance with industry standards and quality control measures
- ☒ Acceptable Work meets the general intent of the specifications and follows quality control measures
- ☐ Poor Work meets industry standards but fails to meet specific quality control measures
- ☐ Unacceptable Work or portions of the work fail to meet quality control measures or industry standards

2) Effectiveness of Contractor's quality control measures

3

- ☐ Superior Work completed properly the first time without the need for re-work or punch list items *Comment:*
- ☐ Good Work completed properly without the need for District prompting.
- ☒ Acceptable Work completed with minor re-work - required minimal prompting / punch lists to correct work
- ☐ Poor Several work items requiring District intervention to meet contract requirements
- ☐ Unacceptable Contractor failed to oversee or correct work without significant prompting from the District

3) Accuracy of the work

3

- ☐ Superior All work completed in strict conformance to the plans with exacting tolerances *Comment:*
- ☐ Good All work completed in conformance to the plans - straight lines and grades
- ☒ Acceptable Work meets acceptable tolerances
- ☐ Poor Failure to meet acceptable tolerances - items slightly bent or bowed, improper slopes, etc.
- ☐ Unacceptable Items consistently or severely - misaligned, bent or bowed, reverse or flat slopes, etc.

4) Overall quality of the final product

3

- ☐ Superior Overall construction / final product is superior - exceeds industry standards *Comment:*
- ☐ Good Overall construction / final product is above average industry standards
- ☒ Acceptable Meets industry standard
- ☐ Poor Final product shows evidence of repairs, re-work, patching, etc.
- ☐ Unacceptable Final product does not meet District or commonly accepted industry standards

5) Ability of the work to pass necessary testing

3

- ☐ Superior Tests passed on the first time without the need for any corrective measures *Comment:*
- ☐ Good Majority of work passed testing the first time
- ☒ Acceptable Work is able to pass necessary testing without significant corrective work or repetitive testing
- ☐ Poor Work passes testing after significant re-work or multiple tests
- ☐ Unacceptable Majority of the work can not pass testing without significant re-work or multiple tests

WORKMANSHIP Summary

Average Score = 3.0 Overall WORKMANSHIP Rating = Acceptable TOTAL

15

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

DILIGENT PROSECUTION AND TIMELY COMPLETION OF WORK

-ORGANIZATION AND MANAGEMENT OF RESOURCES-

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Ability to progress the work without interruptions or shutdowns (work stoppages)

3

- ☐ Superior Maintains a consistent work force and work hours for the duration of the project *Comment:*
- ☐ Good Work force is adequate at all times, requires periodic overtime to meet schedule
- ☒ Acceptable Work progresses without significant shutdowns
- ☐ Poor Work stoppages required due to problems with material deliveries or subcontractors availability
- ☐ Unacceptable Project is delayed without reason or due to contractors forces working on other projects

2) Availability of staff, material and equipment to meet project requirements

3

- ☐ Superior Staff, equipment and materials were always available to meet the project schedule *Comment:*
- ☐ Good Staff, equipment and materials were generally available to meet the project schedule
- ☒ Acceptable Staff, material and equipment shortages did not result in project delays
- ☐ Poor Delays and/or multiple scheduling changes to adjust for shortage of staff, material or equipment
- ☐ Unacceptable Several delays resulting from shortage of staff, material or equipment

3) Adherence to project schedule including project completion

3

- ☐ Superior Maintains an accelerated project schedule resulting in the early completion of the project *Comment:*
- ☐ Good Completes project on time or ahead of schedule
- ☒ Acceptable Completes project within allotted contract time
- ☐ Poor Project schedule not met or adhered to - requires time extensions to complete work
- ☐ Unacceptable Consistently behind schedule - does not complete the project within allotted time

4) Submission and quality of project schedule and updates

3

- ☐ Superior Accurate and complete schedule including updates submitted in accordance with contract *Comment:*
- ☐ Good Schedule and updates submitted in timely manner - accurate and realistic updates etc.
- ☒ Acceptable Schedule and updates submitted upon request of the District
- ☐ Poor Inaccurate or unrealistic schedule requiring consistent updates
- ☐ Unacceptable Failure to provide a realistic or accurate schedule or refusal to update/follow the schedule

5) Submission of Shop Drawings to Prevent Delays in the Work

3

- ☐ Superior All submissions on time, complete and meeting requirements of the specifications *Comment:*
- ☐ Good All submissions on time and complete
- ☒ Acceptable Majority of submissions on time - project was not delayed due to shop drawing process
- ☐ Poor Late submissions requiring Contractor to request accelerated review from the Engineer
- ☐ Unacceptable Few submissions on time resulting in project delays

DILIGENT PROSECUTION AND TIMELY COMPLETION OF WORK Summary

Average Score = 3.0 Overall "Time/Prosecution" Rating = Acceptable TOTAL

(Total / #questions)

15

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

COOPERATION

~Relations with Public and Local Officials~

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Response to District directives

3

- ☐ Superior All directives are responded to immediately *Comment:*
- ☐ Good All directives are responded to in a timely manner without additional prompting
- ☒ Acceptable Most directives are responded to in a timely manner
- ☐ Poor Slow response or argumentative on several directives
- ☐ Unacceptable Non-responsive or argumentative in responding to most directives

2) Cooperation with local officials

3

- ☐ Superior Strong working relationship - worked together, coordinated inspection requirements *Comment:*
- ☐ Good Good working relationship - willingness to work with town inspection staff
- ☒ Acceptable Met all permit and or contract requirements
- ☐ Poor Difficult at times, met minimal requirements
- ☐ Unacceptable Generally uncooperative, argumentative or unprofessional

3) Cooperation and resolution to concerns of local residents and/or businesses

3

- ☐ Superior Always displayed concern for residents, planned work to minimize impact to neighborhood *Comment:*
- ☐ Good Displayed concern for residents, worked to minimize impacts to neighborhood
- ☒ Acceptable Cooperated with reasonable requests by local residents and businesses in a timely manner
- ☐ Poor Complied with reasonable requests from local residents only after District involvement
- ☐ Unacceptable Work did not consider the local residents or businesses - generally uncooperative
- ☐ NA Not Applicable

4) Management and communication with Subcontractors

3

- ☐ Superior Superior management and communication, no problems *Comment:*
- ☐ Good Good working relationships, effective management and communication, minimal problems, easily resolved, no impact on project
- ☒ Acceptable Adequate working relationships, management, and communication
- ☐ Poor Marginal working relationship, management and communication ineffective at times - problems were resolved with little impact on the project
- ☐ Unacceptable Ineffective or nonexistent management and communication resulted in a problematic environment, conflicts were not easily resolved, impacted the project
- ☐ NA Not Applicable

5) Attendance at project meetings

3

- ☐ Superior Meetings always attended by qualified personnel including subcontractors *Comment:*
- ☐ Good Meetings usually attended by qualified personnel and subcontractors
- ☒ Acceptable Sufficient representation by the contractor
- ☐ Poor Poor attendance from contractor's management staff or poor attendance from subcontractors
- ☐ Unacceptable Poor attendance and or preparation, resulting in ineffective meetings

COOPERATION Summary

Average Score
(Total / #questions)

= 3.0

Overall COOPERATION Rating =

Acceptable

TOTAL

15

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

MANAGEMENT OF JOB SITE CONDITIONS

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Compliance with defined project limits – no disturbances beyond project limit

3

- ☐ Superior Extreme care to prevent disturbance to areas outside the project limits (including site runoff) *Comment:*
- ☐ Good Above average care to mark out and or clarify the project area
- ☒ Acceptable Work generally confined to the project limits
- ☐ Poor Minor damage to areas beyond the project limits, tree, bushes, grass areas
- ☐ Unacceptable Damage to or intentional use of areas beyond the project limits

2) Compliance with erosion and sedimentation control requirements

3

- ☐ Superior Extreme care to prevent any site erosion or transportation of sediments *Comment:*
- ☐ Good Exceeded contract requirements
- ☒ Acceptable Met contract requirements with minimal intervention from District staff
- ☐ Poor Met contract requirements only after District intervention - poor maintenance of silt fencing
- ☐ Unacceptable Failure to protect adjacent properties, catch basins or maintenance of silt fencing
- ☐ NA Not Applicable

3) Contractor's ability to keep the project site clean and orderly while the work was in progress, including proper mud and dust control.

3

- ☐ Superior Exceeded expectations for a clean and orderly site *Comment:*
- ☐ Good Site was clean and organized at all times
- ☒ Acceptable Met contract requirements with minimal prompting from District staff
- ☐ Poor Met contract requirements only after repeated prompting from District staff
- ☐ Unacceptable Site not kept clean or organized, excessive mud and dust disturbed local residents/town officials

MANAGEMENT OF JOB SITE CONDITIONS Summary

Average Score
(Total / #questions)

= 3.0

Overall "Job Site" Rating

Acceptable

TOTAL

9

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation Work Sheet

CLAIMS - FINANCIAL MANAGEMENT

Superior = 5 Good = 4 Acceptable = 3 Poor = 2 Unacceptable = 1

1) Number and cause of change orders

3

- ☐ Superior Contractor plans work in advance to mitigate changes and reduce unnecessary project costs *Comment:*
- ☐ Good Contractor works to mitigate the number of changes
- ☒ Acceptable Contractor follows contract requirements for change orders
- ☐ Poor Contractor requests change orders for incidental work - work included in bid items, number of change order requests considered excessive
- ☐ Unacceptable Contractor continually argues about the scope of work to receive unreasonable change orders - number of change order requests considered excessive

2) Notification of possible claims

3

- ☐ Superior District is notified in advance of potential claims and options to mitigate the claim *Comment:*
- ☐ Good Open communication with the District, resulting in early notice of potential claims
- ☒ Acceptable District is notified in advance of potential claims
- ☐ Poor District is notified of foreseeable claims as the situation is occurring
- ☐ Unacceptable District is notified of claims after the work has been completed
- ☐ NA Not Applicable

3) Costs associated with change order work (manner in which Contractor determines price)

3

- ☐ Superior Change order quotes are always reasonable and timely with documentation supporting costs *Comment:*
- ☐ Good Change order quotes are generally fair, willingness to compromise on a fair price
- ☒ Acceptable Willingness to negotiate and work towards an acceptable price
- ☐ Poor Negotiations are drawn out and time consuming, initial price quotes are intentionally high
- ☐ Unacceptable Difficult or unwilling to negotiate or compromise - unreasonable/unrealistic prices
- ☐ NA Not Applicable

4) Accuracy of Contractor's billing

3

- ☐ Superior No errors, accurate representation of work completed, clear and concise *Comment:*
- ☐ Good Accurate representation of work completed
- ☒ Acceptable Few minor errors, quickly resolved
- ☐ Poor Occasional minor errors, poor format, unorganized
- ☐ Unacceptable Frequent errors, difficult to resolve, misrepresentation of work completed

5) Payment to Subcontractors and/or Suppliers

3

- ☐ Superior All payments are made promptly and in accordance with the contract *Comment:*
- ☐ Good Payments are made promptly
- ☒ Acceptable No issues are raised by any Subcontractors or Suppliers regarding payment problems
- ☐ Poor Subcontractors and Suppliers notified the District of late payments for work or materials
- ☐ Unacceptable Subcontractors and Suppliers notified the District of non-payment for work or materials
- Not Applicable

CLAIMS - FINANCIAL MANAGEMENT Summary

Average Score
(Total / #questions)

= 3.0

Overall "Claims & Financial" Rating =

Acceptable

TOTAL

15

THE METROPOLITAN DISTRICT - Contractor Performance Evaluation
SUMMARY SHEET

Contractor: ABC Construction

Project Title: Name of Project Town, CT

Contract No: XXXX-XX Evaluation: 100% Completion

Performance Category:	Total Points	Average Score	Rating
1) COMPETENCE	18	3.0	Acceptable
2) MANAGEMENT OF JOB SITE SAFETY	15	3.0	Acceptable
3) WORKMANSHIP	15	3.0	Acceptable
4) PROSECUTION & TIMELY COMPLETION OF WORK Organization and Management of Resources	15	3.0	Acceptable
5) COOPERATION Relations with Public and Local Officials	15	3.0	Acceptable
6) MANAGEMENT OF JOB SITE CONDITIONS	9	3.0	Acceptable
7) CLAIMS - FINANCIAL MANAGEMENT	15	3.0	Acceptable
TOTAL:		102	
Average Overall Score / Performance Rating:		3.0	Acceptable

OVERALL EVALUATION - PASS / FAIL

PASS

Overall Evaluation (Pass / Fail) Rating is based on the overall performance rating receiving a rating of "Acceptable" or better AND receiving a rating of "Acceptable" or better in at least six of the seven performance categories. Ratings of "Unacceptable" or "Poor" in any two performance categories results in a failure of the overall evaluation regardless of the Average Overall Score.

PREPARED BY: _____ DATE: _____
Construction Inspector

REVIEWED BY: _____ DATE: _____
Construction Manager

REVIEWED BY: _____ DATE: _____
Project Manager

REVIEWED BY: _____ DATE: _____
Manager of Construcion

APPROVED BY: _____ DATE: _____
Deputy CEO, Engineering and Operations

RECEIPT
ACKNOWLEDGED BY: _____ DATE: _____
Chief Executive Officer

THE METROPOLITAN DISTRICT

SECTION 01450

QUALITY CONTROL

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Quality assurance and control of the Work
2. Testing and inspection services
3. Product test reports
4. Manufacturer's field service

1.02 RELATED SECTIONS

- A. Section 01451, Independent Testing Services
- B. Testing requirements are described in various Sections of the Project Manual.

1.03 QUALITY ASSURANCE

- A. The Contractor shall monitor quality control over Suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.
- B. The Contractor shall comply fully with instructions. Should these instructions conflict with the Specifications, the Contractor shall request clarification from the Owner before proceeding.
- C. The Contractor shall comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or requirements indicate higher standards or more precise workmanship.

1.04 SUBMITTALS

- A. Product test reports

1.05 TESTING SERVICES FURNISHED BY CONTRACTOR

- A. Furnish all testing services required for materials and equipment proposed to be used in the Work, and quality control tests made in the field including:
 1. Concrete materials and mix designs.

THE METROPOLITAN DISTRICT

2. Concrete in place.
 3. Standard proctor analyses for all borrowed materials used on the Project.
 4. Standard proctor analysis of all material to be compacted during surface preparation and fine grading and compaction work.
 5. Sieve analyses for all borrow materials used on the Project.
 6. Soil structure and nutrient analyses for all loam and topsoil used on the Project.
 8. Design of asphalt mixtures.
 9. Asphalt in place.
 10. All other tests and engineering data as required in the Contract Documents.
- B. Testing agencies must meet the requirements of Section 01451.
- C. An independent commercial testing laboratory, with current Connecticut certification, shall perform all tests that require the services of a laboratory to determine compliance with the Contract Documents. Independent testing laboratory requirements are defined under Section 01451.
- D. Secure and deliver the required number of samples to the laboratory as required by the Contract Documents.
- E. Notify Owner and Engineer of time, location and material being sampled.
- F. Schedule necessary testing laboratory services.
- G. Furnish written reports of each test within 48 hours of completion of testing.
- H. Notify the Engineer 48 hours prior to operations requiring inspections and laboratory testing services so the Engineer may witness testing. All failed test areas shall be re-worked and re-tested until passing results are obtained.
- I. The Owner may hire its own independent testing laboratory for quality control tests made in the field or laboratory on materials and equipment during and after their incorporation in the Work. Cooperate with the Owner and independent testing laboratory and furnish samples of materials, design, mix, equipment, tools, storage, and assistance as requested.
- J. Re-work all failed test areas until passing results are obtained. All re-tests required as a result of the Contractor's failure to perform the work in accordance with the Contract Documents shall be at the Contractor's expense.

THE METROPOLITAN DISTRICT

1.06 CODE COMPLIANCE TESTING

- A. Provide inspections and tests required by codes or ordinances, or by a legally constituted authority having jurisdiction over the Work.

1.07 PRODUCT TEST REPORTS

- A. Submit two (2) copies of product test reports where required by the Contract Documents.

1.08 MANUFACTURERS' FIELD SERVICE

- A. Provide qualified field service and installation personnel from material and equipment suppliers familiar with site conditions, installation techniques, quality of workmanship, equipment start-up, adjustment, and testing where required by the Contract Documents. Observations are to be reported and incorporated in the Work procedures.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01451

INDEPENDENT TESTING SERVICES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Independent testing services including geotechnical and concrete inspection and testing
2. Testing laboratory services

1.02 RELATED SECTIONS

- A. Section 01450, Quality Control
- B. Section 02200, Earthwork
- C. Section 02202, Special Trench Refill
- D. Section 02510, Temporary and Permanent Paved Surface Restoration
- E. Section 03301, Concrete and Reinforcing Steel

1.03 REFERENCES

A. General

1. ASTM E329 -Standard Specifications for Agencies Engaged in the Testing Inspection of Materials used in Construction.

B. Soil Testing

1. American Association of State Highway and Transportation Officials (AASHTO).

C. Concrete Testing

1. Cement and Concrete Reference Laboratory (CCRL)
2. CTDOT testing requirements

1.04 SUBMITTALS

- A. Qualifications, experience, and certifications of each proposed testing service.
- B. Certificate of calibration for testing equipment.

THE METROPOLITAN DISTRICT

1.05 QUALITY ASSURANCE

A. General

1. Comply with the requirements of Section 01450, Quality Control, for testing and inspection requirements.
2. Testing services shall have the following general qualifications:
 - a. Minimum five (5) years as a firm with the type of testing specified.
 - b. Ability to provide timely field testing services to minimize the impact of the testing requirements on construction progress.
 - c. Certification to perform the specified services in the state in which the Work is to be performed.
3. Testing services proposed by the Contractor shall be subject to review by the Owner and Engineer. Any testing firm not acceptable to the Owner or Engineer will be rejected.

B. All testing agencies and laboratories must meet the requirements of ASTM.

C. Testing company shall have been in business for a minimum of the last five (5) years providing applicable testing services.

D. Testing equipment shall be calibrated at maximum twelve (12) month intervals by devices of accuracy traceable to National Bureau of Standards. Submit copy of certificate of calibration made by accredited calibration agency.

E. Testing shall be in accordance with applicable codes and regulations referenced in individual Specification Sections, and with selected standards of ASTM.

PART 2 – PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 TESTING SERVICES - GENERAL

A. The Contractor shall provide testing services meeting the following:

1. Provide qualified personnel promptly on notice.
2. Perform inspections required by the Contract Documents. Sample and test materials and observe methods of construction to determine compliance with applicable standards and with the requirements of the Contract Documents.
3. Take specimens and samples for testing, as required in individual Specification Sections. Provide all sampling equipment and deliver all specimens and Samples.

THE METROPOLITAN DISTRICT

4. Promptly notify the Owner and the Engineer of irregularities or deficiencies in the Work which are observed during inspection.
5. Promptly submit two (2) copies of reports of inspections and tests to the Engineer including:
 - a. Date issued
 - b. Project title and number
 - c. Testing laboratory or agency name and address
 - d. Name and signature of inspector
 - e. Date of inspection or sampling
 - f. Record of temperature and weather
 - g. Date of test
 - h. Identification of product and Specification Section Location of Project Type of inspection or test
 - i. Results of tests and observations regarding compliance with Contract Documents
- B. The Contractor shall perform additional tests and services as required to assure compliance with the Contract Documents.
- C. The Contractor shall obtain Owner's approval of testing laboratory before performing testing services.
- D. The Contractor shall coordinate with testing laboratory.

3.02 GEOTECHNICAL TESTING

- A. The Contractor shall provide field testing and laboratory for geotechnical soil testing required in Sections 02200 and 02202.

3.03 CONCRETE TESTING

- A. The Contractor shall provide qualified independent field and laboratory testing service to perform the concrete testing required in Division 3 of the specifications.
- B. The concrete testing laboratory shall have been inspected by the State of Connecticut within the past five (5) years.
- C. The testing laboratory shall be a licensed concrete testing laboratory by the State of Connecticut.

THE METROPOLITAN DISTRICT

- D. Field testing technicians shall have a Class A concrete technician license as certified by the State of Connecticut.

3.04 ANALYTICAL TESTING OF AREAS THAT MAY BE CONTAMINATED

- A. The testing laboratory shall be a licensed laboratory in the State of Connecticut.
- B. The testing laboratory shall be able to perform all analyses and provide analytical reports in accordance with the Department of Energy and Environmental Protection's Reasonable Confidence Protocols.

3.05 COORDINATION WITH TESTING LABORATORY

- A. The Contractor shall provide testing laboratory personnel access to site and manufacturer's operations.
- B. The Contractor shall provide laboratory with representative samples of materials to be tested in required quantities.
- C. The Contractor shall furnish labor and facilities:
 - 1. To provide access to Work to be tested.
 - 2. To facilitate inspections and tests.
 - 3. For laboratory's exclusive use for storage and curing of test samples.
 - 4. To provide forms for preparing concrete test beams and cylinders.
- D. The Contractor shall notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
- E. The Contractor shall arrange with laboratory and pay for additional inspections, samples, and tests required for Contractor's convenience.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01490

CONTRACTOR STAGING AREA

PART 1 - GENERAL

1.01 CONTRACTOR STAGING AREA

- A. Contractor staging area shall be established within or near the Project limits where approved by the Owner/Engineer and maintained in a clean, orderly condition by the Contractor.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 01500, Temporary Facilities
- C. Section 01561, Pest Control
- D. Section 01562, Dust Control
- E. Section 01600, Delivery, Storage, and Handling
- F. Section 02270, Sedimentation and Erosion Control
- G. Section 02444, Chain Link Fence and Gates

1.03 SUBMITTALS

- A. Agreement with property owner
- B. Map of staging area layout
- C. All required permits

1.04 LOCATION

- A. Submit map and staging area layout with letter of agreement on private property signed by Contractor and property owner.

1.05 PERMITS

- A. Contractor required to obtain and comply with all required permits from Municipalities including Planning and Zoning Permits and Inland Wetland Permits, if working in or near wetlands.

THE METROPOLITAN DISTRICT

1.06 PROPERTY AGREEMENTS

- A. Contractor required to execute all needed agreements with property owners. Owner and Engineer approval will be required prior to execution.

1.07 MAINTENANCE OF SITE

- A. Follow all environmental protection procedures identified in Section 01110.
- B. Maintain work and staging areas free of trash, garbage, weeds and debris. Mow grassed areas regularly to maintain a pleasant appearance and prevent the collection of trash and deter animals/pests from inhabiting area.
- C. Provide and enforce proper use of refuse containers to ensure that rodents and other pest are not harbored or attracted. Have refuse containers emptied twice weekly or more frequently if necessary to maintain site sanitation. Refer to Section 01561 for other pest control procedures.
- D. Follow all dust control procedures identified in Section 01562. Repetitive treatments of dust control measures shall be applied as needed or directed to accomplish control, at no additional cost to the Owner.
- E. The contractor shall construct and maintain an anti-tracking pad at the entrance to all off-road work or staging areas. The contractor shall remove the anti-tracking pad once the project is completed and restore the affected land in accordance with the specifications and any applicable permitting requirements.
- F. Store and protect all materials and equipment as per Section 01600.
- G. All items delivered shall be unloaded and placed in a manner which will not hamper the Contractor's normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.
- H. Maintain any sedimentation and erosion Controls including silt fencing located in the staging area per Section 02270.
- I. In addition to any conditions contained in the agreement between the Contractor and the property owner, the Contractor must replace all damaged sidewalks, aprons, fencing, or other infrastructure to prior existing conditions when leaving the site. In addition the Contractor must maintain the publicly pathways to the site in a safe, clean condition throughout construction, including replacing sidewalk panels or driveway aprons during construction as directed by Owner
- J. Storage of potentially hazardous or noxious chemicals at the staging area, including cold patch will not be permitted.

THE METROPOLITAN DISTRICT

1.08 TEMPORARY SANITARY FACILITIES

- A. If temporary sanitary facilities are utilized on site, facilities shall be maintained weekly.

1.09 TEMPORARY FENCING

- A. Provide chain link fence in accordance with Section 02444.
- B. Coordinate location of fencing with Engineer.
- C. Perform daily inspections of fence and immediately repair or replace damaged or compromised sections and as directed by the Engineer.
- D. Provide screening material on all fenced areas. Replace screening material immediately that is ripped, torn, vandalized, or otherwise unsightly in the opinion of the Owner or the Engineer.

1.10 FIRST AID SUPPLIES

- A. Based on the size of the crew, provide an adequately stocked first aid kit that is readily available on each work site.

1.11 TRAFFIC CONTROL

- A. Contractor shall be required to pay for any and all costs associated with traffic control for use of a staging area, as required by Owner, municipality, or CTDOT.

PART 2 – PRODUCTS – NOT USED

2.01. MATERIALS

- A. Temporary Fence: See Section 02444.

PART 3 – EXECUTION – NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01500

TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 TEMPORARY OFFICES FOR CONTRACTOR AND ENGINEER

- A. Temporary offices shall be established within the Project limits where approved by the Owner/Engineer, adequately furnished, and maintained in a clean, orderly condition by the Contractor. The Contractor's authorized representative shall be present in the field office at all times while work is in progress. If a full time Project Manager is a Contract requirement, he/she shall be considered the Contractor's authorized representative and a separate office will be provided for the Project Manager and maintained throughout the Contract period. Instructions received there from the Owner/Engineer shall be considered as delivered to the Contractor.
- B. Contractor shall provide a separate building of at least six hundred (600) square feet of floor space for the exclusive use of the Owner/Engineer throughout the period of construction. This space shall consist of separate offices for the Owner's field engineer and inspector(s) and separate space for meetings/conferences. The temporary office shall be weathertight, have a tight floor at least eight (8) inches off the ground and shall be insulated all around with rigid insulation board not less than one half (1/2) inch thick and suitably ventilated. The office shall have at least three screened windows capable of being opened, a screen door and a solid door provided with cylinder lock and three keys. The office shall be provided with janitorial service on a weekly basis, heating equipment, electrical wiring, outlets and fixtures suitable to light the tables and desk adequately as directed. Provide separate toilet facilities for the exclusive use of the Owner/Engineer. A minimum of four (4) parking spaces shall be provided for the use of the Owner/Engineer.
- C. Provide the following furniture and equipment in the Owner/Engineer's office:
 - 1. One plan table, 3-ft by 5-ft and one stool
 - 2. Two (2) Desks about 3-ft by 5-ft with desk chair
 - 3. Four additional chairs
 - 4. Plan rack, as directed
 - 5. Shelves, as directed
 - 6. Four-drawer, lateral filing cabinet with lock
 - 7. Coat rack and hooks

THE METROPOLITAN DISTRICT

8. Desk calculator
 9. Air Conditioner (12,000 BTU)
 10. Fax/Copy/Scan machine, new
 11. Two conference tables (6-ft each).
 12. Eight folding chairs.
 13. Cross-cut shredder with basket, new
 14. First aid kit suitable for ten people with manual, new
- D. Supply all fuel for heating and pay all utility bills.
- E. An approved, suitably constructed and equipped trailer of proper size may be furnished for the Owner/Engineer's office.

1.02 TEMPORARY TELEPHONE

- A. Install two telephone lines in the Owner/Engineer's field office for the Owner/Engineer's exclusive use; one voice grade line with caller ID and call waiting features and a second line for a facsimile machine.
- B. Provide the telephone with an automatic telephone answering device to record messages when the office is not manned.
- C. Pay all cost for installation, maintenance and removal of the telephone service and instruments. The monthly cost of all calls made and received by the Engineer, including toll and long distance calls, shall be paid for by the Contractor for the duration of construction.

1.03 TEMPORARY INTERNET AND DATA ACCESS

- A. Provide high speed internet access in the Owner's field office for the Owner's exclusive use. High speed internet access shall be capable of a minimum of 1.5 mbps upload and 3.0 mbps download speeds. High speed internet access for Owner's use shall be Cable, DSL, or T-1 type service.
- B. Provide router (wired and wireless) for connection of multiple Owner computers.
- C. Pay all costs for installation, maintenance and removal of the high speed internet service and instruments. The monthly cost of high speed internet for exclusive use by the Owner shall be paid for by the Contractor for the duration of construction.

THE METROPOLITAN DISTRICT

1.04 TEMPORARY LIGHT AND POWER

- A. Furnish temporary light and power, including 220 Volt service for welding, complete with wiring, lamps and similar equipment as required to adequately light all work areas and with sufficient power capacity to meet the reasonable needs of all subcontractors. Make all necessary arrangements with the local electric company for temporary electric service and pay all expenses in connection therewith.

1.05 TEMPORARY HEAT

- A. Provide all heat as may be necessary for thawing out and heating the ground or materials and for proper execution, protection and drying out the of work.

1.06 WEATHER PROTECTION

- A. Contractor shall furnish, install and maintain temporary heat and enclosures to provide adequate working areas for personnel during the months of November through March.

1.07 TEMPORARY AIR, STEAM AND WATER

- A. Provide all air, steam and water, including temporary piping and appurtenances required for cleaning and testing pipelines and equipment. Remove temporary piping and appurtenances upon approval of equipment being tested.

1.08 TEMPORARY SANITARY FACILITIES

- A. Provide self-contained, single occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed in a fiberglass or other approved non-absorbent shell. These facilities shall be maintained weekly.

1.09 FIRE EXTINGUISHERS

- A. Provide portable UL rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide portable UL rated Class ABC dry chemical extinguishers or a combination of NFPA recommended Classes for the exposure. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

1.10 TEMPORARY FENCING

- A. Provide commercial grade chain link fence to prevent trespass by workmen and suppliers onto private property and the public from the construction site.
- B. If a trailer is furnished for the Owner's office space, provide six (6) foot high fence around Owner's field office. Equip fence with vehicular and pedestrian gates with locks. Provide Owner with three (3) sets of keys for such locks.

THE METROPOLITAN DISTRICT

- C. Coordinate location of temporary fencing with Engineer.

1.11 FIRST AID SUPPLIES

- A. Based on the size of the crew, provide an adequately stocked first aid kit that is readily available on each work site.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01510

MAINTENANCE OF FLOW IN EXISTING SEWERS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall be responsible for maintaining wastewater flow in all public and private pipes during construction. All bypass pumping systems shall be manned by the Contractor during non-working hours, seven (7) days per week as necessary. During the installation and/or rehabilitation of sections of the sewer system, it is required that the Contractor maintain sewage flows in the system and from all abutting properties at all times. No sanitary service shall be interrupted by the Contractor except as absolutely necessary and then for only very short periods of time of no more than thirty (30) minutes and then only when coordinated with the affected property Owner. During main line cured-in-place pipe lining operations, interruption at the street tie-in will be allowed for up to twenty-four (24) hours, when coordinated, by the Contractor, with the affected property Owner. Prior to beginning any bypass operations, the Contractor shall first comply with the Planned Bypass Pumping administrative requirements contained in Section 01060.
- B. When by-pass pumping is required the Contractor shall supply pumps, conduits, power, and other equipment to divert the flow of sewage around the section in which Work is to be performed. The by-pass system shall be, as a minimum, at least 110% of the maximum capacity of the pipes being bypassed. For the smaller diameter pipe on non-combined systems (8" & 10"), Contractor may size the bypass system based on actual field-verified flows, subject to submittal approval by the Engineer. Flows would be verified by the Contractor both in the submittal phase and again at the time of installation subject to bypass inspection by the Engineer and/or Owner upon the system startup test. Contractor will be required to adjust the bypass system as required for any increased flows at time of installation, at no additional cost to the Owner. In addition, no bypass less than 110% of maximum pipe capacity would be permitted during wet weather related flows. A secondary pump is required to be on hand and within distance of by-pass site so as to maintain flow within the collection system at all times should the primary pump fail for all bypass systems.

1.02 RELATED SECTIONS

- A. Section 01060, Regulatory Requirements
- B. Section 01110, Environmental Protection Procedures
- C. Section 02150, Bypass Pumping, Handling Storm Runoff and Sanitary Sewage Flows

THE METROPOLITAN DISTRICT

1.03 SUBMITTALS

- A. All procedures for maintaining flows must meet the approval of the Engineer and the Contractor shall be required to submit to the Engineer, for approval, a detailed written plan of all methods of flow maintenance prior to construction or within five (5) calendar days following the pre-construction conference, whichever occurs first. The submittal must contain a letter describing the written plan for maintenance of flow including the approximate period of bypass pumping associated with the pipe lining, a list of streets to be impacted, equipment to be used, including back-up equipment, a list of contacts in case of emergencies, and all other information requested by the Engineer or Owner. The Contractor shall submit six (6) copies of this plan for the Owner's use, including sending a copy to the Department of Energy and Environmental Protection. No work shall commence without submittal and approval of this plan.
 - 1. Within fourteen (14) days of any planned bypass, the Contractor shall submit a bypass plan for any proposed bypass or dewatering activity.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION

3.01 GENERAL

- A. Contractor shall provide all labor, equipment, power and materials necessary to maintain flow in existing sewers (including individual house services), and handle existing wastewater flow. Construct and maintain all temporary bypass sewers and be responsible for all bypass pumping of sewage that may be required to prevent backing up of sewage during installation of all new pipe and manhole and to allow proper inspection and testing of the new work. The Contractor shall immediately remove and dispose of all offensive matter spilled during the bypass pumping at his own expense. When the construction process entails sewer lining, the Contractor shall implement an operation that prevents backups into private services and buildings. Work shall be performed as specified in the applicable Work Specification including but not limited to notification procedures for reduced flow usage and/or sewage handling in the case of larger consumers that must have laterals maintained twenty-four (24) hours a day, seven (7) days a week.
- B. When bypass pumping is required the Contractor shall supply pumps, conduits, power, and other equipment to divert the flow of sewage around the section in which work is to be performed. The bypass system shall be, as a minimum, at least 110% of the maximum capacity of the pipes being bypassed. A secondary pump is required to be on hand and within distance of bypass site so as to maintain flow within the collection system at all times should the primary pump fail.
- C. Contractor shall include all upstream construction activities, including flows generated by the Contractor.

THE METROPOLITAN DISTRICT

- D. Wastewater flows from existing sewers shall not be allowed to enter the new facilities or pipes until the new facilities or pipes have been cleaned and tested as required in the Specifications.
- E. The Contractor shall not be permitted to overflow, bypass, pump or by any other means convey sewage or drainage to any brook or water course without permission of the Engineer.
- F. Should damage of any kind occur to the existing sewers, the Contractor shall at his own expense make repairs to the satisfaction of the Engineer.
- G. The Contractor shall be required to repair at his own expense any damage to property, public or private, caused by his operations.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01561

PEST CONTROL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies requirements for pest control related activities at all Work and staging areas in connection with this Contract. The Contractor shall conduct a Rodent Control Survey and develop a Rodent Control Plan that conforms to the City/ Town/State of Connecticut requirements.
- B. Rodent Control Survey and Control Plan shall be performed by a certified pest control specialist. A weekly inspection for pest activity and sanitation deficiencies in all work areas, staging areas and adjacent areas shall be included in the Plan.

1.02 SUBMITTALS

- A. Prior to the start of construction activity, submit in accordance with Section 01300 a written description of the Rodent Control Survey and Control Plan and procedures to be used. The Rodent Control Plan must be approved by the Engineer and the municipality.
- B. Three weeks prior to pest control work in the staging areas outside the Contract area, submit the location of the area, the name of the pest control operator, pest control time schedule and products and procedures to be used. Submit before site occupancy a written statement from the pest control operator certifying that the staging areas are rodent-free.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 WORK AND STAGING AREAS WITHIN THE CONTRACT AREA

- A. Before mobilization begins, provide notification that rodent populations have been effectively controlled by the pest control contractor in the work areas.
- B. Following site clearing and before demolition, excavation, or construction, inspect work areas and remove all remaining trash, debris and weeds.
- C. Maintain work and staging areas free of trash, garbage, weeds and debris. Provide and enforce proper use of refuse containers to ensure that rodents and other pests are not harbored or attracted.
- D. Designate specific locations as lunch and coffee break areas to prevent random disposal of garbage and trash. Keep those areas free of litter and garbage and

THE METROPOLITAN DISTRICT

provide proper refuse containers with lids. Keep refuse containers upright with their lids shut tight.

- E. Have all refuse containers emptied daily to maintain site sanitation.
- F. Notify the Engineer within twenty-four (24) hours whenever rodents (rats or mice) or signs of rodent activity (burrows or droppings) are observed in work or staging areas.

3.02 STAGING AREAS OUTSIDE THE CONTRACT AREA

- A. Implement pest control at all staging areas that are not areas of this Contract, but that are used in connection with this Contract. Undertake rodent control at least two weeks prior to use of the area and with adequate time to ensure that the site is free of rodent populations (rats and mice) prior to site occupancy. Maintain the site free of rodents throughout the duration of its use.
- B. Clear staging areas of trash, debris and weeds prior to occupancy. Initiate those actions only after rodent populations have been effectively controlled.
- C. Maintain staging areas free of trash, garbage, weeds and debris. Provide and enforce proper use of refuse containers to ensure that rodents and other pests are not harbored or attracted.
- D. Dispose of all garbage or trash associated with food in refuse containers with tight-fitting lids. Have refuse containers emptied twice weekly or more frequently if necessary to maintain site sanitation.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01562

DUST CONTROL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Perform dust control operations whenever necessary or when directed even though other work on the project may be suspended. Dust control on exposed soil in trenches or rights of way shall be generally accomplished by the use of water. Calcium chloride may be used when necessary to control dust nuisance on paved surfaces or sidewalks.

1.02 RELATED SECTIONS

- A. Section 01060, Regulatory Requirements
- B. Section 01110, Environmental Protection Procedures

PART 2 - PRODUCTS

2.01 CALCIUM CHLORIDE

- A. Calcium Chloride shall conform to the requirements of AASHTO M144, Type I or Type II and ASTM "Specification for Calcium Chloride," ASTM D98, latest revision. The calcium chloride shall be packaged in moisture-proof bags or airtight drums marked with the manufacturer's name, name of product, date of manufacture, net weight and percentage of calcium chloride guaranteed by the manufacturer, all legibly marked on each container.
- B. Calcium chloride failing to meet the requirements of the aforementioned specifications, or that which has become caked or sticky in shipment, etc., may be subject to rejection at the discretion of the Engineer.

2.02 WATER

- A. Water shall be reasonably clean, shall not be salty or brackish, and shall be free from petroleum products, acids, injurious alkalis and vegetable matter or other deleterious material. The water shall be tested in accordance with AASHTO Method T26 (except if water originates from Owner water mains).
- B. Where an Owner water supply system is available, the Contractor may utilize water from said supply system for controlling dust; however, prior to the use of such water, the Contractor shall make the necessary arrangements with the MDC Operations Department.
- C. Refer to Section 01060 Regulatory Requirements for administrative procedures, application requirements and fees associated with water usage.

THE METROPOLITAN DISTRICT

2.03 REGULATORY REQUIREMENTS

- A. The Contractor shall comply with all the applicable requirements of federal, state, municipal or local conservation/wetlands/watercourses authority having jurisdiction in such matters.

PART 3 - EXECUTION

3.01 DUST CONTROL

- A. The Contractor shall utilize predetermined traffic detour routes to reduce dust generation. The Contractor shall utilize such traffic control measures as may be applied to redirect traffic to predetermined alternate routes, in an attempt to reduce dust generation.
- B. The Contractor shall maintain as much of the existing vegetation as is practicable in non-paved areas.
- C. The Contractor shall utilize phasing of construction as may be practicable to reduce the extent of disturbed area at any given location.
- D. The Contractor shall utilize temporary mulching and/or temporary vegetative cover applications in non-paved areas disturbed by construction to reduce the need for dust control.
- E. The Contractor shall utilize mechanical sweepers on paved surfaces, as necessary, to prevent dust build-up.
- F. Portable rock crushers where allowed and utilized shall be equipped with fine water sprays to control dust.
- G. Water utilized for dust control on exposed soil shall be applied with suitable equipment, such as tank trucks, tanks, pipelines or other devices capable of applying a uniform spread of water over the surface receiving treatment. The equipment shall have a suitable device for positive shut-off and regulating the flow of water to permit positive operator control.
- H. Where calcium chloride is utilized for dust control on paved surfaces or sidewalks, the calcium chloride shall be either loose dry flakes or granules fine enough to be fed through a spreader or similar device, at a rate that will keep the treated surface moist, but not cause pollution or plant damage. Calcium chloride shall be applied utilizing equipment that permits uniform distribution over the entire area receiving treatment. The Contractor shall exercise the proper precautionary procedures and measures regarding the storage, handling and application of calcium chloride in concert with the manufacturer's recommendations, the products "Material Safety Data."
- I. The Contractor shall be responsible for taking all the necessary precautions to avoid entry of calcium chloride into sewers and drains, brooks, streams or other water bodies and drinking water sources.

THE METROPOLITAN DISTRICT

- J. Repetitive treatments of dust control measures shall be applied as needed or directed to accomplish dust control, at no additional cost to the Owner.
- K. The Contractor shall construct and maintain an anti-tracking pad at the entrance to any and all off-road work or staging areas. The Contractor shall remove the anti-tracking pad once the project is completed and restore the affected land in accordance with this Specification.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01570

MAINTENANCE AND PROTECTION OF TRAFFIC

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide, install, maintain, adjust, remove, store and transport all construction signs, barricades, barricade warning lights, traffic cones, traffic drums, sign supports, steel plates, pavement markings, vehicle loop detectors and all other traffic control items necessary or required for the maintenance and protection of vehicular and pedestrian traffic. The Contractor shall take all the necessary measures and precautions for the maintenance and protection of vehicular and pedestrian traffic, both in the immediate work zones, and throughout the overall project area as deemed necessary by the Municipality (with which the Work is located in), CTDOT (if work is occurring on a state road) and/or the Owner. The Contractor shall furnish all the labor, equipment, tools, materials and services required to perform all the Work. The duration of this Work shall be from the date any work is started on the Contract site, including mobilization and until the date of final Contract acceptance. Temporary material and components that are furnished by the Contractor shall remain the property of the Contractor.
- B. Unless other provisions are made on the Contract Drawings or in these Contract Documents, the Contractor shall keep the roadway under construction open to traffic for the full length of the project and shall provide a sufficient number of travel lanes and pedestrian pass ways to move traffic and pedestrians. The travel lanes and pedestrian pass ways shall be kept reasonably smooth and in suitable condition at all times. The Contractor shall conduct its operation to ensure the safety and convenience of travelers and abutting property owners.

1.02 RELATED SECTIONS

- A. Section 01044, Progress and Sequence of Work
- B. Section 01046, Control of Work
- C. Section 01576, Traffic Control Persons
- D. Section 02510, Temporary and Permanent Paved Surface Restoration
- E. Section 02515, Concrete Sidewalks and Walkways

1.03 REFERENCES

- A. Owner Standard Specifications, latest revision.

THE METROPOLITAN DISTRICT

- B. State of Connecticut, Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction, Form 817 including all additions and revisions.
- C. Manual of Uniform Traffic Control Devices (MUTCD), latest revision.
- D. All applicable municipal rules, regulations, specifications, standards and manuals.
- E. American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide, 4th Edition 2011 or latest revision.
- F. AASHTO Policy on Geometric Design of Highways and Streets, 6th Edition 2011 or latest revision.

1.04 SUBMITTALS

- A. Any proposed revisions to the Temporary Traffic Control (TTC) Contract Drawings, including detour plans, shall be submitted to the Owner a minimum of fourteen (14) days prior to the scheduled work.
- B. The Contractor shall submit a Two Week Look Ahead form in the format provided by the Owner. A sample of this form is included following this Section. The form shall be completed and e-mailed to traffic@themdc.com each week (every Thursday by 11:00 am). Information on the form includes: location of work, construction activity and MPT activity (road closed, lane closed, etc.). The information may be displayed on the Owner's Google Traffic Alert map.

PART 2 – PRODUCTS

2.01 PRODUCTS AND MATERIALS

- A. All products and material furnished and incorporated into the Work under this Section shall conform to the requirements and Specifications found in the references listed in Section 1.03 and the following:
 - 1. Owner's Maintenance and Protection of Traffic Design Guidelines, latest revision;
 - 2. Owner's Standard Details, latest revision; and
 - 3. CTDOT Standard Details, latest revision.

PART 3 – EXECUTION

3.01 GENERAL

- A. The Contractor shall maintain vehicular and pedestrian traffic at all times in compliance with the requirements, restrictions, limitations and ordinances imposed by the Municipality, CTDOT (if work is on a state road), and the

THE METROPOLITAN DISTRICT

Contract Documents. If safety problems or congestion are resulting from construction activities, the Contractor may be required by the Municipality, CTDOT, or the Owner to modify the work area traffic control to improve traffic flow. This shall be done immediately and at no additional cost to the Owner.

- B. The Contractor shall make all the necessary arrangements to coordinate traffic control procedures with the Municipality and CTDOT (if required) to minimize the impact of construction activities upon traffic flow.
- C. The Contractor shall attend a tailgate meeting each morning with the Owner's construction representatives and the traffic control person(s).

3.02 TEMPORARY TRAFFIC CONTROL CONTRACT DRAWINGS

- A. The Temporary Traffic Control (TTC) Contract drawings are based upon the suggested construction phasing plan described in Section 01044, Progress and Sequence of Work. The Contractor shall establish work areas in accordance with the TTC Contract Drawings or shall obtain written approval from the Owner and the Municipality and CTDOT, if applicable, to revise.
- B. The Contractor is required to use the TTC Contract Drawings contained in the Contract Documents. At the morning tailgate meeting, the Contractor shall have a copy of the approved TTC plan to be used.

Revisions to the TTC Contract Drawings may result based on requests or restrictions from the Owner, the Municipality, or CTDOT to address field conditions or other circumstances. Additionally, the Contractor may propose revisions to the TTC Contract Drawings to facilitate their means and methods for construction or if the Contractor cannot implement the TTC Contract Drawings. The Contractor shall submit all proposed TTC plan revisions to the Owner at least 14 calendar days prior to implementation for approval.

- C. The Contractor shall be responsible for the preparation and costs associated with their proposed revisions to the TTC Contract Drawings. Revisions to the TTC Contract Drawings by the Contractor shall be prepared and stamped by a Professional Engineer licensed in the State of Connecticut. The TTC plan shall be designed in accordance with the above referenced "Maintenance and Protection of Traffic Design Guidelines" latest revision.
- D. If these specifications are being used for the purpose of a pipe rehabilitation construction project including pipe lining (CIPP), CCTV inspection, point repairs, manhole lining, replacing frame and covers, etc., the Contractor is required to use the typical temporary traffic control plans found in the Contract Drawings on the traffic management sheets for all applicable work zone set ups. The Contractor shall submit to the Owner a list of work zone locations with the appropriate temporary traffic control plan required to complete the work as called out in the "Typical Temporary Traffic Control Plan Summary Table" found within the pipe rehabilitation traffic management sheets. The submittal shall reference the typical plan by letter designation found within the table. It is the responsibility

THE METROPOLITAN DISTRICT

of the Contractor to confirm the traffic control plan is adequate to complete the work. The Owner reserves the right to reject any location within the submission and require a site specific traffic control plan should the Owner deem the chosen typical traffic control plan is not sufficient. When a temporary traffic control plan, from the above referenced table, cannot be used due to field conditions (i.e. road closure, unique lane configuration, CT DOT requirements, etc.) or other, the Contractor is required to prepare and submit to the Owner, a site specific temporary traffic control plan stamped by a Professional Engineer licensed in the State of Connecticut., This shall be done prior to implementing any detours or lane closures, within 14 calendar days and at no additional cost to the Owner.

3.03 WORK ZONE TRAFFIC CONTROL

- A. The Contractor shall guide traffic and protect workers and the public while conducting moving or short duration work zones. Moving or short duration work zones are anticipated for, but not limited to, road restoration (milling and paving) and installation of pavement markings. A project meeting to plan and coordinate these types of work zones shall be conducted with the Owner at least fourteen (14) calendar days prior to performing any work. Additional traffic control measures may be required to ensure safe and efficient moving or short duration work zones.
- B. Unless specified on the Contract Drawings, the Contractor is not permitted to leave work areas and traffic control set up in the roadway overnight. Detour signs can remain in place, but shall be covered/bagged when the detour is not being actively used and removed when the detour is no longer needed. During the construction winter shutdown all detour signs shall be removed and re-installed the following season if required at no additional cost to the Owner. The Contractor is required to protect the Work area during non-working hours, as well, and shall backfill or cover all trench areas. If the use of **steel plates** is approved by the Owner, Municipality and/or CTDOT the Contractor shall comply with the following requirements and any other requirements of the Municipality / CTDOT:
 - 1. Steel plates shall have a permanent slip-resistant surface.
 - 2. Steel plates shall be pinned and ramped in place with asphalt.
 - 3. Traffic control signs shall be installed to warn motorists of steel plates.
- C. The Contractor shall take all necessary precautions to protect the public and workers during setup and removal of traffic control for work zones. Warning signs shall be in place in advance and prior to the start of the work zone traffic control setup and shall remain in place until after the work zone traffic control setup has been removed. Except where traffic conditions require otherwise or as directed by the Owner, placement of the traffic control devices shall begin at the upstream end of the work zone and proceed downstream with traffic flow. Removal shall begin at the downstream end and proceed upstream, opposite of the setup flow. Work zone traffic control devices shall be set up according to the

THE METROPOLITAN DISTRICT

TTC Contract Drawings and with proper taper and buffer (tangent) lengths. Work zone traffic pattern setup shall not commence until the start of the work hours (as defined in the Contract Documents) and shall be fully cleared and traffic restored to normal by the permitted end of the established work hours.

- D. The Contractor will be responsible for monitoring the work zone traffic control to ensure that the devices are present and in very good condition. Adjustments to the devices may need to be made at the request of the Owner or Municipality/CTDOT to meet field conditions or for other reasons (safety, congestion or other). The Contractor shall designate a traffic control person who is responsible for the set up and monitoring of the work zone. This person shall be reachable by cell phone and should be able to respond to any requests within a reasonable timeframe (not to exceed 2 hours). Failure to adequately setup or maintain traffic control within the work zone may result in cessation of work. For each calendar day (or portion thereof) during which there are substantial deficiencies in compliance with the TTC Contract Drawings or these Specifications, reduced payment will be made for the Maintenance and Protection of Traffic (lump sum part) and/or traffic items. The amount will be prorated per day.

3.04 ROAD CLOSURES AND DETOURS

- A. The Contractor shall not close or otherwise obstruct any portion of a street, road, or walk without obtaining the necessary permits or permission from the Municipality and CTDOT (if work is on a state road). Furthermore, the Contractor shall not obstruct any driveway or private way without first obtaining permission, in writing, from the affected property owner(s) and/or associations. The Contractor shall maintain public access to intersecting roads, residences, businesses, adjacent property, and transportation facilities. Any street, road, walk, driveway, private way or land area, public or private, that has not been officially closed shall be maintained passable and safe by the Contractor, who shall assume full liability and responsibility for the adequacy and safety of the provisions made therefore.
- B. Use of private lands, walks, drives, etc. for temporary detours for vehicular or pedestrian traffic or for storage of materials, equipment, field office, etc. shall only be permitted with the written permission of the affected property owner(s) involved and the Owner. The Contractor shall take all the necessary measures and provisions to provide safe access to and from said property(ies) and shall protect the owner(s) from any liabilities and responsibilities for damages, injuries or death, as a result of the Contractor's operations. The Contractor shall furnish to the Owner copies of all agreements made with property owners prior to the use of said property(ies) by the Contractor.
- C. Unless otherwise noted, detours will only be allowed during specified work hours, in accordance with applicable permits.
- D. The Contractor shall be fully responsible for notifying all affected parties of any unanticipated detour or road closings; especially emergency, fire and

THE METROPOLITAN DISTRICT

transportation authorities/agencies. The Contractor shall notify the Owner's Command Center, as well.

- E. Road closures will not be allowed to be in effect during any winter shutdown period.

3.05 TEMPORARY PEDESTRIAN TRAFFIC CONTROL

- A. Where pedestrian facilities exist, the Contractor shall maintain pedestrian access on at least one side of the street at all times and ensure provisions are consistent with the Americans with Disabilities Act (ADA). Where a sidewalk is closed, it shall be marked with a construction barricade and a Sidewalk Closed sign. Advance warning signs and directional guidance shall be provided to direct pedestrians. Pedestrians should be directed to cross at the nearest crosswalks.
- B. The Contractor shall provide and maintain, if necessary, temporary prominently defined walkways in areas of construction activity where the existing public walkways are in the proximity of excavations and/or construction equipment, thereby creating potentially hazardous conditions. Where such walkways are required, they shall have a minimum walking width of no less than three (3) feet with adequate protection on each side. The Contractor shall submit to the Owner for review and approval all proposed plans for temporary walkways.

3.06 COMMERCIAL AND RESIDENTIAL DRIVEWAY ACCESS

- A. The Contractor must provide access to businesses and residences at all times. The Contractor must provide "Business Access or Business Open" signs when the work affects any driveway opening adjacent to a business. Additional signs (Enter here, arrow boards, etc.) may also be required to guide traffic to businesses. This will be determined at the discretion of the Owner. Special consideration and work hours may be required when working around a church, funeral home, etc. Some businesses in the project area may generate truck traffic for deliveries, etc. The Contractor shall coordinate with these.

3.07 BUS SERVICE

- A. The Contractor shall maintain bus routes and stops within the limits of construction. The Contractor is required to coordinate directly with the Connecticut Transit. The Contractor shall provide construction activity schedule/updates to Connecticut Transit so they can alert their drivers and supervisors. Where bus service is maintained, the Contractor shall provide suitable areas for the loading and unloading of passengers.
- B. The Contractor shall also maintain access for school bus routes and stops. There may be door to door pick up/drop off locations within the project work area and the Contractor will be required to maintain access. A contact for the school bus transportation company will be provided to the Contractor. If known and available, a listing of bus routes/stops and locations of door to door pick up/drop offs will be provided to the Contractor. The Contractor shall treat the door to door

THE METROPOLITAN DISTRICT

locations as a must serve and shall work with the bus transportation company to accommodate routes and stops.

3.08 MAINTENANCE OF EXISTING TRAFFIC SIGNALS AND SIGNS

- A. The Contractor shall maintain existing traffic signals and existing signal coordination. All traffic signal hardware, including but not limited to wire, cable, conduit, pull boxes, signal heads, poles, cabinets, pedestrian signals and pedestals, pedestrian push buttons shall be maintained. The Contractor shall work with the signal owner to coordinate operation of the signal including use of a flash operation, if needed. The Contractor may be required to adjust or fix traffic signal or signal equipment. Any signal equipment modifications or replacements shall be made within 48 hours from request of the Owner or signal owner. (Urgent request may need to be made sooner). No separate payment will be made for this work.
- B. The Contractor will be responsible for maintaining existing traffic and parking signs within the project limits. Existing traffic and parking signs that conflict with construction operations shall be bagged. The Contractor shall be responsible for replacing any damaged traffic or parking signs at no additional cost to the Owner.

3.09 CONSTRUCTION VEHICLES AND EQUIPMENT

- A. The Contractor shall ensure that all construction vehicles and equipment are safely located or stored during work and non-working hours so as not to constitute a hazard to vehicles and/or pedestrians. All construction vehicles and equipment shall be operated or stored with due consideration for the safety of the public and workers. Construction vehicles shall be equipped with warning lights, horns, signs and reflective markings to ensure safe operating conditions. Workers' personal vehicles shall be parked in legal parking areas within the roadway or public parking lot. Other parking locations shall be approved by the Owner.
- B. If the Contractor is allowed by the Owner and the Municipality to store construction vehicles and equipment in the public right-of-way during non-working hours, the Contractor shall provide appropriate warning signs and a barricade, etc. around all such vehicles and equipment.
- C. If the Contractor will not be performing any construction activity in a project area for more than one week, the Owner may require that all construction vehicles, equipment, and materials be removed from that area at no additional cost to the owner.

3.10 CONSTRUCTION SIGNS – ENCAPSULATED LENS TYPE III REFLECTIVE SHEETING

- A. The Contractor shall furnish, erect and maintain all signage in accordance with the TTC Contract Drawings or as directed by the Engineer. The sign locations shown on the TTC plans are approximate and may need to be adjusted in the

THE METROPOLITAN DISTRICT

field. Proper distances between advance warning signs are mandatory. Signs in poor condition shall not be used. The Engineer may require the removal and/or replacement of signs and devices that become damaged or are not satisfactory. The Contractor shall make readily available extra signs to be used as field conditions require. Additional signs shall include at minimum: Business Open, Road Work Ahead, Steel Plate Ahead, Road Closed to Thru Traffic Local Traffic Only, directional arrows and lane shift signs. The Contractor shall remove all traffic control signs and devices when no longer needed or required. Signs and their portable supports or metal posts shall conform to the requirements as shown on the Contract Drawings and the latest edition of the Manual of Uniform Traffic Control Devices. Portable sign supports may be used in such a manner as to minimize the possibility of the signs being blown over or displaced by the wind from passing vehicles and are to be of a yielding type to withstand impact with minimal damage to signs, supports, and vehicles.

3.11 CHANGEABLE MESSAGE SIGNS

- A. The Contractor shall furnish, erect and maintain all changeable message signs in accordance with the TTC Contract Drawings or as directed by the Engineer. Changeable) message signs shall conform to the State of Connecticut, Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction, Form 817, 2004 or the latest revision and amendments thereto. Work shall include furnishing and maintaining a trailer-mounted, changeable message sign or a remote controlled changeable message sign, whichever is applicable, at the locations indicated on the Contract Drawings or as directed by the Engineer.
- B. The Contractor shall provide access and training to operate the sign to a person specified by the Owner. When the sign is no longer required, it shall be removed by the Contractor. The Contractor shall designate a point of contact that is available to change the sign message within two hours of notice by the Engineer.

3.12 42-INCH TRAFFIC CONES

- A. The Contractor shall furnish, erect and maintain all traffic cones in accordance with the TTC Contract Drawings or as directed by the Engineer. Traffic cones shall be forty-two (42) inches in height and constructed to withstand impact without damage to the cone or to vehicles. The traffic cones shall be sufficient weight or have bases to which ballast may be added to assure that they will not be blown over or displaced by wind from passing vehicles. Traffic cone spacing shall be as indicated on the TTC Contract Drawings.
- B. The Contractor shall have available on the project, a sufficient number of traffic cones to protect vehicular and pedestrian traffic during construction procedures. All cones deemed by the Engineer, at their discretion, to be inadequate or damaged beyond practical use shall be replaced at no additional cost to the Owner.

THE METROPOLITAN DISTRICT

3.13 TRAFFIC DRUMS

- A. The Contractor shall furnish, erect and maintain all traffic drums in accordance with the TTC Contract Drawings or as directed by the Engineer. Traffic drums shall be manufactured plastic or rubber devices approximately thirty-six (36) inches in height and a minimum of eighteen (18) inches in diameter. The device shall be stabilized with the use of sandbags, ballast rings or other approved means.
- B. The Contractor shall have available on the project, a sufficient number of traffic drums to protect vehicular and pedestrian traffic during construction procedures. All drums deemed by the Engineer, at their discretion, to be inadequate or damaged beyond practical use shall be replaced at no additional cost to the Owner.
- C. If approved by the Owner, the Contractor may substitute forty-two (42) inch high traffic cones for drums in work areas, but not in locations where the work area traffic control set up is used at night.

3.14 TYPE III CONSTRUCTION BARRICADE

- A. The Contractor shall furnish, erect and maintain all construction barricades in accordance with the TTC Contract Drawings or as directed by the Engineer. Construction barricades shall consist of plastic, aluminum or other material which is of sufficient strength for the intended purpose and will not create a hazard to the public. The Contractor shall have available on the project, a sufficient number of barricades to protect vehicular and pedestrian traffic during construction procedures. All barricades deemed by the Engineer, at their discretion, to be inadequate or damaged beyond practical use shall be replaced at no additional cost to the Owner.

3.15 BARRICADE WARNING LIGHTS (TYPE B)

- A. The Contractor shall furnish, install and maintain all barricade warning lights on signs and barricades in accordance with the TTC Contract Drawings or as directed by the Engineer. Barricade warning lights, if required shall be portable lens-directed enclosed light. The light emitted shall be yellow and the light shall be used in a flashing mode. Barricade warning lights shall be in accordance with the requirements of the Institute of Transportation Engineers Standard for Flashing and Steady-Burn Barricade Warning Lights.

3.16 TRAFFIC CONE BARS

- A. The Contractor shall furnish, install and maintain all traffic cone bars in accordance with the TTC Contract Drawings, as directed by the Engineer or as needed to protect the work zone. Use of traffic cone bars and placement is subject to Engineer approval. Traffic cone bars are plastic connectors that are placed on top of traffic cones to help create a barrier. The Contractor shall have available on the project, a sufficient number of traffic cone bars to protect

THE METROPOLITAN DISTRICT

pedestrian traffic during construction procedures. All traffic cone bars deemed by the Owner, at their discretion, to be inadequate or damaged beyond practical use shall be replaced at no additional cost to the Owner.

3.17 TEMPORARY HOT APPLIED PAINTED PAVEMENT MARKINGS (WIDTH, COLOR)

- A. The Contractor shall furnish, install and maintain all temporary hot applied painted pavement markings in accordance with the TTC Contract Drawings, as needed to maintain existing conditions or as directed by the Engineer. Pavement markings shall be of the color and type of existing conditions or as directed by the Engineer including lines, legends, arrows or other markings. Painted legend, arrows and markings may be installed with a truck mounted painting machine or a hand striping machine as needed. Construction methods and materials shall be in conformance with Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 817 or latest revisions. Pavement areas to be painted shall be dry and sufficiently cleaned. Hot-applied paint shall be applied at a temperature of 130 to 145 degrees Fahrenheit at the spray gun. All painting shall be performed in a neat and workmanlike manner. The Contractor shall use a police escort for the truck mounted painting machine.
- B. During construction, the Contractor shall maintain all pavement markings throughout the limits of the project. The Contractor shall replace all pavement markings removed or damaged by construction. The Contractor will be responsible for maintaining existing pavement markings as needed to safely and efficiently guide or control traffic. Crosswalks, stop bars and lane lines may need to be remarked or marked in a different location. The Contractor may be required to install pavement markings on an interim measure. (i.e. before a winter shutdown period, if construction is to last for more than one season). Ticks marks shall be provided for all centerlines on an interim basis between paving and pavement marking installation.
- C. Where pavement markings have been removed as a result of construction operations, the Contractor shall repaint markings within 5 calendar days after placement of paving or as requested by the Municipality or Owner. Temporary pavement markings shall be maintained until final paving is completed.

3.18 PERMANENT EPOXY RESIN PAVEMENT MARKINGS (WIDTH/COLOR)

- A. The Contractor shall furnish, and install permanent epoxy resin pavement markings in accordance with the TTC Contract Drawings, as needed to restore existing conditions or as directed by the Engineer. Pavement markings shall be of the color and type of existing conditions or as directed by the Owner including lines, legends, arrows or other markings. Epoxy resin markings shall be installed with a truck mounted machine and only when the road surface temperature is at least 40 degrees Fahrenheit and rising. Construction methods and materials shall be in conformance with Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 817 or latest

THE METROPOLITAN DISTRICT

revisions. Pavement areas to be painted shall be dry and sufficiently cleaned. All pavement marking work shall be performed in a neat and workmanlike manner. The Contractor shall use a police escort for the truck mounted painting machine.

- B. The Contactor shall notify the Owner, traffic@themdc.com, the Municipality, and CTDOT (if work is on a state road) five (5) calendar days prior to pavement marking installation.
- C. Ticks marks shall be provided for all centerlines on an interim basis between paving and pavement marking installation. The Contractor shall schedule and install pavement markings within 5 calendar days after placement of paving or as requested by the Municipality/CTDOT or Owner.
- D. Permanent pavement markings shall be warranted for up to one year from the date of installation. Markings required to be repainted will be determined at the discretion of the Engineer and at no additional cost to the Owner.

3.19 LOOP VEHICLE DETECTOR

- A. The Contractor shall furnish, and install loop vehicle detectors in accordance with the TTC Contract Drawings, as needed to restore existing conditions or as directed by the Engineer. Work shall consist of protecting, maintaining, and replacing traffic loop detectors, fire box wiring, and related traffic signal wiring and equipment that is removed or damaged by construction. This work also includes furnishing and installing saw cut for the installation of the loop vehicle detector. Replacement of loop vehicle detectors shall conform to the State of Connecticut Specifications, Form 817 and latest revisions and/ or municipal standard.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01576

TRAFFIC CONTROL PERSONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide the services of traffic control persons of the type (uniformed police and/or uniformed flaggers) and number necessary to safely and efficiently control traffic in and around the work zone(s).
- B. Unless otherwise directed by the Owner, traffic control persons shall be present at all times during construction. No construction activity will be allowed to take place including setup and break down of work zones, without the necessary traffic control persons.
- C. The intent of utilizing traffic control persons is to insure public safety by direction of both vehicular and pedestrian traffic. Traffic control persons shall not serve as watchmen to protect the Contractor's equipment and materials.

1.02 RELATED SECTIONS

- A. Section 01046, Control of Work
- B. Section 01120, Site Specific Health & Safety Plan
- C. Section 01570, Maintenance and Protection of Traffic

1.03 REFERENCES

- A. Manual on Uniform Traffic Control Devices (MUTCD), most recent update
- B. American Traffic Safety Services Association (ATSSA)
 - 1. Traffic Control Technician (TCT) certification
 - 2. Traffic Control Specialist (TCS) certification
- C. National Safety Council
- D. The American National Standard for High-Visibility Safety Apparel and Headwear (ANSI/ISEA 107-2004), most recent update
- E. Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction. Form 817, or latest revision.

1.04 SUBMITTALS

- A. Uniformed flaggers shall be persons who have successfully completed

THE METROPOLITAN DISTRICT

flagger training by the ATSSA, National Safety Council, or other program approved by the Owner. A copy of the flagger's training certificate shall be provided to the Owner prior to starting Work.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.01 GENERAL

- A. On a weekly basis, the Contractor shall inform the Owner of their scheduled operations for the following week, including the number and type of traffic control persons and any police vehicles to be requested. Upon review, the Owner may require modifications to the number and type of traffic control persons and police vehicles. The Contractor shall copy or inform the Owner on all final police orders.
- B. The Contractor is responsible for making all arrangements to obtain police and/or uniformed flaggers (where permitted). This includes the scheduling of police and/or uniformed flaggers, approval of police slips, and verification of invoicing.
 - 1. At the end of each work day, police slips shall be signed by the Contractor and submitted to the Owner for approval. Slips not signed by the Contractor and approved by the Owner will not be eligible for payment by the Owner.
- C. Per Standard General Conditions of the Construction Contract, Section 6.02, Paragraph's C and D, the Owner will not pay for police costs for overtime in excess of regular working hours.
- D. Cancellation of any scheduled traffic control detail due to inclement weather or any other reason shall be the responsibility of the Contractor and shall be made in accordance with the municipal and Owner requirements. The Contractor shall be responsible for payment of traffic control persons not cancelled or cancelled without proper notice at no cost to the Owner.
- E. Uniformed flagger's equipment shall include: high visibility garments that meet ANSI Class 2 requirements or higher, a brightly colored hard hat, and a STOP/SLOW paddle that is at least 18 inches in width with letters at least 6 inches high. The bottom of the sign shall be 6 feet above the ground. Uniformed flaggers will only be used at such locations and for such periods as the Owner approves.
- F. All invoices for traffic control persons and police vehicles shall be made to the Contractor. The Contractor shall pay all invoices and expenses incurred. For compensation of these expenses, refer to Sections 01025 and 01030.

END OF SECTION

01576-2

THE METROPOLITAN DISTRICT

SECTION 01600

DELIVERY, STORAGE, AND HANDLING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies the general requirements for the delivery, handling, storage and protection for all Items required in the construction of the Work. Specific requirements, if any, are specified with the related Item.

1.02 TRANSPORTATION AND DELIVERY

- A. Transport and handle Items in accordance with manufacturer's instructions.
- B. Schedule delivery to reduce long term storage prior to installation and/or operation. No materials and equipment are to be stored at the Work site. The Contractor shall maintain an off-site storage yard. All materials delivered to the on site work area shall be carefully coordinated for immediate installation.
- C. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged or sensitive to deterioration.
- D. Deliver products in manufacturer's original sealed containers or other packing systems, complete with instructions for handling, storing, unpacking, protecting and installing.
- E. All items delivered shall be unloaded and placed in a manner which will not hamper the Contractor's normal construction operation or those of Subcontractors and other Contractors and will not interfere with the flow of necessary traffic.
- F. Provide necessary equipment and personnel to unload all items delivered.
- G. Promptly inspect shipment to assure that products comply with requirements, quantities are correct and items are undamaged. For items furnished by others (i.e. Owner, other Contractors), perform inspection in the presence of the Engineer. Notify Engineer verbally, and in writing, of any problems.

1.03 STORAGE AND PROTECTION

- A. Store and protect products in accordance with the manufacturer's instructions, with seals and labels intact and legible. Storage instruction shall be studied by the Contractor and reviewed with the Engineer. Instruction shall be carefully followed and a written record of this kept by the Contractor. Arrange storage to permit access for inspection.

THE METROPOLITAN DISTRICT

- B. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- C. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural, miscellaneous and reinforcing steel shall be stored off the ground or otherwise to prevent accumulations of dirt or grease and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, cracking and spalling to a minimum.
- D. All mechanical and electrical equipment and instruments subject to corrosive damage by the atmosphere if stored outdoors (even though covered by canvas) shall be stored in a weathertight building to prevent injury. The building may be a temporary structure on the site or elsewhere, but it must be satisfactory to the Engineer. Building shall be provided with adequate ventilation to prevent condensation. Maintain temperature and humidity within range required by manufacturer.
 - 1. All equipment shall be stored fully lubricated with oil, grease and other lubricants unless otherwise instructed by the manufacturer.
 - 2. Moving parts shall be rotated a minimum of once weekly to ensure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
 - 3. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment at the time of acceptance.
 - 4. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01630

SUBSTITUTIONS AND PRODUCT OPTIONS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Furnish and install products specified, under options and conditions for substitutions stated in this Section.
- B. Whenever a product, material or item of equipment is specified or described by using the name of a proprietary product or the name of a particular manufacturer or vendor, followed by the phrase "or equal," the specific item mentioned shall be the basis upon which bids are to be prepared, and shall be understood as establishing the type, function, dimension, appearance and quality desired. Other manufacturer's or vendor's products not named will be considered as substitutions, provided the required information is submitted in the manner set forth in this Section and provided the substitution will not require substantial revision to the Contract Documents.

1.02 RELATED SECTIONS

- A. Section 00300, Bid Form

1.03 SUBMITTAL OF LIST OF PROPOSED SUBSTITUTIONS

1.04 CONTRACTOR'S OPTIONS

- A. For Products specified only by reference standard, select product meeting that standard, by any manufacturer.
- B. For Products specified by naming several products or manufacturers, select any one of products and manufacturers named which complies with Specifications.
- C. For Products specified by naming one or more products or manufacturers and stating "or equal," submit a request as for substitutions, for any product or manufacturer which is not specifically named.
- D. For Products specified by naming only one product and manufacturer, there is no option and no substitution will be allowed.

1.05 SUBSTITUTIONS

- A. In order for substitutions to be considered, the Contractor shall submit, within 30 days of issuance of Notice of Award, complete data as set forth herein to permit complete analysis of all proposed substitutions noted on his substitutions list. No substitution shall be considered unless the Contractor provides the required data in accordance with the requirements of this Section within the 30 day period.

THE METROPOLITAN DISTRICT

B. Submit separate request for each substitution. Support each request with:

1. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature; identify:
 - 1) Product description.
 - 2) Reference standards.
 - 3) Performance and test data.
 - 4) Operation and maintenance data.
 - c. Samples, as applicable.
 - d. Name and address of similar projects on which product has been used, and date of each installation.
2. Itemized comparison of the proposed substitution with product specified; list significant variations. Substitution shall not change design intent and shall perform equal to that specified.
3. Data relating to impact on construction schedule occasioned by the proposed substitution.
4. Any effect of substitution on separate contracts.
5. List of changes required in other work or products.
6. Accurate cost data comparing proposed substitution with product specified.
 - a. Amount of any net change to Contract Sum.
7. Designation of required license fees or royalties.
8. Designation of availability of maintenance services, sources of replacement materials.

C. Substitutions will not be considered for acceptance when:

1. They are indicated or implied on shop drawings or product data submittals without a formal request from Contractor.
2. They are requested directly by a Subcontractor or supplier.
3. Acceptance will require substantial revision of Contract Documents.

THE METROPOLITAN DISTRICT

- D. Requests for substitutions submitted after the time frames specified in 1.05.A. will not be considered unless evidence is submitted to the Owner that all of the following circumstances exist:
1. The specified product is unavailable for reasons beyond the control of the Contractor. Such reasons shall consist of strikes, bankruptcy, discontinuance of manufacturer, or acts of God.
 2. The Contractor placed, or attempted to place, orders for the specified products within 10 days after Notice of Award.
 3. Request for substitution is made in writing to the Owner within 10 days of the date on which the Contractor ascertains that he cannot obtain the Item specified.
 4. Complete data as set forth herein to permit complete analysis of the proposed substitution is submitted with the request.
- E. The Owner's decision regarding evaluation of substitutions shall be considered final and binding. Requests for time extensions and additional costs based on submission of, acceptance of, or rejection of substitutions will not be allowed. All approved substitutions will be incorporated into the Agreement by Change Order.

1.06 CONTRACTOR'S REPRESENTATION

- A. In making formal request for substitution, Contractor represents that:
1. He has investigated proposed product and has determined that it is equal to or superior in all respects to that specified.
 2. He will provide same warranties or bonds for substitution as for product specified.
 3. He will coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be complete in all respects.
 4. He waives claims for additional costs caused by substitution which may subsequently become apparent.
 5. Cost data is complete and includes related costs under his Contract, but not:
 - a. Costs under separate contracts.
 - b. Engineer's costs for redesign or revision of Contract Documents.

1.07 OWNER'S DUTIES

- A. Review Contractor's requests for substitutions with reasonable promptness.
- B. Notify Contractor, in writing, of decision to accept or reject requested substitution.

THE METROPOLITAN DISTRICT

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01700

CONTRACT CLOSEOUT

PART1 - GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Closeout procedures.
 - 2. Final cleaning.
 - 3. Adjusting.
 - 4. Spare parts and maintenance materials.

1.02 RELATED SECTIONS

- A. Section 01500, Temporary Facilities
- B. Section 01720, As-Built Documents
- C. Section 01740, Warranties

1.03 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected and that Work is complete in accordance with Contract Documents and ready for Owner's inspection.
- B. Provide submittals to Owner that are required by governing or other authorities.
- C. Submit As-Built Documents including As-built Drawings in compliance with Section 01720, As-Built Documents.
- D. Submit Application for Final Payment identifying total adjusted Contract Sum, previous payments and sum remaining due including retainage in accordance with the Agreement.

1.04 FINAL CLEANING

- A. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
 - 1. Remove labels that are not permanent labels.

THE METROPOLITAN DISTRICT

2. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
3. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

1.05 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.06 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Supply parts and maintenance material as required or requested by the Owner.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01720

AS-BUILT DOCUMENTS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. In addition to the requirements of the General Conditions, the Contractor shall maintain in good order “As-Built Documents”, which shall be marked to record all changes during construction of the Work. As-Built Documents shall include Contract Drawings, Specifications, Addenda, approved Shop Drawings, Samples, Test Records, Change Orders, other modifications of Contract Documents, Field Orders, Sketches, Photographs, and any other information necessary for the proper documentation of the Work as installed.
- B. “As-Built Drawings” shall be defined as marked Contract Drawings, sketches and other notes made by the Contractor to record changes to the Contract Documents during construction of the Work.

1.02 SUBMITTALS

- A. Within two weeks of Substantial Completion of the Contract, the Contractor shall deliver to the Engineer Two sets (color hard copies) of the As-Built Drawings.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.01 RECORDING

- A. The Contractor shall maintain current As-Built Documents at the Site. All field changes shall be recorded on the As-Built Documents within 24 hours of completion. The As-Built Documents may contain handwritten notes and sketches; however all modifications to printed documents shall be neat, clear, and legibly marked. Color markings may be used to record all variations made during construction of the Work.
- 1. The Contractor shall record the following water infrastructure:
 - location/size/type of water mains, valves, tees, crosses, bends, offsets, reducers, corporations, sleeves, couplings, air valves, blow offs, anchors, thrust blocks, casings, meter pits, hydrants, services, caps, plugs, and other structures; distance along the water main between fittings; location and type of restraint; direction of operation of valves (open right (RH) or open left (LH)); depth of cover over water mains, if other than typical (4.5 feet); and description of vertical or rolled bends and offsets. The Contractor shall provide detailed sketches of connections to the existing system showing components including tees, nipple lengths, sleeves, valves, MEGALUGs®, anchors, etc.

THE METROPOLITAN DISTRICT

2. The Contractor shall record the following newly installed or rehabilitated sewer and storm drainage infrastructure: location/elevation/size/type of sanitary sewers, combined sewers, storm drainage pipes, manholes, structures, catch basins, area drains, lateral pipes, chimneys, force mains, siphons, cleanouts, backwater valves, interior plumbing modifications, and all type of fittings built as part of the project. The presence of rock, if encountered, and the presence of sheeting, if left-in-place, shall also be recorded.
- B. For water As-Built Drawings, all valves, fittings, fire hydrants, blow offs, branches, and dead ends shall be located by measurement to a minimum of two fixed permanent objects. Measurements may be made to: the center of another gate box, the center of a manhole cover, hydrant operating nuts, corner of storm sewer curb inlets, perpendicular to curb face, or a utility pole.
- C. For sewer/storm As-Built Drawings, manhole-to-manhole measurements shall be recorded from center of cover to center of cover. Location of lateral connections will be measured as the distance from the center of the cover on the nearest downstream manhole. Elevations of top of frame for all manholes/structures, inverts of all pipes in and out of each manhole/structure, and inverts of all lateral connections shall be recorded using North American Vertical Datum 1988 (NAVD88). Grades of all pipes shall be calculated and recorded.
- D. For sewer/storm lateral pipes, the following information shall be recorded: house number, lot number, type of connection fitting (tee, tee wye, wye, Inserta Tee, chimney, MH connection, or MH drop connection), station of the lateral connection to the main, station of the lateral at the property line, length of pipe from the center of the main to the property line, depth to pipe invert at property line, rise along the lateral, slope in percentage to the nearest hundredth, type and size of pipe, elevation of the top of the pipe at the property line, and date of installation.
- E. Horizontal distances shall be measured and recorded to the nearest tenth of a foot. For sewer/storm As-Built Drawings, vertical elevations shall be measured and recorded to the nearest hundredth of a foot.
- F. Abandoned infrastructure left-in-place shall be recorded for location, size, type, and method of abandonment. For sewer/storm infrastructure, elevation shall also be recorded.
- G. Other underground utilities encountered during the construction of the Work shall be recorded for location, size, and type.
- H. No part of the Work shall be permanently concealed until the required information has been recorded.
- I. The Contractor shall make the As-Built Documents available at all times for inspection by the Engineer and/or Owner.

THE METROPOLITAN DISTRICT

- J. As-Built Documents shall not be used for any other purpose other than to record the Work and shall not be removed from the Contractor's office without Owner approval.
- K. All measurements related to the construction of the Work shall be verified by a Land Surveyor licensed in the State of Connecticut. The measurements shall include all elevations, distances and ties captured during the construction of the Work.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01725

PRESERVATION AND RESTORATION OF PROJECT FEATURES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Protection and replacement of trees, shrubs, signs, property markers, fences, and related project features.
2. Taking precautions, providing programs, and taking actions necessary to protect from damage all public and private property and facilities that are outside the Work scope.

1.02 RELATED SECTIONS

- A. Section 01040, Coordination with Utilities
- B. Section 02900, Landscaping
- C. Section 02905, Unpaved Surface Restoration and Reset Miscellaneous Items
- D. Section 02930, Loaming, Seeding and Sodding
- E. Section 02971, Cleanup

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION

3.01 REPAIR/RESTORATION

- A. Trees and shrubs on private property, which are removed or damaged by the Contractor, shall be replaced in kind.
- B. Signs, fences, property markers, mailboxes, walls, guard rails and other public or private property shall be replaced in kind if damaged by the Contractor. Supports and protective devices required shall be provided.
- C. Underground and Surface Structures
 1. Sustain in their places and protect from direct or indirect injury underground and surface structures designated to remain within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the owner of such structure. Before proceeding with the work of

THE METROPOLITAN DISTRICT

sustaining and supporting such structure, satisfy the Engineer that the methods and procedures to be used have been approved by the party owning same.

2. In the event of damage, injury or loss to existing underground or surface structures that were not indicated to be removed or abandoned, whether shown on the Contract Drawings or not, make all reasonable efforts to facilitate repairs and to mitigate the impact of such events upon the utility or structure owner's normal operations. Restore the existing utility or structure to the condition required by the owner of the utility or structure or at least to the condition found prior to the Work. In the event that the utility owner elects to make the repairs, provide all reasonable access and assistance, and reimburse the utility owner for the cost of repairs. If utility service is interrupted due to damage to facilities, alternate facilities shall be provided.
3. 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 the Work shall be carefully protected for resetting during surface restoration. Each item shall be reset as close to its original location as practicable. All work shall be approved by the Engineer.
4. Existing signs, lampposts, mailboxes, etc. which may be damaged or removed during the course of installing the new pipelines shall be reinstalled in a vertical position at the same location from which they were removed. Replace damaged items with items of equal or better quality than the damaged items. Provide a concrete anchor as necessary, to ensure a rigid alignment at no additional cost. Exercise care in the reinstallation of all items to prevent damage to the newly installed pipelines.
5. Prior to proceeding with any demolition or construction, notify in writing owners of utilities and structures within the vicinity of the proposed Work.
6. Work affecting water distribution systems, which will take fire hydrants out of service, must be coordinated with the local fire department. The Contractor shall be prepared to restore fire flows in the event of an emergency or to provide for temporary fire flow service in accordance with the requirements of the local fire department.
7. When any survey monument or property marker, whether of stone, concrete, wood or metal, is in the line of any trench or other demolition or construction work and may have to be removed, notify the Engineer in advance of removal. Under no circumstances shall any monument or marker be removed or disturbed by the Contractor or by any of his Subcontractors, employees or agents, without the permission of the Engineer. Monuments or markers removed or disturbed shall be reset by a land surveyor licensed in the State of Connecticut at the Contractor's expense. Should any monuments or markers be destroyed through accident, neglect or as a result of the Work under this Contract, the Contractor shall, at his own expense, employ a land surveyor

THE METROPOLITAN DISTRICT

licensed in the State where the Work is located to re-establish the monument or marker.

- D. Replace in-kind any damaged traffic loop detection wiring in a timely fashion. In general, traffic signal wiring damaged by the Contractor shall be replaced and placed in service no later than 24-hours after being taken out of service.

3.02 TREE AND PLANT PROTECTION

- A. The 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.
 - 1. The construction of certain portions of the project may require excavation within the root systems of trees. If necessary, excavation shall be made with small powered equipment or by hand to comply with the requirements of this section. It may be necessary to excavate from more than one direction to avoid damage to the roots. No roots shall be cut within the "Critical Root Radius" (CRR). The CRR (in feet) is calculated by measuring the diameter of the trunk (in inches) at four and one-half feet from the ground and multiplying by 1.5. The Contractor shall consider the tree's loss of stability in wind and under snow and ice loads. If die back occurs in the top of the tree due to damage to the root system, dead branches shall be pruned from the tree before they fall and cause injury.
 - 2. The trunks of trees that are to remain and are within the swing radius of the excavating machine bucket when fully extended shall be wrapped with burlap and by 4 inch protective wood slats (8 inch spacing maximum) wired around the circumference of the trees to protect them from damage.
 - 3. Materials or equipment shall not be stored or parked within the drip line.
 - 4. Temporary fences or barricades shall be installed to protect trees and plants in areas subject to traffic.
 - 5. Fires shall not be permitted under or adjacent to trees and plants.
 - 6. Within the limits of Work, water trees and plants that are to remain, in order to maintain their health during construction operations.
 - 7. 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.
 - 8. Tree limbs shall not be cut except upon written approval of the Owner and the Engineer. If branches, limbs or trunks are cut or damaged, prune branches immediately and protect the cut or damaged areas with emulsified asphalt

THE METROPOLITAN DISTRICT

compounded specifically for horticultural use in a manner approved by the Engineer.

9. 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 at no additional cost to the Owner.
- B. If work is in the City of Hartford, Contractor will be required to comply with the following City ordinance sections relating to work around existing trees:
1. Section 28-161 – Protection during construction
 2. Section 28-162 – Tree Replacement

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 01740

WARRANTIES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies general administrative and procedural requirements for specific warranties required by the Contract Documents, including manufacturers' standard warranties on products and special warranties, and are in addition to the General Warranty and Guaranty included in the General Conditions of the Construction Contract.

1.02 RELATED SECTIONS

- A. Section 01700, Contract Closeout
- B. Refer to Conditions of Contract for the general requirements relating to warranties and bonds.
- C. Specific requirements for warranties for the Work and products and installation that are specified to be warranted are included in the individual Sections of Divisions 2 through 17, as used.

1.03 SUBMITTALS

- A. Submit required written warranties to the Owner prior to the date fixed by the Engineer for Substantial Completion. If the Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion of the Work, or a designated portion of the Work, submit written warranties upon request of the Owner.
- B. When a designated portion of the Work is completed and occupied or used by the Owner, by separate Agreement with the Contractor during the construction period, submit properly executed warranties to the Owner within fifteen (15) days of completion of that designated portion of the Work.
- C. When a special warranty is required to be executed by the Contractor, or the Contractor and a Subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner for approval prior to final execution.
- D. Refer to individual Sections of Divisions 2 through 17, as used, for specific content requirements and particular requirements for submittal of special warranties.

THE METROPOLITAN DISTRICT

1.04 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
- B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights or remedies.
- E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- F. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers and Subcontractors required to countersign special warranties with the Contractor.

1.05 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

Division 2 – Sitework

THE METROPOLITAN DISTRICT

SECTION 02011

TEST PITS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes the excavation of exploratory test pits to determine or verify underground utility or structure locations or other purposes.
 - 1. Test pit excavation under this Section shall be made where indicated on the Contract Drawings or as ordered by the Engineer. Required pre-excavation of the trench as specified elsewhere herein shall not be considered as a test pit for the purposes of this Contract. The Work shall include all necessary excavating, disposing of excavated material, backfilling with bank run gravel in town streets and common fill in cross country easements/wetlands, temporary paving, permanent surface restoration in non-paved areas, bracing, pumping and all incidental Work except as otherwise provided for. Any test pit performed by Contractor at locations not shown, or not as directed by the Engineer shall be at no additional cost to Owner.
- B. This Item of Work is not intended for the general use of the Contractor to verify the location of underground utilities, structures or service connections for the Work shown on the Contract Drawings. The cost of any such Work shall be included in the appropriate Item for permanent Works.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 01320, Construction Photographs
- C. Section 02140, Dewatering and Drainage
- D. Section 02160, Excavation Support Systems
- E. Section 02200, Earthwork
- F. Section 02260, Handling, Transportation and Disposal of Regulated Soil
- G. Section 02510, Temporary and Permanent Paved Surface Restoration
- H. Section 02905, Unpaved Surface Restoration and Reset Miscellaneous Items

PART 2 - PRODUCTS

2.01 BANK RUN GRAVEL AND OTHER TRENCH REFILL MATERIALS

- A. Refer to Section 02202, Trench Refill.

THE METROPOLITAN DISTRICT

2.02 TEMPORARY PAVEMENT

- A. Refer to Section 02510, Temporary and Permanent Pavement.

PART 3 - EXECUTION

3.01 GENERAL

- A. Test pits for the purpose of identifying any conflicts with underground pipelines or structures shall be excavated within thirty (30) days of the Notice to Proceed, and in advance of the actual construction at locations shown on the Contract Drawings and as ordered by the Engineer and as specified below.
- B. The Engineer will identify the locations immediately after the Notice to Proceed. In areas where reinforced concrete sub-base exists, the limit of payment for cutting, removal and installation of the reinforced concrete base shall be 50 square feet.
- C. If the test pit is located in the trench limits, temporary pavement is required and permanent pavement will be paid for during the completion of the work under the respective pavement item. If the test pit is located outside the trench limits, permanent restoration is required, including permanent pavement.
- D. The existing pavement and/or sidewalks to be removed and existing pavement and/or sidewalks to remain shall be carefully saw cut to leave a smooth, straight and vertical edge. Test pits are to be as small as possible while maintaining worker safety. Test pits are to be backfilled and compacted immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer.
- E. Material shall be carefully excavated so that the underground utility or structure being searched for, or any other utility or structure, will not be damaged or destroyed. Excavation shall be with a hand shovel if conditions so warrant and hand excavation will be required within two (2) feet of any utility. Any utility or structure damaged or destroyed shall be replaced or repaired at no additional cost to the Owner.
- F. Support of the excavation and dewatering shall be sufficient to accomplish the purpose of the test pit and be in conformance, where required, with other applicable Sections of these Specifications.
- G. The Contractor shall be responsible for having an on-site mark-out of all utilities (i.e. Call Before You Dig) in the area completed prior to digging a test pit in that area.
- H. Backfill where the material will be subsequently re-excavated as part of the Work under this Contract:
 - 1. The test pit shall be backfilled with bank run gravel material in accordance with the requirements of Section 02202.

THE METROPOLITAN DISTRICT

- I. Temporary and permanent paved and unpaved surface restoration and resetting miscellaneous Items shall be made in accordance with the requirements of Sections 02510 and 02905.
 - 1. Restoration of reinforced concrete sub-base in these areas will not be measured for payment.
- J. Backfill in areas that will not be subsequently re-excavated as part of the Work under this Contract:
 - 1. The test pit shall be backfilled with bank run gravel material as directed by the Engineer in accordance with Section 02202.
 - 2. A minimum of 12 inches of processed stone base shall be furnished, installed and compacted prior to pavement.
 - 3. The pavement surface shall receive a temporary patch in accordance with Section 02510.
 - 4. The pavement surface shall be permanently restored in accordance with Section 02510.
 - 5. Where unpaved areas are disturbed in the course of test pit excavation, restoration shall be in accordance with Section 02905.
 - 6. Restoration of reinforced concrete sub-base in these areas will be measured for payment as a maximum of 50 square feet.
- K. The Contractor shall submit field sketches and digital photographs (close up and some distance away to show relative location) of each Test Pit completed. Field Sketches shall contain elevations of pipe and duct bank inverts and/or crowns, elevations (top and bottom), sizes, locations (horizontal and vertical) from a known point (curb, etc.) and materials of all observed utilities or other obstructions within the trench limit. Test Pits shall be numbered and kept on file with as-built drawings.

3.02 SERVICE CONNECTION OR UTILITY VERIFICATION

- A. Test pits may be carried out to verify the location and type of service connections or utilities or for other purposes as determined by the Engineer.
- B. Test pits at gas main crossings shall be utilized to determine if the crossing can be made at the location indicated on the plans. In Connecticut, all excavations, except the removal of bituminous or concrete road surfaces, within 18" on either side of a hazardous fuel line (natural gas, propane or gasoline) must be done with hand tools only.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02050

DEMOLITION AND MODIFICATIONS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required to demolish, modify, remove and dispose of Work shown on the Contract Drawings and as specified herein.
- B. Included, but not limited to, are demolition, modifications and removal of existing materials, equipment or Work necessary to install the new Work as shown on the Contract Drawings and as specified herein and to connect with existing Work in approved manner.
- C. Demolition, modifications and removals which may be specified under other Sections shall conform to requirements of this Section.
- D. Demolition and modifications shall include the specified Work defined under Section 01010, Summary of Work.
- E. Blasting and the use of explosives will not be permitted for any demolition Work.

1.02 RELATED SECTIONS

- A. Section 01010, Summary of Work
- B. Section 01110, Environmental Protection Procedures
- C. Section 01120 Site Specific Health and Safety Plan
- D. Section 01300, Submittals
- E. Section 02100, Site Preparation
- F. Section 02200, Earthwork

1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, six copies of proposed methods and operations of demolition of the structures and modifications prior to the start of Work. Include in the schedule the coordination of shutoff, capping and continuation of utility service as required.

THE METROPOLITAN DISTRICT

- B. Furnish a detailed sequence of demolition and removal Work to ensure the uninterrupted progress of the Owner's operations. Sequence shall be compatible with sequence of construction and shutdown coordination requirements as specified in Section 01044, Progress and Sequence of Work.
- C. Before commencing demolition Work, all modifications necessary to bypass the affected structure shall be completed. Actual Work shall not begin until the Engineer has inspected and approved the modifications and authorized commencement of the demolition Work in writing.

1.04 JOB CONDITIONS

A. Protection

- 1. Execute the demolition and removal Work to prevent damage or injury to structures, occupants thereof and adjacent features which might result from falling debris or other causes, and so as not to interfere with the use, and free and safe passage to and from adjacent structures.
- 2. Closing or obstructing of roadways, sidewalks and passageways adjacent to the Work by the placement or storage of materials will not be permitted and all operations shall be conducted with a minimum interference to traffic on these ways.
- 3. Erect and maintain barriers, lights, sidewalk sheds and other required protective devices.

B. Scheduling

- 1. Carry out operations so as to avoid interference with operations and Work in the existing facilities.

C. Notification

- 1. At least two weeks prior to commencement of a demolition or removal, confirm with the Engineer in writing of proposed schedule therefor. Owner shall inspect the existing equipment and to identify and mark those Items which are to remain the property of the Owner. No removals shall be started without the permission of the Engineer.

D. Conditions of Structures

- 1. The Owner and the Engineer assume no responsibility for the actual condition of the structures to be demolished or modified.

THE METROPOLITAN DISTRICT

2. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable. However, variations within a structure may occur prior to the start of demolition Work.

E. Repairs to Damage

1. Promptly repair damage caused to adjacent facilities by demolition operation when directed by Engineer and at no cost to the Owner. Repairs shall be made to a condition at least equal to that which existed prior to construction.

F. Traffic Access

1. Conduct demolition and modification operations and the removal of equipment and debris to ensure minimum interference with roads, streets, walks both onsite and offsite and to ensure minimum interference with occupied or used facilities.
2. Special attention is directed towards maintaining safe and convenient access to the existing facilities by plant personnel and plant associated vehicles.
3. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the Engineer and Municipality. Furnish alternate routes around closed or obstructed traffic in access ways.

1.05 RULES AND REGULATIONS

- A. The Building Code of the State of Connecticut shall control the demolition, modification or alteration of the existing buildings or structures.
- B. No building or structure, or any part thereof, shall be demolished until an application has been filed with the Building Inspector and a permit issued. The fee for this permit shall be the Contractor's responsibility.

1.06 DISPOSAL OF MATERIAL

- A. Salvageable material and equipment noted on the Contract Drawings shall become the property of the Owner at their option, otherwise it becomes property of the Contractor and Contractor will be responsible for proper disposal. Dismantle all such items to a size that can be readily handled and deliver them to a designated storage area as directed by the Owner. Any such material damaged due to improper handling will not be accepted and the replacement value of the material deducted from the payment to the Contractor.

THE METROPOLITAN DISTRICT

- B. All other material and Items of equipment shall become the Contractor's property and must be removed from the site and be disposed of properly.
- C. The storage or sale of removed Items on the site will not be allowed.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 GENERAL

- A. All materials and equipment removed from existing Work, shall become the property of the Contractor, except for those which the Owner has identified and marked for his/her use. All materials and equipment marked by the Owner to remain shall be carefully removed, so as not to be damaged, cleaned and stored on or adjacent to the site in a protected place specified by the Engineer or loaded onto trucks provided by the Owner.
- B. Dispose of all demolition materials, equipment, debris and all other Items not marked by the Owner to remain, off the site and in conformance with all existing applicable laws and regulations. Demolition debris must be reused or disposed of at a Department of Energy and Environmental Protection approved Construction and Demolition Volume Reduction Plant. The Engineer must approve any plans to reuse the material at another location. Weight tickets must be provided for any materials disposed of at a Construction and Demolition Volume Reduction Plant.
- C. Pollution Controls
 - 1. Use water sprinkling, temporary enclosures and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.
 - a. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding and pollution.
 - b. Clean adjacent structures, facilities, and general Work area of dust, dirt and debris caused by demolition operations. Return adjacent areas to conditions existing prior to the start of the Work.

3.02 STRUCTURAL REMOVALS

- A. Remove structures to the lines and grades shown unless otherwise directed by the Engineer. Where no limits are shown, the limits shall be 4-in outside the Item to be installed. The removal of masonry beyond these limits shall be at the

THE METROPOLITAN DISTRICT

Contractor's expense and these excess removals shall be reconstructed to the satisfaction of the Engineer with no additional compensation to the Contractor.

- B. All concrete, brick, tile, concrete block, roofing materials, reinforcement, structural or miscellaneous metals, plaster, wire mesh and other Items contained in or upon the structure shall be removed and taken from the site, unless otherwise approved by the Engineer. Demolished Items shall not be used in backfill.
- C. After removal of parts or all of masonry walls, slabs and like Work which tie into new Work or existing Work, the point of junction shall be neatly repaired so as to leave only finished edges and surface exposed.

3.03 ELECTRICAL REMOVALS

- A. Electrical removals shall consist of the removal of existing transformers, distribution switchboards, control panels, motors, conduits and wires, poles and overhead wiring, panelboards, lighting fixtures and miscellaneous electrical equipment all as shown on the Contract Drawings, specified herein, or required to perform the Work.
- B. All existing electrical equipment and fixtures to be removed shall be removed with such care as may be required to prevent unnecessary damage, to keep existing systems in operation and to maintain the integrity of the grounding systems.
- C. Conduits and wires shall be abandoned or removed where shown. All wires in abandoned conduits shall be removed, salvaged and stored at Owners option. Abandoned conduits concealed in floor or ceiling slabs or in walls, shall be cut flush with the slab or wall at the point of entrance. The conduits shall be suitably plugged and the area repaired in a flush, smooth and approved manner. Exposed conduits and their supports shall be disassembled and removed from the site. Repair all areas of Work to prevent rust spots on exposed surfaces.
- D. Where shown or otherwise required, wiring in the underground duct system shall be removed. All such wiring shall be salvaged and stored as specified at owner's option. Verify the function of all wiring before disconnection and removing it. Ducts which are not to be reused shall be plugged where they enter buildings and made watertight.
- E. Where shown, direct-burial cable shall be abandoned. Such cable shall be disconnected at both ends of the run. Where it enters a building or structure the cable shall be cut back to the point of entrance. All opening in buildings for entrance of abandoned direct-burial cable shall be patched and made watertight.

THE METROPOLITAN DISTRICT

- F. Lighting fixtures shall be removed or relocated as shown. Fixtures not relocated shall be removed from the site and delivered to Owner or disposed of properly by the Contractor, at the Owners option. Relocated fixtures shall be carefully removed from their present location and rehung where shown.
- G. Wall switches, receptacles, starters and other miscellaneous electrical equipment, shall be removed and disposed of off the site as required. Care shall be taken in removing all equipment so as to minimize damage to architectural and structural members. All conduits, electrical switches and/or receptacle boxes shall be plugged to prevent migration of gasses. Any damage incurred shall be repaired.

3.04 CLEAN-UP

- A. Remove from the site all debris resulting from the demolition operations as it accumulates. Upon completion of the Work, all materials, equipment, waste and debris of every sort shall be removed and premises shall be left, clean, neat and orderly.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02053

REMOVAL OR ABANDONMENT OF EXISTING SEWER, MANHOLES AND APPURTENANCES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes the removal and proper disposal or abandonment of all existing sanitary, storm and combined sewers, laterals and manholes necessary for installation of the proposed sewers as shown on the plans and indicated in the Specifications. The Contractor shall furnish all the necessary labor, equipment, tools, materials and services required to perform such Work, including payment for and requisition of all necessary permits, excavation costs, trench support, dewatering, and support of adjacent utilities.
- B. Sewer mains and manholes being abandoned that are required to be filled with controlled low strength material (CLSM) are shown on the Contract Drawings.

1.02 RELATED SECTIONS

- A. Section 02140, Dewatering and Drainage
- B. Section 02160, Excavation Support Systems
- C. Section 02200, Earthwork

PART 2 – PRODUCTS

2.01 CONTROLLED LOW STRENGTH MATERIAL

- A. Pumpable controlled low strength material (CLSM) shall be in accordance with Section 03302.

PART 3 – EXECUTION

3.01 GENERAL

- A. The Contractor shall take all measures to support adjacent utilities, above and below ground during the removal of the existing sewers, manholes and laterals.
- B. The Contractor shall comply with all federal, state, regional and local statutes, codes, ordinances and regulations regarding the proper removal and disposal of the existing sewers, manholes and laterals.

THE METROPOLITAN DISTRICT

- C. All flows of sewage regardless of quantity or source must be maintained during the prosecution of the Work. The Contractor's attention is directed to Section 02150, Bypass Pumping, Handling Storm Runoff and Sanitary Sewage Flows regarding the maintenance of all such flows.
- D. In transporting both regulated and non-regulated materials from the construction site to approved disposal sites, the Contractor shall take all the necessary precautions to prevent spillage of solid and liquid regulated and non-regulated materials from the transporting vehicles.
- E. The Contractor shall obtain all the necessary and required permits and licenses, provide all personnel and equipment including loading equipment, trucks, equipment operators and drivers, documentation and manifest forms and coordination with the presiding governing authorities having jurisdiction for the proper disposal of regulated materials at an approved site, and comply with all applicable federal, state, regional, municipal and CTDOT specific regulations and all disposal regulations.
- F. The Contractor shall at no additional charge to the Owner, deliver and unload all salvageable manhole frames and covers from the existing sewer or drainage systems to the MDC Maxim Road Yard, 125 Maxim Road, Hartford at the Owners option.

3.02 PIPE DEWATERING

- A. Carry out any dewatering of the pipe necessary to allow the CLSM operation to proceed as intended and without dilution of the CLSM mixture being installed.
- B. Do not allow any water from the trench to enter the pipe to be abandoned.
- C. Ensure that the discharge from the dewatering equipment is disposed of properly.

3.03 PREPARATION FOR ABANDONMENT VIA CLSM

- A. All submittals shall be approved by the Owner and/or Engineer prior to any placement of CLSM.
- B. The Owner and Engineer must be notified at least 24 hours in advance of any placement of CLSM.
- C. Clean all areas of sewer main debris that may hinder the placement of CLSM.
- D. Remove all water prior to starting placement of CLSM.

THE METROPOLITAN DISTRICT

3.04 INSTALLATION OF CLSM

- A. Sewer mains being abandoned that are required to be filled with controlled low strength material (CLSM) are shown on the Contract Drawings.
- B. Place CLSM to fill the entire volume of the pipe between abandonment points. Continuously place CLSM with no intermediate pour points, but not exceeding 500 feet in length.
- C. Place CLSM under pressure flow conditions into the properly vented open system until CLSM emerges from vent pipes. Pump CLSM with sufficient pressure to overcome friction and to fill sewer main from downstream end to discharge at upstream end.
- D. Plug each end of the sewer main being abandoned.

3.05 ASBESTOS CONCRETE PIPE

- A. Any work involving asbestos concrete pipe shall be in accordance with the EPA's "Demolition Practices Under Asbestos NESHAP." See Section 02112.

3.06 AREA CLEANUP

- A. Remove all CLSM materials and excess excavated materials from the site after abandonment, filling of CLSM if needed and backfilling are completed. Dispose of this material properly.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02054

REMOVAL OR ABANDONMENT OF EXISTING WATER MAIN AND APPURTENANCES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes the removal and proper disposal or abandonment of all existing water main, water services, manholes and appurtenances necessary for installation of the proposed water main as shown on the Contract Drawings and indicated in the Specifications. The Contractor shall furnish all the necessary labor, equipment, tools, materials and services required to perform such Work, including payment for and requisition of all necessary permits, excavation costs, trench support, dewatering, and support of adjacent utilities.
- B. Water mains being abandoned that are required to be filled with pumpable controlled low strength material (CLSM) are shown on the Contract Drawings.

1.02 RELATED SECTIONS

- A. Section 02140, Dewatering and Drainage
- B. Section 02160, Excavation Support Systems
- C. Section 02200, Earthwork

PART 2 – PRODUCTS

2.01 CONTROLLED LOW STRENGTH MATERIAL

- A. Pumpable controlled low strength material (CLSM) shall be in accordance with Section 03302.

PART 3 – EXECUTION

3.01 GENERAL

- A. The Contractor shall take all measures to support adjacent utilities, above and below ground during the removal of the existing water mains, services, manholes and appurtenances.

THE METROPOLITAN DISTRICT

- B. The Contractor shall comply with all federal, state, regional and local statutes, codes, ordinances and regulations regarding the proper removal and disposal of the existing water mains, services, manholes and appurtenances.
- C. In transporting both regulated and non-regulated materials from the construction site to approved disposal sites, the Contractor shall take all the necessary precautions to prevent spillage of solid and liquid regulated and non-regulated materials from the transporting vehicles.
- D. The Contractor shall obtain all the necessary and required permits and licenses, provide all personnel and equipment including loading equipment, trucks, equipment operators and drivers, documentation and manifest forms and coordination with the presiding governing authorities having jurisdiction for the proper disposal of regulated materials at an approved site, and comply with all applicable federal, state, regional, municipal and CTDOT specific regulations and all disposal regulations.
- E. The Contractor shall at no additional charge to the Owner, deliver and unload all salvageable materials from the existing water systems to the MDC Maxim Road Yard, 125 Maxim Road, Hartford at the Owners option.

3.02 PIPE DEWATERING

- A. Carry out any dewatering of the pipe necessary to allow the CLSM operation to proceed as intended and without dilution of the CLSM mixture being installed.
- B. Do not allow any water from the trench to enter the pipe to be abandoned.
- C. Ensure that the discharge from the dewatering equipment is disposed of properly.

3.03 DEMOLITION OF VALVES, GATE BOXES, BLOW-OFFS AND PIPELINE STRUCTURES PRIOR TO ABANDONMENT

- A. Remove all water main appurtenances, such as gate boxes. When water main is to be abandoned without installing CLSM put the gate valve in the closed position prior to gate box removals.
- B. Demolish and remove manholes, gate boxes, and blow-offs or other pipeline structures to a minimum depth of three (3) feet below finished grade, unless if shown on the Contract Drawings or as directed by the Engineer. The remaining portion of the structures shall be filled with bank run gravel and compact.

THE METROPOLITAN DISTRICT

3.04 CUTTING AND CAPPING OF WATER MAINS

- A. No cutting of any water mains shall be allowed until new water main has been installed, tested, and accepted for use and all service connections have been installed.
- B. Prior to Cutting and capping, check for other sources feeding the abandoned water main. If sources are found, notify the Owner and Engineer immediately.
- C. Plug/cap ends in an abandoned water main in a manner approved by the Owner and Engineer. Install concrete around the cap and over the pipe to ensure it is not penetrable by groundwater.
- D. Backfill all excavations.
- E. Repair all street surfaces in accordance with local town and city requirements.

3.05 CUTTING AND CAPPING OF WATER SERVICES

- A. No cutting of any water services shall be allowed until new water main has been installed, tested, and accepted for use and all service connections have been installed.
- B. Once service to be abandoned has been cut and capped, check for other sources feeding the abandoned water service. If sources are found, notify the Owner and Engineer immediately.
- C. Service lines shall be cut and capped at the corporation/curb stop.
- D. The capping of every service must be approved by the Owner and/or Engineer before backfilling of a capped service.
- E. Plug/cap ends in abandoned water services in a manner approved by the Owner and Engineer. Install concrete around the cap and over the pipe to ensure it is not penetrable by groundwater.
- F. Remove all water service appurtenances such as valves, gate boxes, meters and backflow devices. Return all appurtenances to the Owner, as required.
- G. Backfill all excavations.
- H. Repair all street surfaces in accordance with local town and city requirements.

THE METROPOLITAN DISTRICT

3.06 PREPARATION FOR ABANDONMENT VIA CLSM

- A. All submittals shall be approved by the Owner and/or Engineer prior to any placement of CLSM.
- B. The Owner and Engineer must be notified at least 24 hours in advance of any placement of CLSM.
- C. Clean all areas of water main debris that may hinder the placement of CLSM.
- D. Remove all water prior to starting placement of CLSM.

3.07 INSTALLATION OF CLSM

- A. Water mains being abandoned that are required to be filled with controlled low strength material (CLSM) are shown on the Contract Drawings.
- B. Place CLSM to fill the entire volume of the pipe between abandonment points. Continuously place CLSM with no intermediate pour points, but not exceeding 500 feet in length.
- C. Place CLSM under pressure flow conditions into the properly vented open system until CLSM emerges from vent pipes. Pump CLSM with sufficient pressure to overcome friction and to fill water main from downstream end to discharge at upstream end.
- D. Plug each end of the water main being abandoned.

3.08 ASBESTOS CONCRETE PIPE

- A. Any work involving asbestos concrete pipe shall be in accordance with the EPA's "Demolition Practices Under Asbestos NESHAP." See Section 02112.

3.09 AREA CLEANUP

- A. Remove all CLSM materials and excess excavated materials from the site after abandonment, filling of CLSM if needed and backfilling are completed. Dispose of this material properly.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02100

SITE PREPARATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials and equipment required and performing all site preparation, complete as shown on the Contract Drawings and as specified herein.
- B. Obtain all permits required for site preparation Work prior to proceeding with the Work, including clearing and tree removal.
- C. The areas to be cleared, grubbed and stripped within public rights-of-way and utility easements shall be minimized to the extent possible for the scope of Work and in consideration of the actual means and methods of construction used. No unnecessary site preparation within these areas shall be performed. No tree shall be removed unless specified, shown on the Contract Drawings or with prior permission of the Owner.
- D. Contractor shall contact the appropriate regulatory authority and the Owner to review and approve any trees to be cut prior to starting any cutting.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 01725, Preservation and Restoration of Project Features
- C. Section 02050, Demolition and Modifications
- D. Section 02200, Earthwork
- E. Section 02930, Loaming, Seeding and Sodding

1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, copies of all permits required prior to clearing, grubbing, and stripping Work.
- B. The proposed site for the disposal of material and debris from the site preparation shall be submitted for approval to the Engineer.

THE METROPOLITAN DISTRICT

PART 2 – PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 CLEARING

- A. Cut and remove all timber, trees, stumps, brush, shrubs, roots, grass, weeds, rubbish and any other objectionable material resting on or protruding through the surface of the ground.
- B. Preserve and protect trees and other vegetation designated on the Contract Drawings or directed by the Engineer to remain as specified below.

3.02 GRUBBING

- A. Grub and remove all stumps, roots in excess of 1-1/2-in in diameter, matted roots, brush, timber, logs, concrete rubble and other debris encountered to a depth of 18-in below original grade or 18-in beneath the bottom of foundations, whichever is deeper.
- B. Refill all grubbing holes and depressions excavated below the original ground surface with suitable materials and compact to a density conforming to the surrounding ground surface in accordance with Section 02200.

3.03 STRIPPING

- A. Strip topsoil from all areas to be occupied by buildings, structures, and roadways and all areas to be excavated or filled.
- B. Topsoil shall be free from brush, trash, large stones and other extraneous material. Avoid mixing topsoil with subsoil.
- C. Stockpile and protect topsoil until it is used in landscaping, loaming and seeding operations. Dispose of surplus topsoil after all Work is completed.

3.04 DISPOSAL

- A. Cut tree trunks and limbs exceeding 4-in in diameter shall be cut into 4-ft lengths and stockpiled on site in the area designated on the Contract Drawings.
- B. Dispose of material and debris from site preparation operations by hauling such materials and debris to an approved offsite disposal area. No rubbish or debris of any kind shall be buried on the site.
- C. Burning of cleared and grubbed materials or other fires for any reason will not be permitted.

THE METROPOLITAN DISTRICT

3.05 PROTECTION

- A. Trees and other vegetation designated on the Contract Drawings or directed by the Engineer to remain shall be protected from damage by all construction operations by erecting suitable barriers, guards and enclosures, or by other approved means. Conduct clearing operations in a manner to prevent falling trees from damaging trees and vegetation designated to remain and to the Work being constructed and so as to provide for the safety of employees and others.
- B. Maintain protection until all Work in the vicinity of the Work being protected has been completed.
- C. Immediately repair any damage to existing tree crowns, trunks, or root systems. Roots exposed and/or damaged during the Work shall immediately be cut off cleanly inside the exposed or damaged area. Treat cut surfaces with an acceptable tree wound paint and topsoil spread over the exposed root area.
- D. When Work is completed, remove all dead and downed trees. Live trees shall be trimmed of all dead and diseased limbs and branches. All cuts shall be cleanly made at their juncture with the trunk or preceding branch without injury to the trunk or remaining branches. Cuts over 1-inch in diameter shall be treated with an acceptable tree wound paint.
- E. Restrict construction activities to those areas within the limits of construction designated on the Contract Drawings, within public rights-of-way, and within easements provided by the Owner. Adjacent properties and improvements thereon, public or private, which become damaged by construction operations, shall be promptly restored to their original condition, to the full satisfaction of the property Owner.
- F. Construct as necessary based on the type of equipment to be used during the pipelines installations, an access road within the right of way to facilitate the construction activity.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02112

ASBESTOS CEMENT PIPE REPAIRS, REMOVAL, AND DISPOSAL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes the repair, removal, and disposal of asbestos cement pipe (ACP). The Contractor responsible for ACP removal shall furnish all labor, materials and equipment and shall perform all work required safely removing and legally disposing of all asbestos-containing materials. The Contractor shall provide all insurance, certifications and licenses necessary for the Work.
- B. This Section pertains to the removal and legal disposal of ACP in accordance with these Specifications and all applicable federal, state, and local government laws, statutes, regulations, ordinances, standards and guidelines.
- C. Asbestos cement pipe or any other asbestos containing materials, other than for repairs and connections as approved by the Owner, shall not be used or installed.
- D. Under the Work of this Section, "Contractors Engineer" shall mean a third-party Connecticut licensed Asbestos Abatement Project Monitoring entity hired by the Contractor.
- E. Whenever there is a conflict between applicable requirements and these Specifications, the more stringent provisions apply as determined by the Engineer.
- F. The Contractor shall file all necessary notices, obtain all permits and licenses, and pay all governmental taxes, fees, and other costs in connection with the Work. The Contractor shall obtain all necessary approvals of all governmental departments having jurisdiction.

1.02 RELATED SECTIONS

- A. Section 01120, Site Specific health & Safety Plan
- B. Section 02140, Dewatering and Drainage
- C. Section 02160, Excavation Support Systems
- D. Section 02200, Earthwork

THE METROPOLITAN DISTRICT

E. Section 02202, Trench Refill

1.03 SUBMITTALS

- A. No work activities shall commence until submittal Items are reviewed and approved in writing. Submittal data shall be sufficient in detail to allow identification of the particular product or equipment, and to form an opinion as to its conformity to the specification and/or regulations.
- B. Prior to the start of the abatement work prepare and submit the following Items:
 - 1. Detailed work plan which identifies:
 - a. Locations and manners of construction of the Decontamination Facility.
 - b. Methods for the removal of ACP that prevent the release of asbestos fibers into the air.
 - c. All Alternative Work Practices (AWPs) applied for and approved for use at this site. Provide revised respirator program for non-friable and/or approved AWP work, if applicable.
 - 2. Documentation of certification of all workers pursuant to State of Connecticut regulations and OSHA-specified training and medical examinations (with physician's approval).
 - 3. A detailed work schedule listing the proposed number of employees and the dates and hours of each work shift. Schedule shall encompass the entire project, including notifications, inspections, air monitoring and final clean-up.
 - 4. Copies of all permits, licenses and waste shipment records generated or used for this project.
 - 5. A copy of the OSHA-required written Respiratory Protection Program, including a fit testing methodology for respirators, worker medical approvals, and maintenance and decontamination details.
 - 6. Documentation of Contractor's asbestos license and abatement workers licenses issued pursuant to State of Connecticut regulations.
 - 7. Documentation of Contractor's asbestos abatement insurance.
 - 8. Documentation of Contractor's air sampling laboratory certifications.
 - 9. Proposed ACM waste hauler with copies of all applicable licenses, registrations, and approvals (to be approved by the Engineer and Owner).

THE METROPOLITAN DISTRICT

10. Proposed licensed facility/landfill for disposal of asbestos waste (to be approved Owner).
- C. At the completion of the ACP removal work, submit a final report that includes all disposal records, project related data, and air sampling results. The Engineer may require submission of other site related information at the end of the project.

1.04 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. United States Environmental Protection Agency (USEPA) Regulations for Asbestos, 40 CFR 61, Subpart M, National Emissions Standards for Hazardous Air Pollutants (NESHAPS).
- B. USEPA Regulations for Asbestos, Asbestos Abatement Projects, 40 CFR 763, Subpart G.
- C. US Department of Labor, Occupational Safety and Health Administration (OSHA) Asbestos Regulations, 29 CFR 1926.1101.
- D. All National Institute for Occupational Safety and Health (NIOSH) air sampling and evaluation standards.
- E. Connecticut Final Regulations 19a-332a, Standards for Asbestos Abatement.
- F. American Water Works Association (AWWA) Recommended work Practices for Cutting and Splicing Asbestos Cement Water Pipe.
- G. All applicable local ordinances, regulations, or rules pertaining to asbestos, including its storage, transportation, and disposal.

1.05 LOCATION OF WORK

- A. In general, ACP Work is to be performed on sewer pipes that contain greater than 1% asbestos. Whenever possible, the Owner will notify the Contractor of which pipes are classified as ACP. This information is based on testing or prior knowledge.
- B. If additional ACP are encountered that have not been previously identified, the Contractor shall notify the Engineer immediately. The ACP encountered and authorized for removal in areas that were not previously identified will be considered for payment as a Change in Work.

THE METROPOLITAN DISTRICT

- C. The quantities of pipe for removal are provided for general guidance and may not correspond exactly to the quantities that shall be removed by the Contractor. The Contractor shall remove all ACP in all areas identified in the Asbestos Cement Pipe Report in accordance with project scheduling. ACP Work in the project area is shown on the Contract Drawings.
- D. Handling and disposal of all Items identified in the Asbestos Pipe Report are to be included in the bid Item of the Contract unless indicated otherwise.
- E. Alternative Work Practices (AWPs) applications, approvals and costs are the responsibility of Contractor. AWP's shall be reviewed and approved by Engineer prior to implementation. AWP's must be created by a State of Connecticut-licensed Project Designer.

1.06 NOTIFICATION

- A. Contractor must determine if any necessary notifications must be made to any regulatory agencies of proposed ACP removal and demolition activities.
 - 1. Provide the required written notification at least 10 days before the start of the asbestos abatement and demolition activity to the United States Environmental Protection Agency and all required state agencies.
 - 2. Provide the required written notification by registered mail to local authorities as required including the Connecticut Department of Public Health.
- B. Obtain and process all applicable forms and permits required for asbestos abatement.

1.07 AIR MONITORING

- A. Responsibilities – Contractors Engineer shall conduct constant air monitoring during abatement operations for the purpose of determining the effectiveness of containment systems and/or work procedures. The Contractor or Engineer shall also conduct personal exposure air monitoring to determine compliance with OSHA requirements. All air samples shall be analyzed by a laboratory accredited by AIHA and licensed by the Connecticut Department of Public Health. Sampling equipment shall be calibrated before and after each use. At a minimum, one personal air sample and one area air sample shall be collected each week that ACP is being removed. Additional sampling will be as determined necessary by the Engineer.
- B. Air Quality Standard - All air tests made in proximity to any removal area, and to document "clean air," shall be compared to an air quality standard of 0.01 fibers

THE METROPOLITAN DISTRICT

per cubic centimeter (f/cc) as required by applicable regulations. If any air sample exceeds the air quality standard, immediately stop all work until the cause is identified and corrected.

- C. All monitoring methods shall comply with the requirements of 29 CFR 1926.1101 and State of Connecticut regulations.
- D. Results - Provide copies of all personal exposure monitoring results, and post results at the work site after obtaining the results within 48 hours.
- E. Upon completion of all work in any defined work area, the Engineer shall conduct a final inspection for the purpose of certifying work completion. Unsatisfactory conditions shall be immediately corrected in a manner specified by the Engineer. Final payment shall be approved only after Contractor provides a certificate of completion and all properly completed Waste Disposal Documentation Forms as required by law.
- F. Engineer shall perform requisite clearance visual inspection. If the visual inspection fails to meet applicable standards, Contractor shall perform additional cleaning at no additional cost to the Owner and pay for additional inspection efforts performed by the Engineer.

1.08 NOTIFICATION OF HAZARD

- A. The Contractor is warned that asbestos is a known human carcinogen when inhaled and poses serious health risks. Asbestos fibers are easily inhaled and can result in chronic respiratory illness, cancer, and other severe health effects.
- B. Immediately notify the Engineer either verbally or by telephone, followed by written notice, of any risks of adverse health and safety impacts on the environment, exposure of workers or the general public, or failure to comply with the specifications.
- C. Promptly notify the Engineer of the reason and required resolution of all observed deficiencies.

1.09 WORKER PROTECTION AND SAFETY

- A. General - Comply in all respects with regulatory requirements pertaining to worker health and safety protection, asbestos fiber containment, and exposure control. The requirements shall be closely monitored and strictly enforced throughout all work. Any deficiencies shall be promptly corrected or the Contractor shall stop work.

THE METROPOLITAN DISTRICT

- B. Respiratory Protection - Provide respirators to all workers in accordance with applicable regulations and in accordance with the Contractor's Respiratory Protection Program.
- C. Medical Examinations and Recordkeeping - Pursuant to OSHA requirements, provide a baseline and annual medical examination for each worker who enters a removal work area. At a minimum, the medical examination shall comply with 29 CFR 1926.1101 (m).

1.10 WORKER QUALIFICATIONS, TRAINING, AND EDUCATION

- A. The Contractor is required to have a Supervisor, with training and experience as an Asbestos Competent Person, on site at all times when ACP removal work is in progress.
- B. The Supervisor shall be thoroughly familiar and experienced with asbestos cement pipe removal and related work, and shall enforce the use of all safety procedures and equipment. He/she shall be knowledgeable of State of Connecticut, USEPA, OSHA, and NIOSH requirements and guidelines. The Supervisor shall be licensed in accordance with State of Connecticut regulations.
- C. The Contractor shall at all times enforce strict discipline and good order among its employees, and shall not employ any person not skilled in the work assigned, nor anyone who has not received documented notice of the hazards of asbestos, formal training in the use of respirators, safety procedures, equipment, clothing, and work procedures. All workers shall be licensed in accordance with State of Connecticut Asbestos regulations. All workers shall be trained in accordance with OSHA regulations at a minimum.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials or equipment delivered to the site shall be unloaded, temporarily stored, and transferred to the work area in a manner that minimizes disruption to motorists, pedestrians, and local businesses and homes in the area.
- B. All materials and equipment shall comply, at a minimum, with all Sections of this specification, relevant federal, state, and applicable local codes, and industry standards.

2.02 ACP REMOVAL EQUIPMENT & SUPPLIES

- A. Plastic Sheeting ("Poly") and Bags - shall be polyethylene with a thickness of at least 6 mil for all applications.

THE METROPOLITAN DISTRICT

- B. For wetting prior to disturbance of asbestos-containing materials and during removal procedures, use either amended water or a removal encapsulant. The material must be odorless, non-flammable, non-toxic, non-irritating and non-carcinogenic. It shall be applied as a mist using a low-pressure sprayer recommended by the manufacturer.
- C. Tape and Glue - shall be capable of sealing plastic joints and attaching plastic to finished surfaces. The bonding strength and resulting seal integrity shall not be affected by mist or water, wetting or encapsulating agent, or any other materials to be used in the work area.
- D. Warning Signs and Labels - shall comply with all federal, state, or local codes and regulations.
- E. Waste Containers and Transportation - shall be suitable for loading, temporary storage, transport, and unloading of contaminated waste without risk of ripping, rupture, or exposure to persons, or emissions to the atmosphere. Transportation methods shall comply with the provisions of 40 CFR 61, Subpart M, and with any state or local hazardous or special waste regulations for temporary storage, transport, and disposal if such codes are enforced in states in which the waste will be stored, transported, or disposed of.

2.03 SAFETY SUPPLIES AND EQUIPMENT

- A. Respirator Types - Provide all workers with a full or half face respirator that is approved by NIOSH/MSHA for protection against airborne asbestos, and meets the requirements of the OSHA Asbestos Standard. Provide respirators for each worker.
- B. Protective Clothing - Provide all workers and approved visitors with disposable coveralls, head and foot coverings, gloves, and eye protection (i.e., safety glasses with half-face respirators).

PART 3 - EXECUTION

3.01 GENERAL PREPARATION PROCEDURES

- A. Upon receipt of a Notice to Proceed, the Contractor shall meet at the site with the Engineer to reach Agreement on:
 - 1. Scope and manner of work performance and all schedules.
 - 2. The location of temporary storage space.

THE METROPOLITAN DISTRICT

3. Any other logistical factors to minimize interference with public safety and health, and other Contractor activities.
- B. Prepare the work areas according to the following general sequence of procedures to ensure that proper fiber containment and protection systems are installed before any work that could generate airborne asbestos fibers.
1. Erect barricades, post access restriction signs, and provide Decontamination Facilities.
 2. Obtain formal approval from the Engineer of all preparation work and work plans before commencing ACP removal activities. The Engineer shall be given at least 48 hours notification (14 day notification for private property) of the intent to start removal work in any work area.
 3. Any work activity that renders the asbestos friable must be done in a negative air containment area.
- C. Electrical Safety
1. The Contractor must provide portable power with ground fault protection for all non-battery powered equipment.
 2. All materials and workmanship shall conform to the latest editions of applicable codes, standards, and specifications.

3.02 DECONTAMINATION FACILITY

- A. Description - Any personnel, tools, equipment, materials or other Items that become exposed to asbestos fibers must pass through a Decontamination Facility in accordance with applicable regulations.
- B. Construction - Decontamination Facilities shall be constructed and maintained as specified in applicable regulations and shall be located in areas approved by Engineer.
- C. Manner of Operation - All personnel shall enter the Clean Room, remove and store street clothes, and put on clean protective clothing and respirators; then enter the Equipment Room, put on any additional equipment, and enter the Work areas. All personnel exiting the Work areas shall enter the Equipment Room, remove and store or dispose of all contaminated clothing and shoes, shower, and then put on street clothing in the Clean Room. Respirators shall be worn into and cleaned in the shower, and dried and stored in the Clean Room.

THE METROPOLITAN DISTRICT

- D. Wastewater Disposal - All water from the shower and cleaning hose shall be collected, pumped through a 5.0 micron filter, and then legally disposed-of in accordance with all applicable regulations.
- E. Cleaning - Decontamination Facility shall be cleaned using a HEPA-filtered vacuum at least once every shift, or more frequently, if needed, to prevent dust accumulation.
- F. Prohibitions - Smoking, drinking, or eating shall not be permitted in the Work area or Decontamination Facility.

3.03 WORK AREA ISOLATION

- A. Isolate the work areas as required by local, state, or federal regulations.
- B. Post all necessary signage as required by local, state, or federal regulations.

3.04 ASBESTOS CEMENT PIPE REMOVAL

A. General

- 1. Removal of ACP must be performed in accordance with State of Connecticut regulations, USEPA federal regulations which include the NESHAPS regulations, and OSHA regulations.
- 2. All asbestos removal areas shall be properly segregated by posting caution signs meeting the specifications of OSHA 29 CFR 1926.1101 at any location and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Workers shall don all protective equipment. The material shall be removed very carefully to minimize any breakage that may release airborne fibers.
- 3. All ACP must be continuously wetted during impact operations. The Contractor must ensure that a level of no visible emissions is always achieved.
- 4. High-speed abrasive disc saws, including gas powered "demo saws" shall not be used to cut any asbestos containing materials.

B. Work Practices

- 1. Remove ACP using tools and equipment specified in regulatory guidance documents.

THE METROPOLITAN DISTRICT

2. Continuously mist the work area as ACP materials are being removed from the ground.
3. Remove pipe Sections intact whenever possible.
4. All loose debris shall be immediately collected via HEPA vacuum or wet wipe. The vacuum debris and wipe materials shall be segregated and disposed as asbestos contaminated waste.
5. Pipe cutting will be permitted only when repairing or joining to existing ACP. The Contractor shall perform all cutting and handling of ACP in strict conformance with all applicable OSHA, USEPA, and local health agency requirements. Work practices using any cutting equipment must be approved by the Engineer. It may be necessary to perform cutting activities in a negative pressure enclosure using wet methods.
6. Where cutting is not necessary to remove the ACP, a negative pressure enclosure may not be required.
7. Waste must be handled to prevent further breakage as it is being loaded into waste containers.
8. Package all pipe and asbestos waste in accordance with applicable regulations.

3.05 FINAL WORK AREA CLEANUP, DECONTAMINATION, AND WASTE DISPOSAL

A. General Requirements

1. After all ACP has been removed, remove all wastes and perform a final cleanup and decontamination of each work area. Final cleaning shall be performed only after all waste is packaged and removed, but before demolishing any equipment, or dismantling any barrier, Decontamination Facility, or protective covering.
2. Cleaning shall be subject to the approval of the Engineer based on a visual inspection.

B. Waste Disposal

1. Definition - Asbestos wastes are defined as all ACP and debris, disposable clothing and protective equipment, plastic sheeting and tape, exhaust systems or vacuum filters, or any equipment that has been contaminated with asbestos and cannot be completely cleaned by vacuuming and by washing in the Decontamination Facility.

THE METROPOLITAN DISTRICT

2. General Requirements - All asbestos wastes must be handled, packaged, stored, transported, and disposed of as specified in this subsection, and in compliance with all federal, state, and local regulations and codes.
3. Waste Labeling - If waste containers are not already so preprinted, warning labels having waterproof print and permanent adhesive shall be affixed to the lid and/or sides of the containers, whether or not these containers are further packaged. Warning labels shall be conspicuous and legible, and conform to the latest OSHA, USEPA and CTDOT labeling requirements.
4. Waste Packaging - All waste shall be thoroughly wetted when packaged and Contractor shall inspect each bag to observe that water condensation is visible. Insufficiently wetted bags shall be opened, rewetted, and resealed. When a waste bag is full, it shall be securely sealed with tape, and then placed in the designated temporary storage area.
5. The Owner will be the "generator" of all asbestos wastes from this project.

C. Waste Container Removal and Disposal Documentation

1. To comply with the requirement that waste disposal be documented, remove waste containers from work areas only under the direction of Engineer, and complete appropriate documentation for each load of waste removed from the site.
2. Accurately measure the volume of each container or load of waste removed from the site.
3. Provide legal transportation of the waste to the disposal landfill, and complete or obtain all required licenses, manifests, dump slips, or other forms. Copies of all forms or licenses, and the signed original of the Waste Shipment Record (WSR) for each waste load, shall be given to Engineer.
4. Waste may be transported to and temporarily stored at a pre-approved off-site storage area owned by Contractor, but it must ultimately be disposed of at the specified landfill before final payments are approved.

END OF SECTION

THE METROPOLITAN DISTRICT

APPENDIX A

Insert Asbestos Cement Pipe Report

SECTION 02140

DEWATERING AND DRAINAGE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes Designing, furnishing, installing, operating, monitoring, maintaining and removing temporary dewatering and drainage systems as required and lower and control water levels to at least 2 feet below the lowest level of the excavation to permit construction in the dry. Contractor shall obtain and pay for all permits required for temporary dewatering and drainage systems.
- B. Furnish the services of a licensed professional engineer (P.E.) registered in the State of Connecticut, to prepare dewatering and drainage system designs and submittals.
- C. Furnish, maintain and remove temporary surface water control measures that are adequate to drain and prevent surface water entering excavation.
- D. Collect and properly dispose of all discharge water from dewatering and drainage systems in accordance with State and local requirements and permits.
- E. Work shall include the design, equipment, materials, installation, protection, and monitoring the performance of the dewatering and drainage system as required herein.
- F. Protect all adjacent facilities and structures from damage due to dewatering and drainage system equipment and operations.
- G. Remove temporary dewatering and drainage systems when no longer needed. Restore all disturbed areas.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 02145, Handling Contaminated Groundwater
- C. Section 02160, Excavation Support Systems
- D. Section 02200, Earthwork
- E. Section 02201, Earth Excavation Below Grade and Outside Limits of Trench

1.03 SUBMITTALS

- A. At least (30) thirty days prior to the start of construction in any areas of anticipated dewatering, submit to the Owner for review and approval, a proposed dewatering and drainage plan. The dewatering and drainage submittal should include shop drawings and a written description of the proposed system layout, design methodology including calculations and the installation methods to be used. The submittal shall include descriptions of the dewatering and drainage system, observation wells and methods of removal, equipment drilling methods, hole sizes, filter sand placement techniques, sealing materials, development techniques, use of existing monitoring wells, etc. The plan shall identify the anticipated area influenced by the dewatering system and address impacts to adjacent existing and proposed structures. The Contractor shall not proceed with construction in any of these areas until the dewatering plan has been reviewed and approved by the Owner. It is expected that the proposed dewatering plan may have to be modified to suit the variable soil/water conditions encountered along the route.
- B. Dewatering and drainage system designs shall be prepared by a licensed P.E., registered in the State of Connecticut, having a minimum of 5 years of professional experience in the design and construction of dewatering and drainage systems. The Contractor shall submit an original and three copies of the licensed professional engineer's certification on the form specified in Section 01300, stating that the dewatering and drainage designs have been prepared by the P.E., and that the P.E. will be responsible for their execution.
- C. The Contractor shall coordinate dewatering and drainage submittals with the corresponding excavation and excavation support submittals.
- D. If less than one acre is disturbed:
 - 1. The General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities does not apply.
 - 2. However, dewatering BMPs must be followed as described in the Connecticut Guidelines for Soil Erosion and Sediment Control.

If between one and five acres are disturbed:

- 1. Apply for approval from the Municipality where the Work is taking place (review and written approval of soil and erosion plan and will follow all BMPs as described in the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities). If the Municipality does not review then must submit the soil and erosion plan to the DEEP for approval to be covered in accordance with the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities.

If greater than five acres are disturbed:

1. A registration and a certification (with a soil and erosion/stormwater pollution control plan) must be submitted to DEEP and a permit must be obtained in accordance with the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities.

If greater than 10 acres are disturbed:

1. A soil and erosion/stormwater pollution control plan must be submitted to DEEP and DEEP must approve the plan per the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities.

1.04 DEFINITIONS

- A. Where the phrase "in-the-dry" is used in this Section, it shall be defined as an excavation subgrade where the groundwater level has been lowered to at least 2 feet below the lowest level of the excavation, is stable with no ponding water, mud, muck and shall be able to support construction equipment without rutting or disturbance and shall be suitable for the placement and compaction of fill material, pipe or concrete foundations.

1.05 DESIGN AND PERFORMANCE RESPONSIBILITY

- A. The Contractor shall be solely responsible for the proper design and execution of methods for controlling surface water and groundwater.
- B. Contractor shall be solely responsible for damage to properties, buildings or structures, sewers, water mains and other utility installations, pavement and Work that may result from dewatering or surface water control operations.
- C. Any design review and field monitoring activities by the Owner or the Engineer shall not relieve the Contractor of his/her responsibilities for the Work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Pipe for observation wells, if required, shall consist of minimum 1-in I.D., Schedule 80 PVC pipe and machine slotted PVC wellpoints, maximum slot size 0.020-in.
- B. Piping, pumping equipment and all other materials required to control surface water and groundwater in excavations shall be suitable for the intended purpose.

PART 3 - EXECUTION

3.01 GENERAL

- A. Methods of groundwater control may include but is not limited to perimeter trenches and sump pumping, perimeter groundwater cut off, well points, ejectors, deep wells and combinations thereof.
- B. Control surface water and groundwater such that excavation to final grade is made in-the-dry, the bearing soils are maintained undisturbed and softening / instability or disturbance due to the presence or seepage of water does not occur. All construction and backfilling shall proceed- in-the-dry and flotation of completed portions of Work shall be prohibited.
- C. The Contractor shall consider the impact of anticipated subsurface soil / water when selecting methods of excavation and temporary dewatering and drainage systems. When groundwater levels are above the proposed bottoms of excavation, a pumped dewatering excavation will be required for predrainage of the soils to at least 2.0 feet below the lowest level of the excavation until construction has been completed to such an extent that the foundation, structure, pipe, conduit, or fill will not be floated or otherwise damaged. The type of dewatering system, spacing of dewatering units and other details of the Work are expected to vary with soil/water conditions at a particular location.
- D. Dewatering and drainage operations shall be conducted in a manner that does not cause loss of ground or disturbance to the soil that supports overlying or adjacent utilities or structures.
- E. Locate groundwater control system components where they will not interfere with construction activities adjacent to the Work area or interfere with the installation and monitoring of geotechnical instrumentation including observation wells. Excavations for sumps or drainage ditches shall not be made within or below 1H:1V slopes extending downward and out from the edges of existing or proposed foundation elements or from the downward vertical footprint of the pipe.
- F. Install, monitor and report data from observation wells as shown on Contract Drawings. Evaluate the collected data relative to groundwater control system performance and modify systems as necessary to dewater the site in accordance with the Contract requirements.

3.02 SURFACE WATER CONTROL

- A. Construct surface water control measures to prevent flow of surface water into excavations. Provide temporary measures such as dikes, ditches and sumps.
- B. Subgrades shall be sloped to prevent ponding of water.
- C. Subgrades which become disturbed due to surface water shall be removed and refilled as directed by the Owner at no additional cost to the Owner.

3.03 EXCAVATION DEWATERING

- A. At all times during construction, the Contractor shall furnish and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavations. Excavations shall be kept in- the-dry, so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.
- B. Pipe and masonry shall not be laid in water or submerged within 24 hours after being placed or prior to backfilling. Water shall not flow over new masonry within 4 days after placement. Pipe and conduit which becomes submerged shall be removed and the excavation dewatered and restored to proper condition prior to reinstalling the pipe and conduit.
- C. Excavation for foundations and structures shall be maintained in-the-dry for a minimum of 4 days after concrete placement. In no event shall water be allowed to enter an excavation and rise to cause unbalanced pressure on foundations and structures until the concrete or mortar has set at least 24 hours.
- D. Dewatering and drainage operations shall at all times be conducted in such a manner as to preserve the natural undisturbed capacity of the subgrade soils at least 2 feet below the bottom of excavations.
- E. If the subgrade of the trench bottom or excavation becomes disturbed due to the Contractor's dewatering system not working properly, the Contractor shall excavate below normal grade as directed by the Owner and refill with crushed stone, compacted structural fill, etc. at the Contractor's expense to restore the bearing capacity of the subgrade to its original undisturbed condition.
- F. If the method of dewatering does not-properly dewater the trench as specified, the Contractor shall install groundwater observation wells as directed by the Owner and at no additional cost to the Owner and not place any pipe or structure until the readings obtained from the observation wells indicate that the groundwater has

been lowered a minimum of 2 feet below the bottom of the final excavation within the trench limits.

- G. Where the groundwater level is above the proposed bottom of the excavation level, it is expected that some type of pumped dewatering system will be required for pre-drainage of the soils prior to final excavation and for maintaining the lowered groundwater level until construction has been completed to such an extent that the structure, pipeline or fill will not be floated or otherwise damaged. It is further expected that the type of system, spacing of dewatering units and other details of the Work will vary depending on soil / water conditions at a particular location.
- H. Dewatering units used in the Work shall be surrounded by suitable filter sand and no fines shall be removed by pumping. Pumping from the dewatering system shall be continuous until the pipe or structure is adequately backfilled. Stand-by pumps and a source of standby power shall be provided.
- I. Water entering the excavation from precipitation or surface runoff shall be collected, drained to a sump and pumped from the excavation to maintain a bottom free from standing water.
- J. The Contractor shall furnish, provide, install, operate, maintain, move and subsequently remove as often as necessary or required, all the pumps, piping, hoses, flumes, dams, equipment, labor and materials necessary or required for controlling surface and subsurface water entering the trenches, excavations and Work areas, regardless of source or quantity, during the construction of the proposed facilities and the subsequent filtration of said waters prior to discharge.
- K. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
- L. Dewatering facilities shall be suitably positioned or located so as to offer little or no interference with existing utilities, structures, etc., construction Work, completed or on-going and the proper ingress or egress to residences, businesses and factories affected by such dewatering facilities. Drainage shall be disposed of in a suitable area only so that flow or seepage back into the excavated area will be prevented.
- M. Dewatering facilities, procedures, measures, equipment, etc. which cause, or threaten to cause, damage to the Work, completed or under construction, or other existing facilities, shall be expeditiously modified or replaced so as to prevent further damage or threatened damage. The Contractor shall be responsible for determining the modifications or replacements to be made, at no additional expense to the Owner. The Contractor shall be responsible for the repair or replacement of any facilities of whatever nature, new, existing, or under construction receiving damage caused by or incidental to the operations of the

THE METROPOLITAN DISTRICT

Contractor, at no additional cost to the Owner. The Contractor shall take all additional precautions to prevent uplift of any structure during construction.

- N. The Contractor shall continuously monitor pump effluents so as to ensure and prevent the unnoticed prolonged displacement, extraction or migration of particulate matter from the bottoms and sides of trenches or excavations resulting in the immediate or latent subsidence of same, which in turn, threaten to cause to threaten the Work, completed or in progress, or other utilities, structures, adjacent properties, buildings, pavements or other surfaces, and the like.
- O. Pumping water wells, well points, sumps, etc. shall be provided with suitable filters, screens and/or gravel packs to prevent the loss of fine particulates.
- P. The recharge of groundwater to its static level shall be accomplished in a manner so as to maintain the undisturbed state of the foundation soils, prevent disturbance of fill and backfill material and prevent flotation or movement of structures.
- Q. The Contractor shall clean any and all new or existing sanitary sewers or storm drains and appurtenant facilities receiving any sediment from, by or incidental to the Contractor's dewatering operations during the prosecution of the Work, at no additional costs to the Owner.
- R. The Contractor shall employ such measures or methods as necessary or directed to avert surface runoff from entering trenches or excavation. Excavations and trench bottoms shall be maintained free of standing water.
- S. Removal of dewatering equipment shall be accomplished after the system is no longer required; the material and equipment constituting the system shall be removed by the Contractor.
- T. The Contractor shall take all necessary precautions to preclude the accidental discharge of fuel, oil, etc. in order to prevent adverse effects on groundwater quality.
- U. It is the intent of these Specifications that the dewatering of lateral trenches shall occur under the influence of dewatering the mainline trenches as the main sewer installation proceeds, thereby requiring that laterals be installed in conjunction with the mainline installation. If Contractor elects to install laterals at a later date, if dewatering is required it will be included in the service price at no additional cost to the Owner.

3.04 WELLPOINT SYSTEMS

- A. Where necessary, install a vacuum wellpoint system around the excavation to dewater the excavation. Each wellpoint and riser pipe shall be surrounded by a sand or gravel filter. Sand shall be of such a gradation that, after initial

development of the wellpoints, the quantity and size of soil particles discharged shall be negligible. Wellpoint systems shall be capable of operating continuously under the highest possible vacuum.

- B. Installation of well point systems shall be in accordance with the approved submittal in the presence of the Engineer.

3.05 DEEP WELLS

- A. Where necessary, install a deep well system around the excavation to dewater or depressurize the excavation. Each well shall be surrounded by a sand or gravel filter with adequate gradation such that after development, the quantity and size of soil particles discharged are negligible. Sufficient number of wells shall be installed to lower or depressurize the groundwater level to allow excavation to proceed in-the-dry.
- B. Installation of deep well shall be in accordance with the approved submittal in the presence of the Engineer.

3.06 OBSERVATION WELLS

- A. Install observation wells as required under this Section or in accordance with the approved submittal to monitor groundwater levels beneath and around the excavated area until adjacent structures and pipelines are completed and backfilled.
- B. Observation Well Locations and Depths:
 - 1. Wells shall be installed at locations shown on the Contract Drawings or as approved by the Engineer. They shall be located in critical areas with respect to groundwater control to monitor performance of dewatering systems designed by the Contractor's Licensed Professional Engineer.
 - 2. Observation wells required shall be installed to a depth of at least 10-ft below the deepest level of excavation, unless otherwise approved by the Engineer, and to whatever depth is necessary to indicate that the groundwater control system designed by the Contractor's Licensed Professional Engineer is performing as intended. Additional observation wells may be required by the Engineer if deemed necessary to monitor the performance of the Contractor's groundwater control system at no additional cost to the Owner.
 - 3. Locations and depths of observation wells are subject to approval by the Engineer.

THE METROPOLITAN DISTRICT

C. Protect the observation wells at ground surface by providing a lockable box or outer protective casing with lockable top and padlock. Design the surface protection to prevent damage by vandalism or construction operations and to prevent surface water from infiltrating.

1. Provide two copies of keys for each padlock to the Engineer for access to each well.
2. Observation wells shall be developed so as to provide a reliable indication of groundwater levels. Wells shall be re-developed if well clogging is observed, in the event of apparent erroneous readings, or as directed by the Engineer.
3. Submittal observation well installation logs, top of casing elevation, and well locations to the Engineer within 24 hours of completion of well installation.

D. Observation Well Maintenance

1. The Contractor shall maintain each observation well until adjacent structures and pipelines are completed and backfilled. Clean out or replace any observation well which ceases to be operable before adjacent Work is completed.
2. It is the Contractor's obligation to maintain observation wells and repair or replace them at no additional cost to the Owner, whether or not the observation wells are damaged by the Contractor's operations or by third parties.

E. Monitoring and Reporting of Observation Well Data

1. The Contractor shall begin daily monitoring of groundwater levels in Work areas prior to initial operation of drainage and dewatering system. Daily monitoring in areas where groundwater control is in operation shall continue until the time that adjacent structures and pipelines are completed and backfilled and until the time that groundwater control systems are turned off.
2. The Contractor is responsible for processing and reporting observation well data to the Engineer on a daily basis. Data is to be provided to the Engineer on a form, which shall include the following information: observation well number, depth to groundwater, total depth of well, top of casing elevation, groundwater level elevation and date and time of reading.

3.07 DISPOSAL OF DRAINAGE

- A. All water regardless of source or quantity which interferes with the Work shall be removed and treated in the proper manner. The Contractor shall not directly discharge water from trenches or excavations or other dewatering activities to existing watercourses, waterbodies or drainage facilities tributary thereto. All

dewatering discharge shall be made through suitable and proper filtration system prior to entering any existing storm drainage facilities. THE REQUIREMENTS OF THE "CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL" SHALL BE STRICTLY ADHERED TO.

- B. All water pumped or drained from the Work shall be disposed of in a manner consistent with the Specifications, that will not result in undue interference with other Work, completed or under construction, or damage to adjacent properties, pavements or other surfaces, buildings or structures and utilities. The treatment and/or disposal of all pumped or drained water shall also conform to the applicable requirements of Section 01110, "Environmental Protection Procedures" and Section 02145, "Handling Contaminated Groundwater Treatment" (if applicable).
- C. Existing sanitary sewers will be allowed to be used to discharge drainage following proper treatment as specified. The Contractor shall notify the Owner 48 hours in advance in writing prior to the discharge of drainage to the sewer system.
- D. Where feasible and appropriate, dewatering wastewaters shall be infiltrated into the ground. Dewatering wastewaters discharged to surface waters shall be discharged in a manner that minimizes the discoloration of the receiving waters. Each plan shall include a description of the operations and structural practices that will be used to ensure that all dewatering wastewaters will not cause scouring or erosion or contain suspended solids in amounts that could reasonably be expected to cause pollution of waters of the State.

3.08 REMOVAL OF SYSTEMS

- A. At the completion of the excavation and backfilling Work, and when approved by the Engineer, all pipe, deep wells, wellpoints, pumps, generators, observation wells, other equipment and accessories used for the groundwater and surface water control systems shall be removed from the site. All materials and equipment shall become the property of the Contractor. All areas disturbed by the installation and removal of groundwater control systems and observation wells shall be restored to their original condition.
- B. Leave in place any casings for deep wells, wellpoints or observation wells located within the plan limits of structures or pipelines or within the zone below 1H:1V planes extending downward and out from the edges of foundation elements or from the downward projected plan limits of the pipe, or where removal would otherwise result in ground movements causing adverse settlement to adjacent ground surface, utilities or existing structures.
- C. Where casings are pulled, holes shall be filled with sand. Where left in place, casings should be filled with cement grout and cut off a minimum of 3-ft below finished ground level or 1-ft below foundation level so as not to interfere with finished structures or pipelines.

- D. When directed by the Engineer, observation wells should be left in place for continued monitoring. When so directed, cut casings flush with final ground level and provide protective lockable boxes with locking devices. The protective boxes shall be suitable for the traffic and for any other conditions to which the observation wells will be exposed.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02145

HANDLING CONTAMINATED GROUNDWATER

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes designing, procuring, installing, operating, cleaning, and dismantling a temporary groundwater treatment system to manage contaminated groundwater that may be generated during dewatering operations associated with ANY EXCAVATION.
- B. This Specification is performance based; the Contractor shall be responsible for the complete design, procurement, and installation of all materials, equipment and appurtenances necessary to meet the specified service conditions for the duration of the dewatering operations.
- C. The discharge of all groundwater collected from construction dewatering activities within the project limits shall be directed to the sanitary sewer system existing within the construction corridor. Discharge and management of groundwater shall be accomplished in accordance with the Connecticut Department of Energy and Environmental Protection (DEEP) *General Permit for the Discharge of Groundwater Remediation Wastewater* (General Permit), and local regulations and ordinances. The Contractor shall be responsible for securing the General Permit and any other necessary state and local permits, including fees. The General Permit registration for discharge to the sanitary sewer must be submitted to the Engineer for review and approval prior to submittal to the DEEP.
- D. The Contractor shall be the General Permit applicant, the primary contact shall be the Owner, the site Owner shall be the Municipality where the Work is taking place.
- E. The Contractor is hereby notified that a minimum lead time of three to six weeks or more can be expected to prepare, process, and approve the General Permit application, including coordination with the Municipality where the Work is taking place. **No claim for delay will be considered based upon the Contractor's failure to accommodate the permitting process identified above.**
- F. This Item does not apply to the possible diversion of existing wastewater and stormwater flow in existing pipes around the construction site during field activities. Diversion of existing flows remains the responsibility of the Contractor.
- G. The Engineer will sample the groundwater treatment system discharge as required by the General Permit. The Contractor shall be furnished with copies of

THE METROPOLITAN DISTRICT

the analytical results by the Engineer for submittal to the appropriate agencies and shall be responsible for any modifications to the system needed to meet performance requirements.

1.02 SUBMITTALS

- A. As required for the appropriate level of operation, the Contractor shall prepare and submit to the Engineer a groundwater pretreatment system design, stamped and signed by a licensed professional engineer registered in the State of Connecticut including a schematic of the equipment proposed for the groundwater treatment system for review. At a minimum, the diagram shall show flow rates, pipe material and diameter, valve locations, sampling ports, discharge locations, etc. The Contractor shall also submit for review manufacturers' data sheets, assembly details and performance data on the treatment equipment, which may include settling tanks or frac tanks, particulate filters, activated carbon units and/or air stripper units. The pretreatment system design shall be submitted two weeks before startup and include the estimated flow rate, start and completion dates, flow sample frequency and proposed sample analytical methods.
- B. The Contractor shall not be allowed to commence Work activities until such time as the temporary groundwater treatment system design, as applicable, has been reviewed by the Engineer, installed in accordance with the accepted design, and is completely operational. **No claim for delay in the progress of the Work will be considered for failure by the Contractor to design a system to meet this Performance Specification.** It is anticipated that this Work will involve specialty services and/or proprietary products.

1.03 HANDLING CONTAMINATED GROUNDWATER

- A. Groundwater treatment, consisting of a settling tank or frac tank, particulate filter, activated carbon units and/or air stripper units, as required shall be located between the groundwater collection and removal sump and the sanitary sewer, and shall be designed to prevent sediments and solids, as well as contaminants in excess of the General Permit allowable effluent concentrations, from entering the sanitary sewer system. Estimated allowable effluent concentrations are provided in the attached General Permit and will be provided in the authorization provided by DEEP.
- B. Equipment required for this Item shall be installed in a location and manner acceptable to the Engineer, and in accordance with the manufacturers' recommendations to prevent interference with Work and traffic.
- C. The Contractor shall make adjustments to the sanitary sewer tie-in, if necessary, to accommodate the treatment unit. The Contractor shall obtain approval from the Owner if modifications to the municipal sewer system are necessary.

THE METROPOLITAN DISTRICT

- D. The Contractor shall be responsible for treatment of the groundwater to meet performance requirements established in the General Permit.
- E. Prior to initial effluent discharge into the sanitary sewer system, the Engineer will sample the treatment system discharge to verify conformance with requirements of the General Permit.
- F. The Engineer will notify the Contractor as soon as practicable upon knowledge of an exceedance of the pollutant levels established in the General Permit. The Contractor shall be responsible for ceasing the discharge immediately.
- G. Following recognition of an exceedance of the established pollutant levels, and in accordance with the conditions and requirements of the General Permit, the Contractor shall be responsible for all subsequent notifications to the Owner and DEEP, and procedural modifications necessary to reduce contaminant levels to acceptable criteria.
- H. If required, the Contractor shall (re)start the discharge in accordance with all necessary approvals from the DEEP and in full compliance with the General Permit and any amendments imposed thereto.
- I. Upon completion of operations involving the use of the settling tank or frac tank, particulate filters, carbon adsorption units and/or air stripper units, the Engineer will sample silt and sediment collected in the settling tank or frac tank for waste characterization determination. Disposal of the material shall be in accordance with Section 02260, "Handling, Transportation and Disposal of Regulated Soil." The Contractor is hereby notified that laboratory turnaround time is expected to be 14 working days or longer. **No claim delay will be considered based upon the Contractor's failure to accommodate the laboratory turnaround time as identified above.**

1.04 OPERATIONAL REQUIREMENTS

- A. At a minimum the groundwater treatment system shall be designed to meet the following conditions:

Design Water Flow Rate: 40 gpm (or actual, whichever is greater)
Min. Operating Water Temp: 45° F
Settling Tank Detention Time: 4 hours

Note: The design flow rate is based on estimated flows. Actual flows may be higher.

THE METROPOLITAN DISTRICT

PART 2 - PRODUCTS

2.01 GROUNDWATER TREATMENT SYSTEM EQUIPMENT

The following paragraphs recommend groundwater treatment system equipment. This should not be construed as a definitive list of Items but only an example of suggested technologies and of the level of detail expected for the submittals.

- A. Settling tanks or frac tanks should be sized to contain the total discharge from the groundwater collection and removal sump for a period of four hours, and shall be fitted with an opening capable of accepting pumped flows from dewatering operations. The settling tank shall be constructed to prevent silts and solids from entering the sanitary sewer system.
- B. Particulate filters should be a bag-type filter and be sized appropriately for the removal of particulates (silts and other solids) as needed.
- C. Activated carbon units shall be properly sized for the flows under given operating conditions. Each container shall contain virgin activated carbon at start-up. The units shall be supplied with a removable, gasketed cover with bolt-type closing ring. The vessels shall have inlet and outlet couplings adequately sized for the flow and pressure rating. A drain connection shall also be provided at the bottom of the vessel. Pressure gauges shall be provided with the units so that the backpressure of each vessel may be monitored for potential failure.
- D. Air stripper units shall be either a low-profile or packed tower type of system sized to meet the conditions of service described herein. The stripper shall be impact resistant, suitable for the contaminants to be treated and suitable for outdoor operation. The air stripping system shall have an integral effluent stilling well. The air stripper shall be equipped with an air pressure gauge as supplied by the stripper manufacturer. The air blower and motor shall be compatible with the air stripping system provided and shall be explosion-proof. The Contractor shall supply his own power source for the equipment. The exhaust from the stripper shall be configured to discharge the air stream a minimum of ten feet above grade. The Contractor shall also be responsible for providing any air emissions treatment that may be required pursuant to DEEP regulations, and securing applicable discharge permits.
- E. The Contractor shall be responsible for providing, installing, operating and maintaining equipment capable of metering the flow into the sanitary sewer system, such that the total daily flow can be recorded for each day of the discharge. The meter should be capable of measuring, indicating, and recording instantaneous and cumulative flow. The meter shall be used continuously during discharge.

THE METROPOLITAN DISTRICT

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall ensure that all personnel involved with the groundwater treatment operations understand the terms of the General Permit issued for the project by DEEP. In the event of a conflict between the requirements of this Item and the General Permit, then the terms of the General Permit shall govern.
- B. It is intended that the dewatering equipment operates at a rate that removes groundwater that naturally infiltrates the excavation. Care shall be taken not to cause a hydraulic gradient that draws groundwater into the excavation at an excessive rate.
- C. Freeze protection methods and equipment shall be approved by the Engineer.

3.02 HANDLING CONTAMINATED GROUNDWATER

- A. The Contractor shall furnish all labor, equipment, tools and materials and performing all operations in connection with the dewatering, control and diversion of water to maintain "in the dry" conditions of all excavations such that placement of various piping, manholes and appurtenances can be installed in accordance with the Contract Documents.
- B. The Contractor shall provide settling tanks, particulate filters, carbon adsorption units and/or air stripper units, as required, at each dewatering operation to be located between the groundwater collection and removal sump and the sanitary sewer. The tanks shall have a minimum capacity equal to four hours of discharge from the sump, assuming a minimum flow rate of 40 gallons per minute. If additional flow is realized, then additional tank and system capacities shall be employed. The Contractor shall furnish and install a meter to measure and record flows.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02150

BYPASS PUMPING, HANDLING STORM RUNOFF AND SANITARY SEWAGE FLOWS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all materials, labor, equipment, power, maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing dry or wet weather flows around the work area for the duration of the project. Contractor shall obtain all the required permits including the bypass notification requirements for the Connecticut Department of Energy and Environmental Protection and the Owner prior to commencement of bypass operations. Bypass reporting procedures, as outlined in Section 01060, must be completed with all notifications made at least one week in advance.
- B. The design, installation and operation of the temporary bypass pumping system shall be the responsibility of the Contractor and be completed by a licensed professional engineer in the state of Connecticut. The Contractor shall employ the services of a vendor who can demonstrate to the Engineer that he specializes in the design and operation of temporary bypass pumping systems. The vendor shall provide at least five (5) references of projects of similar size and complexity in wastewater applications performed by his firm within the past three years within New England. The bypass pumping system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
- C. The Contractor shall maintain vehicular and pedestrian traffic during the entire bypass pumping operation, as necessary or required, and implement all the necessary or environmental protection procedures as may be required by the presiding authorities having jurisdiction over such matters. See Section 01570 – Maintenance and Protection of Traffic (MPT).

1.02 RELATED SECTIONS

- A. Section 01060, Regulatory Requirements
- B. Section 01300, Submittals
- C. Section 01510, Maintenance of Flow in Existing Sewers
- D. Section 02200, Earthwork

THE METROPOLITAN DISTRICT

1.03 SUBMITTALS

- A. Submittals shall conform to the requirements herein.
- B. For bypass pumping systems, the Contractor shall submit, prior to installation, 6 (six) copies of detailed plans and description outlining all details and provisions of the temporary bypass pumping system. The plan shall be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials and all other incidental items necessary and/or required to insure proper operation of the bypass pumping system, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these Contract Documents. No bypass pumping shall begin until all provisions and requirements have been reviewed and approved. Shop drawings shall be submitted for all pumps, piping, and appurtenances for all types and sizes of equipment required for the bypass pumping work, as required.
 - 1. Within fourteen (14) days of any planned bypass, the Contractor shall submit a bypass plan for any proposed bypass or dewatering activity.
- C. The bypass pumping plan shall include but not limited to the following:
 - 1. Staging areas and access requirements for pumps;
 - 2. Flow stoppage system, including pipe and channel plugging method and types of plugs; No flow through plugs will be allowed for use on bypass installations associated with the work. However, Contractor may use flow-thru plugs for short-term inspection/testing activities, such as vacuum testing, with the approval of the Engineer;
 - 3. Number, size, material, location and method of installation of pump suction piping;
 - 4. Number, size, materials, method of installation and location of installation of discharge piping;
 - 5. Bypass pump sizes, capacity, number of each size to be on site, power requirements, diesel engine specifications, fuel tank capacity, fuel consumption requirements and method of refueling;
 - 6. Calculations of static lift, pipe pressure rating, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted);
 - 7. Size and location of standby power generator, if required;
 - 8. Downstream discharge plan;

THE METROPOLITAN DISTRICT

9. Any thrust and restraint block sizes and locations;
10. Any temporary pipe supports and anchoring required;
11. Calculations for selection of bypass pumping pipe size;
12. Schedule for installation of and maintenance of bypass pumping lines;
13. Plan indicating selection location of bypass pumping line locations;
14. Pumps may not be benched down to make suction lift;
15. Freeze protection and noise control requirements/measures;
16. Plans showing additional maintenance and protection of traffic means are required by the Contractor's bypass pumping plan/layout.

1.04 QUALITY ASSURANCE

- A. The bypass pumping system shall meet the requirements of all codes and regulatory agencies having jurisdiction. The Contractor shall be responsible for damage due to sewer backups or overflows onto streets, yards and unpaved areas or into buildings, adjacent ditches, storm sewers, and waterways, including any subsequent remediation measures required or made necessary by such sewer backups or overflows.

1.05 VENDOR REQUIREMENTS

- A. The vendor shall demonstrate the bypass pumping equipment is automated and is capable of functioning without the assistance of an operator. The vendor shall have a minimum experience of five years designing and supplying wastewater bypass systems.
- B. The vendor shall demonstrate the bypass pumping equipment can operate for an extended period of time running dry. After this period of time, the pump shall have the capability of pulling a 25" Hg vacuum without adjustment or repair.
- C. The vendor shall demonstrate sufficient inventory to perform normal rentals, including this project, and to maintain at least 100% reserve equipment ON-SITE for this project.
- D. The vendor shall maintain 100% repair parts ON-SITE to fulfill any service or repair of all rental equipment.

THE METROPOLITAN DISTRICT

- E. The vendor shall demonstrate sufficient service staff and trucks to mobilize to repair or service equipment within one hour of a service call, twenty-four (24) hours per day, seven (7) days per week. The vendor shall have a service facility within sixty (60) miles of the project.
- F. The Contractor shall provide a list of phone and pager numbers to call for twenty-four-hour service.
- G. The bypass pumping system including all pumps, pipe, hose, valves, and fittings shall be provided by one bypass vendor. The fusion of any pipe or the bypass pumping system shall be provided by the vendor. All hydraulic calculations and drawings required by the submittals shall be provided by the bypass vendor and stamped by a State of Connecticut Licensed-registered Professional Engineer.

PART 2 - PRODUCTS

2.01 BYPASS PUMPING EQUIPMENT

- A. All pumps used shall be centrifugal, end suction, fully automatic self-priming pumps that do not require the use of foot-valves, vacuum pumps, diaphragm pumps, or isolation valves in the priming system. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows shall immediately develop 25" Hg vacuum without adjustment or repair or employ level control devices to regulate on/off or variable speed of the pump. Pumps shall be low noise sound attenuated, critically silenced units, rated for 85 dba at 7 feet, and 68 dba at 30 feet.
 - 1. Submersible pumps shall be allowed, where feasible for lower flow bypass systems. Requests to use submersible pumps must be approved by the Engineer via the submittal process.
- B. Seals shall be high pressure, mechanical self-adjusting type with silicon carbide faces capable of withstanding suction pressures to 100 psi running. The mechanical seal shall be cooled and lubricated in an oil bath reservoir, requiring no maintenance or adjustment. Pump shall be capable of running dry, with no damage, for extended periods of time. All metal parts shall be of stainless steel. Elastomers shall be Viton. Pump end shall be manufactured to meet ISO 9002 certifications.
- C. The pumps may be electric or diesel powered or a combination of both.
- D. The Contractor shall provide the necessary start/stop controls for each pump.
- E. The Contractor shall include one stand-by pump of each size to be maintained on site.

THE METROPOLITAN DISTRICT

- F. Back-up pumps shall be on-line, isolated from the primary system by a valve.
- G. Pump shall not be connected by a common suction manifold. The use of PVC or Steel Pipe with Dresser Couplings will not be accepted. All pipe or hose will be rated for 25" Hg Vacuum.
- H. In order to prevent the accidental spillage of flows, all discharge systems must be constructed of high-density polyethylene pipe with fused joints or Quick Disconnect discharge pipe with positive restrained joints, and leak proof connections. Discharge hose will only be allowed by specific permission of the Engineer. PVC pipe with glued joints, aluminum "irrigation pipe", steel pipe or PVC pipe with Dresser couplings will not be accepted. All joints must be 100% restrained. All discharge piping must have a minimum working pressure of 50 psi or greater if required by bypass design. All force main connections shall be made by using flanged composite hose with a working pressure of 150 psi.
- I. Allowable piping materials will be fused, high-density polyethylene pipe, Quick Disconnect Pipe, or Flanged Composite Pressure Class Hose. SDR of discharge piping shall be suitable for the calculated discharge pressures. The vendor fusing the pipe must have a minimum of five (5) years' experience fusing HDPE pipe of the same diameter required for the project.
 - 1. Lay flat hose with threaded connections shall be allowed where feasible for lower flow bypass systems. Requests to use lay flat hose must be approved by the Engineer via the submittal process, and subject to a visual inspection prior to use.
- J. Autodialer: Provide a single 115-volt, single phase autodialer and associated non-mercury float switches that shall provide 24-hr monitoring of pump activity during bypass operations and notify personnel via telephone of any alarm condition (high flow, loss of power, stand-by pump activation). Once activated, the unit will dial a telephone or pager number (up to eight maximum) of emergency personnel with a pre-recorded message stating the nature of the alarm. Provide cellular number for auto-dialer operation. An active telephone landline will not be provided. Dial emergency personnel as directed by the Owner.
- K. POWER GENERATING FACILITIES. All power generating facilities shall be capable of providing all power necessary to operate any primary and secondary pumping systems. The facilities shall be maintained ready for use if required. These facilities shall adhere to all noise ordinances in the Municipality the work is being performed.

THE METROPOLITAN DISTRICT

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL AND MAINTENANCE

- A. The Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to actual operation. The Contractor shall perform a vacuum test of all suction piping prior to actual operation. The Engineer will be given 24 hour notice prior to testing.
 - 1. All bypass systems are subject to startup testing and inspection by the Owner prior to acceptance for usage.
- B. Any time the bypass pumping system is operating, an experienced operator shall be on site to monitor the operation, adjust pump speed, valves, etc., and make minor repairs to the system and report problems.
- C. During bypass pumping, do not allow sewage to be leaked, dumped, or spilled in or onto any area outside of the existing sewer system. If a sewage leak, dump or spill occurs, Contractor shall notify the Engineer and the Owners's Command Center (860-513-3388) ***immediately***.
- D. In the event of accidental spill or overflow, immediately stop the discharge and take action to clean up, disinfect the spill and immediately notify the Owner.
- E. In the event of rain, the Contractor shall coordinate the operation of bypassing with the Owner.
- F. High flow conditions may require the Contractor to temporarily suspend work, at the Owners request. Days on which work has been suspended shall not be considered working days and no additional compensation will be provided by the Owner.
- G. 100% Spare parts for each type of pump and piping and adequate hoisting equipment for each pump and accessories shall be maintained on site as required.
- H. The Contractor is forbidden to discharge wastewater onto private properties, public roadways or into drainage systems, canals, channels, creeks, wetlands as delineated on the Contract Drawings, or open water courses. The Contractor shall be responsible for any wastewater spills and back-ups and the cost and fines associated with their cleanup. The Contractor shall pay for all damage caused by wastewater spills and back-ups. The Contractor is responsible to report any discharges to the proper authorities.

THE METROPOLITAN DISTRICT

3.02 INSTALLATION AND REMOVAL

- A. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities and traffic patterns and shall obtain approval of the pipeline locations from the Engineer and/or the governing authority having jurisdiction. No bypass shall be performed without following the requirements outlined in Section 01060.
- B. During all bypass pumping operations, the Contractor shall protect existing structures and equipment from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to the existing structures and equipment caused by human or mechanical failure.
- C. Plugging or blocking of wastewater flows shall incorporate primary and secondary plugging and blocking devices. When plugging or blocking is no longer needed for performance of the Work, it is to be removed in a manner that permits the wastewater flow to slowly return to normal flows without surge, in order to prevent surcharging or other major disturbances downstream.
- D. When working inside existing structures, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of gases, combustible or oxygen-deficient atmospheres, and confined spaces.
- E. If possible the pipeline must be located off streets and sidewalks and on shoulders of the roads. When the bypass pipeline crosses streets and driveways, the Contractor may have to place the bypass pipelines in trenches and cover with temporary pavement. The Engineer will make the final determination if the bypass pipeline must be placed in a trench. Upon completion of the bypass pumping operations, and after the receipt of written permission from the Owner, the Contractor shall remove all the piping, restore all property to pre-construction condition and restore all pavement.
- F. When bypass pumping operations are complete, piping shall be drained into the sewer and piping shall be flushed prior to disassembly.

3.03 PERFORMANCE

- A. The Contractor shall provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept wastewater flow before it reaches the point where it would interfere with the Work.
- B. The Contractor shall provide all necessary means to safely convey wastewater flow past the Work. The Contractor shall not be permitted to stop or impede the main flows under any circumstances.

THE METROPOLITAN DISTRICT

- C. The Contractor shall maintain wastewater flow around the Work in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding. The wastewater flow shall be maintained in a manner that protects downstream processes at the Water Pollution Control Facility from flooding and does not affect the quality of wastewater treatment as determined solely by the Owner.
- D. The bypass system shall not require excavation to reduce the suction lift without the specific approval of the Engineer.
- E. The Contractor shall protect water resources wetlands and other natural resources during performance of the Work.
- F. The temporary bypass system must remain in operation until normal wastewater flow can be completely restored.

3.04 HANDLING STORM RUNOFF AND SANITARY SEWAGE FLOWS

- A. The Contractor shall furnish, install, construct, operate and maintain temporary facilities such as pipes, structures, flow diversions, pumping equipment, bypasses and other protective facilities that are necessary for the proper conveyance, without interruption, of storm runoff and sanitary sewage flows through the limits of work during the construction, reconstruction or relocation of new and existing sanitary sewers, storm drains, house connections and manholes throughout the period of time in which the work occurs.
- B. The Contractor shall handle both dry and wet weather flows, regardless of source or quantity of flow, and the protection of existing structures, utilities, etc., and any or all of the finished construction during dry or wet weather flows. The Contractor shall remove and dispose of all such temporary facilities upon the completion of the permanent work. See Section 01510 for bypass requirements.
- C. All materials shall conform to the requirements of the applicable items of these Specifications and be subject to the approval of the Engineer.
- D. In general, the pertinent provisions of the Contract Specifications shall govern the construction methods and procedures to be utilized by the Contractor for the work specified in this Section.
- E. The Contractor shall investigate and verify sanitary sewer flows to evaluate the scope of facilities required for the proper conveyance and maintenance of said flows.
- F. Sanitary flows may be bypassed to the parallel combined sewer or adjacent sewer on any street in this Contract provided the Contractor receives the prior

THE METROPOLITAN DISTRICT

written approval of the Engineer. The existing combined sewers may overflow during wet weather or high flow conditions and for this reason, flow conditions in both the sanitary sewer pipe and bypassed sewer pipe must be closely observed to ensure that bypassing of sanitary flows to the combined sewer will not exacerbate surface water pollution at downstream locations.

1. If the Contractor chooses to bypass to the combined sewer, the Contractor shall demonstrate to the satisfaction of the Engineer that bypassing in this manner will not contribute to surface water pollution at downstream locations.
 2. In general, bypassing to the combined sewer will not be allowed during non-working hours as weather conditions and flow rates in these pipes can change rapidly.
- G. The Contractor shall furnish the Engineer with his proposed detailing methods, procedures, equipment and materials to maintain flows and accomplish the work as described herein. The Contractor alone shall be responsible for the safety of the work, the protection of any facilities, utilities or adjoining properties, and for the successful completion of the work under this item.
- H. The Contractor is hereby notified that due to the age and condition of the existing sewer systems, the flows in said systems may increase during storms or wet weather in general. All flows, regardless of source or quantity, must be maintained in an acceptable manner, so as not to overflow, backup or otherwise create a nuisance or health hazards, or in any way endanger adjoining properties or facilities.
- I. To this end, the Contractor shall furnish, install or construct temporary facilities, connections or structures as necessary to convey and maintain the aforementioned flows during the prosecution of the work under this Contract. All such temporary facilities, structures or connections shall be designed and constructed to permit excavation for permanent work to the payment limits shown on the Contract Drawings. Failures of such temporary facilities which endanger or prevent proper completion of permanent work shall be corrected at the sole expense of the Contractor.
- J. The Contractor shall provide, install, operate and maintain all temporary facilities such as pumping equipment and hoses, conduit, etc. to intercept flows before said flows reach points where they would interfere with the Contractor's work, to bypass the flows beyond the point of immediate construction and to return them to the drainage system of origination below said systems. The Contractor shall have on hand throughout the work such auxiliary pumping equipment, generators, etc., necessary to maintain flows in the event his primary equipment fails.

THE METROPOLITAN DISTRICT

- K. The Contractor shall divert flows as necessary to construct or reconstruct inverts, benching, or other portions of manholes or chambers as indicated on the Contract Drawings, or as directed by the Engineer.
- L. The Contractor shall make temporary connections to keep all house connections laterals, utility lateral connections and storm connections in service, where said connections are encountered during the course of excavation for the proposed facilities. In the event said connections are removed by the Contractor for his convenience to facilitate the installation of proposed facilities, the Contractor shall make temporary reconnections as directed by the Engineer, until such time permanent repairs to the connections can be accomplished.
- M. Unless otherwise provided for, or directed, all temporary facilities shall be bulkhead and/or removed and disposed of in an approved manner when no longer required.
- N. The Contractor shall have no claim for additional compensation by reason of any delay or inconvenience in adapting his operations to the requirement for maintaining and conveying sanitary sewage flows.
- O. No claim will be allowed for any delay, loss or expense to which the Contractor may become subject, directly to indirectly, by reason of the normal or wet weather flows in existing sanitary sewers or by reason of any damage to the existing sewers caused by his operations.
- P. The Contractor shall in no way or manner anticipate any additional compensation for work performed in the removal and/or sand or grout filling of the existing sewer system. Additional costs, if any, shall be included in the appropriate bid items of this Proposal.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02160

EXCAVATION SUPPORT SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes designing and furnishing all labor and materials necessary to construct and maintain complete, all sheeting, soldier piling and lagging, bracing supports, and appurtenances required to perform the Work including sheet piling for building construction, trench support, all shafts and excavations, and cofferdams, permanent and temporary alike, as indicated on the Contract Drawings and specified to retain excavations in a safe manner, to control ground movements, and to protect adjacent structures, or as otherwise directed by the Engineer or required by agencies having jurisdiction over the Work.
- B. Steel sheeting shall be used except where otherwise indicated, specified or directed by the Engineer and agencies having jurisdiction over the Work. All excavation support systems shall be removed by the Contractor unless indicated on the Contract Drawings or otherwise directed by the Engineer.
- C. The Work of this Section includes the removal and disposal of all excavation support system materials that are not to be left in place.
- D. Work shall include the design, equipment, materials, installation, protection, and monitoring of geotechnical instrumentation required to monitor the performance of the excavation support system as required herein.

1.02 RELATED SECTIONS

- A. Section 02140, Dewatering and Drainage
- B. Section 02200, Earthwork
- C. Section 02202, Trench Refill
- D. Section 02210, Rock Excavation and Removal

1.03 SUBMITTALS

- A. Prior to the installation of any excavation support system, the Contractor shall submit to the Engineer for review and approval, complete excavation support system layout and detail drawings and shoring descriptions bearing the

THE METROPOLITAN DISTRICT

Contractor's Engineer's State of Connecticut Professional Seal and signature. At least one copy of the design shall be maintained at the job site while the Work is under construction. This submission review will not relieve the Contractor of the sole responsibility for the adequacy of the system nor shall it be construed as an approval or guarantee that the Contractor's proposed equipment, materials and methods for the sheeting, bracing or appurtenances will be adequate for the Work required at the locations of and for the Work required by this Contract. Submittals shall indicate the following, as a minimum:

1. Provide overall plan layout of the system, indicating clearances, dimensions, material properties, member sizes, locations, spacing and penetrations depth of all members, locations of various types of lateral supports. Indicate existing and proposed utilities, structures or other obstruction, location and type of instrumentation and monitoring points within the area of influence of the excavation.
 2. Provide wall elevations and locations of all bracing.
 3. Show the overall sequence of installation and removal of bracing, indicating levels to which the Work will be carried out before bracing is installed or removed
 4. Method of preloading bracing (if required) and the preload for each member, and the method of locking-off the preload. Include detailed drawings of the connections, jacking supports and method of shimming
 5. Details, layout, arrangement, equipment requirements, and method of construction of the proposed excavation support system
 6. Procedures for resolving difficulties arising from misalignment of members exposed during excavation, and criteria for implementing those procedures
- B. Included as part of this submission, the Contractor's Engineer must provide design calculations and a complete listing of all references, codes, design data and specifications used by the Contractor's Engineer and required by any federal, state or local agency having jurisdiction, and to which the excavation support system design conforms. Design calculations shall include:
1. Loads on the excavation support system for all stages of excavation, bracing removal, and backfilling, including material and equipment loads on adjacent ground during construction.
 2. Design of wall and all bracing members including all details for all stages of construction.

THE METROPOLITAN DISTRICT

3. Theoretical deflections of excavation support system and deformation of structures, pipelines, and other improvements located within the area of influence of the excavation.
- C. Submit to the Engineer for review and acceptance, a plan of action to be implemented in the event any deformation exceeds the calculated theoretical deflections. The plan of actions shall be positive measures by the Contractor to limit further movement of the wall including but not limited to trenching for struts and wales, placement of granular earth berms against the wall, installation of additional struts, or combinations thereof. The details of the mitigating measures shall include a schedule of implementation, location and/or availability of materials, structural details for all connections to the wall and support elements, and a detailed description of the method of implementation. The Contractor shall be prepared to work twenty-four (24) hours per day to implement such measures. The remedial work/mitigating measures shall be at no additional cost to the Owner.
- D. Do not proceed with any support of excavation or protection activities until all submittals required by this Section have been approved by the Engineer.

1.04 QUALITY ASSURANCE

- A. The Contractor's Engineer shall provide and maintain throughout the excavation support system installation and/or Work sufficient supervision and technical guidance to the Contractor for proper excavation support system materials, equipment, operations and methods to the extent necessary to assure compliance with the Contractor's Engineer's design, all safety procedures and standard requirements for such Work, and the successful completion of the Work. Failure to provide and/or maintain such supervision and/or technical guidance during the Work shall in no way relieve the Contractor's Engineer and/or the Contractor from their overall responsibilities and obligations under the Contract, nor shall it be a basis for any claim by either against the Owner and/or the Engineer.
- B. The Contractor and Contractor's Engineer shall fully indemnify and hold harmless the Owner and Engineer and their agents, employees and representatives, from and against any and all claims as stipulated under the Agreement, whether directly or indirectly arising out of, relating to or in connection with the Work.
- C. Quality assurances and proper safety procedures must be maintained at all times and be in strict accordance with the Contractor's Engineer's requirements and consistent with all federal, state and local regulatory agencies having jurisdiction over the Work. Should any conflict in requirements, regulations, restrictions or codes exist between that which is specified by the Contractor's Engineer and any federal, state or local agency, the more stringent application shall prevail.

THE METROPOLITAN DISTRICT

1.05 DESIGN RESPONSIBILITY

- A. The Contractor shall be fully responsible for providing complete and adequately designed excavation support system as required and/or directed by the Engineer in accordance with the provisions set forth herein.
- B. The Contractor shall be responsible for choosing and sizing the support of excavation systems. The size of the systems shall, however, be adequate for removal of material as indicated on the Contract Drawings and to provide adequate space to meet the Contractor's Work requirements for his/her selected methods of construction. The excavation support system shall be chosen such that it limits the amount of ground movements and protect adjacent structures and facility.
- C. The Contractor shall engage, at his own expense, the services of a fully competent and qualified Professional Registered Engineer, hereinafter referred to as the "Contractor's Engineer", registered in the State of Connecticut for the design of all excavation support system requirements to accomplish the Work specified, and for supervising the proper onsite installation associated therewith. The Contractor's Engineer shall be acceptable to the Engineer and demonstrate a minimum of ten (10) years documented experience in the field of excavation support system design and implementation. Prior to the actual employment of the Contractor's Engineer, the Contractor shall submit to the Engineer, to the full extent deemed necessary, a detailed resume stating the Contractor's Engineer's professional qualifications, related experience and references, and if requested, examples of work similar to that required for the Work specified, for a general review by the Engineer and a means of documenting the requisite experience hereinbefore specified. Only after a satisfactory review of the Contractor's Engineer's overall qualifications by the Engineer in fulfillment of the requisite experience hereinbefore specified shall the Contractor finalize such employment and begin the design aspects of the Work.
- D. The Contractor's attention is directed to the fact that acceptance of the Contractor's Engineer and/or his/her qualifications by the Owner and/or Engineer shall not be an overall approval of the Contractor's Engineer nor the excavation support system designs and methods of installation employed during the Work. It being understood that all excavation support system requirements necessary to accomplish the Work specified and/or indicated on the Contract Drawings shall be designed by and installed under the direct supervision of the Contractor's Engineer who shall ultimately and fully bear the responsibility for that Work.

1.06 PRODUCTS AND DESIGN CRITERIA

- A. The overall excavation support system design, quality of materials and methods of installation for all excavation support system applications necessary to

THE METROPOLITAN DISTRICT

accomplish the Work specified shall be consistent with the established standards of the construction industry and must, as a minimum, comply with the requirements for earth support systems for excavations as defined by current US Department of Labor, Occupational Safety and Health Act (OSHA) regulation (29 CFR Part 1926.650 Subpart P) applicable thereto, and any other federal, state and local agencies having jurisdiction and/or requirements pertaining thereto including Building Code requirements of the State or Connecticut. The design and implementation thereof shall be in accordance with sound engineering practice and modern accepted principles of soil mechanics, and shall include the effects of hydrostatic forces and all surcharge loads which may be reasonably anticipated throughout construction. The methods employed shall be to the extent necessary to permit the proper and satisfactory installation and construction of the Work specified; to withstand all loads and forces encountered to provide soil restraint and control of water as required; to insure the safety of the workers and all other personnel on or near the site; to prevent injurious caving or erosion, or loss of ground; to maintain at all times proper and safe pedestrian, vehicular traffic on public and private streets, property and rights-of-way; to minimize horizontal and vertical movements; to protect adjacent structures and utilities from damage; and to stabilize unforeseen areas of work encountered during the execution of the Work as deemed necessary by the Engineer.

- B. Maintain a minimum factor of safety of 1.5 against heave, uplift, piping and instability due to seepage gradients at the base of the excavations.
- C. For support systems in which bracing is installed between opposite sides of the excavation, design the excavation support of both sides to be nearly the same as feasible
- D. Where appropriate recommended and certified by the Contractor's Engineer trench boxes can be used for this project. If the design includes using trench boxes or other pre-manufactured excavation support systems, then these systems must be certified by the manufacturer or Contractor's Engineer before being utilized. The certification must be maintained at the job site while the Work is under construction.
- E. The zone of influence is defined as a line extending from the edge of the foundation or spring line of pipe, then outward and downward at a slope of 1 horizontal to 1 vertical.
- F. The Contractor and Contractor's Engineer's attention is directed to the fact that should any additional investigations, subsurface explorations and/or other appurtenant information be required to fulfill the needs of this design, as determined by the Contractor's Engineer above and beyond that which is already provided under these Contract Documents, the Contractor shall obtain all such information and data required at the Contractor's own expense.

THE METROPOLITAN DISTRICT

1.07 CERTIFICATE OF DESIGN

- A. The Contractor's special attention is directed to the required "Certificate of Design", the form of which is provided at the end of this Section. The Contractor and Contractor's Engineer shall complete this "Certificate" in its entirety for each location of Work to be done, and any revisions associated there with, and submit it simultaneously with, as an integral part thereof, the excavation support system submission. Any submission made without the completed "Certificate", appropriately signed and sealed, shall be returned to the Contractor. The Owner and/or Engineer hereby reserves the right to delay excavation support system work and/or any work associated with, or dependent upon, the proper implementation of the excavation support system, without cause for claim against the Owner or Engineer, until a complete and appropriate submission is rendered. This Certification shall indicate that the excavation support system, bracing and all appurtenances related thereto are designed to withstand the required loads, forces to be encountered, and to provide soil and water control, and are in compliance with these Specifications and all federal, state or local agencies having jurisdiction over the Work to be performed.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Timber bracing:
1. Timber bracing may be of any species of wood which will satisfactorily withstand all driving and construction stresses and the loads to which the members will be subjected. Bracing shall not be less than 3 inches nominal thickness and shall be provided with continuous interlocks. All timber bracing shall be free from worm-holes, windshakes, loose knots, decayed or unsound portions or other defects which might impair its strength or tightness.
- B. Steel sheeting:
1. The shapes, sizes, and lengths of steel sheeting to be utilized are optional with the Contractor, providing they are satisfactory to withstand all driving and construction stresses and provided with continuous interlocks. All steel sheet piling used for the supporting systems, whether new or used, shall be sound and free from defects that may impair their strength.
- C. Bracing, Hardware and Fastenings:
1. Bracing and other supports whether of steel or of timber, shall be of the strength and dimensions necessary to satisfactorily withstand the loads to which they will be subjected. All bracing and other supports shall be free from

THE METROPOLITAN DISTRICT

any defects which might impair this strength. The Contractor shall provide all necessary hardware and fastenings necessary in connection with satisfactory installation of all sheeting and bracing.

D. Soldier Piles / Lagging:

1. Soldier piles and structural steel members shall conform to ASTM A572 or ASTM A242 unless approved otherwise. No members with permanent deformations are to be provided. Members shall not be spliced unless approved by the Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The Contractor shall be fully responsible for ensuring adequate safety measures are provided at all times and shall comply with all safety requirements of federal, state and local agencies having jurisdiction over the Work. Installation of the excavation support system including all bracing, supports and appurtenances, shall be adequate to permit the performance of the Work and be in accordance with the requirements of the Contractor's Engineer and the excavation support system design associated therewith. Installation of trench boxes or pre-manufactured excavation support shall be in accordance with the Contractor's Engineer's design and manufacturer's recommendations.
- B. Monitor performance of excavation support system for both horizontal and vertical deflections daily during excavation, and at intervals not to exceed seven days following the completion of excavation Work. Monitoring points on excavation support system shall be located along the support wall at not more than 25 foot spacing. If monitoring data indicates that deflections have exceeded 1 inch, increase frequency of monitoring as required by the Engineer. Any movements of excavation support system and/or appurtenances which, as determine by the Engineer, can cause damage to adjacent structures or utility, or prevent the proper completion of the Work, the Contractor shall implement the approved plan of action and the support system shall be corrected at the expense of the Contractor. Submit all monitoring measurements to the Engineer on the same day measurements are taken.
- C. Excavation support system shall be installed in a manner which will prevent the disturbance of the surrounding surface, subsurface conditions and/or structures. Any such disturbances shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.
- D. Before beginning construction at any location of this project, adequately protect existing structures, utilities, trees, shrubs, and other existing facilities to remain. All underground utility lines shall be identified, located, and protected from

THE METROPOLITAN DISTRICT

damage or displacement. Utility companies and other responsible authorities shall be contacted to locate and mark the locations and, if they so desire, direct or assist with protecting the underground installation. When required, the Contractor shall obtain an excavation permit from the local authority having jurisdiction prior to the initiation of any excavation Work.

- E. Care shall be taken to prevent voids outside of the excavation support system, but if voids are formed, they shall be immediately filled with common fill material or controlled low strength material (CLSM). Voids in locations that cannot be properly compacted upon backfilling shall be filled with lean concrete or other material as approved by the Engineer.
- F. If unstable material is encountered during excavation, all necessary measures shall be taken immediately prevent ground displacement.
- G. Sufficient quantity of material shall be maintained on site for protection of work in for use in case of accident or emergency.

3.02 SOLDIER PILES AND LAGGING

- A. Install soldier piles with the minimum embedment depths as shown on the Contract Drawing and the MDC Standard Details Manual.
- B. Soldier piles shall be installed as indicated in accordance with Contract Drawings and the MDC Standard Details Manual.
- C. Driven piles shall be installed with driving shoes where hard driving is anticipated.
- D. For soldier piles installed in predrilled holes, provide casing or other methods of support as necessary to prevent caving of holes and loss of ground.
- E. Predrilled holes for soldier pile shall be backfilled with concrete from the pile tip elevation to the elevation of the bottom of the excavation. The remainder of the predrilled hole shall be backfilled with lean concrete or sand. Concrete strength shall be in accordance with the Contract Drawings, the MDC Standard Details Manual, and Division 03 of the Specifications.
- F. The predrilled hole diameter shall be sufficient to allow for proper alignment and concrete backfilling of the pile.
- G. Driven soldier piles shall be advanced without the aid of a water jet.
- H. Provide timber lagging of sufficient thickness to withstand earth pressures. Timber lagging shall be at least 3 inches thick.

THE METROPOLITAN DISTRICT

- I. Install lagging with no gap between adjacent boards. As excavation proceeds, the maximum height of unlagged face of excavation shall not exceed 4 feet. The unlagged face shall not exceed 2 feet if water seeps or flows from the face of the excavation or if the face of the excavation becomes unstable.
- J. As installation progresses, backfill the voids between the excavation face and the lagging. Pack with materials such as hay, burlap, or geotextile filter fabric where necessary to allow drainage of ground water without loss of ground.

3.03 STEEL SHEET PILING

- A. Install steel sheet piling with the minimum embedment depths as shown on the Contract Drawings and the MDC Standard Details Manual.
- B. Drive in plumb position with each sheet pile interlocked with adjoining piles for its entire length so as to form a continuous diaphragm throughout the length of each run of wall, bearing tightly against original ground. Exercise care in driving so that interlocking members can be extracted without damaging adjacent structures or utilities. The methods of driving, cutting, and splicing shall conform to the approved Contract Drawings and the MDC Standard Details Manual.
- C. Use templates or other temporary alignment facilities to maintain piling line.
- D. Prior to installation, the sheet piles shall be thoroughly cleaned and inspected for defects and for proper interlock dimensions. The Contractor shall provide a tool for checking the interlock dimensions.
- E. Each sheet pile shall have sufficient clearance in the interlocks to slide, under its own weight, into the interlock of the sheet pile previously placed.
- F. Excavation shall not be carried in advance of steel sheet piling installation.
- G. Where obstructions are anticipated, pre-excavation or pre-drilling along the sheet pile wall alignment shall be conducted at no additional cost to the Owner. Pre-excavation and pre-drilling shall not extend below the lowest excavation level or into bearing soils for existing or future structures.
- H. Obstructions encountered before the specified embedment for piles shall be removed. Where obstructions cannot be removed, the sheet pile system shall be re-evaluated by the Contractor's Design Engineer for the resulted reduced embedment and additional toe stability measure implemented, as required or for realignment of the sheet pile wall. A submittal of the proposed measures shall be provided.

THE METROPOLITAN DISTRICT

- I. Damaged piling or piling with faulty alignment shall be withdrawn and new piling driven properly in its place. The cost of such additional work shall be considered as part of the pile driving and shall be borne by the Contractor.

3.04 INTERNAL BRACING SUPPORT SYSTEM

- A. Provide wales and struts as needed to enable them to carry maximum design load without distortion or buckling.
- B. Include web stiffeners, plates, or angles as needed to prevent rotation, crippling, or buckling of connections and points of bearing between structural steel members. Allow for eccentricities caused by field fabrication and assembly.
- C. Install and maintain all bracing support members in tight contact with each other and with the surface being supported.
- D. Coordinate excavation work with installation of bracing. Excavation shall extend no more than 2 feet below any brace level prior to installation of the bracing.
- E. Use procedures that produce uniform loading of bracing member without eccentricities or overstressing and distortion of members of system.

3.05 MOVABLE TRENCH BRACING

- A. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the crushed stone and backfill.
- B. When installing rigid pipe (R.C., etc.), any portion of the box extending below mid diameter shall be raised above this point prior to moving the box ahead to install the next pipe. This is to prevent the separation of installed pipe joints due to movement of the box.
- C. When installing flexible pipe (PVC, D.I., etc.) trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below mid-diameter of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, crushed stone shall be placed to fill any voids created and the crushed stone and backfill shall be recomacted to provide uniform side support for the pipe.
- D. Portable trench boxes or sliding trench shields may be used for the protection of workers only.
- E. Additional excavation, backfilling, and surface restoration required as the result of trench box use shall be at no additional cost to the Owner.

THE METROPOLITAN DISTRICT

- F. Trench boxes or shields shall be designed, constructed, and maintained to meet acceptable engineering and industry standards.
- G. Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.
- H. Trench boxes must be in good condition and free from damage that might impair their proper function. The use of sheeting and/or steel road plates to extend the height of trench boxes will not be allowed.

3.06 REMOVAL

- A. All excavation support system approved for removal by the Engineer shall become the property of the Contractor and removed from the construction site.
- B. All restoration and clean up shall be as indicated and as specified.
- C. Unless otherwise indicated on the Contract Drawings or directed by the Engineer, all excavation support systems shall be removed by the Contractor.
- D. Do not remove excavation support members installed within the zone of influence of new or existing structures or pipes. The zone of influence is defined as a line extending down and away from the outer edge of the structure or pipe springline at a slope of 1 horizontal to 1 vertical.
- E. Do not remove internal bracing and transfer loads to the permanent structure without prior acceptance of the Engineer.
- F. Removal shall begin at and progress from the bottom of the excavation. Members shall be released slowly as to note any indication of possible failure of the remaining members or possible cave-in of the sides of the excavation. Backfilling shall progress together with the removal of support systems from excavations.
- G. All voids left after withdrawal of excavation support systems shall be immediately refilled with sand by ramming with tools especially adapted to that purpose or otherwise as directed.
- H. No wood shall remain as part of the abandoned portion of the Work.
- I. Where excavation support system is to be left in place, the Contractor shall cut it off at four (4) feet below grade or as directed by Engineer. The Contractor shall dispose of the removed portions of the excavation system.
- J. No payment will be given for excavation support system which has been left in the excavation or trench for the convenience of the Contractor.

THE METROPOLITAN DISTRICT

Contract Reference:

CERTIFICATE OF DESIGN

Sheet 1 of 3

THE METROPOLITAN DISTRICT COMMISSION
(Owner)

Contract No: _____

dated _____,

In accordance with the provisions of the above referenced Contract, as the designated Contractor,

(Contractor's Name and Address)

hereby certifies that

(Contractor's Engineer's Name and Address)

- (1) Is properly, licensed and currently), registered as a Professional Engineer in the State of Connecticut
- (2) Is fully qualified to design and supervise the

(Item of Work and Location)

In accordance with the provision specified under the appropriate Section and/or Subsections of the Contract Documents:

- (3) Has successfully designed and supervised

_____ (Item of
Work)

before and demonstrates a minimum of ten (10) documented years of proven experience in such field;

- (4) Has personally examined the type(s) and locations(s) of the Work required under this Contract, and the overall conditions associated therewith, to the extent necessary to fully satisfy his or her professional responsibilities for designing and supervising the above referenced Work;
- (5) Has prepared the attached design in full compliance with the applications and requirements of the Contract Documents, sound engineering practice, modern accepted principles of construction, and all applicable federal, state and local laws, regulations, rules and codes having jurisdiction over the Work;
- (6) Will provide sufficient supervision and technical guidance to the Contractor throughout the Work to ensure compliance with the design and all quality assurances necessary to successfully complete the Work;
- (7) Hereby indemnifies and holds harmless the Owner and their agents, employees and representatives, from and against any and all claims, whether directly or indirectly, arising out of, relating to or in connection with the Work; and
- (8) This "Certificate of Design" together with all applicable designs, drawings details, specifications on other related documents necessary to complete the Work as specified, have been signed and sealed pursuant to applicable state law.

CONTRACTOR: CONTRACTOR'S ENGINEER

(Contractor's Name)

(Engineer's Name)

By: _____

By: _____

(Name and Title)

(Name and Title)

Date: _____

Date: _____

(SEAL)

(P.E. STAMP)

(Note: Contractor to fully reference all attachments below:)

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes making excavations in earth for trenches and structures, backfilling such excavations to the extent necessary, compacting backfill, furnishing the necessary material and constructing embankments and fills, and making miscellaneous earth excavations, doing miscellaneous grading, and removing and disposing of surplus material, and restoring excavation and trench surfaces and easements.
- B. Furnish all labor, materials, equipment supervision and incidentals necessary to perform all survey monitoring required to complete the Work shown on the Contract Drawings and specified herein. The Work shall include, but not necessarily limited to: installation and survey of monitoring points on structures and utilities and reporting movements in accordance with the Contract Drawings and Specifications.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 02140, Dewatering and Drainage
- C. Section 02160, Excavation Support Systems
- D. Section 02201, Earth Excavation Below Grade and Outside Limits of the Trench
- E. Section 02202, Trench Refill
- F. Section 02210, Rock Excavation and Disposal
- G. Section 02510, Temporary and Permanent Paved Surface Restoration
- H. Section 02260, Handling, Transportation and Disposal of Regulated Soil
- I. Section 02905, Unpaved Surface Restoration and Reset Miscellaneous Items

THE METROPOLITAN DISTRICT

1.03 SUBMITTALS

- A. In accordance with Section 01300, six (6) copies of certifications, test results and source for crushed stone, bank run gravel, sand and any other material imported on-site for use on fill or re-fill material shall be submitted for approval. The Contractor shall submit for approval the type of equipment to be used for excavation and compaction.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. ASTM D1557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate mixtures using 10-lb (4.54 kg) Rammer and 18-in (457 mm) Drop
- B. Article M.02.01-2, CTDOT Form 817 - Bank (Run) Gravel
- C. Article M.08.03-2 CTDOT Form 817 - Sand
- D. OSHA 29 CFR 1926 Subpart P – Excavation

1.05 QUALITY ASSURANCE

- A. Laboratory Testing
 - 1. At least fourteen (14) days prior to the placement of any backfill or fill materials, deliver a representative sample of the proposed materials weighing at least fifty pounds to the Owners soils testing laboratory in accordance with Section 01300.
 - 2. The soils testing laboratory will perform:
 - a. Grain size analyses (ASTM D422) of the samples to determine their suitability for use as backfill or fill material in conformance to the materials requirements specified herein, per every 1,000 cubic yards of imported fill.
 - b. Atterberg limits (ASTM D4318) of the samples to determine their suitability for use as backfill or fill material in conformance to the materials requirements specified herein, per every 1,000 cubic yards of imported fill.
 - c. Natural Moisture (ASTMD2216) of the samples to determine their suitability for use as backfill or fill material in conformance to the materials requirements specified herein, per every 1,000 cubic yards of imported fill.

THE METROPOLITAN DISTRICT

- d. Organic Content (ASTM D2974) of the samples to determine their suitability for use as backfill or fill material in conformance to the materials requirements specified herein, as required.
 - e. Proctor analyses (ASTM D1557) to determine the maximum dry densities required for compaction testing as specified herein, per every 1,000 cubic yards of imported fill.
3. Test results and determinations of suitability shall be delivered to the Engineer no later than five (5) days prior to the placement of backfill or fill materials.

1.06 SYSTEM DESCRIPTION

- A. The program of excavation, dewatering, sheeting and bracing shall be carried out in such manner as to prevent undermining or disturbing all existing gas pipes, water pipes, sewers, drains, manholes, catch basins, culverts, electrical conduits, telephone ducts, other utilities, utility poles, buildings or other structures or work previously completed by others.
- B. All excavation, trenching and related sheeting, bracing, etc, shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926.650-652 Subpart P) and State requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.
- C. Excavations shall be made in such manner and to such width as required to give suitable room for laying and jointing the piping or for construction of structures; all sheeting, bracing, and supports shall be furnished and placed; all coffer damming, pumping, and draining shall be done; and the bottoms of the excavations shall be rendered firm and dry and acceptable in all respects.
- D. If the bottom of any excavation is taken out beyond the limits indicated or prescribed, the resulting void shall be backfilled at no additional cost to the Owner with thoroughly compacted granular base or crushed stone as directed by the Engineer.
- E. Excavations within the zone of influence of any existing structures or utility will require the use of excavation support system as specified in Section 02160. The zone of influence is defined as a line extending at least 2 feet beyond of edge of the foundation, then outward and downward at a slope of 1 horizontal to 1 vertical.

1.07 SOIL TESTING

- A. At all structures, manholes, pipelines and culverts prior to the placement of concrete work mats, structural fill, crushed stone or structural concrete, coordinate with the Engineer to verify the suitability of the existing subgrade soil

THE METROPOLITAN DISTRICT

and to perform in-place soil density tests as required to verify that the bearing capacity of the subgrade is sufficient. The Engineer shall assess all subgrades below structures prior to the placement and compaction of structural fill or the construction of foundations.

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS

- A. Filter fabric shall be non-woven Geotextile. Refer to Appendix B for the Owner's approved materials list.
- B. Granular materials designated for use in this Section are specified in Section 02202.
- C. All materials for excavation support designated for use in this Section are specified in Section 02160.

PART 3 - EXECUTION

3.01 PREPARATION

- A. No trees within streets and highways, or adjacent to the normal trench therein, shall be damaged or removed. In streets and highways where there is no permanent paving, only those trees, bushes or shrubs required for construction and approved by the Engineer shall, unless otherwise directed, be removed and disposed of. The unlimited removal of trees and brush will generally not be required or permitted. All trees, bushes or shrubs which are not to be removed shall be preserved and protected. Any trees, bushes or shrubs which are to be preserved and protected and which become damaged by the conduct of the Work, shall be replaced at no additional cost to the Owner. Brush, small branches, slash, large trunks, stumps and all other surplus material and debris shall be removed from the site of the Work.
- B. Conduct utility clearance before beginning excavations. Before excavating within 20 feet of utility poles and after pipeline stake out, coordinate construction with the appropriate utility company.
- C. Perform exploratory excavation work (test pits) as necessary or employ soft dig techniques for the purpose of verifying the location and size of underground utilities and structures and to check for unknown utilities and structures, prior to commencing excavation Work. Test pits shall be backfilled as soon as the desired information has been obtained. Backfilled surfaces shall be stabilized in accordance with approved erosion and sedimentation control plans.

3.02 PROTECTION AND RESTORATION OF PROPERTY

- A. All existing buildings, utilities, pipes, poles, wires, fences, curbing, property line markers and other structures which the Engineer decides must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from injury. Should such items be injured, they shall be restored to at least as good condition as that in which they were found immediately before the Work was begun at no additional cost to the Owner.
- B. Fences interfering with the Contractor's operations shall be removed and (unless otherwise specified) later restored.
- C. The trunks of trees which are adjacent to the Work and are not to be removed shall be enclosed with substantial wooden boxes of such height as may be necessary to protect them from injury from piled material, from equipment, from the operations, or otherwise due to the Work. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to the trees not to be removed and particularly to overhanging branches and limbs.
- D. Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. When there is cutting or unavoidable injury to branches, limbs, and trunks of trees, the cut or injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.
- E. Cultivated hedges, shrubs, and plants which might be injured by the operations shall be protected by suitable means or shall be dug up, balled and temporarily replanted and maintained. After the construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of kind and quality at least equal to the kind and quality existing at the start of the Work.
- F. Tractors, bulldozers, or other power-operated equipment, the treads or wheels of which are so shaped as to cut or otherwise deface paved surfaces, shall not be used or operated on these surfaces.
- G. All property disturbed or damaged by the operations shall be restored to a condition at least equal to that in which it was found immediately before work was begun. Suitable materials and methods shall be used for such restoration.
- H. Restoration of existing property and structures shall be done as promptly as practicable and shall not be left until the end of the construction period.

3.03 GENERAL TRENCH EXCAVATION

- A. Trenches in pavement shall have the traveled way surface cut in a straight line by a concrete saw to the full depth of pavement. Excavation shall only be between these lines. Cutting operations shall not be done by backhoe, or other ripping equipment.
- B. Trenches shall be excavated to such depths as will permit the pipe to be laid at the elevations, slopes, or depths or cover indicated on the Contract Drawings and in the MDC Standard Details Manual.
- C. Where pipe is to be laid in crushed stone bedding, granular base or a concrete cradle, the trench may be excavated by machinery to, or to just below the designated depth, provided that the material remaining at the bottom of the trench remains undisturbed and stable/suitable.
- D. If pipe is to be laid in embankments or other recently filled areas, the fill material shall first be placed to a height of at least one foot above the top of the pipe before excavation.
- E. Where pipe or culvert is to be laid directly on the trench bottom, final excavation at the bottom of the trench shall be performed manually, providing a flat-bottom true to grade upon undisturbed material. Bell holes shall be made as required.
- F. The trench for the pipe shall extend beyond the outside of the barrel of the pipe on each side as shown in the MDC Standard Details Manual or as directed by the Engineer. The bottom of the trench is shown on the Contract Drawings and in the MDC Standard Details Manual for water and sewer.
- G. Pipe trenches shall be made as narrow as practicable and shall not be widened by scraping or loosening materials from the sides. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.
- H. Trenches shall be excavated with vertical sides between the elevation of the center of the pipe and elevation one foot above the top of the pipe.
- I. The trench shall not be excavated beyond the trench limit. In case material is loosened or is removed beyond these widths, crushed stone, granular base, or concrete as appropriate shall be provided for the full width of the trench at no additional cost to the Owner, as directed by the Engineer.
- J. Should it be necessary to lower the pipeline below the grade indicated on the Contract Drawings for any reason, the additional excavation and backfill shall be completed as directed.

THE METROPOLITAN DISTRICT

- K. The length of open trench shall be related closely to the rate of pipe placement.

3.04 SERVICE PIPE TRENCH EXCAVATION

- A. Trench excavation for service pipes shall in general conform to Par. 3.03 above except that the trench shall be excavated 6-inches below the pipe bottom to allow placement of the bedding.

3.05 WATERCOURSE CROSSINGS

- A. To install the pipe across watercourses, temporary diversion works as may be necessary to properly handle the flow of the watercourse during the period of pipe installation work shall be furnished and installed. No direct payment will be made for this work, but the cost thereof will be considered as having been included in the prices bid per linear foot of pipelines. Contractor required to abide by all local and state permits and approvals.

3.06 EXCAVATION NEAR EXISTING STRUCTURES

- A. Attention is directed to the fact that there are pipes, manholes, drains, and other utilities and structures in certain locations. An attempt has been made to locate all utilities, etc. on the Contract Drawings, but the completeness or accuracy of the given information is not guaranteed.
- B. As the excavation approaches pipes, conduits, or other underground structures, digging by machinery shall be discontinued and excavation shall be done by means of hand tools, as required. Such manual excavation when incidental to normal excavation shall be included in the Work to be done under Items involving normal excavation.
- C. Where determination of the exact location of a pipe or other underground structure is necessary for properly performing the Work, test pits may be required to be excavated to determine such locations. When such test pits may be properly considered as incidental to other excavation, the Contractor shall receive no additional compensation, the Work being understood to be included as a part of the excavation.

3.07 SHEETING, BRACING AND PUMPING

- A. Sheet piling, bracing and other support methods as may be necessary, or shown on the Contract Drawings to support the sides of the excavation, to prevent undermining of the pavement or to protect from possible injury any pipes, sewers, ducts, poles, conduits or other structures existing in the streets, or highways shall be furnished and installed and shall be removed as the trench is refilled in accordance with Section 02160 unless the Engineer orders it left in place.

THE METROPOLITAN DISTRICT

- B. All excavations shall be maintained in proper condition for carrying on the Work and to this end all bailing, draining, or pumping which may be necessary to keep the trenches or other excavations free of water shall be done. No direct payment will be made for this work but the cost thereof will be considered as having been included in the price bid per linear foot of pipeline.

3.08 EXCAVATION BELOW SPECIFIED GRADE

- A. Over excavation shall be conducted to remove unsuitable soils as shown on the Contract Drawings, as specified herein and in Section 02201, or as directed by the Engineer.
- B. Any acceptable subgrade material which becomes disturbed due to failure of the dewatering system to maintain the excavation in the dry, trafficking on the subgrade, or other Contractor activities, or other failure or neglect to conduct the excavation work properly shall be over excavated to remove the unsuitable material and replace it with concrete or compacted structural fill or other material as directed by the Engineer at no additional cost to the Owner so that the condition of the subgrade meets with the approval of the Engineer before any work is placed thereon.
- C. If, in the opinion of the Engineer, the material, in its undisturbed natural condition, at or below the bottom of the excavation as indicated on the Contract Drawings is unsuitable for foundations, utilities or pavement, it shall be removed to such depth and width as he/she may direct and be replaced with suitable material as directed by the Engineer.
- D. In no case shall the earth be plowed, scraped or excavated by any means so near to the finished subgrade that would disturb the finished subgrade. Hand excavation of the final 3 to 6-inches may be required to obtain a satisfactory, undisturbed subgrade, as required by the Engineer.
- E. If the material at the level of excavation bottom consists of fine sand, sand and silt or soft earth which may work into crushed stone (where required) not withstanding effective drainage, the subgrade material shall be removed to the extent directed by the Engineer and the crushed stone (as required) shall then be wrapped in geotextile fabric and be placed in 6-inch layers thoroughly compacted up to the normal grade of the required grade.
- F. Subgrade Preparation
 - 1. Where the subgrade consists of granular soils (sand and gravel) proofroll the exposed subgrade below structures and pavements. Proofrolling shall be performed with a minimum of four (4) completed coverages of the full area with a vibratory drum roller with a minimum of a 10-ton static drum weight. Proofrolling in confined areas may be accomplished with hand

operated vibratory equipment approved by the Engineer. Proofrolling shall be conducted in the presence of the Engineer.

2. When excavation ends in naturally deposited clay, silt, or fine sand the final excavation shall be performed with a smooth edged bucket to mitigate disturbance of the subgrade soils. Place a minimum of 12 inches of crushed stone wrapped in filter fabric or compacted structural fill directly on the undisturbed subgrade.
3. Boulders exposed at subgrade level shall be removed to a minimum 6-inch clearance around the bottom and sides of all the foundations.

3.09 BACKFILLING AND COMPACTION; GENERAL

- A. Loam and topsoil, loose vegetative matter, stumps, large roots, etc., shall be removed from areas upon which embankments will be built or material will be placed for grading. The subgrade shall be shaped as indicated shown in the MDC Standard Details Manual and shall be so prepared by forking, furrowing, or plowing so that the first layer of the fill material placed on the subgrade will be well bonded to it.
- B. The final cuts to design bearing levels for roadways, walls, slabs, ramps and foundations bearing on soil shall be delayed as long as possible in order to minimize the time during, which subgrade surfaces are exposed to traffic and the elements. The Contractor shall take care to avoid excess traffic on the excavated subgrades prior to placement of fill, utilities or concrete foundations.
- C. Frozen material shall not be placed in the backfill nor shall backfill be placed upon frozen material. Frozen material shall be removed or shall be otherwise treated as required, before backfill is placed.
- D. Geotextile filter fabric shall be placed where shown on the Contract Drawings and /or specified as follows:
 1. The filter fabric shall be unrolled and placed onto the prepared trench bottom as shown in the MDC Standard Details Manual.
 2. Filter fabric shall be unrolled and placed on the prepared subgrade beneath structures requiring use of filter fabric. Fabric shall extend 6 in. beyond the structure and manhole foundations.
 3. Where more than one section of fabric is required, the fabric shall be overlapped no less than 12 in. to assure the continuity of the filter.
 4. The subgrade shall be inspected and acceptable to the Engineer prior to the installation of the filter fabric. The subgrade shall be maintained in a

smooth, uniform, and compacted condition during the installation of the filter fabric. No mechanical equipment shall be driven directly on top of the filter fabric unless permitted by the Engineer. The fabric shall be stored in such a way that it is protected from prolonged exposure to ultraviolet radiation.

5. If the fabric is damaged during installation it shall be immediately repaired. All gravel shall be removed from the affected area and a patch of fabric large enough to cover the damage plus an 18 in. overlap shall be placed on top of the damaged section.
- E. After the subgrade has been prepared as specified, the fill material shall be placed and built up in successive layers until the required elevation is reached.
- F. Layers of fill shall not exceed 12-inches in thickness (loose). Thinner layers shall be used if necessary to achieve the required compaction. In embankments the fill layers shall be slightly crowned or sloped to the edge(s) to facilitate drainage.
- G. Compaction in open areas may be accomplished using heavy vibratory rollers. Compaction in confined areas (including areas within a 45 degree angle extending upward and outward from the base of a wall) and in areas where the use of large equipment is impractical, shall be accomplished by hand operated vibratory equipment or mechanical tampers. Where other methods are not practicable, compaction shall be by use of hand or pneumatic ramming with tools weighing at least 20 lbs. The material shall be spread and compacted in layers not over 6-inches thick. If necessary, sprinkling shall be employed in conjunction with rolling or ramming. Puddling is not allowed.
- H. Each layer of material shall be compacted by the use of vibratory compaction equipment or rollers or other means to achieve the required compaction. At such points as cannot be reached by mobile mechanical equipment, the materials shall be thoroughly compacted by the use of suitable power-driven tampers.
- I. All backfill shall be compacted to at least the specified percent of maximum density as determined by ASTM D1557, Method C.
- J. Previously placed or new materials shall be moistened by sprinkling, if required, to ensure proper bond and compaction. No compacting shall be done when the material is too wet, from either rain or too great an application of water, to compact it properly; at such times the Work shall be suspended until the previously placed and new materials have dried out sufficiently to permit proper compaction. The water content of the soil shall be adjusted by wetting or drying as may be necessary to obtain proper compaction.
- K. Refill material placed around pipes and structures shall be deposited on all sides to approximately the same elevation simultaneously.

THE METROPOLITAN DISTRICT

- L. To prevent longitudinal movement of the pipe, dumping backfill material into the trench and then spreading will not be permitted until fill has been placed and compacted to a level 1 foot over the pipe.
- M. Where crushed stone is shown to be placed below footings or slabs in lieu of structural fill, the crushed stone shall be wrapped with in filter fabric as indicated in the MDC Standard Details Manual.
- N. Crushed stone and bank run gravel shall be placed in layers having a maximum thickness of 6-inches in open areas including points where conduit and piping join structures, measured before compaction.

3.10 COMPACTION REQUIREMENTS

- A. The requirements for compaction of backfill shall conform to the following guidelines based on ASTM D1557 Method C:

<u>LOCATION</u>	<u>PERCENT MAXIMUM DENSITY</u>
Below pipe centerline	95
Above pipe centerline (below unpaved surface)	95
Above pipe centerline (below paved surface)	95
Embankments	95
Below pipe in embankments	95
Below structures	95

- B. The Engineer reserves the right to perform the ASTM D1557 Method C tests on any backfilled area.
- C. The maximum dry density and in-place dry density of the consolidated backfill will be determined by an independent professional soils engineer or qualified testing laboratory selected by the Engineer. The location and depths of in-place density tests will be determined by the Engineer.
- D. Excavation shall be provided to permit in-place density tests at the locations and depths required by the Engineer.
- E. Where the in-place density test indicates that the consolidated backfill does not meet the density requirements specified herein, the backfill material shall be replaced and/or reconsolidated to meet said density requirements at no additional cost to the Owner.
- F. The Owner will pay the cost for the initial laboratory and in-place density testing by the soils engineer or testing laboratory. The Contractor shall pay the costs for the Work conducted by the soils engineer or testing laboratory for any additional

THE METROPOLITAN DISTRICT

in-place density or laboratory testing required by the Engineer to test replaced and/or reconsolidated backfilled material.

- G. The costs for excavation, refilling reconsolidation and any other work necessary to conduct the initial and additional testing shall have been included in the appropriate Item or Items of the Contract which include backfill consolidation.
- H. No payment will be made for any bid Item which includes backfill consolidation until the backfilled material meets the density requirements specified herein.

3.11 REFILLING GENERAL TRENCHES

- A. As soon as practicable after the pipes have been laid, the trenches shall be refilled in 12-inch layers at least to a level 24-inches above the top of the pipe with sand unless otherwise directed by the Engineer and compacted in Specification with the requirements of Par. 3.10 above. Each layer shall be leveled and thoroughly compacted to the satisfaction of the Engineer before the next layer is deposited. Special care shall be taken to consolidate the material under the pipes and the whole work of refilling shall be done in a manner which will prevent subsequent settlement and injury to the pipe.
- B. Above this level, except for the surfacing material, backfill with material as shown in the MDC Standard Details Manual, deposited in 12-inch layers in Municipality roads and 6-inch layers in state highways and compacted to the density described in Par. 3.10. In the event the best of the excavated material is not considered acceptable refill material, the Engineer will direct that Trench Refill be furnished and placed. Excess excavated material shall be removed from the site and disposed of.
- C. The whole work of refilling shall be done in a manner which will prevent subsequent settlement or injury to the pipe.
- D. Ho packing of trenches shall not be allowed above water mains.

3.12 REFILLING SERVICE PIPE TRENCHES

- A. Refilling service pipe trenches shall in general conform to Par. 3.11 above except that prior to installing the service pipe the 6-inch thick sand bedding shall be placed and compacted to the density described in Par. 3.10 above.

3.13 BACKFILLING AROUND STRUCTURES

- A. Backfill shall not be placed against or on structures until they have attained sufficient strength to support the loads to which they will be subjected. Excavated material approved by the Engineer shall be used in backfilling around structures and shall be compacted. Backfilling material shall be spread in horizontal layers not exceeding 12-inches in thickness (loose) and thoroughly compacted to at least 95 percent of

the maximum dry density as determined by ASTM D1557, Method C.

- B. Tree stumps or roots more than 12-inches long or more than ½-inch in diameter and stones or rocks larger than 6-inches in greatest dimension shall not be considered suitable material for backfill around structures.

3.14 SETTLEMENT MONITORING

- A. Establish a system of settlement monitoring for all existing structures, pavement and utilities within a horizontal distance of three times the maximum depth of excavation, or as directed by the Engineer.
- B. Settlement monitoring of existing structures and utilities shall be performed using a combination of surface monitoring points and deformation monitoring points as described herein. Monitoring points shall be installed on existing structures and utilities at a spacing of not more than 50 feet along the length of the utility or 25 feet along the outside face of the structure. The Contractor shall submit a plan of the proposed settlement monitoring points for approval by the Engineer.
- C. Surface Monitoring Points (SMP)
 - 1. SMP shall consist of inscribed markings or approved surveyors nail driven flush with surface installed into existing concrete, masonry or asphalt directly over the centerline of the underground utility.
- D. Deformation Monitoring Points (DMP)
 - 1. DMP shall consist of fixed markers placed on existing utilities and structures to record both horizontal and vertical movements. The initial coordinate locations and vertical controls shall be determined by optical survey methods. DMP's shall consist of nails, screws, reinforcing bars, bolts and similar materials with well-defined measurement points as approved by the Engineer.
 - 2. DMP's shall be firmly attached and shall be protected from damage and vandalism. Remove or cover with a protective box or cap as approved by the Engineer all elements of DMP's protruding more than 0.25-inches.
- E. Clearly identified all monitoring points with permanent easily readable letters and numbers in the field as approved by the Engineer.
- F. Initial Readings: Immediately following monitoring point installation, the Contractor shall take two sets of initial readings to provide baseline readings and to demonstrate the adequacy of the completed installation.
- G. At a minimum, daily monitoring shall be required for all SMP and DMP within 50 feet of active work and at least once per week until the Work is complete. Within

THE METROPOLITAN DISTRICT

24 hours of each survey, submit to the Engineer the latest survey elevations and coordinates at each monitoring point along with all previous survey information.

H. Tolerances

1. Survey measurements for initial location of each of the monitoring points shall consist of determining the elevation and horizontal position with respect to benchmark(s) approved by the Engineer.
2. Surface and Deformation Monitoring Points
 - a. Elevations of monitoring points shall be determined to an accuracy of plus/minus 0.01 feet.
 - b. The horizontal position of monitoring points shall be determined to an accuracy of plus/minus 0.1 foot.

I. Threshold and Limiting Values for settlement monitoring points:

<u>Monitoring Target</u>	<u>Threshold Value</u>	<u>Limiting Value</u>
Structure (SMP and DMP)	0.25 inch	0.5 inch
Utility (SMP and DMP)	0.5 inch	1.0 inch

J. If a Threshold Value is reached:

1. Engineer and Contractor shall meet to discuss remedial measures.
2. Contractor shall increase the instrument monitoring frequency as directed by the Engineer.
3. Contractor shall install and monitor additional instruments as directed.
4. Contractor shall implement the remedial measures in the event the Threshold Value is reached, so the Limiting Value is not reached.
5. Contractor to take all necessary steps so that the Limiting Value is not exceeded. Contractor may be directed to suspend activities in the affected area with the exception of those actions necessary to avoid exceeding the Limiting Value.

K. If a Limiting Value is reached, all Work shall stop and the site secured until remedial measures have been submitted and approved by the Engineer.

L. The Contractor shall make his/her own interpretations of the data resulting from monitoring programs.

THE METROPOLITAN DISTRICT

END OF SECTION

SECTION 02201

EARTH EXCAVATION BELOW SPECIFIED GRADE AND
OUTSIDE LIMITS OF TRENCH

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes, whenever it becomes necessary and so ordered by the Engineer, excavating the trenches to a greater depth or width than is shown on the Contract Drawings or specified herein, for the purpose of avoiding existing underground structures not shown on the Contract Drawings or because of unsatisfactory or unstable foundation or for any other cause that is determined by the Engineer.
- B. Whenever the trench is excavated to a greater depth due to unsatisfactory or unstable foundation, acceptable bank run gravel, crushed stone, structural fill, granular base or sand, as determined by the Engineer, shall be placed and compacted to the grade of the bottom of the pipe under this Item.
- C. If, for any reason, the given trench is required to be changed after excavation has been done on this given line, the necessary excavation and refill shall be done.
- D. Should the Engineer order additional excavation when the trench includes rock, refer to Section 02210.
- E. Earth excavation below grade and outside the trench limits does not refer to adjustments in the field to avoid existing sewer or water services.

1.02 RELATED SECTIONS

- A. Section 02200, Earthwork
- B. Section 02202, Trench Refill
- C. Section 02210, Rock Excavation and Disposal
- D. Section 02260, Handling, Transportation and Disposal of Regulated Soil

1.03 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

THE METROPOLITAN DISTRICT

- A. ASTM D1557 – Test methods for moisture-density relations of soils and soil-aggregate mixtures using 10-LB (4.54-KG) rammer and 18-In (457MM) drop

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS

- A. Backfill materials shall conform to the requirements in Section 02202, Trench Refill.

PART 3 - EXECUTION

3.01 GENERAL

- A. The work under this Section shall conform to the applicable requirements of Section 02200, Earthwork.

END OF SECTION

SECTION 02202

TRENCH REFILL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes, whenever so directed by the Engineer, furnishing bank run gravel, crushed stone, processed stone base, sand, common fill or flowable fill as determined by the Engineer.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 02200, Earthwork
- C. Section 02201, Earth Excavation Below Grade & Outside Limits of the Trench
- D. Section 02260, Handling, Transportation and Disposal of Regulated Soil

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300.
- B. Submit copies of certifications, test results and source for bank run gravel, crushed stone, granular base, sand and any other material imported on-site for use on refill material.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. Section M.01, CTDOT Form 817 – Gradation of Aggregate
- B. Subarticle M.02.02-2 (a), CTDOT Form 817 – Loss on Abrasion
- C. Article M.03.01.2, CTDOT Form 817 – Sand
- D. Article M.02.01-2, CTDOT Form 817 – Bank (Run) Gravel
- E. Article M.02.03, CTDOT Form 817 – Granular Base

THE METROPOLITAN DISTRICT

PART 2 - PRODUCTS

2.01 CRUSHED STONE

- A. Crushed stone shall conform to the requirements of Article M.01, No. 6 Gradation, CTDOT Form 817 and Subarticle M.02.02.2 (a), CTDOT Form 817, for loss on abrasion.

2.02 SAND

- A. Sand shall conform to the requirements of article M.03.01.2, CTDOT Form 817.

2.03 PROCESSED STONE BASE

- A. Coarse and fine aggregate shall be combined and mixed by approved methods so that the resulting material shall conform to the following gradation requirements:

<u>Square Mesh Sieves</u>	<u>Percent Passing by Weight</u>
Pass 2 ¼"	100
Pass 2	95-100
Pass ¾"	50-75
Pass ¼"	25-45
Pass #40	5-20
Pass #100	2-12

- B. Coarse aggregate shall consist of sound, tough, durable fragments of rock of uniform quality throughout. It shall be free from soft disintegrated pieces, mud, dirt, organic or other injurious material. When tested by means of the Los Angeles machine using AASHTO method T-96, it shall not have a loss of more than 50 percent.
- C. Fine aggregate shall be natural sand, stone sand, screenings or any combination thereof. The fine aggregate shall be limited to material 95 percent of which passes a No. 4 sieve having square openings and not more than 8 percent of which passes a No. 200 sieve. The material shall be free from clay, loam and deleterious materials.

2.04 BANK RUN GRAVEL

- A. Bank run gravel shall consist of sound, tough, durable particles of uncrushed gravel, free from soft, thin, elongated or laminated pieces and vegetable or other deleterious substances.
- B. Bank run gravel shall conform to the following gradation and plasticity requirements:

THE METROPOLITAN DISTRICT

<u>Square Mesh Sieves</u>	<u>Percent Passing by Weight</u>
Pass 3 ½"	100
Pass 1 ½"	55-95
Pass ¾"	25-60
Pass #10	15-45
Pass #40	5-25
Pass #100	0-10
Pass #200	0-5

- C. The grading percentages specified above shall apply to the material after it has been delivered to the construction site as well as when tested at the pit or other source of supply.
- D. When the fraction of the dry sample passing the No. 100 mesh sieve is greater than eight (8) percent by weight, the sample will be washed as indicated. The amount obtained from washing shall be added to that obtained by dry sieving and the total amount passing each sieve shall meet the above gradation.
- E. When the fraction of the dry sample passing the No. 100 mesh sieve is four percent or less by weight, no plastic limit test will be made.
- F. When the fraction of the dry sample passing the No. 100 mesh sieve is greater than four percent and not greater than eight percent by weight, that fraction shall not have sufficient plasticity to permit the performing of the plastic limit test using AASHTO Method T90.
- G. When the fraction of the dry sample passing the No. 100 mesh sieve is greater than eight percent by weight, the sample will be washed; and the additional material passing the No. 100 mesh sieve shall be determined by AASHTO Method T-146, except that the No. 100 mesh sieve will be substituted for the No. 40 mesh sieve where the latter is specified in AASHTO Method T-146. The combined materials that passed the No. 100 mesh sieve shall not have sufficient plasticity to permit the performing of the plastic limit test using AASHTO Method T90.

2.05 COMMON FILL

- A. Common fill shall consist of mineral soil substantially free from organic materials, loam, wood, trash and other objectionable materials which may be compressible or which cannot be properly compacted. Common fill shall not contain stones larger than 6-in in any dimension and shall have no more than 20 percent passing the No. 200 sieve. Common fill shall not contain granite blocks, broken concrete, masonry rubble or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling, Snow, ice and frozen soil will not be permitted.

THE METROPOLITAN DISTRICT

- B. Select common fill shall conform to the requirements of common fill except that the material shall not contain any materials larger than 2-in in largest dimension.

2.06 Controlled Low Strength Material (CLSM)

- A. See Section 03302 for Controlled Low Strength Material (CLSM) and Pumpable CLSM.

2.07 RIPRAP

- A. Materials for this item shall consist of sound, tough, durable and angular rock, free from decomposed stones or other defects impairing its durability. The size of a stone as hereinafter specified shall be its least dimension. Broken concrete or rounded stones are not acceptable. The type of material to be used shall be as CT DOT M 12.02 Standard.

2.08 EXISTING MATERIALS

- A. Existing material shall meet requirements of specifications for backfill and shall conform to the requirements of Section 2.05.03 CTDOT Form 817.

PART 3 - EXECUTION

3.01 GENERAL

- A. All material shall be delivered to the work site in a timely manner and in sufficient quantities to insure efficient progress. Each load of material shall be furnished with a ticket identifying the type of material, source, date, weight, truck number and owner, etc., a copy of which shall be provided to the Engineer at the time of delivery.
- B. Sufficient material shall be made available to allow the Engineer to make those tests required to insure the material conforms to these Specifications.
- C. Placement and consolidation of the various materials furnished hereunder shall be done in accordance with Section 02200.
- D. No recycled material shall be allowed for trench refill.

3.02 REUSE OF EXISTING MATERIALS

- A. Excavated materials from the trench can be reused in deep trenches with excavations over 12-feet deep.
- B. The Contractor at his/her own expense, shall have samples of the material tested by an independent laboratory in order to establish its compliance with the

THE METROPOLITAN DISTRICT

specifications. Only material tested and approved by Engineer shall be allowed to be incorporated into the work.

- C. Limits of existing materials shall be installed 2 feet above the crown of the pipe and to a depth of 6 feet below the existing grade.

END OF SECTION

SECTION 02210

ROCK EXCAVATION AND DISPOSAL
(BLASTING NOT ALLOWED)

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required to excavate and dispose of rock and boulders as shown on the Contract Drawings and as specified herein. The Contractor shall furnish acceptable material for backfill in place of the excavated rock to bring the limits of the trench and/or excavation to those required on this project.
- B. Blasting will not be permitted on this project.

1.02 RELATED SECTIONS

- A. Section 02160, Excavation Support System
- B. Section 02200, Earthwork
- C. Section 02201, Earth Excavation Below Grade and Outside Limits of the Trench
- D. Section 02260, Handling, Transportation and Disposal of Regulated Soil

1.03 DEFINITION OF ROCK:

- A. Rock shall be defined as solid mineral material that requires pneumatic hammer, hydraulic breaker, and/or drilling, boring, wedging, barring, chemical splitting or other specialized methods for removal and which cannot be removed by a tracked excavator with a bucket curling force of at least 18,300 pounds.
- B. Boulders, thrust blocks, anchors, buried masonry structures, (including reinforcement), etc consisting of solid mineral material which individually contain a volume of one (1) cubic yard or more shall be classified as rock and shall be paid for as stated elsewhere herein.
- C. Loose or disintegrated rock, loose or rotted shale, nested stones, hardpan and the like will not be paid for as rock and will be considered as excavation under the respected Bid Items.
- D. Rock fragments less than 1 cubic yard which can be removed without resorting to rock excavation shall be considered as excavation.

THE METROPOLITAN DISTRICT

- E. Where there is a difference of opinion of what material is rock and what material is not rock, the Owner shall appoint a geotechnical consultant whose decision will be final.

PART 2 – PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 GENERAL

- A. Rock in pipe trenches shall be excavated below the pipe after it has been laid as shown on the Contract Drawings. The width shall be as shown on the Contract Drawings. Before the pipe is laid, the pipe bedding shall be installed to the correct subgrade with thoroughly compacted suitable material that is the same material as that required for bedding the pipe, furnished and placed at the expense of the Contractor.
- B. Rock at structures shall be excavated below the bottom of the structure slab as shown on the Contract Drawings. The width shall be 2 feet beyond the outside wall of the structure. Before the structure is laid, the structure bedding shall be installed to the correct subgrade with thoroughly compacted suitable material that is the same material that is required for bedding the structure, furnished and placed at the expense of the Contractor.
- C. When rock is encountered, it shall be uncovered, but not excavated, until measurements are made by the Engineer. Rock removal which has not been measured by the Engineer will not be paid for.
- D. All rock excavation operations shall comply with the project, state and local noise and dust regulations.

3.02 EXCESS ROCK EXCAVATION

- A. If rock is excavated beyond the limits of payment indicated on the Contract Drawings and Specifications, the excess excavation, whether resulting from over breakage or other causes, shall be backfilled, by and at the expense of the Contractor, as specified below in this Section.
- B. In pipe trenches, excess excavation below the elevation of the top of the bedding, cradle, or envelope shall be filled with material of the same type, placed and compacted in the same manner, as specified for the bedding, cradle, or envelope. Excess excavation above said elevation shall be filled as specified in Section 02200 and Section 02201.
- C. In excavations for structures, excess excavation in the rock beneath foundations shall be filled with CLSM. Other excess excavation shall be filled as specified in Section 02200 and Section 02201.

3.03 PREPARATION OF ROCK SURFACES

- A. Whenever so directed during the progress of the Work, the Contractor shall remove all dirt and loose rock from designated areas and shall clean the surface of the rock thoroughly, using steam to melt snow and ice, if necessary. Water in depressions shall then be removed as required so that the whole surface of the designated area can be inspected to determine whether seams or other defects exist.
- B. The surfaces of rock foundations shall be left sufficiently rough to bond well with the concrete to be built thereon, and if required, shall be cut to rough benches or steps.
- C. Before any masonry or embankment is built on or against the rock, the rock shall be scrupulously freed from all vegetation, dirt, sand, clay, boulders, scale, excessively cracked rock, loose fragments, ice, snow, and other objectionable substances. Picking, barring, wedging, streams of water under sufficient pressure, stiff brushes, hammers, steam jets, and other effective means shall be used to accomplish this cleaning. All free water left on the surface of the rock shall be removed.

3.04 VIBRATION MONITORING

- A. Vibration Limit Criteria - The Contractor shall limit rock excavation operations to prevent damage to any adjacent building, structure, utilities, pipes or other features near the site. The Contractor is solely responsible to determine the maximum vibration and air blast tolerable at each facility. However, in no case shall the following be exceeded.
 - 1. Peak Particle Velocity (PPV) limits at the ground surface at existing residences, structures, utilities, and existing water mains:

<u>Frequency (Hz)</u>	<u>Maximum Peak Particle Velocity (in. per. sec.)</u>
Over 40	2.0
30 to 40	1.5
20 to 30	1.0
Less than 20	0.5

- B. The Contractor shall monitor peak particle velocities using a minimum of two seismographs operated by personnel trained in their use during all rock excavation activities. Seismograph locations shall be mutually agreed upon by the Engineer and Contractor.

THE METROPOLITAN DISTRICT

- C. Vibration monitoring shall be on a continuous basis throughout the rock excavation operation.
- D. The Engineer may direct that additional vibration monitoring be performed if conditions warrant such action.
- E. Vibration Monitoring Instrumentation – Provide two (minimum) seismographs for full time use on the project during rock removal that have been calibrated within the previous six months to a standard, which is traceable to the National Bureau of Standards. Required characteristics of seismographs are listed below:
 - 1. Measure the three mutually perpendicular components of particle velocity in directions vertical, radial and perpendicular to the vibration source.
 - 2. Measure and display the maximum peak particle velocity component and air blast overpressure immediately after rock removal.
 - 3. Furnish a permanent record of a velocity/time waveform, on a strip chart or from magnetic tape.
 - 4. Have a flat velocity frequency response with a minimum broad band of 6 Hz to 150 Hz with a tolerance equal to or better than plus or minus 10 percent.
 - 5. Have a low frequency omnidirectional transducer for measuring air blast overpressure with a flat frequency response within the limits of 2 Hz to 250 Hz with a tolerance equal to or better than plus or minus 10 percent.
- F. The Contractor shall be completely responsible for all damages resulting from the rock excavation operations and shall, as a minimum, take whatever measures are necessary to maintain peak particle velocities within the specified limits. Modifications to excavation methods required to meet these requirements shall be undertaken at no additional cost to the Owner.

3.05 DISPOSAL OF EXCAVATED ROCK

- A. Excavated rock shall be disposed of in accordance with Section 02200.

3.06 BACKFILLING ROCK EXCAVATIONS

- A. Where rock has been excavated and the excavation is to be backfilled, the backfilling above normal depth shall be done as specified under Section 02200.

3.07 BLASTING

- A. Blast as a means to excavate rock SHALL NOT be permitted in this Contract.

THE METROPOLITAN DISTRICT

- B. The Contractor shall submit to the Engineer details of the equipment that is to be used for rock excavation.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02213

ROCK AND BOULDER EXCAVATION (BLASTING ALLOWED)

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required to excavate and dispose of rock and boulders as shown on the Contract Drawings and as specified herein such that damage is prevented to adjacent utilities, pipes, structures, property and the Work and such that resulting ground vibrations are maintained below the maximum levels specified in this Section. The Contractor shall furnish acceptable material for backfill in place of the excavated rock to bring the limits of the trench and/or excavation to those required on this project.
- B. If allowed by local authorities and identified on Contract Drawings, blasting may be used to loosen rock and boulders for excavation. If blasting is performed, provide the services of a licensed professional engineer or geologist, registered in the state in which the Work is located, to prepare blasting plans and supervise blasting operations.
- C. Protect the existing structures, utilities, adjacent property, workers, Engineer, Owner, all abutters and the public from damage or injury from improper handling of explosives, flyrock and excessive ground vibrations and rock block movements. Should any damage occur to the existing utility or structures caused by rock removal methods (blasting, drilling etc.) shall be repaired at the Contractor's own expense with no additional cost to the Owner.
- D. Furnish, install and put into operation an audible warning system to indicate impending blasting. Familiarize workers, Engineer, Owner, all abutters and the public with the system implemented.
- E. Conduct blast monitoring of every blast round during the conduct of construction using the blast monitoring procedures and equipment specified in this Section.
- F. Conduct pre-blast survey for this Work as specified herein.
- G. Obtain and pay for all permits and licenses required to complete the Work of this Section. Original permits shall be prominently displayed on the Work site prior to initiating blasting operations.

THE METROPOLITAN DISTRICT

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 02200, Earthwork
- C. Section 02210, Rock Excavation and Disposal (Blasting Not Allowed)
- D. Section 02260, Handling, Transportation and Disposal of Regulated Soil

1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, the proposed methods of excavation for the various portions of the Work. Remain responsible for means, methods and techniques, as well as all safety considerations.
- B. Submit letters to property owners for pre-blast survey appointments.
- C. Submit three copies of the pre-blast survey, including three sets of photographs and/or video recordings, as specified herein.
- D. Submit blasting plans. Blasting plans shall be prepared by a licensed professional engineer or licensed geologist, registered in the State of Connecticut, having a minimum of 5 years of professional experience in blasting operations. The blasting plan shall include sketches to show blast locations; proximity to, and methods for protection of, existing structures and utilities; drill hole patterns, amount of charges, firing sequence and times; vibration monitoring plan; powder factor; time delays, weight of explosive in each delay, total pounds of explosives, method of transportation, storage and handling, manufacturers data sheet for all explosives, primers and initiators to be employed, calculations of ground velocities at the nearest structures and nearest utilities, proposed seismograph locations, energy ratio, acceleration and displacement, methods for protection of the existing structures and utilities including special perimeter control blasting procedures; and any other pertinent information required. The plan shall also include methods of matting or covering of the blast area to prevent flyrock and excessive airblast overpressure; details of the audible advance signal system to be employed at the job site as a means of informing workers, Engineer, Owner, all abutters and the general public that a blast is about to occur. Field monitoring methods and techniques including seismographs shall also be addressed.
- E. Submit an original and three copies of the licensed professional engineer or licensed geologist's certification, on the form specified in Section 01300, stating that blasting plans have been prepared by the professional engineer or geologist,

THE METROPOLITAN DISTRICT

and that the professional engineer or geologist will be responsible for their execution.

- F. Submit list of permits and clearances required, when applied for, and date of approval or anticipated approval.
- G. Submit three copies of blasting permits required by local agencies and authorities. Original permits shall be prominently displayed on the site prior to initiating blasting operations.
- H. Submit three copies of blasting records, copy of strip chart (or other permanent record of velocity/time waveform) with calibration and monitoring record marked with the date, time and location of the blast as well as the monitoring location and as specified herein.
- I. Submit post-blast condition surveys and all blasting complaints received by the Contractor within 24 hours of receipt. Each blast complaint report shall include the name and address of the complainant, time received, date and time of blast complained about and a description of the circumstances, which led to the complaint.
- J. Submit name and qualifications of the person(s) responsible for monitoring and reporting blast vibrations and overpressures, and name and qualifications of the person(s) performing the pre-blast and post-blast surveys.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. OSHA Regulations 29 CFR 1910.109 - For Explosive and Blasting Agents

1.05 DEFINITIONS

- A. Rock: Any large mass of stone, bedrock, ledgerrock, thrust block, reinforced thrust block, anchor, or buried masonry concrete structure.
- B. Boulder: Rock fragments exceeding 1 cu yd in volume.
- C. Rock Excavation: The removal of solid rock or rock fragments greater than 1 cu yd in volume which cannot be removed by conventional mechanical excavation equipment or which requires continuous, systematic drilling and blasting, chemical expanders or other special procedures.
- D. Boulder Excavation: The removal of boulders exceeding 1 cu yd in volume which can be excavated without resorting to blasting.

THE METROPOLITAN DISTRICT

1.06 DELIVERY, STORAGE AND HANDLING

- A. The delivery, storage and handling of explosives shall be performed only by qualified persons licensed in the State in which the Work is located and shall be in full conformance with all laws, regulations, ordinances and practices including OSHA REGULATIONS 29 CFR 1910.109 FOR EXPLOSIVE AND BLASTING AGENTS. Extreme care shall be taken to avoid injury or damage to persons or property.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.01 GENERAL

- A. Rock in pipe trenches shall be excavated so as to be not less than 12 inches below the pipe after it has been laid. The width shall be as shown on the Contract Drawings. Before the pipe is laid, the pipe bedding shall be installed to the correct subgrade with thoroughly compacted suitable material that is the same material as that required for bedding the pipe, furnished and placed at the expense of the Contractor.
- B. Rock at structures shall be excavated so as to be no less than 12 inches below the bottom of the structure slab. The width shall be 2 feet beyond the outside wall of the structure. Before the structure is laid, the structure bedding shall be installed to the correct subgrade with thoroughly compacted suitable material that is the same material that is required for bedding the structure, furnished and placed at the expense of the Contractor.
- C. When rock is encountered, it shall be uncovered, but not excavated, until measurements are made by the Engineer.

3.02 EXCESS ROCK EXCAVATION

- A. If rock is excavated beyond the limits of payment indicated on the Contract Drawings and Specifications, the excess excavation, whether resulting from over breakage or other causes, shall be backfilled, by and at the expense of the Contractor, as specified below in this Section.
- B. In pipe trenches, excess excavation below the elevation of the top of the bedding, cradle, or envelope shall be filled with material of the same type, placed and compacted in the same manner, as specified for the bedding, cradle, or envelope. Excess excavation above said elevation shall be filled as specified in Section 02200 and Section 02201.

THE METROPOLITAN DISTRICT

- C. In excavations for structures, excess excavation in the rock beneath foundations shall be filled with concrete. Other excess excavation shall be filled as specified in Section 02200.

3.03 PREPARATION OF ROCK SURFACES

- A. Whenever so directed during the progress of the Work, the Contractor shall remove all dirt and loose rock from designated areas and shall clean the surface of the rock thoroughly, using steam to melt snow and ice, if necessary. Water in depressions shall then be removed as required so that the whole surface of the designated area can be inspected to determine whether seams or other defects exist.
- B. The surfaces of rock foundations shall be left sufficiently rough to bond well with the concrete to be built thereon, and if required, shall be cut to rough benches or steps.
- C. Before any masonry or embankment is built on or against the rock, the rock shall be scrupulously freed from all vegetation, dirt, sand, clay, boulders, scale, excessively cracked rock, loose fragments, ice, snow, and other objectionable substances. Picking, barring, wedging, streams of water under sufficient pressure, stiff brushes, hammers, steam jets, and other effective means shall be used to accomplish this cleaning. All free water left on the surface of the rock shall be removed.

3.04 PREPARATION FOR BLASTING

- A. Perform a pre-blast survey for all structures within the influence range of blasting operations, or within 250-ft of the blast area, whichever is greater. The pre-blast survey shall consist of a close visual inspection, fully supported by photographs or video recordings, performed by, or under the supervision of, a licensed professional engineer or geologist experienced in such surveys. Insurance underwriter shall be present during such surveys. Contractor is responsible for mailing documentation to schedule an appointment with homeowner. Once appointment is scheduled with property owner, the Contractor is responsible to give notice in writing, to the property owner and any representative of local authorities required to be present at such survey. Notify in writing the dates on which surveys are planned so that representatives are present during the examination. Provide copies of notices to the Owner and Engineer.
- B. Observations shall be recorded of the existing conditions for residences, buildings and other structures, which might be affected.
 - 1. The survey shall consist of a description of interior and exterior conditions. Descriptions shall locate cracks, damage or other defects existing and shall include information to make it possible to determine the effect, if any, of the

THE METROPOLITAN DISTRICT

construction operations on the defect. Where significant cracks or damage exists, or for defects too complicated to describe in words, photographs shall be taken and made part of the record.

2. The records of each property examined shall be signed by the representatives present and, if practicable, by the property owner, whether or not they are present at the examinations.
- C. Upon completion of all earth/rock excavation and blasting work, the Contractor shall make a similar examination of properties and structures where complaints of damage have been received or damage claims have been filed. Give notice to interested parties so that they may be present during the final examinations. Records of the final examination shall be signed and distributed as the original pre-blast survey.
- D. Any damage noted after completion of blasting operations which cannot be determined from the pre-blast survey to be a pre-existing condition shall be presumed to have been caused by blasting operations. Such damage shall be repaired promptly and completely to the property owner's satisfaction to restore the condition of the property to that existing prior to blasting.
- E. Maintain pre-blast survey records for a period of not less than 3 years following final completion and acceptance of the Work. In the event of damage claims, a report shall be prepared by the Contractor on the particular structures as requested by the Engineer from those notes and photographs and submitted to the Owner.

3.05 VIBRATION MONITORING

- A. Vibration Limit Criteria - The Contractor shall limit rock excavation operations to prevent damage to any adjacent building, structure, utilities, pipes or other features near the site. The Contractor is solely responsible to determine the maximum vibration and air blast tolerable at each facility. However, in no case shall the following be exceeded.
 1. Peak Particle Velocity (PPV) limits at the ground surface at existing residences, structures, utilities, and existing water mains:

<u>Frequency (Hz)</u>	<u>Maximum Peak Particle Velocity (in. per. sec.)</u>
Over 40	2.0
30 to 40	1.5
20 to 30	1.0
Less than 20	0.5

THE METROPOLITAN DISTRICT

2. Scaled Distance (SD), distance/square root of maximum lbs/delay, shall be established based on the initial blasting and the distance to the closest structure and the charge weight that does not damage any adjacent structure or utility. The established SD shall be used for all blasting associated with this particular portion of the project.
3. Air blast Overpressure Limit:
 - a. The Contractor shall conduct all blasting activity in such a manner that the peak air blast overpressure measured at the location of the nearest above ground, occupied structure to air blast does not exceed 0.013 psi.
- B. The Contractor shall monitor peak particle velocities and air blast overpressures using a minimum of two seismographs operated by personnel trained in their use during all rock excavation activities. Seismograph locations shall be mutually agreed upon by the Engineer and Contractor.
- C. Initial vibration monitoring for blasting operations to establish the SD shall be at the closest existing utility or structure to the blast areas.
- D. Vibration monitoring requires that time of firing be precisely known so that the seismographs can be started before firing. The Contractor shall establish a signal system, which will allow records of vibrations caused by blasting or other rock excavation activities to be made.
- E. Vibration monitoring for non-explosive methods shall be on a continuous basis throughout the operation.
- F. The Engineer may direct that additional vibration monitoring be performed if conditions warrant such action at no additional cost to the Owner.
- G. Vibration Monitoring Instrumentation – Provide two (minimum) seismographs for full time use on the project during blasting which have been calibrated within the previous six months to a standard, which is traceable to the National Bureau of Standards. Required characteristics of seismographs are listed below:
 1. Measure the three mutually perpendicular components of particle velocity in directions vertical, radial and perpendicular to the vibration source.
 2. Measure and display the maximum peak particle velocity component and air blast overpressure immediately after each blast.
 3. Furnish a permanent record of a velocity/time waveform, on a strip chart or from magnetic tape.

THE METROPOLITAN DISTRICT

4. Have a flat velocity frequency response with a minimum broad band of 6 Hz to 150 Hz with a tolerance equal to or better than plus or minus 10 percent.
 5. Have a low frequency omnidirectional transducer for measuring air blast overpressure with a flat frequency response within the limits of 2 Hz to 250 Hz with a tolerance equal to or better than plus or minus 10 percent.
- H. The Contractor shall be completely responsible for all damages resulting from the rock excavation operations and shall, as a minimum, take whatever measures are necessary to maintain peak particle velocities within the specified limits. Modifications to blasting and excavation methods required to meet these requirements shall be undertaken at no additional cost to the Owner.

3.06 MINIMUM SAFETY PRECAUTIONS

A. Clearing the Danger Area before Blasting

1. No blasting shall be permitted until all personnel and vehicles in the danger area have been removed to a place of safety. Contractor shall stop all vehicular and pedestrian traffic from passing close to the blast area at least one minute prior to the blast.
2. A loud, audible, warning system, devised and put in operation shall be sounded before each blast.
3. The Contractor shall familiarize all personnel on the project, Engineer, Owner, abutters and the general public with the system.
4. The danger area shall be patrolled before each blast to make certain that it has been completely cleared and guards shall be stationed to prevent entry until the area has been cleared by the blaster following the blast.
5. The vehicular and pedestrian traffic shall not be permitted to pass until completion of the blast, when the blasters "All Clear" signal is given.
6. The Contractor shall notify the appropriate local authorities and State Police and obtain the required police details to direct traffic.

B. Notify authorized representatives of all utilities, which may be affected by blasting operations at least 72 hours before blasting is performed.

C. The owners and occupants of houses and buildings that are within 250 feet of proposed blasting shall be notified by the Contractor 48 hours prior to blasting. The Contractor shall provide written instructions to each owner about the meaning and timing of the blasters warning signals.

THE METROPOLITAN DISTRICT

- D. No explosives, caps, detonators or fuses shall be stored on the site during non-working hours.
- E. The Contractor shall be responsible for determining any other safety requirements unique to blasting operations on this particular site so as not to endanger life, property, utility services, any existing or new construction, or any property adjacent to the site.
- F. Groundwater or surface runoff in contact with bi-products or residue of any blasting agents, shall be disposed of in an approved area.
- G. No requirement of, or omission to require, any precautions under this Contract shall be deemed to limit or impair any responsibility or obligations assumed by the Contractor under or in connection with this Contract; and the Contractor shall at all times maintain adequate protection to safeguard the public and all persons engaged in the Work and shall take such precautions as will accomplish such end, without undue interference to the public. The Contractor shall be responsible for and pay for any damage to adjacent structures, buildings, utilities and other features resulting from Work executed under this Section.

3.07 BLASTING PLANS

- A. Prior to initiating blasting operations, a blasting plan shall be prepared by a licensed professional engineer or licensed geologist. The plan shall include sketches to show blast locations; proximity to, and methods for protection of, existing structures and utilities; drill hole patterns, amount of charges, firing sequence and times; calculations of ground velocities, energy ration, acceleration and displacement; and any other pertinent information required. Field monitoring methods and techniques shall also be addressed.
- B. If required by local or state regulations, blasting plans shall be reviewed by the appropriate agency or authority and revised as required to meet with their approval.

3.08 BLASTING

- A. Blasting operations shall be performed under the direct supervision of a licensed professional engineer or licensed geologist, by qualified blasting technicians licensed in the State in which the Work is being performed. Blasting operations shall be in full compliance with applicable state and local laws, regulations, ordinances and practices.
- B. Blast locations shall be heavily matted to contain potential flying debris. After a flyrock incident, the Contractor shall submit in writing to the Engineer his proposed changes in procedures to prevent flyrock.

THE METROPOLITAN DISTRICT

- C. Blasting shall not be permitted within 200-ft of locations where concrete has been placed in the preceding 24 hours. Blasting shall not be permitted within 40-ft of concrete structures until the concrete has attained the specified design strength.
- D. If the Engineer believes that continued blasting would threaten the integrity of existing structures or utilities, the Contractor shall stop blasting near the structures or utilities and fragment the remaining rock near the structures or utilities using nonexplosive techniques.

3.09 BOULDER EXCAVATION

- A. Boulders and rock fragments up to 1 cu yd in volume may be reduced in size by rock excavation methods to simplify its removal.

3.10 DISPOSAL OF ROCK AND BOULDERS

- A. Excavated rock shall be disposed of in accordance with Section 02200.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02260

EXCAVATION, HANDLING, TRANSPORTATION AND DISPOSAL OF REGULATED SOIL

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes excavation, testing, handling, temporary storage, loading, transportation and disposal of Regulated Soil.
- B. Establishment of protocols and implementation of procedures to protect worker health and safety as it relates to activities performed in the presence of Regulated Soil.

1.02 RELATED SECTIONS

- A. Section 01025, Measurement and Payment
- B. Section 01060, Regulatory Requirements
- C. Section 01110, Environmental Protection Procedures
- D. Section 01120, Site Specific Health & Safety Plan
- E. Section 01300, Submittals
- F. Section 01562, Dust Control
- G. Section, 02011, Test Pits
- H. Section 02140, Dewatering and Drainage
- I. Section 02145, Handling Contaminated Groundwater
- J. Section 02200, Earthwork
- K. Section 02270, Sedimentation and Erosion Control

1.03 SUBMITTALS

Submit the following prior to commencement of Work in accordance with Section 01300 Submittals:

- A. Transporter Information:

THE METROPOLITAN DISTRICT

1. The name and address of transporters to be used on the project to transport Regulated Soil.
2. Current licenses and permits to operate in all states affected by transport.

B. Disposal Facility Information:

1. General Information
 - a. Facility Name
 - b. Facility Address
 - c. Name of Contact Person
 - d. Title of Contact Person
 - e. Telephone Number of Contact Person
 - f. Permit Number
2. Written confirmation from the facility that they are permitted to accept and will accept material of the general quality and quantity described by these Specifications.
 - a. Facility permits
 - b. Facility acceptance criteria.
 - c. Written approval from Connecticut Department of Energy and Environmental Protection (CTDEEP) for disposal of Regulated Soil or use of Regulated Soil as cover soil in a solid waste disposal area at facilities located in Connecticut.
 - d. Facility sampling frequency and analytical testing requirements.
3. The Engineer must approve the proposed transporter and disposal facility prior to the transport of any Regulated Soil.

C. Soil Management Plan: Submit to the Engineer within 30 calendar days after notice to proceed.

Submit the following during execution of Work in accordance with Section 01300, Submittals:

- D. All chemical analytical reports within 48 hours of the Contractor's receipt.

THE METROPOLITAN DISTRICT

- E. Registrations, letters, forms or applications to be sent to Federal, State or Local environmental regulatory agencies to the Engineer for review prior to submittal. Allow seven days for review. No adjustments for time or money will be made if re-submittals are required due to deficiencies.
- F. Waste profile forms, material shipping records or any other forms, letters or documents that must be signed by the Owner to obtain authorizations for disposal no less than seven days in advance of shipping materials off site.
- G. Shipping papers or manifests that must be signed by the Owner no less than 14 days in advance of shipping materials off site.
- H. Certified manifests or shipping paper and weight slips from the approved disposal facilities for Regulated Soil transported and disposed of off site within five days of Contractor's receipt. At a minimum, manifests and weight slips include the following:

Manifests

- 1. Transporter name, address and telephone number.
- 2. Description of material being transported.

Weight Slips

- 1. Truck number, date and time of load-out.
- 2. Gross weight, tare weight and net weight of truck.

1.04 DEFINITIONS

- A. Clean Fill: Chemically clean fill as defined in Sec. 22a-209-1 of the Regulations of Connecticut State Agencies (RCSA). Clean fill does not contain any substances above natural background levels.
- B. Contaminated Soil: Treated or untreated soil and/or sediment affected by a known or suspected release and determined, or reasonably expected to contain substances exceeding Residential Direct Exposure Criteria or GA Pollutant Mobility Criteria, as these terms are defined in the Remediation Standard Regulations (RCSA Section 22a-133k-1).
- C. Hazardous Soil: Soil that is classified as a hazardous waste (40 CFR 261). Soil is classified as hazardous waste if it exhibits a hazardous waste characteristic or if it contains Resource Conservation and Recovery Act (RCRA) listed hazardous constituents above Connecticut's RCRA "Contained-In" Policy dated May 2002.

THE METROPOLITAN DISTRICT

- D. Hazardous Waste Disposal Area: Facility permitted for treatment, storage, or disposal of Hazardous Waste under RCRA and applicable Connecticut laws and regulations.
- E. Polluted Soil: Soil affected by a release of a substance at a concentration above the analytical detection limit for such substance in accordance with RCSA 22a-133k-1(a)(45).
- F. Regulated Soil: Includes Polluted Soil, Contaminated Soil, and Hazardous Soil.
 - 1. Reusable Regulated Soil: Reusable Regulated Soil means soil with substance concentrations above the analytical detection limit for such substance in accordance with RCSA 22a-133k-1(a)(45) and below the industrial direct exposure criteria and the GB pollutant mobility criteria as these terms are described in the Remediation Standard Regulations (RCSA 22a-133k-1 through 3), which do not contain polychlorinated biphenyls.
 - 2. Non-Reusable Regulated Soil: Non-Reusable Regulated Soil means soil with substance concentrations exceeding Industrial Direct Exposure Criteria or GB Pollutant Mobility Criteria, as these terms are defined in the Remediation Standard Regulations (RCSA Section 22a-133k-1).
- G. Soil: As used in this Section soil includes natural soil, natural sediment, and rock, brick, ceramics, concrete, asphalt paving fragments, and other miscellaneous debris and solid waste contained in the excavated soil.
- H. Solid Waste: Includes all excavated material not classified as Soil.
- I. Special Waste Disposal Area: Facility permitted to receive solid waste under RCSA Sections 22a-209-1 through 13, or for facilities not located in Connecticut, permitted by the state to receive solid or industrial waste.
- J. Treatment or Recycle Facility: Facility permitted to treat or recycle Regulated Soil that is permitted under RCSA 22a-174-3 and CGS Section 22a-454 or for facilities not located in Connecticut, permitted by the state in which the facility is located to treat or recycle Regulated Soil.

1.05 QUALITY ASSURANCE

- A. Regulatory Requirements: Perform earthwork, storage, transportation and disposal in compliance with applicable requirements of authorities having jurisdiction, including but not limited to the following:
 - 1. Connecticut Department of Energy and Environmental Protection
 - a. Connecticut Remediation Standard Regulations (RSRs), RCSA 22a-133k-1 to 3.

THE METROPOLITAN DISTRICT

- b. Connecticut Hazardous Waste Regulations, RCSA 22a-449(c)-100 to 119.
 - c. Connecticut Solid Waste Management Regulations, RCSA 22a-209-1 to 17.
 - d. CTDEEP Bureau of Materials Management and Compliance Assurance - Disposal of Special Waste Authorization (DEP-WEED-APP-200)
 2. United States Environmental Protection Agency (EPA)
 - a. Federal Hazardous Waste Regulations, 40 CFR 261-268.
 - b. Toxic Substance Control Act (TSCA) polychlorinated biphenyl (PCB) regulations at 40 CFR 761
 3. The Owner will be the “generator” of all Regulated Soil. Owner information is as follows:
 - a. Owner’s Name: The Metropolitan District
 - b. ATTN: *Project Manager Name*
 - c. Owner’s Address: 555 Main Street, Hartford CT 06103
 - d. Owner’s Telephone Number: 860-278-7850 xXXXX
 - e. Owner’s Facsimile Number: 860-251-6141
 - f. Project Name: [_____]
 - g. Site Address: [_____]
- B. Contractor Qualifications: Conform to the following qualifications:
1. Work must be performed by Contractor personnel formally trained in procedures for Regulated Soil removal, with a proven history of successfully executing similar projects for a minimum of five years.
 2. Work must be accomplished by Contractor with proper equipment and personnel experienced in similar work.
- C. Contractor’s Qualified Environmental Professional shall be currently licensed as a Licensed Environmental Professional (LEP) in Connecticut or a Licensed Site Professional (LSP) in Massachusetts

THE METROPOLITAN DISTRICT

D. Contractor's Independent Analytical Laboratory: Conform to the following qualifications:

1. Accredited by the State of Connecticut Department of Public Health.
2. Have a minimum five years experience.
3. Ability to perform all analyses and provide analytical reports in accordance with the CTDEEP's Reasonable Confidence Protocols.

1.06 PROJECT CONDITIONS

- A. The geotechnical and environmental reports provided in the appendices provide soil chemical analysis, and boring logs showing subsurface conditions. Information regarding the approximate ground water elevations is also included. The nature and extent of the Regulated Soil are shown on the Contract Drawings.
- B. Notify the Owner if unexpected subsurface conditions are encountered, including visual or olfactory evidence of contamination and discontinue work in area until Owner provides notification to resume work.
- C. The Engineer shall be notified within 24 hours if Regulated Soil is discovered that has not been previously identified or if other discrepancies between data provided and actual field conditions are discovered.
- D. Do not remediate, excavate, treat, or delineate Regulated soil, not previously identified, without consent from the Engineer.

1.07 HEALTH AND SAFETY

- A. Designate, in name and title, a Health and Safety Manager (HSM) for all health and safety questions and concerns and provide a 24 hour contact phone number for the HSM.
- B. Prepare a written Health and Safety Plan (HASP) as described in Section 01120. Such plan must be approved by signature by the HSM and provide for compliance with OSHA regulations including, as applicable 29 CFR 1910.120. All elements in 29 CFR 1910.120(b) (4) shall be addressed in the HASP.
- C. No work shall be performed related to excavation and handling of Regulated Soil until a HASP is submitted to the Engineer. However, the time to perform under the Contract will begin on the date stipulated in the Notice to Proceed.
- D. Maintain the HASP on site and keep it current with Regulated Soil management activities including loading for transportation and actual site conditions.

THE METROPOLITAN DISTRICT

- E. Provide personnel protective equipment as stipulated in the Contractor's HASP during the performance of Work in an area identified as potentially posing a risk to worker health and safety for workers employed by the Contractor and Subcontractors.
- F. Inform all on-site workers and Subcontractors of all site safety rules, known or potential hazards, and emergency response procedures.

1.08 SOIL MANAGEMENT PLAN

- A. Prepare a Soil Management Plan. The plan should be prepared and signed by the Contractor's Qualified Environmental Professional and at a minimum, this plan shall describe detailed procedures that the Contractor plans to follow regarding management of all soil and include the following components:
 - 1. Schedule of activities
 - 2. Soil characterization procedures including sampling frequency, analytical methods and data quality management
 - 3. Storage area construction materials
 - 4. Storage location(s)
 - 5. Soil segregation procedures
 - 6. Soil loading location and method
 - 7. Operating log to track soil origin, storage location and final disposition
 - 8. Inspection and maintenance procedures
 - 9. Erosion control, dust control, and anti-tracking procedures
 - 10. Emergency and preparedness procedures, including spill response plan
 - 11. Transportation routes
 - 12. Proposed transporters and disposal facilities
 - 13. Site security
- B. In most cases, street work does not allow the ability to store soil on-site for any period of time. The Contractor shall provide a method to load Regulated Soil directly into the transporting vehicle. A roll-off container may also be used if permitted by local authorities, but shall be removed from the Work site daily.
- C. No work shall be performed related to excavation and handling of Regulated Soil until the Soil Management Plan is submitted to and approved by the Engineer.

THE METROPOLITAN DISTRICT

- D. Maintain the Soil Management Plan on site and keep it current with Regulated Soil management activities including loading for transportation and actual site conditions.
- E. Inform all on-site workers and Subcontractors of all site safety rules, known or potential hazards, and emergency response procedures.

1.09 SCHEDULING

- A. Notify the Owner and Engineer a minimum of 14 calendar days prior to the start of excavation of Regulated Soil. The Engineer will be responsible for contacting regulatory agencies in accordance with the applicable reporting requirements.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Stockpile Liner (if necessary): The stockpile liner shall be manufactured of new, first quality product designed and manufactured specifically for the intended use and have the following properties:
 - 1. The material shall be U.V. resistant (black in color).
 - 2. The material shall be impervious to prevent precipitation from entering the stockpile or liquids from migrating to underlying soil.
 - 3. The material shall have a minimum thickness of 20 mil for the liner under the stockpile and 10 mil for the liner over the stockpile.
- B. Roll-off Containers: If a roll-off container is used, it must be in good condition and water tight. A liner made from polyethylene and manufactured specifically for a roll-off shall be used. The roll-off shall have a cover that does not contain rips or tears.
- C. Spill Response Materials: Provide appropriate spill response materials including, but not limited to the following: containers, adsorbents, shovels, and personal protective equipment. Spill response materials shall be available at all times when Regulated Soil is being handled or transported. Spill response materials shall be compatible with the type of soil and contaminants being handled and detailed in the Site Specific HASP.
- D. Packaging, Labeling, Marking and Placarding Materials: Provide all of the materials required for the packaging, labeling, marking, placarding and transportation of Regulated Soil in conformance with Department of Transportation standards. Details in this specification shall not be construed as establishing the limits of the Contractor's responsibility.

THE METROPOLITAN DISTRICT

PART 3 – EXECUTION

3.01 GENERAL

- A. It is intended that Contractor activities for the excavation, transportation, handling and disposal of regulated soils on this project will involve management of only those materials that are encountered. It is not intended that the Contractor remediate soils located outside the limits of excavation anticipated for the project as designed.
- B. Requirements of Section 02260 apply to the Contractor and any Subcontractors involved in activities related to Regulated Soils.

3.02 FACILITY APPROVAL

- A. Upon receipt of the final approval from the treatment, recycling or disposal facility, immediately forward a copy of the approval to the Engineer. Coordinate facility approval, loading, transportation, and ultimate disposal of the Regulated Soil at the facility.

3.03 REUSE AND DISPOSAL

- A. Regulated Soil may be:
 - 1. Used as cover of disposed of in a Special Waste Disposal Area provided written approval is obtained from CTDEEP under RCSA Sec.22a-209-8 for use in an in-state facility.
 - 2. Used as landfill cover at a Massachusetts permitted lined or unlined landfill under Massachusetts Department of Environmental Protection Policy # COMM-97-001.
 - 3. Taken to a Special Waste Disposal area for disposal or use as cover in a facility not located in Massachusetts or Connecticut.
 - 4. Taken to a properly permitted Treatment or Recycling Facility for thermal treatment or recycling.
 - 5. Disposed in a Hazardous Waste Disposal Area or Owner approved centralized disposal facility.
- B. Reusable Regulated Soil shall be:
 - 1. Reused on site as backfill in locations above the water table and not in areas subject to erosion in accordance with requirements in Section 02200, Earthwork. Document the backfill location and depth in a scaled drawing for any Reusable Regulated Soil reused. In most cases, backfilling is

THE METROPOLITAN DISTRICT

discouraged. Any backfill material shall meet the structural/compaction requirements of Section 02200 Earthwork.

2. Managed, disposed of, or treated or recycled in accordance with the requirements for Regulated Soil, if not suitable for reuse or surplus.
- C. Clean Fill shall be managed as specified in Section 02200, Earthwork.
- D. Hazardous Soil is not expected to be encountered at the Site. Alternate arrangements will be required to handle such material. These arrangements shall be coordinated between the Contractor, Engineer and Owner.

3.04 SAMPLING AND ANALYSIS

- A. The Contractor's Qualified Environmental Professional shall sample Regulated Soil and have the samples analyzed as required by the treatment, recycling or disposal facility. This analysis can be performed on samples of in situ soil collected prior to excavation or on samples of excavated soil that has been stockpiled. The frequency of sampling and parameters analyzed shall be performed as required by the treatment, recycling or disposal facility.
- B. Submit a copy of all analytical results to the Engineer within 24 hours of the Contractor's receipt of the laboratory report. Analytical data shall be kept confidential and distributed to the Owner and Engineer only.
- C. Coordinate schedule so that Engineer may observe sample collection activities.
- D. All chemical analysis shall be performed by a laboratory certified by the State of Connecticut Department of Health Services and as applicable in accordance with the State of CTDEEP Reasonable Confidence Protocols.

3.05 REGULATED SOIL MANAGEMENT

- A. Manage Regulated Soil in accordance with the procedures in the approved Soil Management Plan, approved HASP and the CTDEEP General Permit for Contaminated Soil and/or Sediment Management (General Permit).
- B. Direct load Regulated Soil, which has been characterized in place and ship it off site to the approved and permitted treatment, recycling or disposal facility. If Regulated Soil has not been pre-characterized or if direct loading is not otherwise feasible place the Regulated Soil in temporary storage immediately after excavation
- C. On-Site soil storage locations are limited to those indicated in the Contract Drawings or to off-site locations established by the Contractor per the approved Soil Management Plan. No other location other than those indicated will be allowed for the storage of soil. Complete the Work in a manner that the soil storage capacity will not be exceeded.

THE METROPOLITAN DISTRICT

- D. Stockpiles shall be constructed to isolate stored Regulated Soil from the environment. Stockpiles shall be constructed to include liners free of holes and other damage. The ground surface on which the liner is to be placed shall be free of rocks greater than 0.5 inches in diameter and any other object which could damage the material.
- E. Contaminated Soil cannot be stockpiled off site unless a registration has been submitted to and approved by the CTDEEP under the General Permit.
- F. Provide a bituminous runoff barrier or staked hay bales surrounding the stockpile and berm vehicle access points.
- G. Cover any stockpiles with a liner free of holes or other damage to prevent precipitation from entering the stockpile. Extend the cover material over the bituminous runoff barrier or staked hay bales and anchor or ballast with sand bags or other suitable material to prevent it from being removed or damaged by wind.
- H. Roll-off units, if used to temporarily store Regulated Soil, shall be water tight. A cover shall be placed over the units to prevent precipitation from contacting the stored soil.
- I. If miscellaneous liquids, such as rainwater that has contacted Regulated Soil, or decontamination wastewaters from washing of Regulated Soil, from equipment or materials are generated, temporarily store them in containers that are water-tight and located in an area approved by the Engineer. Dispose of liquids in a properly permitted off-site treatment, disposal or recycling facility approved by the Engineer.

3.06 WASTE PROFILES, SHIPPING RECORDS AND MANIFESTS

- A. Prepare and submit to the Engineer for review all waste profiles and coordinate with disposal facilities.
- B. Prepare all manifests and shipping documents required for review by the Engineer. Engineer will be responsible for obtaining Owner's signature. For most types of Regulated Soil signed documents are not required for each load.
- C. Submit to Owner and the Engineer, prior to receiving progress payment, documentation certifying that all materials were transported to, accepted, and disposed of, at the selected receiving facility, including but not limited to:
 - 1. Facility signed manifests.
 - 2. Weight slips. Provide certified tare and gross weights for each load.

THE METROPOLITAN DISTRICT

3.07 LOADING

- A. Load Regulated Soil for transport from the project site to the facility following approval by the Engineer.
- B. Load all Regulated Soil into the transportation vehicle in the location(s) specified in the Soil Management Plan.
- C. Following load-out from the stockpile or direct loading each day, remove residual Regulated Soil resulting from spillage from the loading area and return it to appropriate stockpile, dump trailer or roll-off.
- D. All vehicles hauling Regulated Soil from the site shall be inspected by the Contractor prior to leaving the site. Vehicles not properly covered to prevent loss of material will not be allowed to leave the site. All soil residues on the truck shall be removed before leaving the site and properly disposed of.
- E. The Contractor shall be responsible for ensuring that free liquid does not develop during transport. Wet soils shall not be loaded for transport. The Contractor shall be responsible for the cost to properly dispose of any free liquid that may develop during transport.

3.08 TRANSPORTATION

- A. The Transporter shall adhere to all pertinent Federal, State, and local laws and regulatory agency policies.
- B. No material shall leave the site until the treatment, recycling or disposal facility has approved shipments.
- C. Cover transported Regulated Soil prior to leaving the point of generation and until it has arrived at the treatment, recycling or disposal facility.
- D. All vehicles departing the site containing Regulated Soil are to be properly logged to show the vehicle identification number, driver's name, time of departure, destination, and approximate volume and content of materials.
- E. All transportation vehicles are to have secure, watertight containers free of defects for material transportation and bed liners.
- F. Temporarily stored Regulated Soil must be removed from the site in accordance with applicable regulatory deadlines and no later than the completion date for this Contract. Dispose of Hazardous waste within 90 days of generation.

3.09 SPILLS

- A. Immediately notify the Engineer in the event of a spill or release of a hazardous substance, pollutant, contaminant, or oil. The Owner or Engineer will be

THE METROPOLITAN DISTRICT

responsible for any notifications to regulatory agencies. Follow the pre-established procedures as described in the HASP and spill response plan in the Soil Management Plan. Immediately take containment actions to minimize the effect of any spill or leak. Cleanup shall be in accordance with applicable federal, state, and local regulations. Perform additional sampling and testing as directed by the Engineer to verify spills have been cleaned up. Spill cleanup and testing shall be done at no additional cost to the Owner.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02270

SEDIMENTATION AND EROSION CONTROL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required and performing all installation, maintenance, removal and area cleanup related to sedimentation control work as shown on the Contract Drawings and as specified herein. The work shall include, but not necessarily be limited to; installation of temporary access ways and staging areas, silt fences, silt sacks, catch basin protection, dewatering bags, stone filter boxes, stone filter berms, sediment removal and disposal, device maintenance, removal of temporary devices, temporary mulching, excelsior matting installation and final cleanup.

1.02 RELATED SECTIONS

- A. Section 01060, Regulatory Requirements
- B. Section 01110, Environmental Protection Procedures
- C. Section 02200, Earthwork
- D. Section 02900, Landscaping
- E. Section 02930 Looming, Seeding and Sodding
- F. Section 02905, Unpaved Surface Restoration and Reset Miscellaneous Items
- G. Section 02971, Cleanup

1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, within 30 days after the Notice to Proceed, technical product literature for all commercial products to be used for sedimentation and erosion control.

1.04 QUALITY ASSURANCE

- A. Be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the movement of sediment from the construction site to off site areas or into the stream system via surface runoff or underground drainage systems. Measures in addition to those shown on the

THE METROPOLITAN DISTRICT

Contract Drawings necessary to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up at the expense of the Contractor. No additional charges to the Owner will be considered.

- B. Sedimentation and erosion control measures shall conform to the requirements outlined in the Connecticut Guidelines for Erosion and Sediment Control as updated and the General Permit for Stormwater and Dewatering Wastewaters from Construction Activities and the Wetlands Commission Permit appended to these Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Crushed stone for sediment filtration devices, access ways and staging areas shall conform to CTDOT Standard Specifications for Highway and Bridges Form 817.

- B. Berm structural stone shall be rip-rap as follows:

- 1. Rip-rap shall be sound, durable rock which is roughly rectangular shape and of suitable quality to insure permanence in the condition in which it is to be used. Rounded stones, boulders, sandstone or similar soft stone will not be acceptable. Material shall be free from overburden, spoil, shale and organic material, meet the Engineer's approval and be well graded within the following limits:

<u>Weight of Stone</u>	<u>Percent Finer by Weight</u>
40 lb	100
12 lb	50
3 lb	0

- C. Silt Fence

- 1. The silt fence shall be comprised of a sediment control fabric and reinforced netting stitched together with heavy duty thread top and bottom, stapled to hardwood posts. Hardwood posts shall be 4.5 feet long, spaced a maximum 8 feet apart with lower ends tapered to facilitate driving into compacted soil. A six (6") inch flap at the bottom of the fence shall be used to toe in the sediment control barrier to prevent silt migration under the barrier. Each section of fence shall be supplied with a coupling to attach adjoining sections.
 - 2. The silt fence shall conform to the following test requirements:

THE METROPOLITAN DISTRICT

Mechanical Properties	Test Method	Unit	Minimum Average Roll Average	
			MD	CD
1. Grab Tensile Strength	ASTM D 4632	kN (lbs)	0.53 (120)	0.53(120)
2. Grab Tensile Elongation	ASTM D 4632	%	50	50
3. Trapezoid Tear Strength	ASTM D 4533	kN (lbs)	0.22 (50)	0.22 (50)
4. Mullen Burst Strength	ASTM D 3786	kpa (psi)	1654 (2410)	
5. Puncture Strength	ASTM D 4833	kN(lbs)	0.31 (70)	
6. Apparent Opening Size (AOS)	ASTM D 4751	mm (U.S. Sieve)	0.212 (70)	
7. Permittivity	ASTM D 4491	sec-1	1.8	
8. Flow Rate	ASTM D 4491	1/min/m2 (gal/min/ft2)	5500 (135)	
9. UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	70	

3. For silt fence refer to Appendix B for the Owner's approved materials list.

D. Sediment Control Device

Sediment control devices shall be used during construction to control sediment discharges into existing drainage systems or other receiving streams. Silt sack shall be used under catch basins and dewatering bags as a standalone device to catch sediment laden groundwater. They are constructed of permeable geotextile material and contain factory installed hose connections for various size hoses.

- E. Straw mulch shall be utilized on all newly graded areas to protect areas against washouts and erosion. Straw mulch shall be comprised of threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold or other objectionable material. The straw mulch shall contain at least 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.
- F. A matting blanket shall be installed in all seeded drainage swales and ditches as shown in the MDC Standard Details Manual or as directed by the Engineer. . Refer to Appendix B for the Owner's approved materials list

THE METROPOLITAN DISTRICT

PART 3 - EXECUTION

3.01 INSTALLATION

A. Silt Fence Installation

1. Silt fences shall be positioned as indicated on the Contract Drawings and as necessary to prevent off site movement of sediment produced by construction activities as directed by the Engineer.
2. Dig trench approximately 6-in wide and 6-in deep along proposed fence lines.
3. Install pre-fabricated silt fence according to manufacturer's instructions.
4. Backfill trench with excavated material and tamp.

B. Stone Filter Berm Installation

1. Place berm structural stone across channel just below lower sandbag wall at work area. Face upstream side of structural berm with crushed stone.

C. Staging areas and access ways shall be surfaced with a minimum depth of 4-in of crushed stone.

D. Sediment Control Device

1. Silt sacks shall be located in catch basins under the grating as needed.
2. Dewatering bags shall be installed in areas where flooding is minimized to homes and streets preferably near catch basins or open grassy areas.

3.02 MAINTENANCE AND INSPECTIONS

A. Inspections

1. Make a visual inspection of all sedimentation control devices once per week and promptly after every rainstorm. If such inspection reveals that additional measures are needed to prevent movement of sediment to offsite areas or into the vent trench, promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.

THE METROPOLITAN DISTRICT

B. Device Maintenance

1. Silt Fences

- a. Remove accumulated sediment once it builds up to 1/2 of the height of the fabric.
- b. Replace damaged fabric, or patch with a 2-ft minimum overlap.
- c. Make other repairs as necessary to ensure that the fence is filtering all runoff directed to the fence.

2. Filter Boxes

- a. Replace crushed stone when it becomes saturated with silt.

3. Stone Filter Berm

- a. Muck out trapped silt from dewatering operations when it has built up to within 6-in of the top of the berm.
 - b. Replace crushed stone filter when saturated with silt.
4. The Contractor shall monitor both silt sack and dewatering bag performance during construction and maintain them or replace them as they become full of sediment and cannot drain properly.
 5. Add crushed stone to access ways and staging area as necessary to maintain a firm surface free of ruts and mudholes.

3.03 TEMPORARY MULCHING

- A. Apply temporary mulch to areas where rough grading has been completed but final grading is not anticipated to begin within 30 days of the completion of rough grading.
- B. Straw mulch shall be applied at rate of 100 lbs/1000 sq ft and tackified with latex acrylic copolymer at a rate of 1 gal/1000 sq ft diluted in a ratio of 30 parts water to 1 part latex acrylic copolymer mix.

3.04 MATTING BLANKET

- A. Matting blankets shall be installed in all seeded drainage swales and ditches as shown in the MDC Standard Details Manual and as directed by the Engineer in accordance with manufacturer's instructions. The area to be covered shall be properly prepared, fertilized and seeded with permanent vegetation before the

THE METROPOLITAN DISTRICT

blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. The blankets shall be applied in the direction of water flow and stapled. Blankets shall be placed a minimum of three rows (of 4-ft) wide (total approx. 12-ft width) within the drainage swale/ditch and stapled together in accordance with manufacturer's instructions. Side overlaps shall be 4-in minimum. The staples shall be made of wire, .091-in in diameter or greater, "U" shaped with legs 10-in in length and a 1-1/2-in crown. The staples shall be driven vertically into the ground, spaced approximately two linear feet apart, on each side, and one row in the center alternately spaced between each size. Upper and lower ends of the matting shall be buried to a depth of 4-in in a trench. Erosion stops shall be created every 25-ft by making a fold in the fabric and carrying the fold into a silt trench across the full width of the blanket. The bottom of the fold shall be 4-in below the ground surface. Staple on both sides of fold. Where the matting must be cut or more than one roll length is required in the swale, turn down upper end of downstream roll into a slit trench to a depth of 4-in. Overlap lower end of upstream roll 4-in past edge of downstream roll and staple.

1. To ensure full contact with soil surface, roll matting with a roller weighing 100 lbs/ft of width perpendicular to flow direction after seeding, placing matting and stapling. Thoroughly inspect channel after completion. Correct any areas where matting does not present a smooth surface in full contact with the soil below.

3.05 REMOVAL AND FINAL CLEANUP

- A. Once the site has been fully stabilized against erosion, remove sediment control devices and all accumulated silt. Dispose of silt and waste materials in proper manner. Regrade all areas disturbed during this process and stabilize against erosion with surfacing materials as indicated on the Contract Drawings.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02312

SHAFT EXCAVATION AND SUPPORT

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all materials, labor, and equipment required to excavate the shaft in soil overburden and bedrock as indicated on the Contract Drawings and as specified herein.
- B. Shaft shall be constructed using down-hole drilling.
- C. Blasting is not allowed.
- D. The Work shall include all-required overburden support, bedrock support, dewatering, ventilation, grouting and transport and disposal of all excavated materials as brought to the top of the shaft or that which enters the interceptor.
- E. Diversion, control, and removal of shaft groundwater inflow is the responsibility of the Contractor and is incidental to the lump sum price for the construction of the shaft. Dewatering shall include collection, pumping, treatment, disposal and obtaining discharge/ disposal permits. All applicable legislative statutes and regulations of the State of Connecticut shall be followed.
- F. The Contractor shall construct the shaft to the dimensions and at the location as shown on the Contract Drawings. The Contractor shall be responsible for the means and methods of constructing the shaft providing they are in conformance with the Contract Documents. The Contractor shall be responsible for the design of the shaft temporary supports. The Contractor shall be responsible for meeting all Federal, State, and Local requirements that pertain to health and safety during the performance of the Work.

1.02 RELATED SECTIONS

- A. Section 02140, Dewatering and Drainage
- B. Section 02160, Excavation Support System
- C. Section 02200, Earthwork
- D. Section 02201, Earth Excavation Below Grade and Outside of Limits of Trench
- E. Section 02202, Trench Refill

THE METROPOLITAN DISTRICT

F. Section 02210, Rock Excavation and Removal

1.03 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01300. Submittals shall be prepared and stamped by a professional engineer licensed in the State of Connecticut and countersigned by the Contractor certifying that the design meets the construction requirements.
- B. Submit qualifications of shaft specialist Subcontractor and qualifications of Contractor's engineer.
- C. Submit design calculations and shop drawings detailing material types, equipment, and construction methods to be used for shaft support and construction. Design calculations shall include assumptions and calculations. The design of the temporary support systems shall take into account, as a minimum earth and hydrostatic loads, construction surcharge loads, handling and erection loads.
- D. Excavation and overburden and bedrock support procedures and design.
- E. Method of survey control for maintaining and monitoring vertical alignment of the shaft excavation.
- F. Plan and procedure for keying into and sealing the overburden/bedrock interface.
- G. Detailed description of excavation system including methods and equipment to be used. The excavated shaft diameter shall conform to the dimensions shown on the Contract Drawings. If the Contractor selects to excavate a larger diameter shaft for his convenience, the temporary support design for the larger diameter opening shall be submitted. In any case, submittals shall include but not be limited to; down-drill equipment, casings, groundwater inflow control and diversion (including detention tanks), rock reinforcement installation equipment (as required), concrete anchor equipment and installation techniques, ventilation equipment and air quality monitoring, hoisting equipment for materials and personnel.
- H. If bentonite slurry is used for the shaft excavations, submit the methods to be used to control the slurry quality to ensure that shaft stability is maintained during excavation. Also, include the method of slurry treatment and disposal, as required.
- I. Method to penetrate boulders that are expected to be encountered at the shaft locations.

THE METROPOLITAN DISTRICT

- J. Submit daily shift records including casing installed, depth excavated, description of soils and bedrock, logs of advance and downtime, rock support installed, and groundwater diversion installations.

1.04 DEFINITIONS

- A. Plumbness: Vertical orientation of shaft.
- B. Rock-bolts: Tensioned rock reinforcement or anchorage system for support.
- C. Rock-dowels: Un-tensioned rock reinforcement or anchoring system for temporary support.
- D. Overburden: Soils, including all particle sizes from clay through boulders, overlying the bedrock.
- E. Muck: Clean excavated bedrock from the shafts.

1.05 QUALITY ASSURANCE

- A. The Contractor shall employ a shaft specialist Subcontractor having a minimum of 5 years experience and 5 acceptable installations using the same techniques proposed for this Work. The names of projects and individual references shall be included in the submittal. This experience shall include at least five (5) projects in which temporary casing of similar size and depth in the overburden and bedrock was installed and grouted, as required, to provide stable support.
- B. The Contractor's engineer shall be a professional engineer, registered in the State of Connecticut, and shall have at least 5 years experience in the design of shaft support systems, excavation support, dewatering, grouting, and soil stabilization for shaft of similar size and depth and in subsurface conditions as the Work herein.

1.06 JOB SITE CONDITIONS

- A. The Contractor shall conduct excavation operations employing methods and equipment that will positively control dust and other airborne impurities in accordance with OSHA regulations and Section 01562 Special attention shall be paid to control the level of dust in the shafts. The bedrock contains quartz, silica, and other minerals that may pose a hazard to workers.
- B. The Contractor shall test the shaft atmosphere in accordance with OSHA regulations to insure that air quality and air quantity is maintained. A record of all air quality tests shall be maintained.
- C. All shafts shall be covered with temporary removable covers during all time when no underground work is being performed. For temporary covers

THE METROPOLITAN DISTRICT

positioned above the surrounding grade, the cover shall be capable of supporting a minimum load of 150 psf over the entire surface area. For shaft covers installed at grade, the cover shall be designed for HS20-44 truck loadings.

- D. Slurry used for shaft drilling shall be completely contained at all times. No pits or excavations shall be excavated below ground surface to contain or store fluids or be used as a component of the re-circulation process, nor shall slurry be discharged or spilled at any time onto the surface of the work site or adjacent areas.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. The down-hole drilling equipment shall have the capability to drill or excavate the shafts to the dimensions, alignment, and depths shown on the Contract Drawings through the overburden, including boulders and bedrock.

2.02 CASING

- A. All steel casing employed as temporary support shall be welded ASTM A36 steel. The thickness shall be as determined by the Contractor's design but in no case less than 0.5-in thickness.

2.03 ROCK DOWELS

- A. Rock dowels shall be #8 reinforcing bars at least 1 ft long and conforming to ASTM A615.

2.04 ROCK BOLTS

- A. Rock bolts shall be a standard product of a company regularly engaged in manufacturing this product.
- B. Bolts shall be 1-in diameter and conform to ASTM A663, Grade 80 and shall have a rolled thread on each end with at least 5-1/2 inches of thread on the outer end and anchorage on the inner end. Each bolt assembly shall include one steel bearing plate, one hardened steel washer, beveled washers, nut, welded wire fabric anchor plates and extra nuts as required. The expansion shell anchor shall be capable of developing the guaranteed yield strength of the rock bolt.
- C. Nuts for rock bolts shall be hexagon head, conforming to ASTM A325. Bevel washers for rock bolts shall be steel or malleable iron. Hardened steel washers for rock bolts shall conform to ASTM A325.

THE METROPOLITAN DISTRICT

- D. Steel bearing plates and welded wire fabric anchor plates for rock bolts shall conform to ASTM A36. The dimensions of the plates shall be not less than 3/8-inch thick and 6- by 6-inches square.
- E. Accessory steel for rock bolts shall consist of rock bolt mats, channel strapping, or similar strapping members. Accessory steel shall be the product of a recognized manufacturer and shall meet the approval of the Engineer.
- F. The materials for polyester resin anchor bolts shall be a standard product of a company regularly engaged in the manufacture of polyester resin anchor bolts, as approved by the Engineer.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Grade each shaft area to divert surface runoff away from the shaft excavation including flooding from runoff associated with severe rain storms and snow melt.
- B. Provide a shaft collar extending at least 12-in above grade with a safety rail that conforms to all Federal, State and Local requirements, including signs required for safety.
- C. Perform the shaft excavation in accordance with OSHA ventilation, personnel hoist, access and egress requirements for underground work.
- D. Perform the shaft excavation in a manner that will minimize the movement of the ground below and surrounding the excavation and minimize subsidence of the surface, structures, and utilities above, and in the vicinity of the excavation. Support the ground in a manner to prevent loss of ground and to keep the perimeters of the shaft stable at all times.
- E. Steel casing installed as temporary support shall remain in-place. The annulus space between the outside of the casing and the overburden and bedrock shall be filled with grout.
- F. Key the overburden temporary support casing a minimum of 2-ft into bedrock around the full perimeter of the shaft to prevent migration of soils and minimize the intrusion of groundwater into the shaft excavation.
- G. Whenever there is a condition that could affect the stability of the excavation or adjacent structures, the Contractor shall operate with a full crew 24 hours per day including weekends and holidays without interruption until those conditions no longer jeopardize the stability of the Work. Such an occurrence shall be only to alleviate an emergency condition and shall be done only with the approval of the Owner and Engineer. Otherwise, work hours shall be limited as specified under Division 1.

THE METROPOLITAN DISTRICT

3.02 TOLERANCES

- A. The out-of-plumbness of the excavated shaft centerline at any depth shall not exceed 1.5 percent of that depth or 10 percent of the finished inside diameter of the shaft, whichever is less.
- B. Variation from excavated diameter shall not exceed zero to plus 6-in.
- C. The Contractor shall perform monitoring to ensure that the excavation is in compliance with allowable ground movement tolerances. The Engineer shall be verbally notified immediately of the results of the monitoring and the results shall be submitted in writing to the Engineer within 48 hours.
- D. The Contractor shall be responsible to make adjustments to the effected shafts in consultation with the Engineer due to deviations from above tolerances.

3.03 DISPOSAL OF EXCAVATED MATERIAL

- A. Soils excavated shall be removed in accordance with Section 02200.

3.04 GROUTING

- A. Grout shall be placed between the temporary steel casing and the excavated overburden/bedrock in shaft and between the pipe and the excavated overburden/bedrock surface to ensure full contact between the casing/pipe and ground.

3.05 GROUNDWATER INFLOW CONTROL

- A. Groundwater inflow control and diversion work including collecting inflow with drains and piping, and pumping shall be performed, as required, to reduce the total groundwater inflow and to ensure proper installation of the specified liner.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02317

UNDERGROUND WARNING TAPE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes, whenever it becomes necessary, as noted in the Contract Plans and ordered by the Engineer, use of underground warning tape.

1.02 SUBMITTALS

- A. Submit in accordance with Section 01300.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The non-detectable warning tape shall be polyethylene tape manufactured in accordance with the following technical data:

TECHNICAL DATA

<u>PROPERTIES</u>	<u>TEST METHOD</u>	<u>VALUE</u>
Thickness	ASTM D2103	0.004" (4 mils)
Elongation	ASTM D882-75B	> 400%
Tensile Strength	ASTM D882	MD: 1830 psi TO: 2350 psi

- B. Tape shall be 6 inches wide.
- C. The warning tape shall be heavy gauge 0.004 inch polyethylene and shall be resistant to acids, alkalis and other soil components. It shall be highly visible in the following colors with the associated phrases stamped in black letters and repeated at a maximum interval of 40 inches.

Type of Utility	Color	Warning Message
Sanitary Sewer	Green	Caution – Sanitary Sewer Buried Below
Storm Drain	Green	Caution – Storm Drain Buried Below
Water	Blue	Caution – Water Line Buried Below
Electric	Red	Caution – Electric Line Buried Below
Telephone / Communications	Orange	Caution – Telephone Line Buried Below
Gas	Yellow	Caution – Gas Line Buried Below

THE METROPOLITAN DISTRICT

- E. The tape shall be of the type specifically manufactured for marking and locating utilities.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All buried pipe and fittings shall be installed with non detectible underground warning tape located approximately 24" above top of pipe.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02444

CHAIN LINK FENCE AND GATES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing chain link fencing, gates and accessories at the location shown on the Contract Drawings, complete as shown, specified, or directed. The Work includes transporting materials, clearing, excavating, disposing of unused excavated material, furnishing and installing fencing, gates and accessories, backfilling, furnishing additional material for backfilling and restoring both paved and unpaved areas.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 02200, Earthwork

1.03 SUBMITTALS

- A. In accordance with the General Conditions, six (6) copies of the manufacturer's literature and/or shop drawings for the materials of this Section shall be submitted for approval.

1.04 REFERENCES

The following standards based on the latest edition from a part of this Specification as referenced:

- A. ASTM F567-07 – Standard Practice for Installation of Chain Link Fence
- B. Chain Link Fences Manufacturer's Institute – Product Manual
- C. Federal Specification Sheet RR-F-191/3E Fencing, Wire and Posts, Metal (Chain Link Fence Posts, Top Rails and Braces)
- D. AASHTO M181

1.05 QUALITY ASSURANCE

- A. All fencing, gates and accessories shall be subject to inspection after delivery to the job site by the Engineer.

THE METROPOLITAN DISTRICT

1.06 DELIVERY STORAGE AND HANDLING

- A. In accordance with SECTION 01600.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials shall be new and products of a recognized, reputable manufacturer. Used, rerolled or regalvanized materials will not be accepted. All materials shall be hot dip galvanized after fabrication. Posts and other appurtenances shall have a minimum zinc coating of 2.0 ounces per square foot of surface.

2.02 FABRIC

- A. Chain link fence fabric shall be 84 inches high, woven of No. 9-gauge wire in 2-inch diamond-mesh pattern, selvages twisted and barbed, galvanized after weaving with 2.0-ounce zinc coating meeting the requirements of ASTM A 392, Class 2.

2.03 POSTS

- A. The Contractor shall supply materials in accordance with Federal Specification RR-F-191 for fence, posts, gates and accessories, except as hereinafter modified. Standard lengths or longer may be required for setting in ground or in concrete for conditions shown.

2.04 LINE POSTS

- A. For fences up to 8 feet 0 inch high, use galvanized H-columns, 2-inch by 2 ¼-inch, weight 4.1 pounds per linear foot; or 2 ½-inch outside diameter, ASTM A 120, Steel pipe, weight 3.65 pounds per linear foot; or C-section roll formed from steel meeting the requirements of ASTM A 570, Grade 45, 1.875 inches by 1.625 inches.

2.05 END, CORNER, ANGLE AND PULL POSTS

- A. For end, corner, angle and pull posts, use 2.875-inch outside diameter standard weight steel pipe, weight 5.79 pounds per linear foot; or 3.5-inch by 3.5-inch roll-formed section with minimum bending strength of 486 pounds under a 6-foot cantilever load.

2.06 GATE POSTS

- A. For single swing gates up to 6 feet wide, 2.875-inch outside diameter, standard weight steel pipe 5.79 pounds per foot. For single gate 6 feet wide to 13 feet wide,

THE METROPOLITAN DISTRICT

4-inch outside diameter, standard weight steel pipe 9.1 pounds per foot. For other sizes, follow manufacturer's recommendations.

2.07 POST TOPS

- A. Post tops shall be pressed steel, or malleable iron, designed as a weather tight closure cap for tubular posts. Provide one cap for each post. Where top rail is used, provide to permit passage of top rail.

2.08 TENSION WIRE

- A. Tension wire shall be zinc or aluminum coated coil spring steel wire not less than No. 7 gauge (0.177 inch in diameter). Provide tie clips of manufacturer's standard as approval for attaching the wire to the fabric, at intervals not exceeding 24-inches.

2.09 STRETCHER BARS

- A. Stretcher bars shall be one-piece lengths equal to full height of fabric with a minimum cross-section of 3/16 inch by 3/4 inch. Provide one stretcher bar for each gate and end post and two for each corner and pull post.

2.10 STRETCHER BAR BANDS

- A. Bar bands shall be heavy-pressed steel, spaced not over 15-inches on center to secure stretcher bars to tubular end, corner, pull and gate posts.

2.11 TOP RAIL

- A. Not less than 18-foot long tubular steel, 1 5/8-inch outside diameter, weight 2.27 pounds per linear foot. Couplings to be outside-sleeve type and at least 6-inches long. Provide springs at one coupling in five to permit expansion in rail as recommended by the manufacturer. Top rail to extend through line post tops to form continuous brace from end-to-end of each stretch of fence.

2.12 BRACES

- A. Brace pipe shall be of the same material as the top rail and shall be installed midway between the top rail and extend from the terminal post to the first adjacent line post. Braces shall be securely fastened to the posts by heavy-pressed steel and malleable fittings, then securely trussed from line post to base of terminal post with a 3/8-inch truss rod and tightener.

2.13 FITTINGS

- A. Malleable steel, cast iron, or pressed steel, galvanized to meet the requirements of ASTM A 153. Fittings to include extension arms for barbed wire, stretcher bars and

THE METROPOLITAN DISTRICT

clamps, clips, tension rods, brace rods, hardware, fabric bands and fastenings, and all accessories.

2.14 GATES

- A. Gates shall be swing, complete with latches, stops, keepers and hinges.
- B. Gate frames shall be constructed of tubular members welded at all corners or assembled with fittings. On steel, welds shall be painted with zinc-based paint. Where corner fittings are used, gates shall have truss rods of 3/8-inch minimum nominal diameter to prevent sag or twist. Gate leaves shall have vertical intermediate bracing as required spaced so that no members are more than 8 feet apart. Gate leaves 10 feet or over shall have horizontal brace or one 3/8-inch minimum diagonal truss rod.
- C. Fabricate frames of standard weight pipe 1.90-inch outside diameter, weight 2.72 pounds per linear foot.
- D. Gate fabric shall be the same type as used in the fence construction. The fabric shall be attached securely to the gate frame at intervals not exceeding 15-inches.
- E. Gate hinges shall be of adequate strength for gate and wire large bearing surfaces for clamping in position. The hinges shall not twist or turn under the action of the gate. The gates shall be capable of being opened and closed easily by one person.
- F. Gate latches, stops, and keepers shall be provided for all gates. Latches shall have a plunger-bar arranged to engage the center stop, except that for single gates of openings less than 10 feet wide a forked latch may be provided. Latches shall be arranged for locking with padlocks. Center stops shall consist of device arranged to be set in concrete and to engage a plunger-bar the latch of double gates. No stop is required for single gates. Keepers shall consist of a mechanical device for securing the free end of the gate when in the full open position.
- G. Double gates shall be provided in the size and configuration as indicated. Provide gate stops for all double gates, consisting of mushroom type or flush plate with anchors. Set in concrete to engage the center drop rod or plunger bar. Provide locking devices and padlock eyes as an integral part of the latch, requiring one padlock for locking both gate leaves.
- H. Provide keeper for all vehicle gates, which automatically engages the gate leaf and holds it in the open position until manually released.

THE METROPOLITAN DISTRICT

2.15 CONCRETE

- A. Materials as specified in Section 03302, Concrete. Compressive strength shall not be less than 3,000 psi at 28 days.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Installation of fencing shall meet the requirements of ASTM F 567.
- B. Erect fencing in straight lines between angle points by skilled mechanics experienced in this type of construction. Erection shall be in accordance with the manufacturer's recommendations as approved with these Specifications. Post holes shall be a minimum depth of 3 feet below finished grade. Holes for line posts shall be 9-inches in diameter. Holes for gate, corner and pull posts shall be 16 inches in diameter. Space posts shall be not more than 10 feet on centers and in true lines. Set posts plumb and to the depth of 2 feet 10-inches. The top rail of the fence shall be at the top of the fabric. Fill remainder of the hole with concrete to extend around the posts to a point of 2-inches above finished grade. The top surface shall have a crown watershed finish. After the concrete has been set, install accessories. Fasten chain link fabric to end posts with stretcher bars and clamps and to line posts and top rail with wire or bands at approximately 14-inch centers and 24-inch centers, respectively. Brace gate posts diagonally to adjacent line posts to ensure stability. Hang gates and adjust all hardware so that gates operate satisfactorily from open or closed position.

3.02 TOUCH UP AND REPAIR WORK

- A. Remove and replace fencing which is improperly located or is not true to line, grade and plumb within tolerances as indicated.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02510

TEMPORARY AND PERMANENT PAVED SURFACE RESTORATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work described in this Section includes furnishing all labor, material, equipment and incidentals required to restore paved surfaces, including furnishing and installing all base and surface materials for temporary and permanent paved surfaces for roads, driveways, curbing, pavement markings, etc. as shown on the Contract Drawings and as specified or directed. The Work also includes transporting all materials, clearing, excavation, disposing of excavated materials, placing and consolidating base material, installing concrete road base where applicable, placing and compacting bituminous concrete pavement, cold planning or milling, sidewalk and driveway surfaces, removing and replacing bituminous curbing, resetting or replacing stone curbing and all incidental Work, all to approved grades and as specified, except as otherwise provided for under other Sections.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 01570, Maintenance and Protection of Traffic
- C. Section 02200, Earthwork
- D. Section 02515, Concrete Sidewalks and Walkways
- E. Section 02516, Concrete Driveway Ramps
- F. Section 02771, Granite Curbing

1.03 SUBMITTALS

- A. In accordance with Section 01300, six (6) copies of the following information shall be submitted for approval:
 - 1. Name and address of Contractor's paving Subcontractor, if required.
 - 2. Names and addresses of material suppliers.
 - 3. Any technical information for Engineer's approval of alternate methods and materials.

THE METROPOLITAN DISTRICT

4. Permanent Pavement Patch Certification Form (at completion of 1 year Warranty Period)

1.04 REFERENCES

- A. Section 8.11, CTDOT Form 817 – Concrete Curbing
- B. Section 6.02, CTDOT Form 817 – Reinforcing Steel
- C. Section 8.13, CTDOT Form 817 – Stone Curbing
- D. Section 8.14, CTDOT Form 817 – Reset Stone Curbing
- E. Section 8.15, CTDOT Form 817 – Bituminous Concrete Curbing
- F. Section 9.21, CTDOT Form 817 – Concrete Sidewalks and Ramps
- G. Section 9.22, CTDOT Form 817 – Bituminous Concrete Sidewalk, Bituminous Concrete Driveway
- H. Article M.02.02, CTDOT Form 817 - Subbase
- I. Section M.03, CTDOT Form 817 – Portland Cement Concrete
- J. Section M.04, CTDOT Form 817 – Bituminous Concrete Materials
- K. Article M.12.06, CTDOT Form 817 - Stone Curbing
- L. Article M.06.01.3, CTDOT Form 817 – Wire and Welded Steel Wire Fabric
- M. Municipal Specifications (most recent):
 1. Town of Bloomfield, Subdivision Regulations
 2. Town of East Hartford, Manual of Technical Design
 3. Town of Glastonbury, Standards for Public Improvements
 4. City of Hartford, Standard Technical Specifications for Streets and Roads, Traffic and Streetscape Construction
 5. Town of Newington, Specification for Construction of Roads
 6. Town of Rocky Hill, Subdivision Regulations

THE METROPOLITAN DISTRICT

7. Town of Wethersfield, Subdivision Regulations
 8. Town of West Hartford, Infrastructure Rules and Specifications
 9. Town of Windsor, Highway Engineering Standards and Specifications
- N. In the event of a contradiction between the Project Manual, the CTDOT Specifications and the applicable Municipal specifications, the applicable Municipal specifications shall take precedence except for any issues related to measurement and payment.
- O. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE AND EQUIPMENT

- A. All permanent repairs to be completed under the Contract shall be done by a paving contractor (Individual, Partnership or Corporation) who has regularly engaged in the construction of curbs, walks and/or roadways for the last two (2) years and has filed a satisfactory Performance Bond and Insurance as may be required by the municipality or state authority having jurisdiction.
- B. Permanent pavement repairs or trench restoration shall be completed by use of a mechanical paver unless specific exception is granted by the Engineer or the municipality and/or state authority. Hand paving shall be kept to an absolute minimum to avoid separation and will only be permitted in areas not accessible by a mechanical paver. Mechanical method shall include all other paving operations not classified by hand method.
- C. The requirements herein shall in no manner relieve the Contractor of full responsibility for all pavement and trench restoration Work to be performed under this Contract nor shall the requirements invalidate any of each and every other right the Owner has under this Contract or by law.
- D. All necessary equipment, components and accessories to acceptably complete the Work as anticipated in the Contract Drawings and as specified or as ordered by the Engineer shall be available for use on the project. All equipment used on the project Work shall be used in conformance with the manufacturer's recommendations of use and shall be in good operating condition.
- E. All pavement placed shall be maintained and warrantied by the Contractor for a period of 1 year or greater, as required by Municipality. During this period, all areas which have settled or are unsatisfactory for traffic shall be removed and replaced by the Contractor at his/her expense. During this period, all areas that have settled or are unsatisfactory for traffic shall be removed and replaced within 10 days of notification by the Owner and at no additional cost to the Owner.

THE METROPOLITAN DISTRICT

- F. At the completion of this 1 year Warranty period, as defined by the Conditions of the Agreement, the Contractor and Owners Inspector shall re-inspect all permanent pavement patches and permanent sidewalk and driveway apron repairs. Contractor and Owners Inspector shall inspect all said locations and submit to the Owner a completed Permanent Pavement Patch Certification Form (attached) certifying that said locations are in good condition. Any patches found not to be in good condition, shall be repaired by the Contractor at no additional cost to the Owner, and re-inspected again one year later from date of repair. Appropriate retainage will be held by the Owner for 1 year Warranty period in accordance with the Conditions of the Agreement. **Full completion of pavement re-inspections and submission of completed Permanent Pavement Patch Certification Forms will be required as a condition of retainage release.**

PART 2 - PRODUCTS

2.01 SUBBASE

- A. Subbase material shall conform to the requirements of Article M.02.02, CTDOT Form 817.

2.02 PROCESSED STONE BASE

- A. Processed stone base shall conform to the requirements of Section 02202, Trench Refill.

2.03 CONCRETE

- A. Concrete for road repairs shall conform to the requirements of Section M.03, CTDOT Form 817

2.04 REINFORCING STEEL

- A. Reinforcing steel shall conform to the requirements of Article M.06.01, CTDOT Form 817.

2.05 BITUMINOUS CONCRETE MATERIALS

- A. Bituminous concrete, tack coat, joint sealer, etc., for road repairs shall conform to the requirements of Section M.04, CTDOT Form 817. The Contractor has the option of using recycling reclaimed asphalt pavement.

2.06 BITUMINOUS CONCRETE CURBING

- A. Bituminous concrete curbing shall conform to the requirements of Sections 8.15

THE METROPOLITAN DISTRICT

and M.04, CTDOT Form 817.

2.07 PRECAST CONCRETE CURBING

- A. Precast concrete curbing shall conform to the requirements of Sections 8.11 and M.03.01, CTDOT Form 817816.

2.08 STONE CURBING

- A. Stone curbing shall conform to requirements of Article M.12.06, CTDOT Form 817.

2.09 CALCIUM CHLORIDE

- A. Calcium chloride shall conform to AASHTO M144, Type I or Type II.

2.10 OTHER MATERIALS

- A. Other materials required for repairs to driveways, curbs, and sidewalks shall be as specified under the various CTDOT Form 817 Sections referenced for the item to be repaired.

PART 3 - EXECUTION

3.01 GENERAL

- A. All paved surfaces, including roads, driveways and sidewalks, bituminous curbs, and similar structures which are in any way disturbed by the Work shall be replaced in as good a condition as existed or better than existed prior to the beginning of work. New material shall be supplied to replace that lost or damaged in these structures. All Work shall conform to the specifications hereunder.
- B. Where shown or ordered, sidewalks, curbs, etc., shall be restored or replaced on different grade or alignment, which Work, with associated grading, without additional payment therefore.
- C. Cement concrete and bituminous concrete sidewalks and wheel chair ramps, including driveway transitions and aprons, shall conform to the details shown in the MDC Standard Details Manual, to relevant Sections of the Connecticut DOT Standard Specification, the ADA Accessibility Guidelines for Buildings and Facilities (ADAAAB), to Section 02515 (Concrete Walkways), and the U.S. Architectural and Transportation Barriers Compliance Board latest ed. Accessible Right-of-way Design Guide. The Contractor and Subcontractor shall have a set of these standards at the site at all times
- D. Notice of the date and location of all permanent paving repair and restoration Work shall be given to the municipality or state authorities at least twenty-four (24) hours

THE METROPOLITAN DISTRICT

before the Work is started.

- E. Whenever the subbase becomes dry enough to cause dust problems, apply water or spread calcium chloride uniformly over the gravel surface in sufficient quantity to eliminate the dust.
- F. When the air temperature falls below 50 degrees F, extra precautions shall be taken in drying the aggregates, controlling the temperature of the materials, before placing and compacting the mixture.
- G. No mixture shall be placed when the air temperature is below 40 degrees F, or when the material on which they are placed contains frost, or has a surface temperature not suitable to the Engineer.
- H. No vehicular traffic or loads shall be permitted on the newly completed pavement until adequate stability has been attained and the material has cooled sufficiently to prevent distortion or loss of fines. If the climatic or other conditions warrant it, the period of time before opening to traffic may be extended at the discretion of the Engineer.

3.02 TEMPORARY PAVED SURFACE REPAIRS

- A. Temporary pavement shall be placed wherever existing pavement or concrete surface has been removed or disturbed at the end of each work day, unless otherwise approved by the Municipality and the Owner. This includes roadways, driveways and sidewalks where removal and restoration is required.
 - 1. The trench shall be backfilled to the required depth below the existing pavement, shaped and compacted to the limits indicated on the Contract Drawings and in the MDC Standard Details Manual.
 - 2. The temporary pavement shall be placed and compacted by steel-wheeled rollers of sufficient weight to thoroughly compact the bituminous concrete without damaging the existing pavement. The new pavement shall be rolled smooth and even with the existing pavement.
 - 3. Clean all road surfaces adjacent to the trench area to be paved. No paving is to be placed until subsurface is dry.
 - 4. Temporary pavement shall be maintained in a condition suitable for traffic until replaced or overlaid by final pavement. Defects shall be repaired within 1 day of notification of such defects.

THE METROPOLITAN DISTRICT

3.03 PERMANENT PAVEMENT REPAIRS

- A. Final pavement over trenches shall not be placed until receipt and acceptance by the Municipality and Owner of approved compaction reports.
- B. In areas where concrete subbase is not present, saw cut back 12-inch minimum from existing temporary pavement, dispose of all cutback materials, then remove temporary pavement, existing pavement structure and subbase.
- C. In areas where concrete subbase is present, saw cut back 6-in minimum from the edge of the existing concrete base, dispose of all cutback materials, remove temporary pavement, pavement structure, concrete base and subbase to the bottom of the existing concrete base unless otherwise directed by the Engineer.
 - 1. Prepare the road base, reset all castings, furnish, place and level concrete to depths indicated on the Contract Drawings and in the MDC Standard Details Manual including all forms needed to place concrete, furnishing and installing all reinforcement, doweling existing concrete for the purposes of connecting new reinforced concrete base with existing concrete base, forming around new manholes and gate boxes, and placement of expansion joint material.
- D. Shape and compact subbase to 95 percent of maximum dry density as determined by ASTM D1557, Method D. Processed stone base shall be placed in 4-inch lifts with a total compacted minimum depth as shown on the Drawings.
- E. Place bituminous concrete skimcoat/leveling course to the thickness directed by the Engineer.
- F. Place Binder Course and compact thickness by steel-wheeled roller. Maximum lift shall be 2 inches. Depth of pavement shall match existing conditions.
- G. Broom and tack coat edges of existing pavement and Binder Course with emulsified or cutback asphalt.
- H. Place Finish Course and compact to a thickness detailed on the Contract Drawings, to provide a smooth finish, flush with surface of existing pavement.
- I. The Contractor shall be responsible for the adjustment to grade of all castings within the limits of overlay as described in Section 3.08.
- J. Unless otherwise permitted by the Engineer for particular conditions, only machine methods for installation of pavement overlay shall be used. The equipment for spreading and finishing shall be mechanical, self-powered pavers, capable of spreading and finishing the mixture true to line, grade, width and crown. The mixtures shall be placed and compacted only at such times as to permit proper inspection and checking by the Engineer.

THE METROPOLITAN DISTRICT

- K. Bituminous concrete shall be placed by mechanical spreader except in areas inaccessible to the spreader. Contractor shall maintain a minimum of 6-in curb reveal. Reveal at the driveway aprons should be completed in accordance with municipality standards.
- L. After the paving mixture has been properly spread, initial and intermediate compaction shall be obtained by use of steel wheel rollers having a weight of not less than 240 pounds per inch width of tread.
- M. Final rolling over the overlay pavement shall be performed by a steel wheel roller weighing not less than 285 pounds per inch width of tread at a mix temperature and time sufficient to allow for final smoothing of the surface and compaction.
- N. Immediately after placement of overlay pavement, all joints between the existing and overlay pavement shall be sealed and sanded.
- O. Clean all pavement penetrations and remove all loose aggregate from the site.
- P. Replace all traffic loop detectors disturbed by the Contractor's operation.
- Q. Place pavement markings as specified herein.

3.04 PERMANENT PRIVATE DRIVEWAY REPAIRS

- A. Paved driveways which are cut or damaged longitudinally by trenching shall be repaved to their full width for the length so damaged. Driveways cut or damaged transversely shall be repaved to their full width from, and including, the area of damage to the street end of the paved surface.
- B. Bituminous concrete driveways removed, damaged or otherwise affected by the Contractor's operations shall be replaced in accordance with the requirements of Section 9.22 (Bituminous Concrete Driveway), CTDOT Form 817. The thickness of materials shall be the same as that of the materials being replaced, except that the base shall be at least 8-inches thick and the bituminous concrete shall be at least 3-inches thick after compaction.
- C. Concrete driveways removed, damaged or otherwise affected by the Contractor's operations shall be replaced, in general, in accordance with the requirements for bituminous concrete driveways. Concrete shall be the same thickness as that removed, but in no case shall the concrete be less than 6-inches thick. Reinforcing steel shall be equivalent or better than that removed.
- D. Non-paved driveways shall be repaired using materials equivalent to or better than those removed and of the same thickness.

THE METROPOLITAN DISTRICT

3.05 PERMANENT CURB REPAIRS

- A. Concrete, stone or bituminous concrete curbing that is removed, damaged or otherwise affected by the Contractor's operations shall be replaced in kind and in accordance with the requirements of Section 8.11 (Concrete Curbing), Section 8.13 (Stone Curbing), or Section 8.15 (Bituminous Concrete Lip Curbing), all of CTDOT Form 817, as applicable. Resetting stone curbing shall be in accordance with the requirements of Section 8.14 (Reset Stone Curbing), CTDOT Form 817. All curbing shall conform to the dimensions of the replaced or adjacent curbing unless directed otherwise by the Engineer.
- B. Existing granite curbing shall be reset within the limits of excavation as required.
- C. Existing bituminous and concrete curbing shall be replaced adjacent to those areas of the roadway that are excavated and/or re-graded as a result of the installation of catch basins. Saw cut the existing curbing at a point beyond the limit of excavation and pavement removal. The new concrete curb shall be aligned with the curb inlet or gutter mouth of the new basin.

3.06 SIDEWALK REPAIRS

The sidewalks shall be installed in accordance with Section 02515 and the following requirements:

- A. Concrete and bituminous sidewalks that are removed, damaged or otherwise affected by the Contractor's operations shall be replaced in kind in accordance with the requirements of Section 9.21 (Concrete Sidewalks) or Section 9.22 (Bituminous Concrete Sidewalk) both of CTDOT Form 817, as applicable. The thickness of materials shall be the same as that of the materials replaced and shall be based on applicable State or Municipal standards, except that the sidewalk base shall be at least 8-inches thick, the bituminous concrete shall be at least 2-inches thick after compaction and the concrete shall be at least 5-inches thick.
- B. Sidewalks of other materials shall also be replaced using materials equivalent to or better than those removed and to the same thickness. Driveways and paving areas shall be constructed in accordance with Section 9.22.03, the ADA Accessible Guidelines for Building and Facilities (ADAAB) and the U.S. Architectural and Transportation Barriers Compliance Board Latest ed. Accessible Right-of-way Design Guide. Paved driveways and parking areas which are cut or damaged longitudinally by trenching shall be as shown on the Contract Drawings, in the MDC Standard Details Manual and as directed by the Owner. Concrete driveway ramps as shown on the Contract Drawings or damaged or otherwise affected by the Contractor's operations shall be replaced with Section 9.24.03, the ADA Accessible Guidelines for Building and Facilities (ADAAB) and the U.S. Architectural and Transportation Compliance Board (AAB) Latest ed. Accessible Right-of-way Design Guide. Prior to installing concrete, or

THE METROPOLITAN DISTRICT

pavement, Contractor shall establish grade elevations at all wheel chair ramp locations, and shall set proper transition lengths according to the referenced standards and the MDC Standard Details Manual. All wheel chair ramp joints and transition sections which define grade changes shall be formed, staked and checked by the Owner prior to placing cement concrete. All grade changes are to be made at joints. Should the Contractor neglect to inform the Owner, or install them incorrectly, and if the ramps do not meet requirements, the Contractor shall immediately remove them and replace them with ones that conform to ADA/AAB. This shall be done at the Contractors own expense. Concrete for wheelchair ramps shall be 5-inch thick. Concrete for driveway aprons shall be 8-inch thick. Bituminous concrete shall be 3-in thick surface course constructed in two equal lifts.

3.07 PAVEMENT MARKINGS

- A. Reline all streets with pavement markings equal in type and location where existing prior to paving.
- B. Where pavement markings have been removed as a result of construction operations, the Contractor shall repaint markings after placement of initial paving as requested by the Municipality or Owner. Temporary pavement markings shall be maintained until final paving is completed.
- C. Restore pavement markings after:
 - 1. Installation of temporary pavement trench repair.
 - 2. Installation of permanent pavement trench repair.
 - 3. Installation of permanent pavement full-width overlay.
 - 4. Or as directed by the Owner or Engineer.
- D. Temporary and permanent pavement markings shall match the existing layout of markings, unless noted differently on the Contract Drawings.
- E. Traffic markings shall be installed in accordance with the Municipality, CTDOT specifications and Section 01570.

3.08 ADJUSTING EXISTING MANHOLE AND VALVE ELEVATIONS

- A. Adjust the elevations of existing manhole frames and covers and gate boxes should it become necessary as a result of road restoration or re-grading.
- B. Adjustments to manhole frames and covers to be made by using manhole adjusters acceptable to the Owner or the affected utility.

THE METROPOLITAN DISTRICT

- C. Castings owned by private utilities shall be raised by their own forces. The Contractor shall be responsible for coordinating this Work.
- D. The method of adjusting castings shall be as follows:
 - 1. Cut around catch basin or manhole castings a minimum of 8-inches from casting.
 - 2. Excavate and rebuild up to 12-inches of masonry below the bottom of the casting as directed by the Engineer, then backfill with suitable material and compact to bottom of casting.
 - 3. Place CLSM or other approved material as directed to approximately 2 inches below the raised casting grade.
- E. The method of raising gate boxes shall be as follows:
 - 1. Cut around gate box a minimum of 8-inches from gate box.
 - 2. Excavate as required and raise the gate box.
 - 3. Place CLSM or other approved material as directed to approximately 2-inches below the top of the gate box.
- F. Castings which need to be raised or adjusted to complete permanent curb to curb paving shall be done immediately prior to paving.

3.09 MILLING AND OVERLAY OF STREETS

- A. The milling (cold plane) and overlay Work shall not begin until the receipt and acceptance by the Municipality and Owner of approved compaction reports.
- B. Repair any soft and broken areas in temporary and existing pavement. Remove any cold patch pavement that has been placed. Clean all surfaces to be paved of all foreign matter and loose material. All surfaces shall be dry before priming.
- C. The existing curb reveal shall be maintained by milling (cold planing) to a depth of 2 inches across the full width of the street, curb to curb or as detailed in the Contract Drawings. Repair any defects in curbing caused by the Contractor's operations.
- D. At the limits of the overlaying, the Contractor shall cold plane (mill) the existing pavement to provide a 20 foot long smooth transition between the overlay and the existing pavement. At the limits of overlay at side streets, saw cut the existing pavement.

THE METROPOLITAN DISTRICT

- E. Place bituminous concrete skimcoat/leveling to the thickness directed by the Engineer to level depressions in the milled surface.
- F. Prior to placement of the overlay, the entire road width where overlay is to be placed shall be broom cleaned and tack coated and keyways shall be cut at all intersecting streets.
- G. Wherever the edge of the new pavement passes over existing paved driveways or side streets, or the new pavement ends on existing pavement, the existing pavement shall be grooved 1-in deep in the surface such that the surface of the new pavement will slope to the surface of the existing pavement in not less than 18-inch and the new pavement will not be less than 1-inch thick.
- H. The overlay pavement shall match the thickness detailed on the Contract Drawings to provide a smooth finish, flush with surface of existing pavement. The limits of the overlay are indicated as the Permanent Pavement limits described in Section 01025.
- I. The Contractor shall be responsible for the adjustment to grade of all castings within the limits of overlay as described in Section 3.08.
- J. Unless otherwise permitted by the Engineer for particular conditions, only machine methods for installation of pavement overlay shall be used. The equipment for spreading and finishing shall be mechanical, self-powered pavers, capable of spreading and finishing the mixture true to line, grade, width and crown. The mixtures shall be placed and compacted only at such times as to permit proper inspection and checking by the Engineer.
- K. Bituminous concrete shall be placed by mechanical spreader except in areas inaccessible to the spreader. Contractor shall maintain a minimum of 6-in curb reveal. Reveal at the driveway aprons should be completed in accordance with municipality standards.
- L. After the paving mixture has been properly spread, initial and intermediate compaction shall be obtained by use of steel wheel rollers having a weight of not less than 240 pounds per inch width of tread.
- M. Final rolling over the overlay pavement shall be performed by a steel wheel roller weighing not less than 285 pounds per inch width of tread at a mix temperature and time sufficient to allow for final smoothing of the surface and compaction.
- N. Immediately after placement of overlay pavement, all joints between the existing and overlay pavement shall be sealed and sanded.
- O. Clean all pavement penetrations and remove all loose aggregate from the site.

THE METROPOLITAN DISTRICT

P. Replace all traffic loop detectors disturbed by the Contractor's operation.

Q. Place pavement markings as specified herein.

END OF SECTION

MDC

PERMANENT PAVEMENT PATCH CERTIFICATION FORM

The contractor and its foreman do hereby certify, that said work is in conformance with all applicable local, state and federal codes, rules, and regulations.

Contract Number

Patch Location

Date of Permanent Restoration

ROAD SUBBASE

Depth of Roadbase Restored

Material Used

Material Supplier

PAVEMENT LAYER(S)

Orginal Pavement Thickness

Lift #1 of Road Restored

Material Used

Lift #2 of Road Restored

Material Used

Additional Lifts of Road Restored

Material Used

Material Supplier

CONCRETE LAYER

Method of Dowelling

Concrete Thickness

Concrete Class

Material Supplier

Company Name

Foreman Signature

Date of One-Year Inspection

Contractor Signature

Inspector Signature

The inspector does hereby ceritfy that the work at the above location is not defective at the time of this warrenty inspection.

THE METROPOLITAN DISTRICT

SECTION 02515

CONCRETE SIDEWALKS AND WALKWAYS

PART 1 – GENERAL

1.01. SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing sections of concrete sidewalks, walkways, ramps, pads and aprons as shown on the Contract Documents or as otherwise required in restoration. The Work includes furnishing and installing, cast in place concrete walkway sections complete with base material, temporary pavement and restoration.

1.02. RELATED SECTIONS

- A. Section 02200, Earthwork
- B. Section 02202, Trench Refill
- C. Section 02510, Temporary and Permanent Paved Surface Restoration
- D. Section 02930, Loaming, Seeding and Sodding

1.03 SUBMITTALS

- A. Shall be in accordance with Section 01300 and the appropriate State of Connecticut or Municipal requirements.

1.04. REFERENCES

The following standards based on the latest edition from a part of the Specification as referenced:

- A. American Society for Testing and Materials - ASTM
- B. CTDOT Form 817 - Section 9.21, Concrete Sidewalks & Section M.03, Portland Cement Concrete

1.05. QUALITY ASSURANCE

- A. All concrete sidewalks and walkways shall be subject to the inspection and acceptance from the appropriate State of Connecticut or Municipal authority.

THE METROPOLITAN DISTRICT

PART 2 – PRODUCTS

2.01 GENERAL

- A. All material shall adhere to the Specifications of the State of Connecticut Department of Transportation, Municipality or Authority having control over the Work required in furnishing and installing concrete sidewalks and walkways.

2.02 PROCESSED STONE BASE

- A. Base material shall be in accordance with Section 02202 when not otherwise stipulated by the CTDOT or Municipal authority.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Concrete sidewalks, walkways and ramps shall be installed as specified in the Standard Specifications of the CTDOT or Municipality having control over the walkway.
- B. If a section(s) of sidewalk or walkway becomes cracked, broken or otherwise become unfit for pedestrian traffic, due to any operation or work performed by the Contractor, the CTDOT or Municipality having control shall specify the method used to repair or replace the damaged section.
- C. When completed, the sidewalks or walkways shall be kept moist and protected from traffic and weather for at least 3 days.
- D. Any statement of Measurement and Payment in the CTDOT or Municipal Standard Specifications shall be disregarded; Measurement and Payment for this Section can be found in Section 01025, "Measurement and Payment".

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02516

CONCRETE DRIVEWAY APRONS AND RAMPS

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required and installing concrete driveway aprons and ramps as shown on the Contract Drawings and as specified herein.

1.02 RELATED SECTIONS

- A. Section 02200, Earthwork
- B. Section 02510, Temporary and Permanent Paved Surface Restoration
- C. Section 02515, Concrete Sidewalks and Walkways
- D. Section 02930, Loaming, Seeding and Sodding

1.03 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. American Society for Testing and Materials (ASTM)
- B. American Association of State Highway and Transportation Officials (AASHTO)
- C. State of Connecticut Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Constructions, Form 817, and all supplements (CTDOT Form 817)
- D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete shall be as specified in CTDOT Form 817 Section 9.24.02.
- B. Wire Fabric Reinforcement shall be as specified in CTDOT Form 817 Section 9.24.02.

THE METROPOLITAN DISTRICT

- C. Expansion joint filler shall be bituminous type, 1/2-in thick meeting AASHTO M-213-65.
- D. Materials for gravel base course shall be as specified in Form 817 Section M.02.01.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Concrete driveway aprons and ramps shall be a minimum of 8" thick. Refer to Municipal Specification.
- B. Wire Fabric Reinforcement
 - 1. All wire fabric shall be stored off the ground and shall be protected from moisture and be kept free from dirt, oil, or injurious coatings.
 - 2. Splices in welded wire fabric shall be lapped not less than 1-1/2 courses or 12-in, whichever is greater. Wire fabric splices shall be tied together with wire ties as approved spaced no more than 24-in on center. Support as approved in middle of slab.
 - 3. Before being placed in position, wire fabric shall be thoroughly cleaned of loose mill and rust scale, dirt and other coatings, including ice, that reduce or destroy bond. Where there is delay in depositing concrete after reinforcement is in place, fabric shall be reinspected and cleaned when necessary.
 - 4. In no case shall wire fabric be covered with concrete until the amount and position of the fabric have been checked by the Engineer and his/her permission given to proceed with the concreting.
- C. Expansion joint shall be installed as shown on Contract Drawings or as directed by the Engineer.
- D. When completed, the driveway aprons and ramps shall be kept moist and protected from traffic and weather for at least 3 days.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02517

REINFORCED CONCRETE PAVEMENT BASE

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes saw cutting concrete, removing all deteriorated concrete for the full depth of the concrete pavement, furnishing and installing deformed steel bars or wire mesh, and reconstructing the concrete base with new concrete, where shown on the Contract Drawings or directed by the Engineer and as hereinafter specified.
- B. The Contractor shall provide steel deck plates to be used as directed by the Engineer for the Maintenance and Protection of Traffic over areas where the concrete has been removed full depth but cannot be replaced in time to allow full roadway traffic operations or when the concrete has been placed but didn't achieve the required compressive strength of 3000 psi. Steel deck plates shall not be used when the posted speed limit exceeds 25 mph. The plates shall remain the property of the Contractor.
- C. Work under this Section shall also include the submission of working drawings, detailing the temporary steel deck plates to be utilized, and the method of anchorage.

1.02 RELATED SECTIONS

- A. Section 02200, Earthwork
- B. Section 02202, Trench Refill
- C. Section 02510, Temporary and Permanent Paved Surface Restoration
- D. Section 02511, Decking

1.03 SUBMITTALS

- A. Shall be in accordance with Section 01300 and the appropriate State of Connecticut or Municipality requirements.

1.04 REFERENCES

The following standards based on the latest edition from a part of the specification as referenced:

- A. American Society for Testing and Materials (ASTM)

THE METROPOLITAN DISTRICT

- B. CTDOT FORM 817 Section 4.01 Concrete For Pavement, Section M.03 Portland Cement Concrete
- C. Standard specifications from the Municipality having jurisdiction and control over the work required.

1.05 QUALITY ASSURANCE

- A. All concrete pavement base shall be subject to the inspection and acceptance from the appropriate State of Connecticut or Municipal authority.

PART 2 – PRODUCTS

2.01 GENERAL

- A. All material shall adhere to the specifications of the State of Connecticut Department of Transportation or the Municipality having control over the work required in furnishing and installing concrete walkways.
- B. Cement Concrete
 - 1. The cement shall be composed of Portland cement, fine and coarse aggregates and water mixed in the following proportions by weight:

QUANTITIES PER CUBIC YARD

a. Normal Mix (96 Hour Cure)

Cement	550 lbs.
Sand (dry)	1,165 lbs.
Stone (dry) 1 1/4"	1,130 lbs.
Stone 3/4"	430 lbs.
Stone 1/2"	430 lbs.
Water (Max.)	31 gals.
Entrained Air	5 percent (+/-1%)
Slump (24-hour)	3 inches (max)
Strength (96 hours)	3000 psi (min)

b. 48 Hour Cure

Cement	650 lbs.
Sand (dry)	1,165 lbs.
Stone (dry) 1 1/4"	1,280 lbs.
Stone 3/4"	410 lbs.
Stone 1/2"	410 lbs.

THE METROPOLITAN DISTRICT

Water (Max.)	31 gals.
Entrained Air	5 percent (+/-1%)
Slump (24-hour)	3 inches (max)
Strength (48 hours)	3000 psi (min)

c. 24 Hour Cure

Cement	750 lbs.
Sand	1,120 lbs.
Stone (1-1/4")	1,260 lbs.
Stone (3/4")	390 lbs.
Stone (1/2")	390 lbs.
Water	34 gals. (max)
Air	5 percent (\pm 1%)
Slump	3 inches (max)
Strength (24 hours)	3000 psi (min)

- d. The proportions are based on the weights of cement and surface dry aggregates and on bulk specific gravities of 2.65 for fine aggregate and 2.90 for coarse aggregate. Appropriate corrections shall be made for aggregates having appreciably different density.

C. High Early Strength Concrete – The high early strength concrete shall conform to one of the following:

1. The Contractor shall design and submit to the Engineer for approval a high early strength concrete mix. This mix shall be air-entrained, and shall be composed of Portland cement, fine and coarse aggregates, approved admixtures and additives, and water. The mix shall contain between 4 and 7 percent-entrained air, and shall attain a 6-hour compressive strength of 2,500 psi. Additionally, the mix shall contain shrinkage compensating additives such that there will be no separation of the patched area from the parent concrete. This shrinkage-compensating additive shall be utilized so as to produce expansion in the high early strength concrete of no more than 3 percent.
2. In lieu of the above high early strength concrete mix, the Contractor may propose the use of a proprietary type mix that will meet the same physical requirements as those stated above. A mix design shall be submitted for this material, stating the percentage of each component to be utilized.
3. Regardless of the type of high early strength concrete proposed by the Contractor, substantive data that demonstrates the ability of the material to meet the specification requirements shall be submitted with the proposed mix design at least two weeks prior to its use.

THE METROPOLITAN DISTRICT

D. Cement

1. Portland cement shall conform to the requirements of Article M.03.01, CTDOT Form 817.

E. Sand

1. Sand shall conform to the requirements of Section 02202 of these specifications.

F. Crushed Stone

1. Crushed stone shall conform to the requirements of Section 02202 of these specifications.

G. Processed Stone Base

1. Processed stone base shall conform to the requirements of Section 02202 of these specifications.

H. Water

1. For use in concrete must be clean and free from objectionable impurities. In general, water from Municipality mains shall be used.

I. Air Entraining Agent

1. The air entraining agent used to produce the required percentage of entrained air shall be the "Darex" or equal manufactured by Grace Construction Products and shall meet the requirements of ASTM C-260-01. The agent shall be added at the same time as the mixing water. Prior to adding the agent, the material producer shall discuss and recommend the appropriate "Darex" product for the purpose intended.

J. Accelerator

1. Only when ordered by the Engineer, 'a calcium chloride solution (one pound of calcium chloride per quart of solution) shall be added to the concrete at the rate of one quart of solution per bag of cement as part of the mixing water.

K. Slump

1. The slump of the concrete upon discharge from the truck at the job site is to be directly correlated to the approved mix design. Only withheld water can be added in the field.

THE METROPOLITAN DISTRICT

L. Reinforcing

1. Welded wire mesh shall be plain finish, 6" x 12", No. 4 gage welded steel wire conforming to ASTM A-82-01, ASTM A-497-02, (AASHTO M32-03). The weight of material shall not be less than 44 pounds per 100 square feet. Wire mesh shall be provided in flat sheet form only.
2. Dowels shall conform to the material requirements of ASTM A615/A for plain bars and shall be grade 60. The dowels shall be hot dipped galvanized in accordance with AASHTO M232m/m
3. Grout shall be non-shrink, non-staining and shall consist of a mixture of hydraulic cement, water, fine aggregates, and expansive mixture approved by the Engineer. The grout mix shall confirm to the following requirements:
 - a. The grout mix shall have an unrestrained volumetric expansion of not less than 3% or more than 8%.
 - b. The grout mix shall have a minimum seven (7) day compressive strength of 3000 psi when tested by methods conforming to the requirements of ASTM C-109-02.
 - c. The water content of the grout shall be kept as low as possible for proper grouting. However, it shall not exceed five (5) gallons per sack of cement.
 - d. With the approval of the Engineer the Contractor may substitute a non-shrink –premixed mortar, provided the Contractor submits samples of the grout mix for testing and approval.
 - e. Anchors for construction joints shall be 5/8" diameter dowel bars forged from ASTM A-615-04 grade deformed 60 steel reinforcing rod with 5/8" threaded splicer with nailing flange. Anchors shall be DB-DI splicers as manufactured by Dayton Superior or approved equal.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Construction Methods

1. All existing concrete pavement base adjacent to new concrete shall be cut with a concrete saw and the cut shall extend only to the top of the existing reinforcing wire mesh. The concrete below this reinforcement shall be removed with a pavement breaker. The existing reinforcing wire mesh shall

THE METROPOLITAN DISTRICT

be tied to the newly placed reinforcing wire mesh prior to placement of new concrete. In situations where this is not practical or reinforcing wire mesh is not present, anchors shall be provided in lieu of wire mesh. Anchors shall be DB-DI splicers as manufactured by Dayton Superior or approved equal with hooked 5/8" dowel bars forged from ASTM A-615-04 Grade 60 deformed rebar material (steel). Splicer to be 5/8" and threaded with nailing flange. Saw cutting for the full depth of the concrete base will be allowed if anchors are utilized exclusively in each repair location. No additional payment will be made for saw cutting under any circumstances.

a. Mixing and Transporting Concrete

All concrete shall be plant-mixed or transit-mixed. If the concrete is mixed at the plant, it shall be transported to the job in truck mounted drum-type mixer agitators. Concrete shall be discharged from the truck at the job site not more than 1 1/2 hour after water is introduced into the batch.

Measuring, batch in, mixing, agitation and transporting of the concrete shall be as specified in AASHTO "SPECIFICATIONS FOR READY MIXED CONCRETE" M157-97, latest revision.

b. Reinforcing

- (1) Longitudinal wires for wire mesh shall be spaced 6" on centers and transverse wires spaced 12" on centers.
- (2) The wire mesh shall be placed $4" \pm 1/2"$ above the bottom surface of the concrete. Adjacent pieces of mesh shall be lapped at least 8". The mesh shall be placed so that wires spaced 6" apart are parallel to curbs and traffic lanes.

c. Joints

(1) Longitudinal Joints

When constructing or reconstructing concrete pavement for the entire width of traveled way, a longitudinal construction joint will be required to accommodate traffic during construction.

Joints shall be neatly formed and shall be a butt type joints, with anchors placed at the mid-point of the slab. Abutting slabs at longitudinal joints shall be tied together with anchors spaced 2 foot on center. Anchors shall be DB-DI splicers as manufactured by Dayton Superior or approved equal with hooked 5/8" dowel bars forged from ASTM A-615-04 Grade 60 deformed rebar material

THE METROPOLITAN DISTRICT

(steel). Splicer to be 5/8" and threaded with nailing flange. Saw cutting for the full depth of the concrete base will be allowed if anchors are utilized exclusively in each repair location. No additional payment will be made for saw cutting under any circumstances. If the construction phasing allows a pour from curb to curb, a longitudinal control joint shall be cut along the centerline in accordance with the requirements for transverse control joints.

(2) Transverse Control Joints

Transverse control joints shall be placed every forty feet (40') or as otherwise indicated on the plans or ordered by the Engineer. Joints shall be a depth of one third the depth of the slab and a minimum width of one quarter inch (1/4"). The following methods are acceptable for the formation of joints:

- i) Formed grooves shall be made by depressing an approved tool or device into the plastic concrete. The tool or device shall remain in place until the concrete has attained its initial set and shall then be removed without disturbing adjacent concrete.
- ii) Sawed joints shall be created by sawing grooves in the surface of the pavement with an approved concrete saw. After each joint is sawed, the saw cut and adjacent concrete surface shall be thoroughly cleaned.
- iii) Sawing of the joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling, usually 4 to 24 hours. All joints shall be sawed before uncontrolled shrinkage cracking occurs. If necessary, the sawing operations shall be carried on both day and night, regardless of weather conditions. A standby saw shall be available in the event of breakdown. Sawing shall be discontinued if a crack develops ahead of the saw. In general, all joints shall be sawed in sequence. If extreme conditions make it impracticable to prevent erratic cracking by early sawing, the contraction joint groove shall be formed prior to initial set of concrete, as provided above.

(3) Transverse Construction Joints

- i) Transverse construction joints shall be placed whenever the placing of concrete is suspended for more than 30 minutes or when new concrete base is to be constructed adjacent to the existing concrete base. When a joint falls within 5 feet of a

THE METROPOLITAN DISTRICT

utility structure, adjust the location to fall on the center of round structures and at or between the corners of rectangular structures.

- ii) Joints shall be neatly formed and should be a butt type joint with anchors placed at the midpoint in the slab. Anchors shall be DB-DI splicers as manufactured by Dayton Superior or approved equal with hooked 5/8" dowel bars forged from ASTM A-615-04 Grade 60 deformed rebar material (steel). Splicer to be 5/8" and threaded with nailing flange. Saw cutting for the full depth of the concrete base will be allowed if anchors are utilized exclusively in each repair location. No additional payment will be made for saw cutting under any circumstances.

(4) Transverse Expansion Joints

- i) Transverse expansion joints will be required at 120 foot intervals along the roadway centerline and/or in the locations called for on the plans. 5/8" x 24" round steel dowels shall be placed along the entire joint at 2' O.C. spacing. Prior to pouring of concrete slabs, dowels shall be placed 4" up from the bottom of the slabs to be poured, and one end of the dowel shall be coated or dipped in hot 60-70 penetration asphalt cement, viscosity grade AC-20, conforming to the requirements of AASHTO M20-70. Dowels shall be intermediate grade steel conforming to AASHTO M-31-03, and ASTM A-615A. No. 8 deformed steel bars will not be accepted as dowels. Expansion joint material shall be non-extruding pre-molded joint material consisting of cork granule base in a watertight asphalt binder between two layers of asphalt impregnated paper. The expansion joint material is to be 3/4" thick and extend the entire width of the slab to be poured. Expansion joint fillers shall be placed 1/4" below the surface of the concrete. Expansion material shall meet AASHTO Specification M33-99.

(5) Sealing Joints

- i) All control and expansion joints shall be filled with joint-sealing material before the pavement is opened to traffic and as soon after completion of the curing period as is feasible. Just before sealing, each joint shall be thoroughly cleaned of all foreign material, and joint faces shall be clean and surface-dry when seal is applied. The joint seal material shall be applied hot and shall be stirred during heating to prevent localized

THE METROPOLITAN DISTRICT

overheating and shall be AC-20. The sealing material shall be applied to each joint opening as directed by the Engineer. The joint filling shall be done without spilling material on the exposed surfaces of the concrete. Any excess material on the surface of the concrete shall be removed immediately and the pavement surface cleaned. The use of sand or similar material to cover the seal shall not be permitted. Joint-sealing material shall not be placed when the air temperature in the shade is less than 50 degree F, unless approved by the Engineer.

(6) Placing of Concrete

- i) The concrete shall be discharged and placed in a manner which will prevent separation of coarse aggregate and mortar. Concrete shall always be placed starting at the low end of the section and working upgrade.
- ii) Before placement of the concrete, the subbase shall be thoroughly moistened. This shall be done far enough in advance of placement to allow absorption of water to a depth of at least 1", leaving a moist but not muddy surface.
- iii) The finished thickness of the concrete base shall be at least 8". The concrete shall be placed to a uniform cross section consistent with the proposed cross slope and flush with existing concrete base.
- iv) The time elapsing from the time water is added to the mix until the concrete is placed shall not exceed 90 minutes. In hot weather, the maximum allowable time may be reduced by the Engineer.

(7) Curing Concrete

- i) Normal Condition

All cement concrete shall be cured. The surface of the concrete shall be covered immediately after the initial set in such a manner that the surface is not damaged and shall be kept covered for at least the minimum cure time for the concrete mix being used. Enough cover material shall be placed to cover the edges after forms have been removed.

Covering shall be burlap or cotton mats kept saturated, waterproof double-sheet asphalt cemented Kraft paper

THE METROPOLITAN DISTRICT

reinforced in both directions, meeting ASTM specifications C-171-03.

Kraft paper, if used, shall be lapped at least 12", the lap and edges of the paper shall be securely weighted down with continuous planks, piles of earth or other material to keep edges down tight. Rocks and stones shall not be used. Before reusing paper covers, they shall be checked for tears or holes and shall be repaired. Covers which have become unserviceable will be rejected by the Engineer.

NOTE: No liquid membrane-forming compound will be allowed for curing.

ii) Cold Weather Protection

When concrete is being placed and the air temperature may be expected to drop below 35 degree F, such concrete shall be protected by first covering as specified in (a) above, upon which cover shall be placed a layer of hay or straw, 6" to 8" in thickness, over which another layer of paper or mats shall be spread and the edges of these covers shall be firmly fastened in place. The protecting material shall remain in place for such time as the Engineer may direct, and any concrete incurred by frost action shall be removed and replaced at the Contractor's expense.

(8) Use of New Concrete

Bituminous concrete binder shall not be placed until the concrete has reached a strength of 3000 p.s.i. Vehicular traffic and construction equipment shall be excluded from the concrete surface until the specific cure time has taken place. Any damage to the pavement from traffic or any other causes shall be repaired by the Contractor at his own expense. Concrete cylinder testing will be used to determine the strength of concrete. Testing will be coordinated and paid for by the Contractor.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02605

MANHOLES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing precast concrete manholes at the locations and to the lines, grades, dimensions, and details shown on the Drawings, complete as shown, specified and directed.
- B. The Work includes, all as shown, specified and directed, transporting materials, clearing, excavation, disposing of all excavated materials, connecting storm or sewer lateral and drain pipes to manholes, furnishing and installing all components of manholes, including pre-cast sections and brick or block masonry, placing concrete, constructing inverts and water tables, backfilling, furnishing material for backfilling, miscellaneous grading, bracing, diversion and/or maintenance of sanitary, storm or combined sewage flows, pumping, furnishing and installing bedding material, geotextile fabric, concrete base, frames and covers, manhole drop pipes, manhole steps, waterproofing, testing, temporary and permanent unpaved surface restoration, and all incidental work, except as otherwise herein provided for.
- C. The Contractor shall consider all manholes to be Permit Required Confined Spaces in accordance with OSHA standard, 29 CFR 1910.146.

1.02 RELATED SECTIONS

- A. Section 02053, Removal and Disposal of Existing Sewer, Manholes and Appurtenances
- B. Section 02160, Excavation Support Systems

1.03 SUBMITTALS

- A. In accordance with Section 01300, six (6) copies of the manufacturer's data sheet(s) shall be submitted for approval.

The data sheets shall include the following:

- 1. Name and address of supplier and manufacturer for all materials (precast manhole sections, frame and cover, manhole steps, masonry units, brick, cement, etc.)
- 2. Manhole dimensions and size and location of reinforcement and openings.

THE METROPOLITAN DISTRICT

3. Details of joints between sections and between manhole and entering pipe.
4. Details and locations of openings, lifting holes, inserts, steps, etc.
5. Location plan or list showing the location of each manhole and such other information as needed for installation.
6. A certified statement that inspection and all of the specified tests have been made and met shall also be submitted.

1.04 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. ASTM A48 – Standard Specification for Gray Iron Castings
- B. ASTM A276 – Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes
- C. ASTM A746 – Standard Specification for Ductile Iron Gravity Sewer Pipe
- D. ASTM A615/A615M – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- E. ASTM C32 – Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
- F. ASTM C443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
- H. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections
- I. ASTM D3034 – Standard Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
- J. ASTM D4101 – Standard Specification for Propylene Plastic Injection and Extrusion Material
- K. Article M.08.02-1, CTDOT Form 817 – Brick for Catch Basins, Manholes or Drop Inlets
- L. Article M.08.02-3, CTDOT Form 817 – Masonry Concrete Units for Catch Basins, Manholes or Drop Units

THE METROPOLITAN DISTRICT

M. Article M.11.04, CTDOT Form 817 - Mortar

1.05 QUALITY ASSURANCE

- A. All materials shall be inspected and tested at the place of manufacture as required by the standard specifications to which the material is manufactured.
- B. All materials shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the place of manufacture by a representative of the Owner.
- C. In addition, the Owner reserves the right to have any or all materials inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the Owner's expense.
- D. Precast concrete manhole sections shall not be delivered to the work site until they have aged at least seven (7) days. Any precast concrete structure delivered to the site not meeting the seven (7) day age requirement will be rejected by the Engineer.

PART 2 - PRODUCTS

2.01 PRECAST CONCRETE MANHOLE SECTIONS

- A. Precast concrete manhole sections and appurtenances shall conform to ASTM C478 with the following exceptions and additional requirements:
 - 1. The wall sections shall be not less than 5 inches thick for 48-inch I.D. manholes and 6 inches for 60-inch I.D. manholes.
 - 2. Portland cement concrete with a minimum 28-day compressive strength of 4,000 psi shall be used for 48-inch I.D. and 60-inch I.D. manholes.
 - 3. Seal tongue and groove joints of precast sections with either rubber O-ring gasket or preformed flexible joint sealant. O-ring rubber gaskets shall conform to ASTM C443. Preformed flexible joint sealant shall conform to ASTM C990. Refer to Appendix B for the Owner's approved materials list.
 - 4. The tops of the base sections shall be suitably shaped by means of accurate bell-ring forms to receive the barrel sections. All holes for pipes shall be cast in the base sections so that there is a clear distance of four inches minimum between the inside bottom of the base section and the bottom of the pipe.
 - 5. Openings for pipe and materials to be embedded in the wall of the base shall be cast in the base at the required locations during the manufacture of the base.

THE METROPOLITAN DISTRICT

6. Base pads shall be pre-cast with extended bases.
7. Cone sections shall be of the eccentric type and be manufactured in accord with the standards for wall and base sections.
8. Flat top slabs shall have a thickness and reinforcement in compliance with ASTM C478.
9. Manhole sections shall contain manhole steps so as to form a continuous ladder with a distance of twelve inches (12") between steps.
10. No more than two lift holes shall be cast or drilled in each section.
11. Sections shall be cured by subjecting them to thoroughly saturated steam at a temperature between 100 and 130 degrees F. for a period of not less than 12 hours or, when necessary, for such additional time as may be needed to enable the sections to meet the strength requirements. Cast date is required on all sections.
12. Shipment of precast manhole sections to the construction site shall not be allowed until the precast sections have aged at least seven (7) days. Cast date is required on all sections. Any precast concrete structure delivered to the site not meeting the seven (7) day age requirement will be rejected by the Engineer.
13. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each manhole section.
14. All precast units shall be designated for AASHTO H-20 traffic loading.
15. Provide integrally cast knock-out panels in precast concrete manhole sections at locations and with sizes shown on the Contract Plans. Knock-out panels shall have no steel reinforcing.

2.02 PIPE CONNECTIONS TO MANHOLES

A. Connect pipe to manholes using one of the following methods:

1. Flexible sleeve – Integrally cast sleeve in precast elements or install sleeve in formed or cored opening. Pipe shall be fastened in sleeve with stainless steel clamp(s). Coat stainless steel clamp(s) with bituminous material to protect from corrosion. Flexible sleeve shall be Lock Joint Flexible Manhole Sleeve; Kor-N-Seal connector; PSX Press-Seal Gasket or equal.
2. Compression gasket – Integrally cast compression gasket in precast element. Compression gasket shall be A-Lok or equal.

THE METROPOLITAN DISTRICT

2.03 BRICK

- A. Brick shall conform to the requirements of Article M.08.02-1, CTDOT Form 817.

2.04 CONCRETE MASONRY UNITS

- A. Concrete masonry units shall conform to the requirements of Article M.08.02-3, CTDOT Form 817.

2.05 MORTAR

- A. Mortar shall conform to the requirements of Article M.11.04, CTDOT Form 817.

2.06 MANHOLE FRAMES AND COVERS

- A. The manhole frames and covers shall conform to the Owner approved materials for sanitary sewer and storm sewer installations.
- B. Castings shall conform to ASTM Specifications A-48, Class 30 and shall be thoroughly cleaned, heated, and dipped in approved black asphaltum paint.
- C. Sewer manhole covers shall conform to all current MDC standards and shall be appropriately marked "SEWER", or "STORM DRAIN", cast in 3-in letters. Manhole frames and covers shall be furnished by manufacturers as listed on the Owner's approved materials list in Appendix B.

1. Standard Manhole Frame and Cover in streets:

- a. Frame - 36" Ø inner flange diameter, 48" Ø outer flange diameter
- b. Frame – 25 13/16" Ø inner flange diameter, 34" Ø outer flange diameter
- c. Cover (modified) – 23-7/8" Ø diameter, 1-1/4" center vent hole

2. Standard Watertight Manhole Frame and Cover in cross-country locations or where noted:

- a. Bolted and Gasketed Frame - 33 13/16" Ø inner flange diameter, 39" Ø outer flange diameter
- b. Cover - 31-3/4" Ø diameter

THE METROPOLITAN DISTRICT

- D. Rocking or rattling covers will be replaced at no additional cost to the Owner. In order to prevent covers from rocking or rattling under traffic and to insure proper fit and interchangeability between different frames and covers, the lower surface of the cover and the corresponding upper surface of the frame shall be machine-finished in a lathe to provide a round, smooth, flat contact with the dimensions and clearances called for on the Owner's Standard Drawings.
- E. All manufactured manhole frames and covers submitted for Owner approval and use shall be clearly and conspicuously marked on the top surface of each in English letters designating the manufacturing country of origin. Such marking shall be made either by means of die stamping, cast-in molding, etching or engraving. No other type of marking is acceptable.

2.07 MANHOLE STEPS

- A. Manhole steps, as shown on Owner Standard Drawings, shall be built into manhole walls and elsewhere as indicated, and shall be aligned to form a continuous ladder with rungs equally spaced vertically at a maximum distance of 12-inches apart. The top step shall be between 12-inches and 16-inches below the manhole cover. Steps shall be embedded in the manhole wall a minimum depth of 3-inches and rungs or cleats shall project a minimum clear distance of 5-inches from the interior manhole wall, measured from the point of embedment. Additional steps shall be furnished and set as shown on the plans or where ordered by the Engineer.
- B. Aluminum manhole steps shall be forged aluminum safety rung, alloy 6061-T6. That portion of the manhole step encased in concrete or masonry shall be coated with either bitumastic or zinc chromate paints.
- C. Plastic manhole steps shall be in conformance with ASTM C478 and shall be of copolymer polypropylene conforming to ASTM D4101 for Type 11 propylene copolymers. The copolymer polypropylene compound shall encase a ½-inch Grade 60 steel reinforcing rod conforming to ASTM A615. Plastic manhole steps shall resist pull out forces over 1,500 lbs.

2.08 MANHOLE PLATFORMS

- A. Manholes over 20 feet in height shall have a platform constructed 8 feet below the top of the manhole as shown on the detail sheets or as directed by Engineer.
- B. Manhole platforms shall have a 30-in diameter opening with aluminum grating as specified in the MDC Standard Detail Manual.

2.09 INSIDE DROP

- A. Drop pipe fittings for inside drop manholes shall be ASTM D3034 SDR 35 (PVC)

THE METROPOLITAN DISTRICT

polyvinyl chloride pipe and fittings.

- B. Anchor straps and fasteners for drop pipe and fittings shall be 1/8" x 1½" Type 304 stainless steel strip cut to suit with suitable stainless steel fasteners.
- C. The ductile iron lateral stub shall conform to ASTM A746 and shall extend beyond the manhole wall to virgin soil.

2.10 DAMPPROOFING

- A. Two coats of bituminous waterproofing material applied to the exterior surfaces of sanitary sewer manholes by brush or spray in accordance with the manufacturer's recommendations. Dampproofing shall be Hydrocide 700B by Sonneborn , or approved equal.

2.11 GEOTEXTILE FABRIC

- A. See Appendix B for Owners Approved Materials List.

2.12 BEDDING MATERIAL

- A. Bedding material shall consist of crushed stone conforming to the requirements of Section 02202 of these Specifications.

2.13 BANK RUN GRAVEL

- A. Bank run gravel refill shall conform to the requirements of Section 02202 of the Specifications.

2.14 CAST IN PLACE CONCRETE

- A. Poured in place concrete shall conform to all requirements specified in Section 03302, Miscellaneous Concrete.

PART 3 - EXECUTION

3.01 GENERAL

- A. Earthwork, traffic control, environmental protection, rock excavation (where applicable), dewatering, support of excavations, sheeting and shoring, backfilling and compacting, etc. shall be done in accord with the applicable Sections of these Specifications.
- B. Special manholes will be built as indicated on the Contract Drawings and detailed in the MDC Standard Detail Manual for the particular manhole.

THE METROPOLITAN DISTRICT

- C. Extra excavation below grade and outside the limits of the trench, where ordered shall be done in accord with Sections 02200 and 02201.
- D. Existing manholes, where indicated on the Contract Drawings, shall be removed to facilitate construction of new manholes. Resultant material shall be removed and disposed of in accordance with local, state, and federal regulations.

3.02 PLACING PRECAST MANHOLE SECTIONS

- A. After the excavation has been completed as required, filter fabric placed, the bedding material shall be placed from the bottom of the excavation to the bottom of the manhole and suitably compacted in accord with the requirements of Section 02200. The bedding material shall cover the full bottom of the excavation and be at least 12 inches in depth.
- B. The precast manhole section shall be carefully lifted and lowered to position in the excavation by suitable rigging. While the section is suspended, it shall be inspected and examined for defects. No section shall be installed that is known to be defective. If any defective section is discovered after it is installed, it shall be removed, replaced with a sound section and removed from the worksite at no expense to the Owner.
- C. The joint between sections shall be thoroughly cleaned in accordance with the manufacturer's instructions to assure a watertight joint.
- D. Precast reinforced concrete manhole sections shall be set to be vertical and the sections in true alignment.
- E. Any manhole which shows any settlement or displacement after installation shall be taken out and reinstalled to the satisfaction of the Engineer.
- F. Rubber gaskets or approved equal shall be installed in all joints in accord with the manufacturer's recommendations.
- G. All holes in sections used for handling shall be thoroughly plugged with rubber plugs made specifically for this purpose or with non-shrink grout.
- H. Openings or penetrations for lateral connections may be "core-bored", where and if approved or directed by the Engineer.

3.03 INVERTS AND WATER TABLES

- A. Inverts and water tables shall be built of brick or formed with poured concrete as directed by the Engineer. Inverts shall, in general, have a uniform grade between the inverts of the inlet and outlet pipes. Joints in brick inverts shall be tooled to be slightly concave and polished.

THE METROPOLITAN DISTRICT

- B. Only clean bricks shall be used. Bricks shall be moistened by suitable means, until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.
- C. Each brick shall be laid in a full bed and joint of mortar without requiring subsequent grouting, flushing or filling, and shall be thoroughly bonded.

3.04 PLASTERING AND CURING MASONRY

- A. Outside faces of masonry walls shall be plastered with mortar ½-inch thick.
- B. If required, the masonry shall be properly moistened prior to application of the mortar. The mortar shall be carefully spread and troweled. After hardening, the mortar shall be carefully checked by being tapped for bond. Unbonded or unsound mortar shall be removed and replaced.
- C. Brick masonry and mortar shall be protected from too rapid drying by the use of burlap, kept continually moist, or by other suitable means, and shall be protected from the weather and frost.

3.05 SETTING MANHOLE FRAMES

- A. Cast iron frames shall be set to a full even bearing on cement mortar flush with finished grade or as directed by the Engineer. The flange of the frame shall not project outside of the masonry on which it rests. The inner circle of the frame shall not overhang the brickwork by more than one inch (1").
 - 1. A minimum of two courses of red brick ASTM C-32-72, Grade SM mortared in place (not to exceed 18" in height) shall be placed directly under the manhole frame. Under no circumstances shall precast concrete grade rings be allowed.
- B. Until such time as cast iron frames and covers are set, manhole tops must be kept covered with temporary coverings to exclude persons, animals, dirt and foreign substances.

3.06 DAMPPROOFING

- A. Paint outer surfaces of sanitary sewer or combined sewer manholes with two coats of bituminous dampproofing at the rate of 30 to 60 square feet per gallon, in accordance with the manufacturer's instructions.

3.07 LEAKAGE TESTS FOR SEWER MANHOLES

- A. Test each liquid-containing manhole for leakage. Engineer shall observe each test. Perform exfiltration test as described below:

THE METROPOLITAN DISTRICT

1. Assemble manhole in place; fill and point all lifting holes and exterior joints (within 6 feet of the ground surface) with an approved non-shrinking mortar. Test prior to placing the shelf and invert and before filling and pointing the horizontal joints below 6 feet of depth. Lower ground water table below bottom of the manhole for the duration of the test. Plug all pipes and other openings into the manhole and brace to prevent blow out.
 2. Fill manhole with water to the top of the cone section. If the excavation has not been backfilled and no water is observed moving down the surface of the manhole, the manhole is satisfactorily water-tight. If the test, as described above is unsatisfactory as determined by the Engineer, or if the manhole excavation has been backfilled, continue the test. A period of time may be permitted to allow for absorption. Following this period, refill manhole to the top of the cone, if necessary and allow at least 8 hours to pass. At the end of the test period, refill the manhole to the top of the cone again, measuring the volume of water added. Extrapolate the refill amount to a 24-hour leakage rate. The leakage for each manhole shall not exceed one gallon per vertical foot for a 24-hour period. If the manhole fails this requirement, but the leakage does not exceed three gallons per vertical foot per day, repairs by approved methods may be made as directed by the Engineer. If leakage due to a defective section of joint exceeds three gallons per vertical foot per day, the manhole shall be rejected. Uncover the rejected manhole as necessary and to disassemble, reconstruct or replace it as directed by the Engineer. Retest the manhole and, if satisfactory, fill and point the interior joints.
 3. No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorptions, etc. It will be assumed that all loss of water during the test is a result of leaks through the joints or through the concrete.
 4. An infiltration test may be substituted for an exfiltration test if the ground water table is above the highest joint in the manhole. If there is no leakage into the manhole as determined by the Engineer, the manhole will be considered water-tight. If the Engineer is not satisfied, testing shall be performed as previously described.
- F. A vacuum test may be substituted for a leakage test as follows:
1. Where the excavation has not been backfilled, the filling and pointing of exterior joints shall not be necessary prior to performing this test.
 2. The vacuum test shall be conducted as follows:
 - a. The compression band shall be inflated to affect a seal between the vacuum base and the top of the manhole below the frame. The vacuum pump shall then be connected to the outlet port with the valve open and a

THE METROPOLITAN DISTRICT

vacuum of 10-in Hg (20-in of Hg absolute) drawn. The valve shall then be closed.

b. The following test criteria shall apply to 4-ft and 5-ft diameter manholes:

(1) A drop of 1-in Hg shall be allowed over a 2-minute period for manholes 0-10 feet deep.

(2) A drop of 1-in Hg shall be allowed over a 2-1/2-minute period for manholes 10-15 feet deep.

(3) A drop of 1-in Hg shall be allowed over a 3-minute period for manholes 15-30 feet deep.

3. If the pressure drop exceeds the acceptable limits the Contractor shall be allowed to make necessary repairs, as approved by the Engineer. The manhole shall then be re-tested.

4. If the manhole fails to meet the minimum requirements of the vacuum test when re-tested, it may be water tested, at no additional cost to the Owner, as outlined in paragraph 3.02.

5. Upon completion of a successful vacuum test, the interior and exterior joints shall be filled and pointed.

G. All visible leaks which occur after backfilling shall be sealed by approved methods and manholes shall be retested.

3.08 LEAKAGE TESTS FOR DRAIN MANHOLES

A. The Engineer will visually inspect drain manholes for possible leaks before backfilling is allowed. All joints shall be sealed to the satisfaction of the Engineer.

B. The Engineer may require an exfiltration test as described for sewer manholes on any structure for which he/she deems appropriate.

3.09 CLEANING

A. Thoroughly clean all new manholes of all silt, debris and foreign matter of any kind, prior to final inspections.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02610

SEWER TESTING AND CLEANING

PART 1 – GENERAL

1.01 SCOPE OF WORK

The Work specified in this Section includes the Contractor using his own equipment, or by a Subcontractor approved by the Engineer. All equipment proposed for conducting the tests shall be subject to the approval of the Engineer. Contractor submittals shall contain sufficient detail to show the setup and proposed operation, and no testing will be permitted without prior approval of the Engineer.

- A. Furnish all labor, materials, equipment and incidentals required to clean and test all new pipe installed under this Contract as specified herein.
- B. The term “sewer”, as used in this Section, shall apply to both stormwater pipelines, overflow pipelines and sewer pipelines.
- C. All new sewer pipes shall be cleaned and televised (CCTV) at the completion of Work and at the completion of the 1 year warranty period. **Full completion of CCTV work and submission of required documents and video will be required as a condition of retainage release.**
- D. All new sewers and shall be air tested. All new laterals shall be air tested to the property line.
- E. All new mainline sewers connecting to existing sewers shall be joint tested at each joint of the new sewer pipe installed.
- F. All sewers shall be tested for leakage by an infiltration test if the ground water level is a minimum of 2-ft above the crown of the pipe for the full length of the section tested.
- G. When sewers cannot be tested by an infiltration test as specified above, they shall be tested by an exfiltration test using water or air.

1.02 RELATED SECTIONS

- A. Section 02612, Reinforced Concrete Pipe
- B. Section 02615, Ductile Iron Pipe for Sanitary Sewer

THE METROPOLITAN DISTRICT

- C. Section 02622, Polyvinyl Chloride Sewer and Drain Pipe
- D. Section 02764, Television Inspection

1.03 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM C828 - Standard Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Lines
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 DEFINITIONS

- A. Normal cleaning – cleaning accomplished using water jets (pressure shall not exceed 1200 psi) to scour and remove debris, grease, light roots, etc. from pipe and manhole in 1 to 3 complete passes of the nozzle. This Work shall be classified as light hydraulic cleaning that shall be performed in conjunction with the repair, rehabilitation, pre-construction and post-construction inspections, etc. of existing or new sewer pipe as specified herein.
- B. Heavy Hydraulic Cleaning and root removal – cleaning accomplished using water jets (pressure shall not exceed 1200 psi), or other mechanical means, to scour and remove debris, mineral deposits, removal of roots larger than fine roots (as defined by PACP), hardened grease and intruding sealing ring material using cutting device, etc. from pipe and manhole in 4 or more complete passes of the nozzle. This Work shall be classified as heavy hydraulic cleaning.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.01 CLEANING

- A. At the conclusion of the Work, thoroughly clean all pipelines by flushing with water or other means to remove all dirt, stones, pieces of wood, or other material which may have entered the pipes during the construction period. Debris cleaned from the lines shall be removed from the low end of the pipeline. If after this cleaning, obstructions remain, they shall be removed. After the pipelines are cleaned and if the groundwater level is above the pipe or following a heavy rain,

THE METROPOLITAN DISTRICT

the Engineer will examine the pipes for leaks. If any defective pipes or joints are discovered, they shall be repaired or replaced by the Contractor.

3.02 TELEVISION INSPECTION

- A. All new sewer pipelines shall be television inspected by the Contractor prior to acceptance to assure proper jointing and flow characteristics. Television inspections shall not be scheduled until construction of other utilities in the same area is completed and pipeline under consideration has been backfilled and compacted to sub-grade elevation. Television inspection will be performed after the pipelines have been cleaned and also for a second time at end of the 1-year maintenance period. Contractor will be required to repair any defects noted at this time at no additional cost to the Owner.

3.03 TESTING

A. General

- 1. The Contractor shall test the first section of new mainline pipe and new service pipe as soon as it is installed to demonstrate that the work conforms to these Specifications. The initial test section shall not be more than 500-ft of pipeline.
- 2. Testing of pipe shall closely follow pipe laying. The Contractor shall have no more than 1000-ft of untested sewer or drain constructed at any time.

B. Infiltration Test

- 1. Pipe shall be tested for infiltration if groundwater level is a minimum of 2 feet above the crown at the highest elevation of the pipe for the full length of section to be tested, after the backfill has been placed and the ground water allowed to return to normal elevation. Infiltration tests shall be made under the supervision of the Engineer and the length of line to be tested shall be the length between adjacent manholes. The allowable infiltration shall be 100 gals per inch of diameter per day per mile of pipe in PVC, DI and RCP pipe for each section tested. There shall be no gushing or spurting leaks.
- 2. If an inspection of the completed sewer or any part thereof shows pipes or joints which allow noticeable infiltration of water, the defective work or material shall be replaced or repaired as directed, at no additional cost to the Owner.
- 3. Rates of infiltration shall be determined by means of V-Notch weirs, pipe spigots, or by plugs in the end of the pipe to be furnished and installed in an approved manner and at such times and locations as may be directed by the Engineer.

THE METROPOLITAN DISTRICT

C. Exfiltration Test

1. Leakage tests by exfiltration shall be made before or after backfilling at the discretion of the Engineer. The length of pipe to be tested shall be such that the head over the crown at the upstream crown is not less than 2-ft and the head over the downstream crown is not more than 4-ft. The pipe shall be plugged by pneumatic bags or mechanical plugs in such a manner that the air can be released from the pipe while it is being filled with water. Before any measurements are made, the pipe shall be kept full of water long enough to allow absorption and the escape of any trapped air to take place. Following this, a test period of at least one hour shall begin. Provisions shall be made for measuring the amount of water required to maintain the water at a constant level during the test period.
2. If any joint shows an appreciable amount of leakage, the jointing material shall be removed and the joint repaired. If any pipe is defective, it shall be removed and replaced. If the quantity of water required to maintain a constant level in the pipe does not exceed 100 gals per inch of diameter per day per mile of pipe and if all the leakage is not confined to a few joints, workmanship shall be considered satisfactory. If the amount of leakage indicates defective joints or broken pipes, they shall be corrected or replaced.

D. Air Testing

1. When the Engineer specifies or directs that leakage tests shall be made using the low-pressure air test method, the Contractor will be required to provide all equipment, test plugs in the required sizes, appurtenances, connecting hose or pipe, labor and materials necessary to conduct and control the test as herein specified. All testing shall be performed in accordance with the procedures described in ASTM C828.
2. All tests shall be conducted on the completed sewer pipeline between manholes. Testing of shorter sections of pipeline will only be permitted with the approval of the Engineer.
3. The Contractor is cautioned regarding the importance of properly installing the end caps used to plug hubs, wyes, bends, ends of laterals, and other inlets, and securing them against movement during installation of sewer. Failure to take this precaution can cause a properly installed sewer pipeline to fail a low-pressure air test.
4. The Contractor is further cautioned regarding the safety of personnel during the test. Low-pressure air can exert a substantial force on a pipe plug, even on all diameter pipe plugs. The Contractor will be responsible to insure that

THE METROPOLITAN DISTRICT

all plugs utilized are in good condition and that they will not be pressurized beyond the limits recommended by their manufacturer.

5. No one will be permitted in a manhole containing a plug while air is under pressure in the pipeline being subjected to low-pressure air testing.
6. All gages, controls, and appurtenances for equipment used to conduct the test will be located outside of manholes. Connections to the line under test, test plugs, and other equipment will be made with hose or pipe extensions which will safely contain the pressures necessary to conduct and control the test.
7. Immediately prior to testing, all lines will be cleaned and flushed with water. Pipe manufactured in accordance with ASTM Specification C-76, where applicable, shall be soaked for a period of 12 hours to saturate the pipe wall prior to testing with low-pressure air.
8. The equipment used to introduce the low-pressure air into the sewer line shall include a safety valve, or release device, located in the equipment at a point which will insure that, during the build-up of test pressure, the pipeline being tested will not be subjected to an internal pressure that could damage a properly installed pipeline.
9. The gage used to measure the drop in pressure shall have a 4-inch diameter face with a scale of 0 to 15 PSI (pounds per square inch) in 0.1 PSI increments, or as approved by the Engineer.
10. The Contractor shall determine the elevation of the ground water table in the area of the pipeline being subjected to the low-pressure air test in a manner approved by the Engineer.
11. After cleaning and flushing the line, plugs will be installed in the pipeline being subjected to the low-pressure air test and braced as necessary to secure the plugs in place.
12. Utilizing the approved equipment, air at low pressure will be slowly introduced into the pipeline until the pressure within the pipeline being tested increases to 4 PSIG greater than the back pressure exerted by the ground water table over the pipe being tested, but not greater than 9 PSIG, (back pressure = 1 PSIG per 2.31 feet of water) as determined above (if the water table is not at a level above the pipe, the test pressure should be brought up to 4 PSIG). Allow at least 2 minutes to elapse prior to starting the test. If necessary, allow a small amount of air to slowly enter the pipeline in order to maintain a pressure of 4 PSIG above the back pressure due to the water table, or 4 PSIG if there is no back pressure to compensate for.
13. Disconnect the supply air hose from the source of air and allow the air pressure within the pipe being tested to drop to 3.5 PSIG above the

THE METROPOLITAN DISTRICT

backpressure due to the existing ground water table (or to 3.5 PSIG if there is no water table). At this point, start measuring the time for the pressure in the pipeline to drop 1 PSIG (or to drop to 2.5 PSIG if there is no back pressure due to a water table).

14. The time required to drop 1 PSIG shall not be less than that indicated in Table 1 for the size and length of pipeline being tested. If the time is less than that indicated in Table 1, the pipeline will be considered to have failed the test (See Table 1).
15. Any section of the sewer line which fails to meet this test will be repaired or replaced as necessary by the Contractor, and retested at no additional expense to the Owner.
16. The Contractor will be responsible for all costs and delays incurred due to efforts to locate and repair any leaks in any sewer line which fails the low-pressure air test, regardless of whether the failure is due to workmanship, material failure, the result of an improperly installed or braced end cap; or any sewer line damaged due to failure to provide a properly sized and operable safety valve or pressure relief device, on the testing equipment for protection of the pipeline being tested. No sewer line will be considered acceptable until it successfully passes the requirements of this test unless the requirement is waived by the Engineer.
17. All testing will be conducted by the Contractor or his approved Subcontractor in the presence of the Engineer. The Contractor or his Subcontractor shall keep a written record which will show the results of the tests conducted. These records should include sufficient data on length of line, pressure levels, time for pressure drop and related features noted during the testing of each segment of the line. A copy of these records shall be given to the Owner.

E. Allowable Deflection Test

1. Pipe deflection measured not less than 90 days after the backfill has been completed as specified shall not exceed 5 percent. Deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
2. Deflection shall be measured with a rigid mandrel (Go/No Go) device cylindrical in shape and constructed with a minimum of 9 evenly spaced arms or prongs. Drawings of the mandrel with complete dimensions shall be submitted to the Engineer for each diameter of pipe to be tested. The mandrel shall be hand pulled through all sewer lines.
3. Any section of sewer not passing the mandrel shall be uncovered at no additional cost to the Owner and the bedding and backfill replaced to

THE METROPOLITAN DISTRICT

prevent excessive deflection. Repaired pipe shall be retested at no additional cost to the Owner. Retested pipe shall not deflect more than 4 percent.

F. Sewer Pipe Joint Testing

1. Existing hydrostatic head shall be established by inserting a pipe probe into the backfill material at the crown of the pipe at the downstream manhole and applying pressure until equilibrium is attained. This is the back pressure that all test pressures for that section of line shall be increased by.
2. A precise pressure of 4 psi above the existing hydrostatic head shall be applied to each joint. Once the pressure of 4 psi above hydrostatic head at the joint has been recorded on the gauge above ground, the water flow shall be stopped and the pressure gauge observed for 30 seconds. Should the pressure on the joint drop 0.5 psi or more within 30 seconds, the joint will have failed the test. Joints that fail the test shall be repaired as directed by the Engineer and re-tested by the same procedure until the joints pass the pressure test.
3. During the joint testing program, complete records shall be kept, recording the location of the manhole section in which the testing is done, location of each joint tested, test pressures used, and the test results.
4. Pipe joints that fail the joint test shall be repaired to the satisfaction of the Engineer and shall be subject another joint test at the direction of the Engineer.
5. Place attest packer inside pipe and test every joint.

THE METROPOLITAN DISTRICT

TABLE 1

MINIMUM TIME REQUIRED FOR A PRESSURE DROP OF 1 PSIG AS REQUIRED

IN LOW PRESSURE AIR TEST SPECIFICATION - MINUTES: SECONDS

(BASED ON 0.0015 CFM/SQ. FT.)

Pipe Diameter (in.)	Specification Time for Length (L) Shown (min:sec)								
	100 ft.	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.	450 ft.	500 ft.
4	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:47
6	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24	7:07
8	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24	12:40
10	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48	19:47
12	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38	28:29
15	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04	45:51
18	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41	64:06
21	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31	87:15
24	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33	113:58

Note: If lateral sewers are included in the test, their lengths may generally be ignored in computing required test times. In the event a test section, having a total internal surface area less than 625 square feet, fails to pass the air test when lateral sewers have been ignored, the Engineer shall recompute the test time including all lateral sewers.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02612

REINFORCED CONCRETE PIPE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals necessary to install and test reinforced concrete pipe and fittings complete as shown on the Contract Drawings and as specified herein.
- B. All pipe and fittings shall be manufactured for this project and no pipe shall be furnished from stock.

1.02 RELATED SECTIONS

- A. Section 02140, Dewatering and Drainage
- B. Section 02160, Excavation Support Systems
- C. Section 02202, Trench Refill
- D. Section 02610, Sewer Testing and Cleaning
- E. Section 02764, Television Inspection
- F. Section 03302, Miscellaneous Concrete
- G. Section 03604, Non-Shrink Construction Grout

1.03 SUBMITTALS

- A. Submit to the Engineer, within thirty days of the Notice to Proceed, the name of the pipe and fitting suppliers and a list of materials to be furnished.
- B. Reinforced Concrete Pipe
 - 1. Submit shop drawings, in accordance with Section 01300, showing pipe layout and details of reinforcement, joint, method of manufacture and installation of pipe gasket, specials and fittings, and a schedule of pipe lengths (including the length of individual pipes by diameter) for the entire job.

THE METROPOLITAN DISTRICT

2. Submit with the shop drawings documentation that the fine and course aggregates to be used in manufacture of the concrete pipe comply with the requirements of Paragraph 2.01C. Documentation shall be less than 6 months old and shall indicate the source of the aggregates and the date of the analysis. Similar documentation shall be submitted to the Engineer at least yearly while pipe is being manufactured for this project.
 - a. Documentation shall be signed and sealed by a professional engineer from a qualified independent materials testing laboratory that conforms to ASTM E329 and is regularly inspected by the Cement and Concrete Reference Laboratory of the National Bureau of Standards.
 - b. The Owner reserves the right to have independent analysis of aggregates if quality assurance tests of the pipe indicate noncompliance with aggregate requirements
3. Prior to each shipment of pipe, submit certified test reports that the pipe was manufactured and tested in accordance with the ASTM Standards specified herein.

1.04 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. American Society for Testing and Materials (ASTM)
 1. ASTM C33 - Standard Specification for Concrete Aggregates.
 2. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
 3. ASTM C150 - Standard Specification for Portland Cement.
 4. ASTM C443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
 5. ASTM C361 - Reinforced Concrete Low-Head Pressure Pipe.
 6. ASTM C497 – Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
 7. ASTM C655 - Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe.

THE METROPOLITAN DISTRICT

8. ASTM C822 - Standard Definitions and Terms Relating to Concrete Pipe and Related Products.
9. ASTM C969 – Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
10. ASTM E329 – Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

1.05 QUALITY ASSURANCE

- A. The manufacturer shall be responsible for the performance of all acceptance tests as specified in Paragraph 5.1.2 of ASTM C76. In addition, all reinforced concrete pipe to be installed under this Contract may be inspected at the plant for compliance with these Specifications by an independent testing laboratory provided by the Owner. The manufacturer's cooperation in these inspections shall be required. The cost of inspection of all pipe approved for this Contract, plus the cost of inspection of a reasonable amount of disapproved pipe will be borne by the Owner. The pipe manufacturer shall:
 1. Have sufficient pipe made in advance so that a minimum of approximately 200-ft will be approved at each plant inspection. Pay for each plant inspection that does not result in this minimum length of R.C. pipe being approved, the cost being deducted from monthly progress payments.
 2. Notify the independent testing laboratory at least 48 hours prior to requesting pipe inspection.
- B. Inspection of the pipe will also be made by the Engineer or other representatives of the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job.

PART 2 - PRODUCTS

2.01 REINFORCED CONCRETE PIPE

- A. The pipe units shall be of the classes indicated on the Contract Drawings and shall conform to ASTM C76, Class IV, wall B or C straight pipe. The pipe interior shall be smooth and even, free from roughness, projections, indentations, offsets, or irregularities of any kind. The concrete mass shall be dense and uniform.

THE METROPOLITAN DISTRICT

- B. Non-air-entraining portland cement conforming to ASTM C150, Type II shall be used. The use of a non-bleeding, water-reducing, dispersing agent may be permitted subject to the specific approval of the Engineer. The use of any other admixture will not be permitted.
- C. Fine aggregate shall consist of washed inert natural sand conforming to the requirements of ASTM C33, except for gradation with a maximum loss of 8 percent when subject to 5 cycles of the soundness test when using magnesium sulfate. Coarse aggregate shall consist of well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33, except for gradation with a maximum loss of 8 percent when subject to 5 cycles of the soundness test when using magnesium sulfate. Documentation of the aggregate to be used in the manufacturer of reinforced concrete pipe meet these specification requirements shall be submitted to the Engineer as stated in 1.03 above.
- D. The 28-day compressive strength of the concrete, as indicated by cores cut from the pipe shall be equal to or greater than the design strength of the concrete. The concrete mass shall be dense and uniform. The average absorption shall not exceed 5.5 percent of the dry weight and no specimen shall exceed 6.0 percent. Reinforcement shall be circular for all concrete pipe. Quadrant steel shall not be used. Reinforcement shall be installed in both the bell and the spigot. At least one circumferential reinforcement wire shall be in both the bell and spigot area and reinforcement in the bell and spigot shall be adequate to prevent damage to concrete during shipping, handling and after installation. When cores indicate that reinforcing steel has less than 85 percent bond the pipe shall be subjected to a 3-edge bearing test to 13 psi to verify strength and water tightness.
- E. Pipe may be rejected for any of the following reasons:
 - 1. Exposure of any wires, positioning spacers or chairs used to hold the reinforcement case in position, or steel reinforcement in any surface of the pipe, except for ends of longitudinal reinforcing, and as permitted by ASTM C76, Section 8.2.
 - 2. Transverse reinforcing steel found to be in excess of 1/4-in out of specified position after the pipe is molded.
 - 3. Any shattering or flaking of concrete at a crack.
 - 4. Voids, with the exception of a few minor bugholes, on the interior and exterior surfaces of the pipe exceeding 1/4-in in depth unless properly and soundly pointed with mortar or other approved material.
 - 5. Unauthorized application of any wash coat of cement or grout. Any pipe dressing procedures shall be subject to approval of the Engineer.

THE METROPOLITAN DISTRICT

6. A deficiency greater than 1/4-in from the specified wall thickness of pipe 30-in or smaller in internal diameter.
7. A deficiency greater than 6 percent from the specified wall thickness of pipe larger than 30-in in internal diameter, except that the deficiency may be 8 percent adjacent to the longitudinal form joint, provided that the additional deficiency does not lie closer than 20 percent of the internal diameter of the pipe. The deficiencies in wall thickness permitted herein do not apply to gasket contact surfaces in gasketed joint pipe.
8. A variation from the specified internal diameter in excess of 1 percent, or interior surfaces which have been reworked after placing of concrete. The variation in internal diameter permitted herein does not apply to gasket contact surface in gasketed joint pipe.
9. A hollow spot (identified by tapping the internal surface of the pipe) which is greater than 30-in in length or wider than 3 times the specified wall thickness. Repair of such defective areas not exceeding these limitations may be made as specified in Paragraph 2.01R.
10. Defects that indicate imperfect molding of concrete; or any surface defect indicating honeycomb or open texture (rock pockets) greater in size than area equal to a square with a side dimension of 2-1/2 times the wall thickness or deeper than two times the maximum graded aggregate size; or local deficiency of cement resulting in loosely bonded concrete, the area of which exceeds in size the limits of area described in Paragraph 2.01E9 above when the defective concrete is removed. Repair of such defects not exceeding these limits may be made as specified in Paragraph 2.01R.
11. Any of the following cracks:
 - a. A crack having a width of 0.005-in to 0.01-in throughout a continuous length of 36-in or more.
 - b. A crack having a width of 0.01-in to 0.03-in or more throughout a continuous length of 1-ft or more.
 - c. Any crack greater than 0.005-in extending through the wall of the pipe and having a length in excess of the wall thickness.
 - d. Any crack showing two visible lines of separation for a continuous length of 2-ft or more, or an interrupted length of 3-ft or more anywhere in evidence, both inside and outside.
 - e. Cracks anywhere greater than 0.03-in in width.

THE METROPOLITAN DISTRICT

- F. The pipe shall be clearly marked as required by ASTM C76 in a manner acceptable to the Engineer. The markings may be at either end of the pipe for the convenience of the manufacturer, but for any one size shall always be at the same end of each pipe length. Pipe shall not be shipped until the compressive strength of the concrete has attained 4,000 psi and not before seven days after manufacture and/or repair, whichever is the longer
- G. Pipe shall have a minimum laying length of approximately 8-ft, except for closure pieces as approved by the Engineer. Have available at the site of the work sufficient pipe of various lengths to affect closure at manholes or structures that cannot be located to accommodate standard lengths. Short lengths of pipe made for closure etc may be used in the pipeline at the end of construction if properly spaced. The length of the incoming and outgoing concrete pipe at each structure shall not exceed 4-ft. Maximum laying length shall not exceed 16-ft, but the installation of 16-ft lengths will depend upon the ability to handle such lengths of pipe in sheeted trenches, comply with trench width requirements, maintain the integrity of the sheeting and avoid disturbance to adjacent ground. If in the opinion of the Engineer the use of 16-ft lengths is impracticable, shorter lengths shall be used.
- H. After manufacture, each length of pipe shall be checked against the length noted on the shop drawings. Pipe more than 1-1/2-in longer than that shown on the shop drawings shall not be used on this project. Variations in length of the same pipe shall not exceed ASTM C76 requirements.
- I. During manufacturing, measuring devices shall be used to assure joint assembly is within the tolerance of ASTM C76 and these Specifications.
- J. The Engineer shall have the right to cut cores from such pieces of the finished pipe as he/she desires for such inspection and tests as he/she may wish to apply. Holes left by the removal of cores shall be filled in an approved manner by and at the expense of the manufacturer. Core drilling shall be carried out by the pipe manufacturer at his/her expense. The number of cores shall not exceed the requirements of ASTM C76.
- K. The Engineer shall also have the right to take samples of the concrete after it has been mixed, or as it is being placed in the forms or molds and to make such inspection and tests thereof as he/she may wish.
- L. At the start of the work, a set of test cylinders shall be taken each day on which pipe is manufactured for the project or more often if required. This may ultimately be reduced to one set of three specimens for every 50 cu yds of concrete placed, if the uniformity of results warrants and if approved by the Engineer. At the start of the work, a relationship shall be established between ultimate strength of test cylinders stored in a standard manner as compared to

THE METROPOLITAN DISTRICT

cylinders steam cured with the pipe and as compared to cores taken from the corresponding finished pipe. At least five sets of tests shall be made.

- M. Test cores may be taken for every 500 linear feet of pipe manufactured, but not less than once each day on which pipe is manufactured for the project. Cores may be reduced to one set of two per week (or possibly fewer, but not less than one set for every 1,500 linear feet), if a satisfactory relationship is established between cores and cylinders made and cured in the standard manner. This relationship shall not vary by more than 10 percent more or less from the average ratio. Cores may be drilled in any manner which will provide a smooth core face. All pipe cylinders and cores shall be 4-in in diameter. Cores shall be carefully saw-trimmed and capped in a vertical position with a sulfur cap of minimum thickness, at least one day before being tested.
- N. Core testing shall conform to Standard ASTM Methods.
- O. At the time of inspection, the pipe will be carefully examined for compliance with the appropriate ASTM and project specifications and shop drawings. All pipes shall be inspected for general appearance, dimension, "scratch-strength," blisters, cracks, roughness, soundness, etc. All pipes will be checked for soundness by being tapped and scratched over a reasonable portion of the area, at least once on every 50 sq in of pipe surface. The surface shall be dense and close-textured. Cores also shall serve as a basis for rejection of pipe, particularly if lamination or poor bond of reinforcement is apparent.
- P. The manufacturer shall use measuring devices to assure joint assembly is within tolerances of ASTM C76 and these Specifications. If, during construction, the pipes cannot be satisfactorily joined, the manufacturer shall pre-join the pipe at the plant.
- Q. Unsatisfactory or damaged pipe will be either permanently rejected or returned for minor repairs. Only that pipe actually conforming to the specifications and accepted will be listed for approval, shipment and payment. Approved pipe will be so stamped or stenciled on the inside before it is shipped. All pipe which has been damaged after delivery will be rejected and if such pipe already has been laid in the trench, it shall be acceptably repaired, if permitted, or removed and replaced, entirely at the Contractor's expense.
- R. Pits, blisters, rough spots, breakage and other imperfections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Non-shrink cement mortar used for repairs shall have a minimum compressive strength of 6,000 psi at the end of 7 days and 7,000 psi at the end of 28 days, when tested in 3-in cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.

THE METROPOLITAN DISTRICT

- S. Supply a length of concrete pipe with three holes of proper diameter cut at the quarter points for each of the Y-saddles required. The holes shall be cut halfway through the pipe by the manufacturer while the concrete is still "green" leaving the reinforcement intact. These pipes shall be reserved for use with Y-saddles only and the remaining concrete and reinforcement shall be cut in the field only from the hole to be used. The holes not used shall be plugged with non-shrink cement mortar as specified above using a neat cement slurry prior to plugging with mortar. Any alternate method for providing for service connections shall be submitted to the Engineer for approval.

2.02 JOINTS FOR REINFORCED CONCRETE PIPE

- A. Joints shall be concrete and rubber tongue and groove or bell and spigot type joint conforming to ASTM C361 with provisions for using a round rubber O-Ring gasket in a recess in the spigot end of the pipe. The bevel on the bell of the pipe shall be between 1-1/2 degrees and 2-1/2 degrees. The diameters of the joint surfaces which compress the gasket shall not vary from the true diameters by more than 1/16-in.
- B. The round rubber "O-Ring" gaskets shall conform to ASTM C443 except as otherwise specified herein. Two gaskets shall be submitted to the Engineer for tests at least 30 days before joining any pipe.
- C. Specimens shall be heated in a dry oven to 150 degrees F for 6-hour duration and five specimens shall be tested by immersion, one each as follows: 2-hour immersion in petroleum ether, 72-hour immersion in saturated Hydrogen Sulfide solution, 72-hour immersion in 1 percent NaOH solution, 72-hour immersion in standard soap solution (80 percent alcohol), 72-hour immersion in 10 percent NaCl solution. The specimens shall show no detrimental change in color, texture, or feeling upon completion of the above tests. Specimens of the gaskets shall be subjected to tensile tests of approximately 100 psi before and after immersion and heating tests and shall show an elongation of at least 25 percent. Upon release from the tensile tests, each specimen shall return to its original length. The manufacturer shall supply test data and affidavits showing compliance in accordance with this Section. Tests shall have been conducted within six months of the start of manufacture of the pipe.
- D. The gaskets shall be designed and manufactured so that the completed joint will withstand an internal water pressure in excess of 13 psi for a period of 10 minutes without showing any leakage by the gasket or displacement of it. The pipe manufacturer shall provide facilities for testing the effectiveness of the joints against leakage and one such test may be required for each 500-ft of pipe for each type of joint manufactured. Such tests shall be made by an internal or external pressure against the joint of at least 13 psi for a period of ten minutes in accordance with ASTM C443. The completed joint, when installed in place in the

THE METROPOLITAN DISTRICT

work, shall be capable of withstanding a groundwater pressure of 13 psi without exceeding the allowable leakage specified for the pipe testing.

- E. The manufacturer shall inspect all pipe joint surfaces for out-of-roundness and pipe ends for squareness. The manufacturer shall furnish to the Engineer a notarized affidavit stating all pipe meets the requirements of ASTM C76, these Specifications and the joint design.

PART 3 - EXECUTION

3.01 LAYING CONCRETE PIPE (OPEN CUT)

- A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe or fittings and the joint surfaces. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective.
- B. As soon as the excavation is completed to the normal grade of the bottom of the trench, refer to the MDC Standard Details Manual for specific subbase depths and materials required. Pipe shall be laid in a dry trench. Blocking under the pipe will not be permitted.
- C. Bedding shall be placed and compacted to give complete vertical and lateral support for the lower section of the pipe as indicated in the MDC Standard Details Manual. A depression shall be left in the supporting bedding at the joint to prevent contamination of the rubber gasket immediately before being forced home. Before the pipe is lowered into the trench, the spigot and bell shall be cleaned and free from dirt. Gasket and bell shall be lubricated by a vegetable lubricant which is not soluble in water, furnished by the pipe manufacturer and harmless to the rubber gasket. The pipe shall be properly aligned in the trench to avoid any possibility of contact with the side of the trench and fouling the gasket. As soon as the spigot is centered in the bell of the previously laid pipe, it shall be forced home with jacks or come-alongs. After the gasket is compressed and before the pipe is brought fully home, each gasket shall be carefully checked for proper position around the full circumference of the joint. Steel inserts shall be used to prevent the pipe from going home until the feeler gage is used to check the final position of the gasket. The jacks or come-alongs shall be anchored sufficiently back along the pipeline (a minimum of five lengths) so that the pulling force will not dislodge the pieces of pipe already in place. Only a jack or come-along shall be employed to force the pipe home smoothly and evenly and hold the pipe while backfilling is in progress. Under no circumstances shall crowbars be used nor shall any of the motor driven equipment be used.
- D. As soon as the pipe is in place and before the come-along is released, backfill shall be placed as indicated in the MDC Standard Details Manual and compacted for at least one-half the length of pipe. Not until this backfill is placed shall the

THE METROPOLITAN DISTRICT

come-along be released. If any motion at joints can be detected, a greater amount of backfill shall be placed before pressure is released. When pipe laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by a watertight plug or other approved means.

- E. Carefully regulate the equipment and construction operations such that the loading of the pipe does not exceed the loads for which the pipe is designed and manufactured. Any pipe damaged during construction operations shall promptly and satisfactorily be repaired or replaced at the Contractor's expense.

3.02 HANDLING STORM RUNOFF AND SANITARY SEWAGE FLOWS

- A. Refer to Section 02150

3.03 REMOVAL AND DISPOSAL OF EXISTING SEWER, MANHOLES AND APPURTENANCES

- A. Refer to Section 02053.

3.04 TELEVISION INSPECTION AND LOW PRESSURE AIR TEST

- A. Refer to Section 02610 and Section 02764.

3.05 UNDERGROUND UTILITY MARKING

- A. The tape shall be provided and installed in accordance with Section 02317.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02615

DUCTILE IRON PIPE FOR SANITARY AND STORM SEWER

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes the installation of the ductile iron pipe for sanitary sewer and storm drain as indicated on the Contract Drawings and as herein specified.
- B. The Contractor shall furnish and install sewer and storm drain piping and service connection piping to the lines and grades and in the locations indicated on the Contract Drawings and/or as ordered by the Engineer.
- C. Installation shall include but not be limited to, all necessary equipment and materials required for the completed pipeline, including foundation, earth excavation, rock excavation, traffic control, dewatering, test pits, trench stabilization and support, and protection of existing utilities, facilities, structures, fittings, bedding, temporary and permanent reconnection of existing house connection laterals to new sewers or drains, support and protection of crossing utilities, installation of piping in tunneled portions of work, backfilling, trench compaction, utility detection tape, filter fabric envelope, temporary and permanent surface restoration, handling of sewage/storm/combined flows and removal and disposal of existing sewers, manholes and appurtenances and bulkheading and grout filling of same.

1.02 RELATED SECTIONS

- A. Section 02140, Dewatering and Drainage
- B. Section 02160, Excavation Support Systems
- C. Section 02202, Trench Refill
- D. Section 02610, Sewer Testing and Cleaning
- E. Section 02764, Television Inspection
- F. Section 03302, Miscellaneous Concrete
- G. Section 03604, Non-Shrink Construction Grout

THE METROPOLITAN DISTRICT

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300.
- B. Pipe, joint and fittings data:
 - 1. Dimensions and general details for typical length of pipe.
 - 2. Detail of joints.
 - 3. Dimensions and general details for all fittings.
- C. Submit certified statement that inspection and all specified tests have been performed.

1.04 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. ASTM A746 Standard Specifications for Ductile Iron Gravity Sewer Pipe
- B. AWWA C104 Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water
- C. AWWA C105 Polyethylene Encasement for Ductile Iron Pipe Systems
- D. AWWA C111 Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
- E. AWWA C115 Flanged Ductile Iron Pipe with Threaded Flanges
- F. AWWA C116 Protective Fusion Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service
- G. AWWA C151 Ductile Iron Pipe, Centrifugally Cast, for Water or Other Liquids
- H. AWWA C150 Thickness Design of Ductile Iron Pipe
- I. AWWA C153 Ductile Iron Compact Fittings, 3 in. through 24 in. and 54 in. through 64 in. for Water Service

1.05 QUALITY ASSURANCE

- A. All pipe and fittings shall be inspected and tested at the foundry as required by the standard specifications by which the material is manufactured.

THE METROPOLITAN DISTRICT

- B. All pipe and fittings shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the foundry by a representative of the Owner.
- C. In addition, the Owner reserves the right to have any or all pipe, fittings, and special castings inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests will be at the Owner's expense.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS

A. Sewer Lines

1. Pipe

- a. Ductile iron gravity and pressure pipe shall conform to the current ASTM, A746, and AWWA C111 and C151 (ANSI A21.51) standard. All pipe shall be new, and shall have the AWWA or ASTM designation, pressure class and size of pipe stamped on the outside of each joint. Ductile iron pipe less than eight (8") inches in diameter will not be allowed for sewer mains.
- b. Ductile iron thickness shall conform in all respects to the current AWWA C150/C151 standard, based on a minimum of 200 psi working pressure. All pipe shall be class 52.
- c. Pipe to be shipped in accordance with the pipe manufacturer's recommendations and stored in a manner that the pipe is not damaged. The Contractor will replace damaged piping at no additional cost to the Owner.

2. Joints and Gaskets

- a. The ductile iron pipe and fittings shall have mechanical joints as specified in ANSI/AWWA C111/A21.11.
- b. Gaskets for mechanical joints to be stored shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.
- c. Push-on joints: The gasket shall be installed in the socket of the pipe previously laid and the gasket then lubricated. The plain end of the pipe being laid shall then be inserted and pulled or pushed to the full depth of the socket. An approved jack-type tool shall be used to assemble

THE METROPOLITAN DISTRICT

pipe 10-inch and larger. Plain ends of cut pipe shall be filed or ground to a taper to prevent damage to the gasket during the insertion.

3. Fittings

- a. Fittings for ductile iron pipe shall be of ductile iron, and shall conform to AWWA C153.

4. Bolts and Nuts

- a. Bolts and nuts for mechanical joints shall be high-strength corrosion resistant low alloy steel, and conform to AWWA C111. Flange bolts and nuts for above ground installation shall conform to Appendix A of AWWA C115. Flange bolts and nuts shall be 316 stainless steel. Mechanical joint bolts shall be handled and stored in such a manner that will ensure proper use with respect to types and sizes.

5. Polyethylene Encasement

- a. Polyethylene encasement shall conform to AWWA C105. Joint tape shall be self-sticking PVC or polyethylene, 8 mils thick.

6. Coatings/ Linings

- a. For sanitary sewer and combined sewer service, ductile iron pipe and fittings shall be lined with a ceramic-filled amine-cured epoxy, Protecto 401 by Indurall on sanitary sewers (not necessary on storm drains). The lining thickness shall be 40 mils minimum. Application shall be performed by an applicator approved by the coating manufacturer, in accordance with manufacturer's instructions and under controlled conditions at the applicator's shop or the pipe manufacturer's plant. Applicator shall submit a certified affidavit of compliance with manufacturer's instructions and requirements specified herein.
- b. Buried pipe shall be installed with a bituminous coating in accordance with AWWA C151 and C110 respectively.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION

- A. Pipes and fittings shall be subjected to a careful inspection and a hammer test before being laid or installed.

THE METROPOLITAN DISTRICT

3.02 LAYING DUCTILE IRON PIPE

- A. Pipe found to be defective or damaged shall not be installed. It shall be removed from the site and replaced with sound pipe.
- B. Pipe shall be cut with an approved saw, wheel, or hydraulic cutter.
- C. The program of earthwork, rock excavation, dewatering, traffic control, support of excavation, environmental protection, backfilling and compacting, handling sanitary sewage and storm water flows, etc., shall be done in accordance with the applicable Sections of the Contract Documents.
- D. Removal and disposal of existing sewer and appurtenances shall be done in accord with Section 02053.
- E. Where and as shown on the Contract Drawings, the Contractor will be required to remove and relay portions of existing sanitary or storm house connection laterals, in conjunction with the installation of new sanitary sewers and storm drains. At certain locations utility owners will be performing utility relocation work. The Contractor shall coordinate his scheduling of work of said utility owners.
- F. Pipe shall be installed in accordance with applicable pipe section of these Specifications.
- G. As soon as the excavation is completed to the normal grade of the bottom of the trench, refer to the MDC Standard Details Manual for specific subbase depths and materials required. Pipe shall be laid in a dry trench. Blocking under the pipe will not be permitted.
- H. Wyes, bends, inlets, tees, chimneys, etc., shall be installed as shown or directed in the pipeline. The Contractor shall have a sufficient quantity of fittings on hand that can be installed as required around existing utilities as directed by the Engineer.
- I. Existing house connection laterals (sanitary and storm) shall be temporarily reconnected to the new sanitary sewer or storm drain until such time as the permanent connection can be made.
- J. Backfill material shall be placed in lifts as specified in Section 02200 and compacted in the full width and length of the trench up to the approved height above the pipe and below the surface to be paved as specified.
- K. Trench stabilization and support systems shall be used for all installation work and shall conform with OSHA regulations. Where indicated on the Contract Drawings and as specified or ordered by the Engineer, the excavation support

THE METROPOLITAN DISTRICT

system shall be installed and either be removed or left in-place, as determined by the Engineer.

3.03 FIELD QUALITY CONTROL

- A. Tests and television inspections shall be performed by the Contractor in accordance with the requirements of Section 02610 and 02764.
- B. The Contractor shall also assist the Engineer in the monitoring of such tests and in the inspection and measurements to ensure the quality of the installed system.

3.04 HANDLING STORM RUNOFF AND SANITARY SEWAGE FLOWS

- A. Refer to Section 02150

3.05 REMOVAL AND DISPOSAL OF EXISTING SEWER, MANHOLES AND APPURTENANCES

- A. Refer to Section 02053.

3.06 TELEVISION INSPECTION AND LOW PRESSURE AIR TEST

- A. Refer to Section 02610 and Section 02764.

3.07 UNDERGROUND UTILITY MARKING

- A. The tape shall be provided and installed in accordance with Section 02317.

3.08 CLEANING

- A. Care shall be taken to prevent earth, water, and other materials from entering the pipeline. As soon as possible after the pipe and manholes are completed, the Contractor shall clean out pipelines and manholes, being careful to prevent soil, water, and debris from entering any existing pipe.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02622

POLYVINYL CHLORIDE SEWER AND DRAIN PIPE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required to install and test polyvinyl chloride (PVC) sewer and drain pipe and fittings, complete as shown on the Contract Drawings and as specified herein.
- B. Pipe or piping refers to all pipe, fittings, material and appurtenances required to construct PVC pipe complete in place.

1.02 RELATED SECTIONS

- A. Section 02140, Dewatering and Drainage
- B. Section 02160, Excavation Support Systems
- C. Section 02202, Trench Refill
- D. Section 02610, Sewer Testing and Cleaning
- E. Section 02764, Television Inspection
- F. Section 03302, Miscellaneous Concrete
- G. Section 03604, Non-Shrink Construction Grout

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300.
- B. Pipe, joint and fittings data:
 - 1. Dimensions and general details for typical length of pipe.
 - 2. Detail of joints.
 - 3. Dimensions and general details for all fittings.
- C. Submit certified statement that inspection and all specified tests have been performed.

THE METROPOLITAN DISTRICT

1.04 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

A. American Society for Testing and Materials (ASTM) Publications

1. D3034 – Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
2. F679 - Specification for Poly (vinyl chloride) (PVC) Large - Diameter Plastic Gravity Sewer Pipe and Fittings.
3. F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
4. D 3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
5. F794 - Standard Specification Poly (vinyl chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter. (Only closed profile gravity sewer pipe will be considered based on this ASTM specification.)
6. F1803 - Standard Specification Poly (vinyl) (chloride) (PVC) Closed Profile Gravity Sewer Pipe.
7. D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
8. D1784 – Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
9. F949 – Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings.

1.05 QUALITY ASSURANCE

- #### A.
- All pipe delivered to the job site shall be accompanied by test reports certifying that the pipe and fittings conform to the herein-mentioned ASTM specifications. In addition, the pipe shall be subject to thorough inspection and tests, the right being reserved for the Engineer to apply such tests as the Engineer deems necessary.

THE METROPOLITAN DISTRICT

- B. All tests shall be made in accordance with the methods prescribed by the herein - mentioned ASTM specifications, and the acceptance or rejection shall be based on the test results.
- C. The Contractor shall furnish all labor necessary to assist the Engineer in inspecting the pipe. Pipe will be inspected upon delivery, and such as does not conform to the requirements of this Contract shall be rejected and shall immediately be removed by the Contractor.

1.06 DELIVERY, STORAGE AND HANDLING

- A. All items shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the Engineer.
- B. PVC items deteriorate in sunlight and are slightly brittle, especially at lower temperatures, so care shall be taken in loading, transporting and unloading items to prevent injury to the items. All items shall be examined before installation and no piece shall be installed which is found to be defective. Handling and installation of pipe and fittings shall be in accordance with the manufacturer's instructions, referenced standards and as specified herein.
- C. Any pipe or fitting showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.
- D. While stored, pipe shall be adequately supported from below at not more than 3-ft intervals to prevent deformation. The pipe shall be stored in stacks no higher than that given in the following table:

<u>Pipe Diameter (inches)</u>	<u>Max. No. of Rows Stacked</u>
8 or less	5
12 to 21	4
24	3

- E. Pipe and fittings shall be stored in a manner which will keep them at ambient outdoor temperatures and out of the sunlight or delivered to the site so that no pipe is exposed to sunlight for more than 30 days. Temporary shading as required to meet this requirement shall be provided. Simple covering of the pipe and fittings which allows temperature buildup or direct or indirect sunlight will not be permitted.
- F. If any defective item is discovered after it has been installed, it shall be removed and replaced with an exact replacement item in a satisfactory manner by the Contractor, at the Contractor's own expense. All pipe and fittings shall be

THE METROPOLITAN DISTRICT

thoroughly cleaned before installation and the interior shall be kept clean until testing.

- G. In handling the items, use special devices and methods as required to achieve the results specified herein. No uncushioned devices shall be used in handling the item.

1.07 WARRANTY

- A. Any repairs made as a result of the inspection, for example, joint sealing or pipe section replacement- shall be warranted for one year. At the end of the one year warranty period, the repair will be inspected and shall be tested by the Contractor as, and any deficiencies shall be corrected by the Contractor, also as described.

PART 2 - PRODUCTS

2.01 PIPE, FITTINGS, AND SPECIALS

- A. The polyvinyl chloride pipe and fittings, including also those required for stubs, shall conform to one of the following:
 - 1. ASTM D3034 for diameters 6-inch through 15-inch,
 - 2. ASTM F679 (Wall thickness T- 1) for diameters 18-inch through 27-inch,
 - 3. ASTM F949 for 6 to 36-inch diameter polyvinyl chloride (PVC) pipe with a smooth interior.
 - 4. Closed profile pipe conforming to ASTM F1803 for diameters 18-inches through 48-inches.
 - 5. ASTM F794 for diameters 18-inches through 48-inches.
- B. The pipe shall have pipe diameter to wall thickness ratio (SDR) of a maximum of 35, unless otherwise indicated and/or approved by the Engineer. Refer to Appendix B for the Owner's approved materials list. Closed profile pipe shall have a minimum stiffness of 46 psi for 18 inch to 27-inch PVC sewer pipe and minimum stiffness of 50 psi for 30-inch and larger diameter PVC pipe.
- C. Straight pipe shall be furnished in lengths of not more than 13 feet, and Y-branches shall be furnished in lengths of not more than 3 feet, unless otherwise permitted by the Engineer. Saddle Y-branches will not be allowed.
- D. Fittings and special pipe pieces (specials) shall conform to the specifications for straight pipe insofar as applicable and to the details indicated in the MDC Standard Details Manual.

THE METROPOLITAN DISTRICT

- E. Foundation, base, haunching, backfill and bedding shall be as shown in the MDC Standard Details Manual and as specified in Sections 02200 and 02202.
- F. Geotextile fabric shall have an effective opening size of 70 µm.
- G. PVC hub, stainless steel band, and rubber sleeve shall be used for drain service lateral connections to mainline pipe and shall be as manufactured by Inserta Tee or equal.

2.02 JOINTS

- A. Joints for the polyvinyl chloride pipe shall be push-on bell and spigot joints using elastomeric ring gaskets conforming to ASTM F477. The gaskets shall be securely fixed into place in the bells so that they cannot be dislodged during joint assembly. The gaskets shall be of a composition and texture which is resistant to common ingredients of sewage and industrial wastes, including oils and groundwater, and which will endure permanently under the conditions of the proposed use. The joints shall conform to ASTM D3212.

PART 3 - EXECUTION

3.01 EXECUTION - GENERAL

- A. The program of earthwork, rock excavation, dewatering, traffic control, support of excavation, environmental protection, backfilling and compacting, handling sanitary sewage and storm water flows, etc., shall be done in accordance with the applicable Sections of the Specifications.
- B. Removal and disposal of existing sewer and appurtenances shall be done in accord with Section 02053.
- C. Where and as shown on the Contract Drawings, the Contractor will be required to remove and relay portions of existing sanitary or storm house connection laterals, in conjunction with the installation of new sanitary sewers and storm drains. At certain locations other utility owners will be performing utility relocation work. The Contractor shall coordinate his scheduling of work of said utility owners.
- D. Pipe shall be installed in accordance with applicable pipe section of these Specifications.
- E. As soon as the excavation is completed to the normal grade of the bottom of the trench, refer to the MDC Standard Details Manual for specific subbase depths and materials required. Pipe shall be laid in a dry trench. Blocking under the pipe will not be permitted.

THE METROPOLITAN DISTRICT

- F. Pipe shall be connected at joints with the use of a push-on integral rubber gasket on all plastic pipe conforming with the designated ASTM specifications.
- G. Wyes, bends, inlets, tees, chimneys, etc., shall be installed as shown or directed in the pipeline. The Contractor shall have a sufficient quantity of fittings on hand that can be installed as required around existing utilities as directed by the Engineer.
- H. Existing house connection laterals (sanitary and storm) shall be temporarily reconnected to the new sanitary sewer or storm drain until such time as the permanent connection can be made.
- I. Backfill material shall be placed in lifts as specified in Section 02200 and compacted in the full width and length of the trench up to the approved height above the pipe and below the surface to be paved as specified.
- J. Trench stabilization and support systems shall be used for all installation work and shall conform with OSHA regulations. Where indicated on the Contract Drawings and as specified or ordered by the Engineer, the excavation support system shall be installed and either be removed or left in-place, as determined by the Engineer.
- K. Trench dams shall be placed at the locations shown on the Contract Drawings. Backfill shall be placed evenly on each side of the trench dam as indicated in the MDC Standard Details Manual.

3.02 INSPECTION

- A. Each pipe unit shall be inspected before being installed. No single piece of pipe shall be laid unless it is generally straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16 in. per ft. of length with a maximum deviation of 3/4 in. per length of pipe. If a piece of pipe fails to meet this required check for straightness, it shall be rejected and removed from the site. Any pipe unit or fitting discovered to be defective either before or after installation shall be removed and replaced with a sound unit.

3.03 INSTALLATION

- A. Pipes and fittings complying with ASTM F949 shall be installed in accordance with ASTM D2321.
- B. All underdrains shall be match-in-kind. Refer to applicable Municipality Standards.
- C. The pipe bedding shall be as shown in the MDC Standard Details Manual and in accordance with Section 02721.

THE METROPOLITAN DISTRICT

- D. Suitable bell holes shall be provided, so that after placement, only the barrel of the pipe receives bearing pressure from the supporting material.
- E. All pipe and fittings shall be cleared of all debris, dirt, etc., before being installed and shall be kept clean until accepted in the completed work.
- F. Pipe and fittings shall be installed to the lines and grades indicated on the Contract Drawings, in the MDC Standard Details Manual or as required by the Engineer. Care shall be taken to ensure true alignments and gradients.
- G. Before any joint is made, the previously installed unit shall be checked to assure that a closed joint with the adjoining unit has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to the required grade by striking it with a shovel handle, timber or other unyielding object.
- H. All joint surfaces shall be cleaned. Immediately before jointing the pipe, the bell or groove shall be lubricated in accordance with the manufacturer's recommendation. Each pipe unit shall then be carefully pushed into place without damage to pipe or gasket. Suitable devices shall be used to force the pipe units together so that they will fit with a minimum open recess inside and outside and have tightly sealed joints. Care shall be taken not to use such force as to wedge apart and split the bell or groove ends.
- I. Joints shall not be "pulled" or "crimped" unless permitted by the Engineer.
- J. Where any two pipe units do not fit each other closely enough to enable them to be properly jointed, they shall be removed and replaced with suitable units and new gaskets.
- K. Details of gasket installation and joint assembly shall follow the directions of the manufacturers of the joint material and of the pipe, all subject to review by the Engineer. The resulting joints shall be watertight and flexible.
- L. All premolded gasket joint polyvinyl chloride pipe of a particular manufacturer may be rejected if there are more than five unsatisfactory joint assembly operations or "bell breaks" in 100 consecutive joints, even though the pipe and joint conform to the appropriate ASTM Specifications as hereinbefore specified. If the pipe is unsatisfactory, as determined above, the Contractor shall, if required, remove all pipe of that manufacturer of the same shipment from the work and shall furnish pipe from another manufacturer which will conform to all of the requirements of these specifications.
- M. Open ends of pipe and branches shall be closed with polyvinyl chloride stoppers secured in place in an acceptable manner.

THE METROPOLITAN DISTRICT

- N. After each pipe has been properly bedded, enough bedding material shall be placed between the pipe and the sides of the trench, and thoroughly compacted, to hold the pipe in correct alignment. Bell holes, provided for jointing, shall be filled with bedding material and compacted. Bedding above the spring line of the pipe (see MDC Standard Details Manual for material) shall be placed and compacted to complete the pipe bedding.
- O. The Contractor shall take all necessary precautions to prevent flotation of the pipe in the trench. At all times pipe installation is not in progress, the open ends of the pipe shall be closed with temporary watertight plugs, or by other acceptable means.
- P. If water is in the trench when work is to be resumed, the plug shall not be removed until suitable provisions have been made to prevent water, earth, or other substances from entering the pipe.
- Q. Pipelines shall not be used as conductors for trench drainage during construction.

3.04 ALLOWABLE PIPE DEFLECTION

- A. Pipe provided under this specification shall be so installed as to not exceed a maximum deflection of 5 percent. Such deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
- B. Upon completion of a section of sewer, including placement and compaction of backfill, the Contractor shall measure the amount of deflection by pulling a specially designed gage assembly through the completed section. The gage assembly shall be in accordance with the recommendations of the pipe manufacturer and be acceptable to the Engineer.
- C. Should the installed pipe fail to meet this requirement, the Contractor shall do all work to correct the problem as the Engineer may require without additional compensation.

3.05 CLEANING

- A. Care shall be taken to prevent earth, water, and other materials from entering the pipeline. As soon as possible after the pipe and manholes are completed, the Contractor shall clean out the pipeline and manholes, being careful to prevent soil, water, and debris from entering any existing sewer.

THE METROPOLITAN DISTRICT

3.06 HANDLING STORM RUNOFF AND SANITARY SEWAGE FLOWS

- A. Refer to Section 02150.

3.07 REMOVAL AND DISPOSAL OF EXISTING SEWER, MANHOLES AND APPURTENANCES

- A. Refer to Section 02053.

3.08 TELEVISION INSPECTION AND LOW PRESSURE AIR TEST

- A. Refer to Section 02610 and Section 02764.

3.09 UNDERGROUND UTILITY MARKING

- A. The tape shall be provided and installed in accordance with Section 02317.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02628

PIPE REPAIR COUPLINGS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required to connect new replacement sewer pipe and wyes to existing pipe; and repair existing sewer pipe; complete as shown on the Contract Drawings and as specified herein.

1.02 RELATED SECTIONS

- A. Section 02200, Earthwork
- B. Section 02612, Reinforced Concrete Pipe
- C. Section 02615, Ductile Iron Pipe for Sanitary Sewer
- D. Section 02622, Polyvinyl Chloride Sewer and Drain Pipe
- E. Section 02721, Laying Sewer and Drain Pipe, General

1.03 SUBMITTALS

- A. Submit to the Engineer the name of the manufacturers and model number and data sheets of all materials to be furnished.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Flexible sleeve type couplings to connect different pipe types shall be of corrosion resistant rubber or PVC with Series 300 stainless steel clamp bands. Refer to Appendix B for the Owner's approved materials list for flexible sleeve type couplings.. Stainless steel clamp bands shall be as manufactured by Indiana Seal or equal. All stainless steel bands shall be coated with bitumastic.
- B. Flexible donut type couplings to connect different pipe types shall be of corrosion resistant rubber or PVC. Flexible donut type couplings shall be as manufactured by Fernco or equal.

THE METROPOLITAN DISTRICT

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPE REPAIR COUPLINGS

- A. Existing sewer pipe shall be excavated with care so no damage to the pipe or existing fittings is caused. Hand digging around the existing pipe will be required to provide a clear opening for repairing or removing and reinstalling new pipe as specified herein.
- B. All repair couplings shall be examined before installation and none shall be installed which are found to be defective.
- C. Installation of all repair couplings shall be in accordance with manufacturer's instructions, the pipe manufacturer and as specified herein.
- D. Any damage to existing pipe or fittings other than pipe or fittings specifically intended to be removed, replaced or abandoned as part of this Contract shall be repaired by the Contractor as directed by the Engineer. If the Contractor damages existing pipe or fittings through error or for his own convenience he shall repair all damages at his own expense.
- E. Flexible sleeve type couplings and donut type couplings shall be installed for connecting new replacement PVC pipe and fittings to existing sewer pipe or service connections, regardless of the type of existing pipe material. Pipe rehabilitation using a sleeve type and a donut type coupling or using two-sleeve type couplings shall be as shown on the Contract Drawings, in the MDC Standard Details Manual and as specified herein.
- F. Flexible sleeve type couplings shall be installed over smooth, clean spigot or cut ends of pipe. If cutting pipe is required, the cutting shall be done by machine or tool specifically intended for cutting the type of pipe being worked on. All cutting of pipe shall be at right angles to the axis of the pipe and shall leave a smooth cut.
- G. Replacement of existing sewer pipe at service connection replacements using flexible couplings shall consist of removing the pipe to the length required. Care shall be exercised so that on the existing pipe left-in-place, a clean, unbroken spigot end (or smooth cut end) and a clean, unbroken bell end (or smooth cut end) are available to connect to the replacement pipe. The Contractor shall then insert a donut coupling into the bell end of the existing pipe and shall install the replacement pipe into the bell and donut. The replacement pipe shall have a sleeve coupling on the opposite end and shall be "folded in" until it is aligned with the existing spigot end. The sleeve coupling shall then be slid halfway back over the existing spigot and clamped securely in place. The new pipe shall be bedded and backfilled as specified. The new pipe shall be accurately cut to length so that the gap left, after fold in, is 1-in or less. As an alternative, the Contractor may omit

THE METROPOLITAN DISTRICT

the donut coupling and use two sleeve type couplings to connect replacement pipe with plain or cut ends to two existing plain or cut end pipes.

3.02 INSTALLATION OF SERVICE LATERAL REPLACEMENT SADDLES ON CIPP

- A. The Contractor shall excavate and remove a portion of the existing sanitary sewer main or carrier pipe to expose the liner pipe. Provide sufficient working space to install a flexible tap saddle.
- B. The Contractor shall use the existing service hole, per the manufacture's recommendations, in the liner pipe that will form a tight fit between the liner pipe, PVC hub and rubber boot.
- C. The flexible tap saddle shall be installed to align with the existing service hole in the pipe, making sure the saddle is properly oriented to the mainline.
- D. The flexible tap saddle shall be a Fernco Saddle, or equal.
- E. The PVC hub shall be inserted into the rubber boot, per manufacturers recommended instructions. The stainless steel band shall be placed around the top of the rubber boot and tightened to form a watertight seal.
- F. The service lateral shall be replaced as detailed.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02640

POINT REPAIRS TO SANITARY SEWER LINES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, supervision, equipment, appliances and materials, and performing all operations in connection with the point repair or replacement of existing sanitary sewers at the locations as indicated, and as directed by the Owner, complete in place and accepted, in accordance with the Contract Drawings and Specifications.
- B. The Work shall include cutting, removal and replacement of existing pavement and pavement base; temporary and permanent pavement; replacement of unsuitable backfill material; trench excavation with sheeting, shoring and bracing of the trench as required and/or as directed; exposing the sewer for inspection and repair; replacing defective pipe with new PVC or DI pipe; tees; wyes and chimneys; compaction of all fill, backfill and subgrades; protection of existing pipelines, utilities, structures and work; dewatering, testing and all appurtenant work; maintaining existing sewer flows; and restoration of disturbed grass areas, sidewalks, and pavement.
- C. The Contractor is required to perform television (CCTV) inspection prior to construction to verify the existing conditions and the exact location of each point repair. Additional CCTV inspections will be required at the completion of the point repair and one (1) year after substantial completion. If the Contractor were to perform the CCTV at the one (1) year mark or shortly after, they are still liable to repair any defects that are discovered. Retainage will be held in accordance with the Agreement until the CCTV has been completed, submitted and accepted by the Engineer.

1.02 RELATED SECTIONS

- A. Section 01510, Maintenance of Flow in Existing Sewers
- B. Section 01570, Maintenance and Protection of Traffic
- C. Section 02053, Removal and Disposal of Existing Sewer, Manholes and Appurtenances
- D. Section 02150, Bypass Pumping
- E. Section 02160, Excavation Support Systems

THE METROPOLITAN DISTRICT

- F. Section 02200, Earthwork
- G. Section 02230, Granular Fill Materials
- H. Section 02510, Temporary and Permanent Paved Surface Restoration
- I. Section 02610, Sewer Testing and Cleaning
- J. Section 02615, Ductile Iron Pipe for Sanitary Sewer
- K. Section 02622, Polyvinyl Chloride Sewer Pipe
- L. Section 02628, Pipe Repair Couplings
- M. Section 02764, Television Inspection

1.03 SUBMITTALS

- A. Shop drawings, a list of materials, and technical data shall be submitted to the Owner for approval prior to any work being performed under this Section of the Specifications in accordance with Section 01300.

1.04 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. ASTM C425-04 Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings

1.05 DESIGN CONDITIONS

- A. Point repairs shall conform to the requirements of the Specifications and shall be coordinated with all other associated work.
- B. A Point Repair is considered the replacement to a minimum of ten (10) linear foot section of piping with a maximum of twenty six (26) linear feet of total pipe installed. It is the intent under Point Repairs to replace 10 linear feet of pipe in each location unless otherwise noted on the Contract Drawings. The Contractor shall minimize the number of pipe joints at each point repair location. During any operation associated with point repair, the work may be modified as deemed necessary or as directed by the Owner. The maximum total of 26 linear feet shall apply to any additional replacement required based on existing conditions at the time of construction or additional pipe required to connect to existing pipe in sound condition, as determined by the Engineer.

THE METROPOLITAN DISTRICT

- C. On all sewer lines in which a point repair is to be made, the normal flow of sewage shall be bypassed with the Owner's approval, by bypass pumping. Maintain sewage flow at all times.
- D. The approximate location of point repairs has been made available on the Contract Drawings. The Contractor shall undertake such investigations, as he deems necessary, to verify the location of point repairs including television (CCTV) inspection on that line segment prior to excavation.
- E. If a service is located at the point repair location, the pipe and service connection shall be replaced to the property line or as shown on the Contract Drawings.

1.06 PUBLIC NOTIFICATION

- A. All property owners shall receive notification that their sewage service will be interrupted during the CCTV inspection and while the point repair is being installed. The Contractor shall distribute all written notices to each affected property owner at the following times:
 - 1. Seven (7) days prior to construction activities.
 - 2. Between 24 to 48 hours prior to construction activities.
 - 3. Within 24 hours after completion of construction activities.
- B. The Owner will provide copies of all public notifications for distribution by the Contractor.
- C. Each notice shall include the date, start time and estimated time when service will be completely restored. The Contractor shall provide a telephone number for property owners to call for information when work is in progress.
- D. The Contractor shall contact any home or business that cannot be activated within the time stated in the written notice.
- E. The maximum amount of time any home or business shall be without sanitary sewer service is eight (8) hours. Any home or business that is without sanitary service for longer than (8) hours will be bypassed to the sanitary sewer at no additional cost to the Owner.
- F. Contractor's schedule is subject to approval based on critical stakeholders and at no additional cost to the Owner.

THE METROPOLITAN DISTRICT

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The materials necessary for a point repair are shown on the Contract Drawings, detailed in the MDC Standard Manual and specified in the appropriate Sections of these Specifications.
- B. For point repair locations that are scheduled for CIPP lining, the application of Protecto 401 interior coating is not required when using ductile iron pipe.

2.02 JOINTS

- A. When connecting the new pipe to the straight spigot end of the existing pipe, suitable flexible adapters shall be used for joining dissimilar materials or similar materials. The adapters shall be either the insert type or the stainless steel banded coupling type (Refer to Appendix B for Owner's approved materials list. The adapter and band material shall be of materials, which pass the strength and chemical requirements of ASTM Designation: C594, latest revision. All banded maintenance couplings and adapters shall bear the manufacturer's identifying mark and size.
- B. When connecting the new pipe to the bell end of existing sewer pipe, a concrete encasement shall be used for joining dissimilar materials or similar materials. The concrete encasement shall cover the entire joint as detailed in the MDC Standard Details Manual. Concrete encasement is not required if the pipe segment is scheduled for cured-in-place lining under this Contract.

2.03 SEWER CONNECTIONS AND APPURTENANCES

- A. Service Connections
 - 1. Any service connection replaced during a point repair shall conform to these Specifications and applicable ASTM Specifications, for the materials and installation. Materials shall be PVC pipe as specified in Section 02622 or ductile iron pipe as specified in Section 02615 as shown on the Contract Drawings and in the MDC Standard Details Manual.

PART 3 - EXECUTION

3.01 GENERAL

- A. The pipeline shall be excavated and exposed at the points of defects for the designated length of sewer section as recorded for inspection. All defective pipe located shall be uncovered so that the entire defect can be repaired or replaced and aligned into its final position in the profile. This work shall be

THE METROPOLITAN DISTRICT

accomplished in such a manner that the integrity of the pipe and joints is not destroyed.

- B. Upon completion of the realignment and rehabilitation of the defect as described herein, it shall be CCTV inspected. It is the intention of these Specifications that all rehabilitated or repaired pipelines be CCTV inspected.
- C. Replacement of and methods for bedding materials shall conform to the trench details shown in the MDC Standard Details Manual.
- D. Repair or replacement of existing defective sewer pipe shall conform to the appropriate Sections of these Specifications.
- E. Repair or replacement of leaking service connections, wyes, tees and saddles shall conform to the appropriate Sections of these Specifications.
- F. Connect newly constructed sewer pipe to existing sewer pipe, main sewer line and service lines, all in good condition, so that no possible source of leakage may be created. Any sewer pipe damaged by the Contractor shall be replaced or repaired at his/her expense.
- G. Unless shown otherwise on Contract Drawings, repairs of laterals shall extend to the property line.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02641

AIR VALVE ASSEMBLY (WATER)

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing air valves, chlorination valves, chlorination blow-offs and other related assemblies in the pipeline, and installing gate boxes over the assembly, as shown on the Contract Drawings or as directed by the Engineer, in accordance with these Specifications. Also included are the clearing, trenching and disposal of excavated materials, backfilling trenches, furnishing the additional material for backfilling, grading, bracing and pumping.

1.02 RELATED SECTIONS

- A. Section 01570, Maintenance and Protection of Traffic
- B. Section 02651, Ductile Iron Water Main and Fittings

1.03 SUBMITTALS

- A. In accordance with Section 01300, six (6) sets of the manufacturer's literature for the materials of this Section shall be submitted for approval.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings
- B. ASTM B88 - Standard Specification for Seamless Copper Water Tube
- C. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
- D. ANSI/AWWA C800 - AWWA Standard for Underground Service Line Valves and Fittings
- E. MDC Standard Details Manual.

THE METROPOLITAN DISTRICT

PART 2 - PRODUCTS

2.01 COPPER PIPE

- A. The copper tubing shall conform to ASTM B88, Type K.

2.02 FITTINGS

- A. All brass fittings shall be of standard design generally used by water utilities and be in accordance with ASTM B62 and ANSI/AWWA C800.
- B. The corporation stops and angle valves shall be of good, tough, composition bronze well-mixed and free from flaws and imperfections. The corporation stops shall be of a type suitable for use in ductile iron mains. The inlet end shall have an inlet taper thread type known as the "Mueller Taper Thread".
- C. Corporation stop for air valves shall be rated a minimum of 250 PSI.
- D. For specific size and connection details, see the Contract Drawings and the MDC Standard Details Manual.

2.03 GATE BOX

- A. The gate box shall conform to the following requirements:
- B. Cast iron shall conform to ASTM A-48, Class 25.
- C. Top section shall be of the top flange design and shall have no bead on the bottom.
- D. The word "WATER" shall be cast with raised letters in the center of the cover.
- E. Base section shall be of the Dwyer design which centers the operating nut for positive access to the valve.
- F. For specific gate box details, see the MDC Standard Details Manual.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION

- A. All tubing and fittings shall be carefully examined for defects and no material shall be installed which is known to be defective and should any defective tubing or fitting be discovered after being installed, it shall be removed and replaced with sound material at no additional cost to the Owner.

THE METROPOLITAN DISTRICT

3.02 INSTALLATION

- A. The air valves, chlorination valve and blow-off shall be installed according to the details shown in the MDC Standard Details Manual and to the satisfaction of the Engineer. To properly receive the air valve or other assembly the ductile iron pipe shall be drilled and tapped. All tapped holes for corporation stops shall be "Mueller Taper Thread".
- B. All tapped holes in ductile iron pipe shall be cleaned by running the correct size tap into the hole immediately prior to installing the corporation.
- C. Gate boxes shall be set plumb and centered on the fitting, etc. Earth fill shall be carefully tamped around the gate box to a distance of 4 feet on all sides of the box or to the undisturbed trench face, if less than 4 feet.
- D. Excavation and refill shall conform to the requirements under other applicable Contract Sections.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02642

12-INCH AND SMALLER GATE VALVES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing gate valves in the pipeline, together with gate boxes, joint restraints, and extension stems, where required, over the assembly and appurtenances shown on the Contract Drawings, complete as shown, specified or directed. The Work includes furnishing and installing all gate valves, transporting materials, clearing, trenching, disposing of unused excavated materials, joint restraint, gate box, extension stem, where required, backfilling trenches, furnishing additional material for backfilling, miscellaneous grading, shoring, bracing, pumping and all other incidental work required to fully complete this work in accordance with the Contract Drawings and Specifications, except as otherwise provided for.

1.02 RELATED SECTIONS

- A. Section 02200, Earthwork
- B. Section 02651, Ductile Iron Pipe and Fittings
- C. Section 02669, Blow-off Assembly

1.03 SUBMITTALS

- A. Manufacturer's literature and/or shop drawings for the materials of this Section shall be submitted for approval in accordance with the requirements of Section 01300.
- B. A certified statement that inspection and all of the specified tests have been made and met shall also be submitted at the time of delivery.

1.04 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. ANSI/AWWA C111/A21.11 - American National Standard for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
- B. ANSI/AWWA C500 - American National Standard for Gate Valves for Water and Sewerage Systems

THE METROPOLITAN DISTRICT

- C. ANSI/AWWA C509 - American National Standard for Resilient - Seated Gate Valves for Water and Sewage Systems
- D. AWWA C515 - Reduced - Wall, Resilient – Seated Gate Valves for Water Supply Service
- E. ANSI/AWWA C550 – Protective Epoxy Interior Coatings for Valves And Hydrants.
- F. ASTM A 36 - Standard Specification for Structural Steel
- G. ASTM A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- H. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
- I. ASTM A536 - Standard Specification for Ductile Iron Castings

1.05 QUALITY ASSURANCE

- A. All gate valves, accessories and gate boxes shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.
- B. A certified statement that inspection and all of the specified tests have been made and met shall also be submitted at the time of delivery.
- C. All gate valves, accessories and gate boxes shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the foundry by a representative of the Owner.
- D. In addition the Owner reserves the right to have any or all materials inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere at the Owner's discretion. Such inspection and/or tests shall be at the Owner's expense.

PART 2 - PRODUCTS

2.01 GATE VALVE

The gate valve shall conform to ANSI/AWWA C500, ANSI/AWWA C509 and the following additional requirements:

- A. Valve shall be resilient sealed.
- B. Body and bonnet shall be constructed of ASTM A536 ductile iron.

THE METROPOLITAN DISTRICT

- C. Wedges shall be constructed of ASTM A536 ductile iron and encapsulated with EPDM.
- D. All other materials not specified shall be as specified in ANSI/AWWA C500 and C509.
- E. Bolts and nuts for connecting O-ring seal plates and bonnet to body shall be stainless steel.
- F. Valve shall be furnished with O-ring seals utilizing two O-rings, consistent with appropriate specifications. Valve shall be capable of having O-rings replaced while the valve is under pressure.
- G. Valve shall have mechanical joint ends, unless otherwise specifically indicated, which shall conform to ANSI/AWWA C111/A21.11. All joint accessories shall be furnished with each valve.
- H. Valve shall be non-rising stem.
- I. Direction to open (right-hand or left-hand) shall be as shown in the MDC Standard Details Manual.
- J. Operating nut shall be 2" square.
- K. Valve, linings, and coatings shall conform to NSF Standard 61.
- L. Valve shall have a working pressure rating of 250 psi.
- M. Provide all internal and external wetted parts coated with a fusion bonded epoxy in accordance with ANSI/AWWA C550.

2.02 GATE BOX

The gate box shall conform to the following requirements:

- A. Cast iron shall conform to ASTM A-48.
- B. Top section shall be of the top flange design and shall have no bead on the bottom.
- C. The word "WATER" shall be cast with raised letters in the center of the cover.
- D. Base section shall be of the Dwyer design which centers the operating nut for positive access to the valve.
- E. For specific gate box details, see the MDC Standard Details Manual.

THE METROPOLITAN DISTRICT

- F. Ten (10") inch gate box to be used for 10" gate valve and greater.

2.03 EXTENSION STEM

- A. The extension stem shall be fabricated from stainless steel conforming to ASTM A 36.
- B. For extension stem details, see the MDC Standard Details Manual.

2.04 JOINT RESTRAINT DEVICES

- A. Refer to Section 02651.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION

- A. The gate valve, gate box, joint restraints etc. shall be subject to a careful inspection before being installed. The valve shall be run through a full open-close cycle to insure proper operation.

3.02 INSTALLATION OF GATE VALVE, GATE BOX AND JOINT RESTRAINTS

- A. The gate valve shall be installed according to the details shown in the MDC Standard Details Manual and to the satisfaction of the Engineer.
- B. All debris and foreign material shall be cleared from valve openings and seats. All mechanisms shall be checked and all nuts and bolts checked for tightness.
- C. The gate box shall be set plumb and centered directly over the operating nut of the valves. Earth fill shall be carefully tamped around the gate box to a distance of 4 feet on all sides of the box or to the undisturbed trench face, if less than 4 feet.
- D. Where and as shown on the Contract Drawings, or ordered, a valve extension stem shall be installed. An extension stem will be ordered when the valve-operating nut is more than 4.5' feet below finished grade.
- E. Excavation, shoring, dewatering, and refill and traffic control shall conform to the requirements under other applicable Contract Sections.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02644

16-INCH AND LARGER BUTTERFLY VALVES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing butterfly valves in the pipeline, together with gate boxes and extension stems, where required, over the assembly and appurtenances shown on the Contract Drawings, complete as shown, specified or directed. The Work includes, all as shown, specified or directed, transporting materials, clearing, trenching, disposing of unused excavated materials, furnishing and installing the butterfly valve, gate box, extension stem, where required, backfilling trenches, furnishing additional material for backfilling, miscellaneous grading, sheeting, bracing, pumping and all incidental work, except as otherwise provided for.

1.02 RELATED SECTIONS

- A. Section 02651, Ductile Iron Pipe and Fittings

1.03 SUBMITTALS

- A. In accordance with Section 01300, six (6) sets of the manufacturer's literature and/or shop drawings for the materials of this Section shall be submitted for approval.
- B. A certified statement that inspection and all of the specified tests have been made and met shall also be submitted.

1.04 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. ANSI/AWWA C111/A21.11 – American National Standard for Rubber-Gasket joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
- B. ANSI/AWWA C504 - American National Standard for Rubber-Seated Butterfly Valves
- C. ASTM A 36 – Standard Specification for Structural Steel
- D. ASTM A 123 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on

THE METROPOLITAN DISTRICT

Iron and Steel Products

- E. ASTM A126 – Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
- F. ASTM A536 – Standard Specification for Ductile Iron Castings
- G. MDC Standard Details Manual.

1.05 QUALITY ASSURANCE

- A. All butterfly valves, accessories and gate boxes shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.
- B. All butterfly valves, accessories and gate boxes shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the foundry by a representative of the Owner.
- C. In addition the Owner reserves the right to have any or all materials inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the Owner's expense.

PART 2 - PRODUCTS

2.01 BUTTERFLY VALVE

The butterfly valve shall conform to ANSI/AWWA C504, and the following additional requirements:

- A. Valve shall have a short body length with integrally cast ends.
- B. Valve shall utilize continuous rubber lining on the internal body surfaces and extending over the flanges, or a disk which sits at an angle to the axis of the pipe are acceptable.
- C. Valve Bearings: Self-lubricating, nonmetallic material to effectively isolate the disc-shaft assembly from the valve body. Cast or ductile iron thrust or journal bearing surfaces are not acceptable.
- D. Valve shall have mechanical joint ends, unless otherwise specifically indicated, which conform to ANSI/AWWA C111/A21.11. All joint accessories shall be furnished with each valve.
- E. Body shall be constructed of ASTM A536 ductile iron or ASTM A126 Class B cast iron.

THE METROPOLITAN DISTRICT

- F. Valve seats shall be molded new natural rubber or synthetic rubber.
- G. Seat shall be mounted in the body or on the disc.
- H. Where seat mounted on disc, mechanically fasten to the disc with Type 316 stainless steel hex head screws. Rubber seat shall be reinforced with stainless steel retaining ring. Seat vulcanized or bonded to the disc are not acceptable.
- I. Mating surface for valve with the seat on the disc shall be Type 316 stainless steel. Mating surface shall mechanically retained in valve body and sealed with O-ring.
- J. Where valve seat mounted on body shall have seat mechanically secured or clamped with Type 316 stainless steel fasteners.
- K. Mating surface for valve with the seat on body shall be Type 316 stainless steel or plasma applied nickel-chromium material containing 80 percent nickel, 20 percent chrome.
- L. Plated or spray applied mating surface shall not be acceptable.
- M. Where seat is on valve disc, disc shall be constructed of ASTM A536 ductile iron or ASTM A126 Class B cast iron.
- N. Where seat is on valve body, disc shall be constructed of ASTM A536 ductile iron, ASTM A126 Class B cast iron, or Type 316 stainless steel. Type 316 stainless steel edge shall be provided on cast or ductile iron disc and secured with Type 316 stainless steel threaded fasteners, heat shrunk on disc, a welded on overlay, or plasma applied nick-chrome material.
- O. Shaft shall be constructed of Type 304 stainless steel.
- P. Shaft seals with O-rings or stuffing boxes for split-V packing are permitted. Valve seal shall be replaceable while valve is under pressure.
- Q. Valve shall be designed for buried service.
- R. Direction to open (right-hand or left-hand) shall be as shown in the MDC Standard Details Manual.
- S. Valve shall be Class 150-B with operator sized for service up to 150 psi line pressure and a velocity of 16 ft. per second.
- T. Valve shall be furnished with a 2" square operating nut on a vertical spindle for manual operation. In addition, if installed in a pit, vault or other accessible structure, the valve shall have its operator equipped with an open-close indicator.

THE METROPOLITAN DISTRICT

- U. Valve, linings, and coatings shall conform to NSF Standard 61.

2.02 GATE BOX

The gate box shall conform to the following requirements:

- A. Cast iron shall conform to ASTM A-48.
- B. Top section shall be of the top flange design and shall have no bead on the bottom.
- C. The word "WATER" shall be cast with raised letters in the center of the cover.
- D. Base section shall be of the Dwyer design which centers the operating nut for positive access to the valve.
- E. For specific gate box details, see the MDC Standard Details Manual.

2.03 EXTENSION STEM

- A. The extension stem shall be fabricated from stainless steel conforming to ASTM A 36. Galvanizing shall conform to the latest edition of ASTM A 123.
- B. For extension stem details, see the MDC Standard Details Manual.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION

- A. The butterfly valve, gate box, etc. shall be subject to a careful inspection before being installed. The valve shall be run through a full open-close cycle to insure proper operation.

3.02 INSTALLATION OF BUTTERFLY VALVE, GATE BOX AND JOINT RESTRAINTS

- A. The butterfly valve shall be installed according to the details shown in the MDC Standard Details Manual and to the satisfaction of the Engineer.
- B. All debris and foreign material shall be cleared from valve openings and seats. All mechanisms shall be checked and all nuts and bolts checked for tightness.
- C. The gate box shall be set plumb and centered directly over the operating nut of the valves. Earth fill shall be carefully tamped around the gate box to a distance of 4 feet on all sides of the box or to the undisturbed trench face, if less than 4 feet.
- D. Where and as shown on the Contract Drawings, or ordered, a valve extension stem

THE METROPOLITAN DISTRICT

shall be installed. An extension stem will be ordered when the valve-operating nut is more than 4.5 feet below finished grade.

- E. Excavation and refill shall conform to the requirements under other applicable Contract Sections.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02645

FIRE HYDRANT ASSEMBLY

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing fire hydrant assemblies and appurtenances shown on the Contract Drawings, complete as shown, specified or directed. The Work includes furnishing and installing all fire hydrant assemblies, transporting materials, clearing, trenching, disposing of unused excavated materials, abandonment of existing hydrants, removal of existing hydrants and delivery to the Owner's Water Bureau Yard, gate valve and gate box, concrete collar, crushed stone drain pocket, fittings, pipe restraints and underground warning tape, backfilling trenches, furnishing additional material for backfilling, temporary and permanent paved and unpaved surface restoration and resetting miscellaneous items, miscellaneous grading, sheeting, bracing, pumping and all incidental work, except as otherwise provided for.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 02160, Excavation Support System
- C. Section 02200, Earthwork
- D. Section 02642, 12-Inch and Smaller Gate Valves
- E. Section 02651, Ductile Iron Water Main and Fittings
- F. Section 03302, Miscellaneous Concrete

1.03 SUBMITTALS

- A. Manufacturer's literature and/or shop drawings for the materials of this Section shall be submitted for approval in accordance with the requirements of Section 01300.
- B. A certified statement that inspection and all of the specified tests have been made and met shall also be submitted.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

THE METROPOLITAN DISTRICT

- A. ANSI/AWWA C502 -AWWA Standard for Dry-Barrel Fire Hydrants.
- B. ANSI/AWWA C550 - AWWA Standard for Protective Epoxy Interior Coatings for Valves and Hydrants.

1.05 QUALITY ASSURANCE

- A. All hydrants, gate valves and fittings shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.
- B. All fire hydrants, valves and fittings shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the foundry by a representative of the Owner.
- C. In addition, the Owner reserves the right to have any or all fire hydrants, valves, fittings and special casting inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or the tests shall be at the Owner's expense.

PART 2 - PRODUCTS

2.01 FIRE HYDRANT

The fire hydrant shall conform to the latest edition of ANSI/AWWA C502, ANSI/AWWA C550 and the following additional requirements:

- A. Buried depths to be obtained from Contract Drawings, MDC Standard Details Manual and field verified.
- B. Hydrant to be painted bright red on aboveground section with yellow bonnets.
- C. Hydrant shall be compression-type with valve opening against pressure.
- D. Minimum size of valve opening: 5-inch diameter.
- E. Diameter and style of inlet connection: 6-inch, mechanical joint.
- F. O-ring seals are required.
- G. Number and size of nozzles: two 2-1/2-inch hose nozzles and one 4-1/2-inch pumper nozzle. All threads shall be National Standard Firehose Coupling Screw Threads.
- H. Direction to open: counter-clockwise, open to the left.

THE METROPOLITAN DISTRICT

- I. Hydrant shoe will have a protective coating of an epoxy type.
- J. Refer to Appendix B for Owner's approved materials list for hydrant manufacturers.
- K. All hydrants shall be self-draining.

2.02 DUCTILE IRON WATER MAIN AND FITTINGS

- A. Refer to Section 02651.

2.03 GATE VALVE AND GATE BOX

- A. Refer to Section 02642.

2.04 CRUSHED STONE

- A. Refer to Section 02202.

2.05 MISCELLANEOUS CONCRETE

- A. Refer to Section 03302.

2.06 HARNESSING

- A. Refer to Section 02651.

2.07 UTILUNDERGROUND WARNINGTAPE

- A. Refer to Section 02317.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION

- A. Hydrants, gate valves, pipe, fittings, gate boxes etc. shall be subject to a careful inspection before being installed. Hydrants and valves shall be run through a full open-close cycle to insure proper operation.

3.02 INSTALLATION OF HYDRANT ASSEMBLY

- A. Fire hydrants, piping, gate valves, etc. shall be installed according to the details shown in the MDC Standard Details Manual and to the satisfaction of the Engineer.
- B. All debris and foreign material shall be cleared from hydrants and valve openings and seats. All mechanisms shall be checked and all nuts and bolts checked for tightness.

THE METROPOLITAN DISTRICT

- C. The hydrant shall be set plumb. Earth fill shall be carefully tamped around the hydrant to a distance of 4 feet on all sides of the hydrant, or to the undisturbed trench face, if less than 4 feet. Connecting pipe shall have at least the same depth of cover as the distributing main. See the MDC Standard Details Manual.
- D. Not less than 12 cubic feet of broken stone shall be placed around the base of the hydrants at the location of the drain holes. Backfill around the hydrants shall be properly compacted to the grade line. Hydrants shall have the interiors cleaned of all foreign matter before installation, and shall be inspected in the open and closed positions.
- E. The body of the hydrant shall be of sufficient length to allow the hydrant to be set at the proper elevation. Offset hydrant lateral to install at same depth of cover at the distributing main. Furnish and install extensions when required for greater depths. Extensions should only be used if an offset is not possible and shall be approved by Owner.
- F. Ductile iron pipe and harnessing shall be installed in accordance with Section 02651.
- G. The underground warning tape shall be placed approximately two (2) feet above the top of the pipe.
- H. Gate valves and gate boxes shall be installed in accordance with Section 02642.
- I. Crushed stone and concrete shall be placed in accordance with Sections 02200 and 03302 respectively.
- J. Excavation and refill shall conform to the requirements under other applicable Contract Sections.
- K. Final connection to hydrant shall be mega lug restrained fittings.

3.03 ABANDONMENT OF EXISTING HYDRANT

- A. Subsequent to abandonment of the existing water main(s) by the Owner, each hydrant to be abandoned shall be dug up and removed from its lateral. The cover and top section of the hydrant lateral gate box shall also be dug up and removed. Both excavations shall be backfilled and resurfaced in accordance with other applicable Sections of these Specifications. The abandoned hydrants, gate box top sections and covers shall be transported to the Owner's Yard at 125 Maxim Road, Hartford. The Owner will off-load the materials with the Contractor's assistance.
- B. Until a fire hydrant is physically removed, any hydrant that becomes non-usable during abandonment procedures shall have a heavy duty cover placed over it and

THE METROPOLITAN DISTRICT

secured and marked "Out of Service". The Contractor shall coordinate this activity with the Owner and give proper notification.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02651

DUCTILE IRON WATER MAIN AND FITTINGS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing variously sized ductile iron pipe and fittings for water main to the lines and grades shown on the Contract Drawings complete as shown, specified or directed. The Work includes furnishing, installing and field testing the pipelines complete with lacings and harnessing, restraints, transporting materials, clearing, trenching, disposing of unused excavated material, gas mains or other abandoned utilities and concrete anchors, underground warning tape, backfilling trenches, furnishing material for backfilling, traffic control, temporary and permanent paved surface restoration, miscellaneous grading, temporary and permanent unpaved surface restoration and resetting miscellaneous items, removing and disposing of concrete road base, bracing, pumping and all incidental work, except as otherwise provided for.

1.02 RELATED SECTIONS

- A. Section 01570, Maintenance and Protection of Traffic
- B. Section 02160, Excavation Support Systems
- C. Section 02200, Earthwork
- D. Section 02653, Disinfecting and Flushing Water Mains
- E. Section 03302, Miscellaneous Concrete

1.03 SUBMITTALS

In accord with Section 01300, detailed drawings as follows shall be submitted and no work shall be fabricated until they have been approved by the Engineer:

- A. Dimensions and general details for typical length of pipe.
- B. Detail of joint between pipes for both push-on and restrained joints together with installation instructions.
- C. Dimensions and general details for all fittings including joint details for both mechanical and restrained joints.

THE METROPOLITAN DISTRICT

- D. Location plan or lists showing number of pipes and fittings and other such information as needed for installation.
- E. Prior to furnishing the pipe-laying schedule, test pits shall be dug where the new pipe connects to the present water mains to ascertain the location, elevation and cross-sectional dimensions of the present mains. This information shall be forwarded to the pipe manufacturer for incorporation into the pipe-laying schedule.
- F. A certified statement that inspection and all of the specified tests have been made and met shall also be submitted.
- G. For insulated pipe material, Contractor to submit the manufacturer's literature and/or shop drawings for the material proposed.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. ANSI/AWWA C104/A21.4 - American National Standard for Cement - Mortar Lining for Ductile-Iron Pipe and Fittings for Water
- B. ANSI/AWWA C110/A21.10 - American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-Inch through 48-Inch, for Water and Other Liquids
- C. ANSI/AWWA C111/A21.11 - American National Standard for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
- D. ANSI/AWWA C151/A21.51 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water and Other Liquids
- E. ANSI/AWWA C153/A21.53 - American National Standard for Ductile-Iron Compact Fittings, 3-Inch through 48-Inch (75 Mm Through 300 Mm), for Water and Other Liquids
- H. ANSI/AWWA C600 - AWWA Standard for Installation of Ductile Iron Water Mains and their Appurtenances
- I. DIPRA's Installation Guide for Ductile Iron Pipe

1.05 QUALITY ASSURANCE

- A. All pipe and fittings shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.

THE METROPOLITAN DISTRICT

- B. All pipe and fittings shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the foundry by a representative of the Owner.
- C. In addition, the Owner reserves the right to have any or all pipe, fittings and special castings inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the Owner's expense.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE

The ductile iron pipe shall conform to ANSI/AWWA C151/A21.51, ANSI/AWWA C111/A21.11, ANSI/AWWA C104/A21.4 and the following additional requirements:

- A. All pipe for water shall be Class 54.
- B. All pipe shall be lined with double-thickness, cement-mortar in accord with ANSI/AWWA C104/A21.4.
- C. All pipe shall have push - on joints employing a single elongated grooved rubber gasket as specified in ANSI/AWWA C111/A21.11, unless otherwise specified.
- D. All pipe will be coated inside and outside with an approved bituminous material in accordance with ANSI/AWWA C104/A21.4 and ANSI/AWWA C151/A21.51.
- E. The grade of ductile iron shall be 60-42-10.
- F. All pipe shall be marked in accord with ANSI/AWWA C151/A21.51.
- G. All requirements of the American National Standards Institute Specifications will be rigidly enforced.
- H. The grooved rubber gaskets and joint lubricant shall be furnished with the pipe. The gasket shall be plainly identified as to pipe size and packaged in a suitable and satisfactory manner for shipment.
- I. All joint accessories shall be furnished with each pipe and shall be plainly identified as to pipe size.

2.02 DUCTILE-IRON OR GRAY-IRON FITTINGS

The ductile iron or gray iron fittings shall conform to ANSI/AWWA C110/A21.10, ANSI/AWWA C111/A.21.11, ANSI/AWWA C104/A21.4, ANSI/AWWA C153/A21.53 and the following additional requirements:

THE METROPOLITAN DISTRICT

- A. All fittings shall be lined with double-thickness cement-mortar in accord with ANSI/AWWA C104/A21.4, except sleeves, caps, and plugs.
- B. All fittings will be coated inside and outside with an approved bituminous material in accord with ANSI/AWWA C104/A21.4 and Section 10-9 of ANSI/AWWA C110/A21.10.
- C. All fittings shall have mechanical joints as specified in ANSI/AWWA C111/A21.11.
- D. All cast and ductile iron fittings shall have a pressure rating of at least 150 psi.
- E. Bolt holes in the mechanical joint bells of all fittings shall straddle the vertical centerline of the fitting (laying in horizontal position).
- F. All joints accessories shall be furnished with each fitting and shall be plainly identified as to size.
- G. Compact ductile iron fittings that meet AWWA Specifications may be used if approved by the Engineer.

2.03 HARNESSING

- A. Eyebolts and lacing rods shall be of A-36 steel. All components shall be hot-dipped galvanized.

2.04 MECHANICAL JOINT RESTRAINT SPECIFICATIONS

Restraint devices for mechanical joint fittings and appurtenances conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, shall conform to the following:

- A. Design
 - 1. Restraint devices for nominal pipe sizes 3 inch through 48 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.
 - 2. The devices shall have a working pressure rating of 350 psi for 3-16 inch and 250 psi for 18-48 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.

THE METROPOLITAN DISTRICT

B. Material

1. Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.
2. Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.
3. Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) Specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.
4. Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

C. Traceability

1. An identification number consisting of year, day, plant and shift (YYDDD) (plant designation) (Shift number), shall be cast into each gland body.
2. All physical and chemical test results shall be recorded such that they can be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in hard copy, to the purchaser that requests such documentation and submits his gland body identification number.
3. Production pieces that are too small to accommodate individual numbering, such as fasteners and wedges, shall be controlled in segregate inventory until such time as all quality control tests are passed. These component parts may then be released to a general inventory for final assembly and packaging.
4. All components shall be manufactured and assembled in the United States. The purchaser shall, with reasonable notice, have the right to plant visitation at his/her expense.

D. Installation

1. Mechanical joint restraints shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.
2. Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

THE METROPOLITAN DISTRICT

E. Approvals

1. Restraint devices shall be Listed by Underwriters Laboratories (3" through 24" inch size) and Approved by Factory Mutual (3" through 12" inch size).
2. Refer to Appendix B for Owner's approved materials list for mechanical joint restraints.

2.05 RESTRAINT HARNESS SYSTEM FOR DUCTILE IRON PIPE PUSH-ON BELLS

- A. Ductile iron pipe bell restraint shall consist of a wedge action restraint ring on the spigot joined to a split ductile iron ring behind the bell. The restraint ring shall have individually actuated wedges that increase their resistance to pull-out as pressure or external forces increase. The restraint ring and its wedging components shall be made of a minimum grade of 65-45-12 ductile iron confirming to ASTM A536. The wedges shall be heat treated to a minimum hardness of 370 BHN. Torque limiting twist off nuts shall be used to insure proper actuation of the restraining wedges.
- B. The split ring shall be made of a minimum grade of 65-45-12 ductile iron conforming to ASTM A536. The connecting tie rods that join the two rings shall be made of low alloy steel that conforms to ANSI/ AWWA C111/ A21.11 and shall have a protective coating. The assembly shall have a rated pressure, with a minimum two to one safety factor of 350 psi in sizes sixteen inch and 250 psi in the sizes eighteen inch through thirty six inch.
- C. Refer to Appendix B for Owner's approved materials list for push-on and bell joint restraints. All restraint systems shall be installed in accordance with manufacturer' specifications. Re-use of restrained MJ Fittings will not be permitted. Once a restrained MJ fitting has been installed and nuts have been torqued off, that fitting cannot be re-used, and a new fitting will be provided at no additional cost to the Owner.

2.06 UNDERGROUND WARNING TAPE

- A. See Section 02317.

2.07 TRENCH REFILL

- A. Refer to Section 02202.

2.08 UNPAVED SURFACE RESTORATION AND RESET MISCELLANEOUS ITEMS

- A. Refer to section 02905.

2.09 TEMPORARY AND PERMANENT PAVED SURFACE RESTORATION

- A. Refer to Section 02510.

THE METROPOLITAN DISTRICT

2.10 INSULATION

- A. The Contractor shall furnish and install the required pipe insulation and jacketing to enclose the insulation over pipe, mechanical joints, fittings, expansion joints, etc. as shown on the Contract Drawings.
- B. Insulation shall be applied to piping with all joints tightly butted. Joint sealant shall completely fill spaces between sections. All sections of insulation shall be secured with at least two 0.75 inch wide by .002 inch thick stainless steel bands but should not be allowed to crush insulation. Cracked or broken sections shall be replaced. Spaces between sections, mechanical joints and expansion joints shall be packed with a light density fiberglass. Installation of insulation, jacket and finish shall be applied per manufacturers' recommendation.
- C. Pipe insulation shall be lightweight rigid inert insulation, resistant to moisture in a liquid or vapor form, with an average compressive strength of at least 90 psi. Insulation shall be a minimum of 2 inches thick unless otherwise shown on the drawings. Insulation shall be FOAMGLAS® cellular glass insulation manufactured in accordance with ASTM C552, "Standard Specification for Cellular Glass Thermal Insulation", by Pittsburgh Corning Corporation whose quality system for manufacturing, inspecting, and testing of FOAMGLAS® Insulation is certified to meet the requirements of ISO 9002 or approved equal. The FOAMGLAS® Insulation shall be fabricated in half sections wherever possible. The FOAMGLAS® Insulation shall be fabricated to accommodate the size and shape of all fittings to be insulated including bends, tees, expansion couplings and valves. For large diameter piping where half sections are not practical, curved sidewall segments are preferred. Insulation finish on insulation to be covered with soil shall be Pittwrap jacketing or approved equal. Insulation finish on sections not covered by soil shall be either fiber reinforced mastic or .02 thick inch non-corrosive metal jacket. Wherever possible, the insulation should be factory jacketed with protective membranes such as PITTWRAP SS Jacketing or equal.
- D. Pipe covering protection saddles shall be provided to prevent crushing of insulation at cradle installations. Protection saddles shall be hot dipped galvanized Fig. 654 as manufactured by the PHD Manufacturing, Inc. of Columbiana, Ohio or approved equal.
- E. Mastic shall be PITTCOTE® 300 Finish, an asphalt cutback mastic or approved equal.
- F. Reinforcing Fabric shall be PC® Fabric 79 open mesh polyester fabric with a 6 x 5.5 mesh/inch configuration or approved equal.
- G. Sealant shall be PITTSEAL® 444N sealant, a non-setting butyl sealant with a minimum 85% solids content or approved equal.

THE METROPOLITAN DISTRICT

2.11 POLYETHYLENE ENCASEMENT

- A. Buried pipe shall be installed with polyethylene encasement where indicated on the Drawings or specified herein. Polyethylene encasement shall have a minimum thickness of 8 mils and meet or exceed the minimum standards established by AWWA C105, current edition. Acceptable manufacturers include North Town Company, AA Thread and Seal Tape, Inc, Sigma Corp. or approved equal.
 - 1. Polyethylene encasement shall meet minimum size requirements per table 3 of Section 2.15 of DIPRA's Installation Guide for Ductile Iron Pipe.
 - 2. Test results from an independent testing agency certifying that the polyethylene encasement meets all criteria established by AWWA C105, current edition, shall be submitted to the Engineer prior to approval of the polyethylene encasement for use. In general, samples shall be submitted and include test results in accordance with the AWWA standard associated with tensile strength, elongation, dielectric strength, impact resistance, and propagation tear resistance.
 - 3. A 2-inch wide plastic adhesive tape, such as calpico Vinyl, Polyken 900, or approved equal, shall be used for sealing seams, cuts, or tears in polyethylene encasement. Duct tape shall not be allowed.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION

- A. Pipes and fittings shall be subjected to a careful inspection and a hammer test just before being laid or installed.

3.02 TRANSPORTING AND DISTRIBUTING PIPE

- A. The pipe and fittings shall be transported from the place of manufacture, all permits which may be necessary shall be secured and the requirements of the Connecticut Department of Transportation, cities and towns, concerning heavy transporting over state, city and town highways shall be complied with.
- B. During loading, transporting and unloading, more than ordinary care shall be taken to prevent injury to the pipes. Such work shall be done with each section of the pipe under the full control at all times and under no conditions shall a pipe be dropped on the ground. Pipes shall be placed on sand beds or other methods may be employed to avoid chances of the pipe being frozen to the ground surface. The ends of pipe shall be plugged or cupped to prevent entering water, materials, animals, etc.

THE METROPOLITAN DISTRICT

- C. In distributing the pipes in the field, as permitted, each piece shall be placed as near as possible to the point where it is to be installed and faced in the proper direction. In case any pipe should be damaged from handling or other cause and made unacceptable to the Engineer, it shall be replaced with a new pipe at no additional cost to the Owner. The Contractor is cautioned that state, city or town authorities may not permit storing pipe, etc., within street or highway limits.
- D. Pipe and accessories shall be handled to ensure delivery to the trench in sound, undamaged condition, including no injury to the pipe coating or lining. If the coating or lining of any pipe or fitting is damaged, the repair shall be made by the Contractor in a satisfactory manner, at no additional cost to the Owner. No other pipe or material shall be placed inside a pipe or fitting after the coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Owner. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place.

3.03 TEST PITS

- A. Refer to Section 02011.

3.04 CLEARING TREES AND BUSHES

- A. No trees within streets and highways, or adjacent to the normal trench therein, shall be damaged or removed unless so ordered by the Engineer. Any requirements in any permit relative to trees shall be adhered to.
- B. In streets and highways where there is no permanent paving, only those trees, bushes or shrubs shall be removed and disposed of as may be required for construction and as approved by the Engineer. The unlimited removal of trees and brush will generally not be required or permitted.

3.05 CUTTING PAVEMENTS

- A. Pavements shall be cut by suitable methods as approved by the governing authority having jurisdiction.

3.06 LAYING DUCTILE IRON PIPE

- A. In general, trenching for the installation of the pipeline(s) shall be in accord with Section 02200. Proper and suitable tools and appliances for safe and convenient

THE METROPOLITAN DISTRICT

handling and laying of pipe shall be used, and care shall be taken to prevent coating from being damaged, particularly on the inside of the pipes.

- B. Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Water-line materials shall not be dropped or dumped into the trench. Abrasion of the pipe coating shall be avoided. Except where necessary in making connections with other lines or as authorized by the Engineer, pipe shall be laid with the bells facing in the direction of laying. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and relayed. Pipe shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until joints are complete. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings. Where any part of the coating or lining is damaged, the repair shall be made by and at the Contractor's expense in a satisfactory manner in accord with the pipe manufacturer's recommendations. Pipe ends left for future connections shall be valved, plugged, or capped, and anchored, as shown.
- C. Pipe work shall not be started until the following minimum equipment is available and on site:
 - 1. Wheel pipe cutters, hydraulic pipe cutter or a pipe saw for the sizes of pipe to be laid;
 - 2. Ratchet type socket wrenches for mechanical joint bolt and nuts;
 - 3. At least two expandable pipe stoppers of the proper size for closing the end of the piping being laid when not actually laying pipe.
- D. All pipes shall be carefully examined for defects and no pipe or other casting shall be laid which is known to be defective, and should any defective pipe or other casting be discovered after being laid, it shall be removed and replaced with a sound casting at no additional cost to the Owner.
- E. The pipe shall be laid upon sound soil, cut true and even, so that the barrel of the pipe will have a bearing for its full length. In the event the trench is excavated below the grade of the bottom of the pipe, the trench will be brought up to grade with gravel, pneumatically tamped, before the pipe is laid. Should rock/ledge be occasioned said materials shall be removed and the pipe shall be installed on a compacted sand bedding minimum 6" in depth from the lowest project of the pipe in accord with Section 02210 and Section 02213
- F. The underground warning tape shall be placed approximately two (2) feet above the top of the pipe.

THE METROPOLITAN DISTRICT

- G. When not actually laying pipe (e.g. overnight, weekends, holidays, etc.) the open ends of the pipe shall be kept plugged with approved watertight end caps.
- H. All necessary precautions shall be taken to prevent water from entering the pipe during installation of the pipeline.
- I. Unless directed otherwise by the Engineer all the following criteria shall be applied:
 - 1. The pipeline shall be installed a minimum of four (4) feet - six (6) inches below finished grade.
 - 2. The pipeline shall also be installed to provide at least eighteen (18) inches of vertical clearance between the water pipe and storm drains or sanitary sewers.
 - 3. When vertical clearance cannot be met concrete separation shall be installed as directed by the Engineer.
- J. Install polyethylene encasement around ductile iron pipe to the limits shown on the Contract Drawings, in the MDC Standard Details Manual or specified herein and in accordance with pipe manufacturer's recommendations.
 - 1. Polyethylene encasement shall be installed per ANSI/AWWA C105/A21.5, Method 'A' in accordance with Section 2.15 of DIPRA's Installation Guide for Ductile Iron Pipe.
 - 2. A fabric type or padded sling shall be used when handling polyethylene encased pipe to prevent damage to the polyethylene encasement.
 - 3. All seams in the polyethylene encasement shall be sealed completely with approved 2-inch wide plastic adhesive tape.
 - 4. Extreme care shall be taken to ensure that all rips or tears in the polyethylene encasement are properly repaired with additional tape and film as described in ANSI/AWWA C105/A21.5.
 - 5. Extreme care shall be taken with backfilling to avoid damaging the polyethylene encasement.

3.07 CUTTING PIPE

- A. Whenever the pipes require cutting, an approved saw, wheel or hydraulic type cutter shall be used. This work shall be done at no additional cost to the Owner, in a manner satisfactory to the Engineer, and only experienced men shall be engaged thereon.

THE METROPOLITAN DISTRICT

3.08 JOINTS

- A. On pipe with rubber gasket push-on joints, the gasket shall be installed in the socket of the pipe previously laid and the gasket then lubricated. The plain end of the pipe being laid shall then be inserted and pulled or pushed to the full depth of the socket. An approved jack-type tool shall be used to assemble pipe 10-inches and larger. Plain ends of cut pipe shall be filed or ground to a taper to prevent damage to the gasket during the insertion.
- B. On fittings, butterfly and gate valves with mechanical joints, the follower ring and rubber gasket shall be placed on the plain end of the pipe being (or previously) laid and entered into the socket of the fitting. The gasket shall then be evenly seated in the socket, the follower ring moved up to the face of the gasket and the "T" bolts inserted and made finger-tight. The "T" bolts shall then be tightened with a ratchet or torque wrench as indicated in the manufacturer's instructions for installing the restrain system.
- C. All mechanical joint style restrained joint fittings shall be installed in accordance with manufacturer recommendations, and as described below:
 - 1. Where shown on the Contract Drawings, Contractor shall conduct test pits on existing fittings to confirm presence of joint restraint. Contractor shall also re-torque all bolts on existing fittings to confirm proper restraint.
 - 2. Mechanical or pneumatic methods cannot be used to torque off nuts (where applicable). All twist-off nuts shall be hand tightened using a clockwise only turning socket wrench.
 - 3. Restrained joint fittings cannot be backfilled until inspection by Owner.
 - 4. Contractor shall collect all torqued nuts from restrained joint installations. Owner reserves the right to request Contractor to provide torqued nuts for proof of proper installation.
 - 5. Where shown on the Contract Drawings, Contractor shall coordinate with Owner to shut down existing main during tie-in work. A minimum of 14 day notice shall be provided to Engineer in advance of this work.
- D. The maximum allowable deflection shall be as given in AWWA C600. If the alignment requires deflection in excess of the above limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit set forth.

THE METROPOLITAN DISTRICT

3.09 THRUST RESTRAINT

- A. Plugs, caps, tees, reducers and bends deflecting more than the allowable deflection as given in AWWA C600, either vertically or horizontally, on waterlines 4 inches in diameter or larger, and fire hydrant laterals, shall be provided with thrust restraints. Valves shall be securely anchored or shall be provided with thrust restraints to prevent movement. Thrust restraints shall be either restrained joints for ductile iron pipes or thrust blocks as detailed in the MDC Standard Details Manual or directed by the Engineer.
- B. Thrust blocking shall be concrete of a mix not leaner than: 1 cement, 2-1/2 sand, 5 gravel; and having a compressive strength of not less than 2,000 psi after 28 days. Blocking shall be placed between solid ground and the hydrant or fitting to be anchored. Unless otherwise indicated or directed, the base and thrust bearing sides of thrust blocks shall be poured directly against undisturbed earth. The sides of thrust blocks not subject to thrust may be poured against forms. The area of bearing shall be as shown or as directed. Blocking shall be placed so that the fitting joints will be accessible for repair. Steel rods and clamps, protected by galvanizing or by coating with bituminous paint, shall be used to anchor vertical down bends into gravity thrust blocks. Where any section of a water line is provided with concrete thrust blocking for fittings or hydrants, the hydrostatic tests shall not be made until at least 7 days after installation of the concrete thrust blocking and providing that the concrete thrust blocking had a minimum compressive strength of not less than 2,000 psi after 7 days or unless otherwise approved by the Engineer.
- C. The harnessing system for push-on joint pipe and mechanical joints shall be installed in full accord with the recommendations of the manufacturers and as approved by the Engineer.

3.10 CLEANING

- A. Before, and after, if required, the installation of the pipeline, but prior to filling the line with water, the interior of the pipelines shall be cleaned to the satisfaction of the Engineer, by such means as the Engineer approves.

3.11 FIELD TESTING

- A. Prior to disinfection, the pipeline shall be tested for leakage between test bulkheads and/or main line valves. The pipeline will be filled with water and tested in accord with the latest ANSI/AWWA C600 under a pressure of 150 psi at the lowest point in the pipeline. Under the test pressure, all visible leaks shall be made tight to the satisfaction of the Engineer. The total leakage per 24 hours from the line thus tested shall not exceed the allowed leakage as determined by the Engineer based on the latest ANSI/AWWA C600. Visible leaks shall be repaired even though the total leakage of the portion in question may be less than the above-mentioned permissible limit. Test pressure shall be applied for at least two hours and as much longer as required to permit inspection for leaks. Should the leakage exceed the

THE METROPOLITAN DISTRICT

maximum specified amount and investigation show this leakage to be at the joints or caused by defective work elsewhere, such defective work shall be repaired to the satisfaction of the Engineer or, if he so orders, the pipe or pipes shall be replaced at no additional cost to the Owner and repairs or replacement shall be continued and the test repeated until the leakage under the test pressure is within the limit prescribed and the work left in a manner entirely satisfactory to the Engineer.

- B. The Contractor shall be responsible for any damage to the pipeline or to adjoining property due to the testing.

3.12 DISINFECTING AND FLUSHING WATER MAINS

- A. Follow instructions in Section 02653 as specified.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02653

DISINFECTING AND FLUSHING WATER MAINS CONTINUOUS HYPOCHLORITE FEED METHOD

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section describes continuous feed method of disinfecting newly constructed potable-water mains. The Contractor installing water mains and appurtenances such as pipe, valves, fittings and accessories within the Owner service area is responsible for disinfecting the water main and pipe sections. The Owner requires the Contractor to adhere to the strict standards stipulated in latest edition of AWWA C651, "Standard for Disinfecting Water Mains" when performing disinfection procedures. The standards represent the physical, chemical and bacteriological parameters that must be satisfied prior to determining if newly installed water mains can be placed into service.
- B. The Contractor installing water mains and appurtenances within the Owner service area is responsible for all operations related to disinfecting water mains and pipe sections smaller than 16-inches in diameter, except for work related to the existing distribution system. This work shall also include dechlorination and flushing of water mains. The gates within the existing distribution system shall be operated only by the Owner. The Owner shall provide disinfection solution and injection of disinfection solution for all water mains 16-inches in diameter and larger. The Owner shall also provide services related to the dechlorination of water mains larger than 16-inches in diameter. The Contractor will be required to provide all labor and appurtenances required to direct flushing discharge to an approved disposal location for all water mains, regardless of pipe size. Flushing discharge to existing combined sewers shall be limited and quantity of flows restricted so as not to trigger an overflow condition.
- C. After flushing and subsequent to performing the disinfection operation, the Owner will collect and analyze two complete sets of water samples. The two sets of water samples will be collected approximately twenty-four hours apart from each other. The first sample will be taken 2 hours after flushing and the second sample 24 hours after the first sample. Anticipate approximately two business days for sampling and test results. The Owner will compare the results from the water samples collected to the maximum allowable limits for each parameter. If all parameters are satisfactory then the water main is considered to have passed and can now be opened for service. It is important to note that if any one parameter fails then two additional water samples will be collected twenty-four hours apart from each other. The parameters used to compare to the water sample results are listed in Table 1.

THE METROPOLITAN DISTRICT

- D. Use of Owner supplied water for flushing purposes may be limited during periods of high demand or when temperatures exceed 95 degrees Fahrenheit.

1.02 RELATED SECTIONS

- A. Section 02651, Ductile Iron Water Main and Fittings

1.03 SUBMITTALS

- A. The Contractor shall be responsible for developing a detailed plan that discusses at a minimum the scouring full pipe diameter flushing, methods for handling the volume of water from the flushing operation, disinfecting procedure with liquid sodium hypochlorite solution, de-chlorination procedure and sampling for each section of new water main to be tested. In accordance with Section 01300 Submittals, the Contractor shall provide a detailed submittal to the Engineer and Owner that outlines the specifics of the proposed procedures for each location.
- B. The Contractor shall be required to issue a submittal for the Subcontractor that will be performing the chlorine injection. The submittal shall include a minimum of three disinfection jobs of equal size and scope within the last two years and three references with contact information to establish the minimum level of required experience to perform the chlorine injection on the project. The Contractor shall be allowed to proceed with the implementation of this Section only if the submittal has been approved by the Owner.
- C. The Contractor shall provide a submittal for the sodium hypochlorite solution certifying NSF/ANSI 60, including Material Safety Data Sheet (MSDS).

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. ANSI/AWWA C651-14 (or latest revision) – AWWA Standard for disinfecting water mains

PART 2 – PRODUCTS

2.01 SODIUM HYPOCHLORITE SOLUTION

- A. Sodium hypochlorite conforming to ANSI/AWWA B300 is available in liquid form in glass, rubber-lined or plastic containers typically ranging in size from 1 quart to 5 gallons. Sodium hypochlorite contains approximately 5% to 15% available chlorine, and the storage conditions and time must be controlled to minimize its deterioration.

THE METROPOLITAN DISTRICT

- B. The Contractor shall supply new, unopened containers of sodium hypochlorite solution, opened in the presence of the field inspector.

PART 3 – EXECUTION

3.01 GENERAL

- A. The sanitary handling of materials, the practices during construction, and the continual inspection of the work are the primary means for ensuring the sanitary condition of the water main. The effectiveness of disinfection depends on maintaining clean pipes and avoiding major contamination during construction activities.

3.02 PREVENTATIVE AND CORRECTIVE MEASURES DURING CONSTRUCTION

- A. Heavy particles generally harbor bacteria and prevent elevated chlorine concentrations from contacting and killing these organisms. The procedures of this Specification must be observed to assure that a water main and its appurtenances have been thoroughly cleaned for the final disinfection by chlorination. Also, any connection of a new water main to the active distribution system prior to the receipt of satisfactory physical and bacteriological sample results may constitute a cross-connection. Therefore, new water mains must be isolated until physical and bacteriological tests, immediately after and 24 hours following flushing of the water main, are satisfactorily completed and meeting Owner specifications.
- B. KEEPING PIPE CLEAN AND DRY. A successful disinfection process begins at the early stages of construction. The Contractor must protect piping systems from contamination including interiors of pipes, fittings and valves. Pipe and appurtenances delivered for construction shall be capped or bagged to minimize the entrance of foreign material. All openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods. Rodent-proof plugs may be used when watertight plugs are not practicable and when thorough cleaning will be performed by flushing or other means. The sanitary handling of materials, the practices during construction, and the continual inspection of the work are the primary means for ensuring the sanitary condition of the water main.
- C. Delay in placement of delivered pipe invites contamination. The more closely the rate of delivery is correlated to the rate of pipe laying, the lower the risk of contamination.
- D. JOINTS. Joints of all pipes in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.

THE METROPOLITAN DISTRICT

- E. **SEALING MATERIALS.** No contaminated material or any material capable of supporting prolific growth of microorganisms shall be used for sealing joints. Sealing material or gaskets shall be handled in a manner that avoids contamination. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water and approved by the pipe manufacturer, and not contribute odors. It shall be delivered to the job in closed containers and shall be kept clean and applied with dedicated, clean applicator brushes.
- F. **CLEANING AND SWABBING.** Each pipe section that is being readied for assembly in the field and just prior to installation, shall have the interior pipe surface swabbed with a 1% to 5% hypochlorite disinfecting solution using mechanical means like pulling a chlorine soaked mop or pigging device through the pipe or by power washing. If in the opinion of the Engineer, any dirt enters the pipe while being installed, the pipe will be swabbed again with 1% to 5%. The cleaning method used shall not force mud or debris into the interior pipe-joint spaces and shall be acceptable to the Engineer.
- G. **WET TRENCH CONSTRUCTION.** If it is not possible to keep the pipe and fittings dry during installation, the water that may enter the pipe-joint spaces shall contain an available chlorine concentration of approximately 25 mg/L. This may be accomplished by adding calcium hypochlorite granules or tablets to each length of the pipe before it is lowered into a wet trench or by treating the trench water with hypochlorite tablets.
- H. **FLOODING BY STORM OR ACCIDENT DURING CONSTRUCTION.** If the main is flooded during construction, it shall be cleared of the floodwater by draining and flushing with potable water until the main is clean. The section exposed to the floodwater shall then be filled with chlorinated potable water that, at the end of a 24-hour holding period, will have a free chlorine residual of not less than 25 mg/L. The chlorinated water may then be drained or flushed from the main.

3.02 PREFLUSHING OF SOURCE WATER

- A. The source water used for disinfection and pressure testing shall be flushed prior to its use to ensure that normally occurring contaminants or debris are not introduced into the new water main pipe. The Owner will be responsible for operating gate valves in the street as necessary. Adequate drainage must be provided during flushing, away from the construction area. The Contractor shall be responsible for constructing temporary discharge piping and/or materials as necessary, at no additional cost to the Owner.

3.03 FIELD TESTING

- A. Refer to Section 02651, Ductile Iron Water Main and Fittings for field pressure testing procedures. This testing is to be satisfactorily completed prior to initiating the flushing/disinfection procedures covered in this Section.

THE METROPOLITAN DISTRICT

3.04 CONTINUOUS FEED METHOD OF CHLORINATION

- A. Hypo-chlorination utilizes a concentrated dose of chlorine solution, usually 25 ppm for a 24 hour period, to eradicate bacterial contamination. This is a critical operation that requires skilled personnel and therefore the Owner reserves his right to request the replacement of any Contractor/Subcontractor's personnel for lack of skills performing these tests. The Contractor shall not be compensated for the replacement of his Subcontractor or its personnel if requested by the Owner as a result of lack of skills in performing these tests. These procedures allow for disinfecting a new section of the MDC water distribution system, minimizing the risk to the field crews, to customers and to the environment. These procedures are to be followed when disinfecting all new pipelines which utilize the injection of sodium hypochlorite.

3.05 FINAL FLUSHING

- A. After the applicable retention period of 24 hours, heavily chlorinated water should not remain in prolonged contact with the pipe. In order to prevent damage to the pipe lining or to prevent corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main, fittings, valves and branches until chlorine measurements show that the concentration in the main is no higher than that generally prevailing in the distribution system.
- B. The Contractor shall make arrangements with the Owner to flush the new water main following disinfection. Owner forces shall be responsible for operating the gate valves in the street as necessary. It is important to note here that the new water main shall be kept isolated from the active distribution system using a physical separation until disinfectant has been flushed and satisfactory bacteriological, physical and VOC testing has been completed. Operation of all valves used in filling and flushing the line shall be performed by Owner personnel.
- C. The Contractor shall be responsible for supplying necessary materials, equipment and appurtenances for neutralizing the chlorine and to perform all flushing operations except the operating of gate valves within the existing water distribution system. The minimum materials and equipment required to flush and neutralize the water main are:
 - 1. Five 3-inch x 20-foot rubber hoses, each with 3-inch male x female Camlock Couplings.
 - 2. Dechlorination device, model 3M-3100, manufactured by Measurement Technologies, Sammamish WA or approved equal.
 - 3. Standard hydrant wrench.

THE METROPOLITAN DISTRICT

4. 90-degree ductile iron elbow with retaining gland, either 4 or 6-inch depending on blow off size.
 5. Customized 4 or 6-inch, 3/8-inch thick metal plate that bolts on to the 90-degree ductile iron elbow with 2-1/2-inch male fire connection (NST) thread. 4 or 6-inch depends on the blow off size.
 6. Ascorbic acid powder.
- D. The Contractor shall also be responsible for determining where the water will drain during the flushing operation so as not to cause localized flooding or cause damage to property or the environment. The environment to which the chlorinated water is to be discharged shall be inspected. Following neutralization of the chlorinated water, the level of chlorine shall be between 0.1 and 0.8 mg/l and in no case higher than the chlorine level in the distribution system. It is important to note that during the summer month's water mains tend to take longer to disinfect due to higher ambient temperatures increasing the bacterial count. Usually, additional flushing will result in successfully disinfecting the water main.

3.06 DISINFECTION TESTS

- A. Following disinfection and flushing, Owner forces will collect and analyze water samples from the new main utilizing a copper sterilization sampling fitting located no more than every 1,200 feet along the newly constructed water main. Two sets of water samples will be collected: the first approximately 2 hours following the flushing operation, and the second set of samples will be collected 24 hours after the first set of samples was taken. The results are available approximately two business days following collection. The analytical results for the samples will be compared to the maximum allowable limits for each parameter as established by the Owner shown in Table 1. If the parameters are satisfactory for BOTH sets of water samples, then the water main is considered passing and can be opened for service.
- B. To ensure the water sample integrity, the Owner requires the person taking the sample to complete a "Chain of Custody" form, see attachment. This form must accompany the water sample when transporting to the Owner's laboratory at Reservoir 6 prior to analyzing.

Table 1
Physical, Chemical and Bacteriological Parameters for Water Mains

Parameter	Maximum Allowable Limit
pH	6.4 to 10
Color	15 units
Turbidity	1.0 NTU
Odor	2
Hardness	60 ppm.
Specific Conductance	150 microhms at 25 °C
Coliform Bacteria	0 per 100 milliliters at 35 °C
Standard Heterotrophic Plate Count	< 500 per milliliter at 35 °C
Chlorine Residual	<0.1- 0.8 ppm.
Volatile Organic Compounds (VOC)	See C. Below

- C. For VOC concentrations less than 100 ppb the water main is approved to be placed in service. For VOC concentrations of 100 to 200 ppb, the full volume of the water main will be flushed to remove the VOCs and the water main will be approved to be placed in service. For VOC concentrations over 200 ppb, the water main shall be re-sampled for VOC's, but not HPC's if the bacteriological samples passed the test.

3.07 RESAMPLING

- A. If the initial disinfection fails to produce satisfactory physical and bacteriological results for EITHER set of water samples, the new main shall be re-flushed and re-sampled (two sets of water samples).
- B. If the new water main fails two rounds of sampling, the Owner shall determine if re-disinfection is needed or if the new main should only be flushed.

END OF SECTION

THE METROPOLITAN DISTRICT

ATTACHMENT-CHAIN OF CUSTODY FORM

MDC - Sample Collection \ Chain of Custody
Distribution Specials
New Mains

Project DVW (when applicable to Developer Permit Agreement):

Project Name (for all projects): _____

Town: _____

Sample I.D.	Location (street)	Size of Main	Length of Main
S1			
S2			
S3			
S4			

Is a VOC being submitted? YES / NO

Time Collected

<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
------------------	------------------	------------------	------------------

Chlorine residual

<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
------------------	------------------	------------------	------------------

Collected by _____

Any observations that might affect the physical and bacteriological quality of the water should be noted below:

Relinquished By:	Date / Time:
Received By:	Date / Time:
Relinquished By:	Date / Time:
Received By:	Date / Time:

THE METROPOLITAN DISTRICT

SECTION 02654

REMOVAL OF PROTRUDING TAPS

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all equipment, labor and materials necessary to internally remove protruding taps in those sewers scheduled to be rehabilitated by cured-in-place pipe lining.
- B. The Contractor shall maintain wastewater flows, in accordance with Section 01510, at all times during performance of this work.
- C. Dirt and debris caused by protruding tap removal shall not be allowed to enter the wastewater flow and be carried to downstream reaches.

1.02 RELATED SECTIONS

- A. Section 01570, Maintenance and Protection of Traffic
- B. Section 02150, Bypass Pumping
- C. Section 02766, Cured-in-Place Pipe (CIPP) for Sewer Mains

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Protruding taps shall be removed using an internal, remote-controlled intruding pipe remover. Excavation and replacement of protruding taps will not be allowed except under special situations authorized in writing by the Engineer.
- B. The equipment shall consist of a main body containing a rotating head assembly equipped with carbide cutting edges. The rotating cutting head shall be driven by air, water or by electricity and shall be capable of cutting concrete, vitrified clay pipe or other materials commonly used for pipe construction with the exception of cast iron or steel.
- C. The equipment shall be pulled through the sewer using winches and a cable set up between adjacent manholes.
- D. If necessary, the equipment shall be accurately positioned using a TV camera in conjunction with the cutter assembly.

THE METROPOLITAN DISTRICT

PART 3 - EXECUTION

3.01 PERFORMANCE

- A. The Contractor shall remove all protruding taps from sewers to receive cured-in-place pipe lining.
- B. The Contractor shall maintain a complete record of all taps that were removed, and furnish two (2) copies of this record to the Owner and Engineer.
 - 1. The list shall show the date, street, sewer reach (by manhole numbers), station, location (left, right or top) and house address of each tap removed.
 - 2. The list shall also show similar data for any taps that were not successfully removed, as well as the reason why removal was unsuccessful.
- C. The Contractor shall protect existing sewer lines and service connections from damage caused by improper use of the equipment.
 - 1. Damage to a sewer or service connection caused by removal of a tap shall be repaired immediately, as directed by the Engineer and at no cost to the Owner.
- D. The Contractor shall remove all dirt and debris from the sewer following completion of tap removal in that reach.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02656

TAPPING SLEEVE AND GATE VALVE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing variously sized tapping sleeve and tapping gate valve assemblies in the pipeline, together with gate box and extension stem, if required, as shown on the Contract Drawings, complete as shown, specified or directed. The Work includes, all as shown, specified or directed, digging test pit at tapping locations transporting materials, clearing, excavation, disposing of unused excavated materials, furnishing and installing tapping sleeve and gate valve, warning tape, gate box, extension stem, if required, constructing poured class "A" concrete thrust block, refilling trenches, furnishing additional material for refilling, temporary and permanent paved and unpaved surface restoration and resetting miscellaneous items, pumping, bracing, sheeting, miscellaneous grading and all incidental Work, except as otherwise provided for.
- B. The Owner forces will make the actual tap 12" and less into cast iron and ductile iron pipes. All other taps shall be performed by the Contractor.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 02011, Test Pit
- C. Section 02140, Dewatering and Drainage
- D. Section 02160, Excavation Support Systems
- E. Section 02200, Earthwork
- F. Section 02510, Temporary and Permanent Paved Surface Restoration
- G. Section 02642, 12-Inch and Smaller Gate Valves
- H. Section 02644, 16-Inch and Larger Butterfly Valves
- I. Section 02651, Ductile Iron Pipe And Fittings
- J. Section 02905, Unpaved Surface Restoration And Reset Miscellaneous Items
- K. Section 03302, Miscellaneous Concrete

THE METROPOLITAN DISTRICT

1.03 SUBMITTALS

- A. In accordance with the General Conditions and Section 01300, six (6) sets of the manufacturer's literature and/or shop drawings for the materials of this Section shall be submitted for approval.
- B. A certified statement that inspection and all of the specified tests have been made and met shall also be submitted.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. ANSI/AWWA C110 - American National Standard for Ductile Iron and Gray Iron Fittings, 3-Inch Through 48-Inch, for Water and Other Liquids
- B. ANSI/AWWA C111/A21.11 - American National Standard for Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
- C. ANSI/AWWA C500 - American National Standard for Gate Valves for Water and Sewerage Systems
- D. ASTM A 36 - Specification for Structural Steel
- E. ASTM A 123 - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron And Steel Products
- F. ASTM A 120 - Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
- G. ANSI/AWWA C509 – Specification of Resilient Seated Tapping Gate Valves
- H. MDC Standard Details Manual.

1.05 QUALITY ASSURANCE

- A. All tapping sleeves, gates valves and gate boxes shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.
- B. All tapping sleeves, gate valves and gate boxes shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the foundry by a representative of the Owner.
- C. In addition, the Owner reserves the right to have any or all tapping sleeves, gate valves and gate boxes inspected and/or tested by an independent service at either

THE METROPOLITAN DISTRICT

the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the Owner's expense.

PART 2 – PRODUCTS

2.01 TAPPING SLEEVE

The tapping sleeve shall conform to AWWA C223 and the following additional requirements:

- A. All components shall conform to NSF Standard 61.
- B. A test plug shall be provided on all tapping sleeves.
- C. Sleeve shall be furnished with all necessary bolts, nuts, gaskets and lubricants for assembly and installation.
- D. Sleeve shall be of the split bolted type with recessed flanged or mechanical joint outlets to connect to tapping gate valves.
- E. Tapping sleeve shall be of Type 304 stainless steel.

2.02 TAPPING GATE VALVE

The tapping gate valve shall conform to ANSI/AWWA C509 and the following additional requirements:

- A. Tapping gate valve will be resilient seated type.
- B. Valve inlet shall be flanged with raised face or mechanical joint for proper alignment with the sleeve outlet.
- C. Valve outlet shall be mechanical joint, in accordance with ANSI/AWWA C111/A21.11, with all mechanical joint accessories furnished, including approved joint restraint devices.
- D. Valve shall be manufactured with oversize seat rings to permit the use of a full-size cutter (of nominal tapping gate size). Valve shall be compatible with a Mueller Model C-1 machine or other type as designated by the Owner.
- E. Bolts and nuts for connecting O-ring seals and bonnet to body shall either be copper-silicon or stainless steel.
- F. Direction to open (right-hand or left-hand) shall be as shown in the MDC Standard Details Manual.

THE METROPOLITAN DISTRICT

- G. Operating nut shall be 2" square.
- H. Valve, linings, and coatings shall conform to NSF Standard 61.

2.03 GATE BOX

The gate box shall conform to the following requirements:

- A. Cast iron shall conform to ASTM A48, Class 25.
- B. Top section shall be of the top flange design and shall have no bead on the bottom.
- C. The word "WATER" shall be cast with raised letters in the center of the cover.
- D. Base section shall be of the Dwyer design which centers the operating nut for positive access to the valve.
- E. For specific gate box details, see the MDC Standard Details Manual in Appendix A.

2.04 EXTENSION STEM

- A. The extension stem shall be fabricated from stainless steel conforming to ASTM A 36. Galvanizing shall conform to ASTM A 123.
- B. For extension stem details, see the MDC Standard Details Manual.

2.05 MISCELLANEOUS CONCRETE

- A. Refer to Section 03302 and 03100.

2.06 TRENCH REFILL

- A. Refer to Section 02202.

2.07 TEMPORARY AND PERMANENT PAVEMENT RESTORATION MATERIALS

- A. Refer to Section 02510.

2.08 UNPAVED SURFACE RESTORATION MATERIALS

- A. Refer to Section 02905.

2.09 UNDERGROUND WARNING TAPE

- A. Refer to Section 02317.

THE METROPOLITAN DISTRICT

2.10 JOINT RESTRAINT DEVICES

- A. Refer to Sections 02642 and 02651.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION

- A. Tapping sleeves, tapping gate valves, gate boxes, etc., shall be subject to a careful inspection before being installed. Valves shall be run through a full open-close cycle to insure proper operation.

3.02 INSTALLATION OF TAPPING SLEEVE AND TAPPING GATE VALVE

- A. Prior to the installation of the tapping sleeve/Tapping Gate Valve assembly, the Contractor shall excavate a test pit at the proposed tapping sleeve/tapping gate valve location, so as to determine the suitability of said location for mounting the tapping sleeve. All the necessary permits shall have been secured prior to the start of such excavation. In the event the proposed tapping sleeve location is determined to be unsuitable by the Engineer, the Engineer shall direct the Contractor to dig another test pit or expand the original test pit so as to find a suitable location to mount said tapping sleeve. The tapping sleeve and tapping gate valve shall be installed according to the details shown in the MDC Standard Details Manual and to the satisfaction of the Engineer.
- B. The tapping sleeve location on the pipe shall be carefully cleaned and inspected prior to installing the sleeve. Both the sleeve and valve shall be carefully installed and supported in position free from distortion and/or strain, by the Contractor's forces. The excavation for said assembly shall be properly supported and dewatered, all in accordance with OSHA requirements.
- C. All debris and foreign material shall be cleaned from sleeve and valve openings and seats. The tapping sleeve shall be installed with the test plug on top. All mechanisms shall be checked and all nuts and bolts checked for tightness. The Contractor shall construct a poured concrete thrust block on the backside of the tapping sleeve in accordance with the details as shown in the MDC Standard Details Manual. A minimum of 7 feet of excavation beyond the tapping gate valve shall be provided for the Owner's tapping equipment.
- D. Subsequent to tapping the main (performed by the Owner), the gate box shall be set plumb and centered directly over the operating nut of the valve. Earth fill shall be carefully tamped around the gate box to a distance of 4 feet on all sides of the box or to the undisturbed trench face, if less than 4 feet.

THE METROPOLITAN DISTRICT

- E. Where and as shown on the Contract Drawings, or ordered, valve extension stems shall be installed. An extension stem will be ordered when the valve-operating nut is more than 4.5 feet below finished grade.
- F. Excavation and refill shall conform to the requirements under other applicable Contract Sections. Temporary and permanent paved and unpaved surface restoration shall conform with the requirements under other applicable Contract Sections.

3.03 TAPPING EXISTING WATER MAIN - (For tapping size of 12-inches or less)

- A. At least ten (10) working days prior to the scheduled tapping date, the Systems Repair Department of the Operations Division of the Metropolitan District shall be contacted at telephone 278-7850 extension 3629 or 3627 to confirm the scheduled date. Owner forces will install the tapping machine and perform all tapping operations on the existing water main. If in the opinion of the Engineer the excavation support is not safe for the Owner to execute the tapping, the Owner will not execute the tap. The Contractor will be responsible to reinstall the trench support and reschedule the tapping date. The Owner will back charge the Contractor for its down time (labor and equipment) related to mobilization and demobilization related to this tap

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02657

WATER SERVICE RENEWAL OR RECONNECTION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing 2-inch or less diameter copper water service renewals or reconnections to the lines and grades shown on the Contract Drawings, complete as shown, specified and directed. The Work includes, all as shown, specified and directed, transporting materials, clearing, trenching, disposing of unused excavated materials, removing and disposing of sections of present copper and wrought iron water services, making connections to existing copper and wrought iron service pipes, relocation of meter pits, furnishing and installing the services complete with necessary fittings, valves, appurtenances, and underground warning tape, backfilling trenches, furnishing additional material for backfilling, miscellaneous grading, temporary and permanent paved and unpaved surface restoration and resetting miscellaneous items, bracing, pumping and all incidental work, except as otherwise provided for.
- B. The Owner will tap the new water main and furnish and install the corporation stop.
- C. All water services to be renewed are maintained between the water main and the street line by the Owner.
- D. For the purposes of this Work, reconnection shall be the installation of a new corporation and extension of the new service piping from the corporation to a point of reconnection to existing service piping as shown generically on the plans. Renewal shall be the installation of a new corporation and extension of new service piping to the existing water service curb stop located at the street line. Renewals shall include the replacement of the existing curb stop valves and ford box / meter pit if present including additional coordination for the replacement of meters.
- E. The Contractor is advised that the detail shown in the MSC Standard Details Manual is intended only to show a typical installation, and that the exact details of any particular installation will depend on the conditions found upon excavating the existing water service. The size, type and number of components required for any water service renewal or reconnection may vary significantly from that shown. The Contractor shall have no claim for additional compensation beyond that indicated in the Proposal, or claim for delay, because of any work or materials required for the satisfactory completion of all water services renewals or reconnections.

THE METROPOLITAN DISTRICT

1.02 RELATED SECTIONS

- A. Section 02160, Excavation Support Systems
- B. Section 02200, Earthwork
- C. Section 02510, Temporary and Permanent Paved Surface Restoration

1.03 SUBMITTALS

- A. In accordance with the Section 01300, six (6) sets of the manufacturers' literature for the materials of this section shall be submitted for approval.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. ASTM B62 – Standard Specification for Composition Bronze or Ounce Metal Castings
- B. ASTM B88 – Standard Specification for Seamless Copper Water Tube
- C. ASTM A126 – Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
- D. ANSI/AWWA C800 - AWWA Standard for Water Service Line Fittings
- E. MDC Standard Details Manual.

1.05 SCHEDULING

- A. All taps of the water main will be performed by the Owner upon request. In executing this work, a minimum of three (3) installations shall be ready for tapping at any time when requesting the Owner to perform the taps. Taps shall be requested a minimum of forty-eight (48) hours before they are desired by calling the Owner's Systems Repair Activity at 278-7850 extension 3627 or 3629. Service taps will only be performed after the water main has been disinfected, sampled and approved for use.

THE METROPOLITAN DISTRICT

PART 2 – PRODUCTS

All materials shall be from manufacturers and models as specified in the “Approved Materials for Water Main Installations” unless otherwise approved by the Engineer.

2.01 COPPER PIPE

- A. The copper tubing shall conform to ASTM B88, Type K. Tubing shall be continuous and 1-inch in diameter unless shown otherwise.

2.02 FITTINGS AND VALVES

- A. All brass fittings and valves shall be of standard design generally used by water utilities and be in accordance with ASTM B 62 and ANSI/AWWA C800.
- B. All fittings and valves shall be compression for copper pipe or threaded for valves for wrought iron pipe. Compression fittings, valves, etc., shall be of the design employing the pipe clamp feature.
- C. The curb stop ball valve shall not be of the stop and waste type.

2.03 SERVICE CURB BOX

- A. The service curb box shall be an extension-type box. (5 feet fully extended) with a 1/2-inch diameter inside self-centering stainless steel stop rod, 35 inches long. The rod shall have a stainless steel yoke. The upper section of the box shall be 1-inch diameter steel pipe and the bottom section shall be ASTM A126 gray cast iron. The covers shall also be gray cast iron, with two (2) holes in the cover for non-paved areas and a plug cover for paved areas.

2.04 UNDERGROUND WARNING TAPE

- A. Underground warning tape shall conform to the requirements of Section 02317 of the Specifications.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION

- A. All tubing, fittings and valves shall be carefully examined for defects and no material shall be installed which is known to be defective. Should any defective tubing, fitting or valve be discovered after being installed, it shall be removed and replaced with sound material at no additional cost to the Owner.

THE METROPOLITAN DISTRICT

3.02 INSTALLATION

- A. The top of the service pipe shall be at least 4-1/2 feet below finished grade and shall be laid on a 6-inch minimum thick sand bed.
- B. Pipe shall not be laid in a trench with other pipes or conduits unless separated from the other pipes or conduits by at least 2 feet and laid on undisturbed earth shelf. All service pipe shall be laid, in so far as is practicable, in a straight line from the main pipe to the connection point unless approved by the Engineer. At least 12 inches clearance shall be maintained when the service is installed beneath storm and/or sanitary sewers.
- C. The underground warning tape shall be placed approximately two (2) feet above the top of the pipe.
- D. The new water service components shall be installed complete, from the new corporation (to be installed by the Owner upon request) to the existing piping to remain on the private property served, a reasonable distance beyond the street line including replacement of the curb stop, curb box and operating rod, as shown on the Contract Drawings and in the MDC Standard Details Manual. The existing water service components shall be removed as required in order to install the new water service.

3.03 RENEWAL AND RECONNECTION PROCEDURE

- A. Work on water service renewals or reconnections shall not commence until the newly installed water main has been accepted and put into service by the Owner.
- B. The following procedure shall be followed for performing the water service renewal or reconnection:
 - 1. The trench for the new water service components shall be excavated between the point of connection to the existing piping to remain on the private property served and the water main in the street. The existing corporation at the water main shall also be exposed. Excavation shall include removal of curbing, sidewalk slab(s), shrubbery, etc. as required.
 - 2. Depending on underground soil conditions, the location of other nearby utilities and other applicable considerations, an approved underground piercing tool to create a tunnel for installation of all or a portion of the length of the water service renewal or reconnection may be allowed in lieu of full open-cut excavation. The type and operation of any piercing tool proposed for use shall be approved by the Owner, and the use of any such tool shall be allowed solely at the discretion of the Owner. All decisions of the Owner regarding approval and use of such tools shall be final and binding.

THE METROPOLITAN DISTRICT

3. The new water service components shall be installed between the two points of connections without actually connecting the ends of the existing piping. Service renewal work shall include installation of the new curb stop. Upon inspection and approval by the Engineer, the new service may be backfilled between the two points of connection, taking care to leave adequate space for performing the connections and tapping the water main. The excavation shall be adequately shored and dewatered to provide safe and satisfactory working conditions within the excavation, and shall be large enough to accommodate the Owner's tapping crew and their equipment. A minimum 6 feet excavation from the pipe wall is required to accommodate the Owner's tapping equipment and crew.
4. Upon proper notification, the Owner's crew will tap the existing water main and install a new corporation. The new water service piping shall be connected to the corporation, and the Owner's crew will open the corporation and curb stop to flush the new piping and check for leakage at line pressure between the water main and the new curb stop. Following the flushing, the Owner's crew will close the new curb stop, the old corporation at the old water main and the main valve at the water meter to the building served. Prior to the Owner activating any portion of the renewed or reconnected water service, it shall be adequately backfilled and/or braced to withstand the working pressures and forces. Elimination of any leakage in the new installation, including dismantling and reassembling or replacing the new components shall be done as necessary. All water service shutdowns shall be coordinated with the Property Owner/Tenants of the property served by the water service being shut down. Shut downs should not be longer than two (2) hours.
5. The connection of the new piping to the existing piping to remain on the private property served shall be completed. The Owner's crew will also abandon the existing corporation (i.e., perform a "cut-off"). In some cases, it may not be possible to close the existing corporation. In these cases, the water main must be shut down in order for work to be performed on the existing water service. All water main shutdowns will be ordered and scheduled by the Owner's Resident Engineer and performed by Owner forces. Only the Owner may operate its water facilities.
6. Following the completion of the final connection of the new water service components, the Owner's Resident Engineer will arrange for the Owner's tapping crew or other Owner forces to remove the water meter at the building served, flush the renewed water service by operating the curb stop, and replace the water meter. After the section of new piping from the curb stop to the existing piping on the private property served is confirmed by the Owner's Resident Engineer to be satisfactorily installed and free from leaks at line pressure, backfilling of the water service trench shall be completed.

THE METROPOLITAN DISTRICT

7. Upon completion and flushing of the entire water service renewal or reconnection, the Owner will activate service to the building served.
8. All paved and unpaved areas shall be temporarily and permanently restored to the existing condition and with materials as good as or better than existed prior to disturbance. Shrubs, bushes, trees, etc. damaged by the Contractor's operations shall be replaced with items as good as or better than existed prior to their damage.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02669

BLOW-OFF ASSEMBLY

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing blow-off assemblies of the various sizes, lengths, and configurations as shown on the Contract Drawings, complete as shown, specified or directed. The Work includes, all as shown, specified or directed, transporting materials, clearing, trenching, disposing of unused excavated materials, furnishing and installing the blow-off assembly including tee or other fillings, ductile iron pipe, gate valve, gate box, extension stem if required, gate box top section, trench refill, crushed stone drain pocket, miscellaneous concrete, fittings, pipe restraints and underground warning tape, backfilling trenches, furnishing additional material for backfilling, miscellaneous grading, maintenance and protection of traffic, temporary and permanent paved and unpaved surface restoration and resetting miscellaneous items, sheeting, bracing, pumping and all incidental work, except as otherwise provided for.

1.02 RELATED WORK

- A. Section 02160, Excavation Support Systems
- B. Section 02200, Earthwork
- C. Section 02642, 12-Inch and Smaller Gate Valves
- D. Section 02651, Ductile Iron Pipe and Fittings
- E. Section 03302, Miscellaneous Concrete

1.03 SUBMITTALS

- A. In accordance with Section 01300, six (6) sets of the manufacturer's literature and/or shop drawings for the materials of this Section shall be submitted for approval.
- B. A certified statement that inspection and all of the specified tests have been made and met shall also be submitted.

THE METROPOLITAN DISTRICT

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. MDC Standard Details Manual.

1.05 QUALITY ASSURANCE

- A. All blow-off assemblies including gate valves and fittings shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.
- B. All blow-off assemblies including valves and fittings shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the foundry by a representative of the Owner.
- C. In addition, the Owner reserves the right to have any or all blow-off assemblies including valves, fittings and special castings inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or the tests shall be at the Owner's expense.

PART 2 - PRODUCTS

2.01 DUCTILE IRON WATER MAIN AND FITTINGS

- A. Refer to Section 02651.

2.02 GATE VALVE, GATE BOX AND EXTENSION STEM

- A. Refer to Section 02642.

2.03 CRUSHED STONE AND TRENCH REFILL

- A. Refer to Section 02202.

2.04 HARNESSING

- A. Refer to Section 02651.

2.05 MISCELLANEOUS CONCRETE

- A. Refer to Section 03302.

2.06 UNDERGROUND WARNING TAPE

THE METROPOLITAN DISTRICT

- A. Underground warning tape shall be 6-inches wide non-detectable, designed to withstand extended underground exposure, colored blue and be durably imprinted with an appropriate warning indicating the presence of the buried pipe. (See Section 02317)

2.07 PAVED AND UNPAVED SURFACE RESTORATION

- A. Materials shall be in accordance with Sections 02510 and 02905 respectively.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION

- A. Blow-off assemblies including gate valves, pipe, fittings, gate boxes, etc. shall be subject to a careful inspection before being installed. Valves shall be run through a full open-close cycle to insure proper operation.

3.02 INSTALLATION OF BLOW-OFF ASSEMBLIES

- A. Blow-off assemblies including piping, gate valves, fittings, etc. shall be installed according to the details shown in the MDC Standard Details Manual and to the satisfaction of the Engineer.
- B. All debris and foreign material shall be cleared from valve openings. The blow-off assembly shall be set plumb. Blow-off assemblies and connecting pipe shall have at least the same depth of cover as the distributing main.
- C. Trench refill shall be placed over the pipe and fittings from the bottom of the trench to 2 feet above the top of the pipe and fittings.
- D. Ductile iron pipe and harnessing shall be installed in accordance with Section 02651.
- E. The underground warning tape shall be placed approximately two (2) feet above the top of the pipe.
- F. Gate valves and gate boxes shall be installed in accordance with Section 02642.
- G. Crushed stone, trench refill and concrete shall be placed in accordance with Sections 02200, 02202 and 03302 respectively.
- H. Paved and unpaved surface restoration shall be performed in accordance with Sections 02510 and 02905 respectively.
- I. Excavation and refill shall conform to the requirements under other applicable Contract Sections.

THE METROPOLITAN DISTRICT

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02677

SEWER SERVICE LATERAL REHABILITATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes the rehabilitation of certain active sewer service laterals and connections in lined and unlined sewer mains. All lateral rehabilitation and cured-in-place pipe (CIPP) lining work shall occur without excavation through the installation of a resin impregnated, flexible one-piece or two-piece liner in the form of an internal sleeve, tube or "top hat". The lateral liner will be installed and cured into the existing service lateral pipe utilizing apparatus recommended by the approved manufacturer.
- B. The service lateral connection liner shall consist of a three (3) inch minimum collar section around the full circumference of the service lateral in the mainline sewer. The collar section shall extend approximately five (5) feet up the lateral.
 - 1. After completion of the collar section, the service lateral shall be lined from the sewer main to the property line unless otherwise shown on the Contract Drawings.
- C. Top hats shall be utilized for service lateral connections when no additional lateral lining is required. Top hats shall extend no less than twelve (12) inches and no greater than thirty six (36) inches into the lateral.
- D. The completed liner or top hat will form a continuous, tight fitting, corrosion resistant and verifiable non-leaking cured-in-place pipe. The Contractor shall furnish all labor, materials, equipment and incidentals required and install and test the service lateral connection liner and appurtenances as specified herein.
- E. A recorded video survey must be completed on all service laterals in accordance with Section 02764 prior to liner or top hat installation.
- F. Service lateral connections may be a combination of tees, wyes or break-in taps with varying sizes and angles ranging from 30 to 90 degrees.
- G. Sewer service lateral cleanouts shall be installed for cured-in-place liners for service laterals as shown on the Contract Drawings. For locations where sewer service lateral cleanouts are not shown on the Contract Drawings, the Contractor may choose to install new service clean outs at their discretion subject to written approval from the property Owner and Engineer and at no additional cost to the Owner.

THE METROPOLITAN DISTRICT

- H. Contractor shall verify pipe diameters and materials for all service laterals to receive cured-in-place lining prior to commencing operations.
- I. Contractor shall perform any point repairs requiring excavation prior to installation of the cured-in-place liner or top hat.

1.02 RELATED SECTIONS

- A. Section 01510, Maintenance of Flow in Existing Sewers
- B. Section 01570, Maintenance and Protection of Traffic
- C. Section 02150, Bypass Pumping
- D. Section 02654, Removal of Protruding Taps
- E. Section 02764, Television Inspection
- F. Section 02766, Cured-in-place Pipe for Sewer Mains

1.03 SUBMITTALS

- A. Submit the following in accordance with Section 01300:
 - 1. Shop drawings and schedules of all liners, top hats and appurtenances required. Design data and specification data sheets listing all parameters used in the liner design and thickness calculations based on ASTM F1216 and D2412 for fully deteriorated pipe and as specified herein. All design calculations shall be sealed and signed by a Professional Engineer registered in the State of Connecticut. Submit P.E. Certification Form for all design data.
 - 2. Detailed procedure for installing the liners or top hats, including the method of sealing the one-piece or two-piece liner to the sewer main.
 - 3. Within fourteen (14) days of any planned bypass, the Contractor shall submit a bypass plan for any proposed bypass or dewatering activity.
 - 4. The name of the manufacturer and the location of the facility where the liners or top hats are manufactured.
 - 5. Contractor's Qualifications. Submit copy of manufacturer's license certificate. Submit list of ten (10) similar jobs within the past five (5) years as well. Provide project information such as name of project, number of services connection laterals, date complete, and project references. All

THE METROPOLITAN DISTRICT

listed projects must have been performed within the United States of America.

6. **Material Certifications.** Written certification is required from the manufacturer that all materials used in the work were manufactured and tested in accordance with the appropriate ASTM Specification and is being used or installed in conformance with the manufacturer's recommendations.
7. **Public Notifications.** The Contractor shall submit a copy of the initial resident notification as described in Subsection 1.08. The Owner will provide copies of all public notifications for distribution by the Contractor.
8. **Storage and Delivery Procedures.** The Contractor shall provide the liner manufacturer's recommended storage and delivery procedures. This shall include storage and delivery temperatures, maximum time from wet-out to installation, and other pertinent information.
9. **Safety Data Sheets.** The Contractor shall submit applicable Safety Data Sheets (SDS) for each component of the sewer service lateral cured-in-place liners or top hat system.
10. **Test Results.** Prior to the use of any materials, the Contractor shall furnish, at their expense, the results of testing of the proposed materials by an independent laboratory in conformance with these Specifications. All submitted test data shall have been performed on field installed samples within the last twelve (12) months. Testing by an independent laboratory shall verify that the products to be used meet all minimum strength standards as set forth in ASTM F1216, Table 1. Testing shall also verify that any product to be used on the project meets the minimum chemical resistance requirements as established in ASTM F1743, Table 2, where the testing is in accordance with Section 7.2.1 of ASTM F1743. Pipe Cleaning Procedure. The Contractor shall submit a narrative describing in sufficient detail the proposed methods of root cutting and cleaning the existing laterals. Prepare such narrative to include the degree of cleaning as recommended by the lining manufacturer. Such narrative shall indicate approval of proposed cleaning methods by the lining manufacturer's technical representative.
11. **Liner Thickness Calculations.** The Contractor shall perform liner thickness calculations and furnish them to the Engineer with supporting assumptions. Calculations shall be done after cleaning, televising, and other field inspections have been accomplished. Design parameters shall be as specified herein.
12. **Curing Cycle and Cooling Rate.** The Contractor shall submit the resin manufacturer's recommended curing cycle as well as the recommended cooling rate. The Contractor shall submit a copy of the cure logs for each lateral installation.

THE METROPOLITAN DISTRICT

13. Pre-lining and post-lining video recordings and logs. The Contractor shall submit two (2) copies of the pre-lining and post-lining television inspection video recordings and logs for each lateral within thirty (30) days of each completed television inspection and after the one (1) year period upon project substantial completion.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

A. American Society for Testing and Materials (ASTM)

1. ASTM D638 – Standard Test Methods for Tensile Properties of Plastics
2. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
3. ASTM F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin Impregnated Tube
4. ASTM F1743 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)
5. ASTM D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
6. ASTM D2990 - Standard Test Methods for Tensile, Compressive and Flexural Creep and Creep-Rupture of Plastics
7. ASTM D5813 - Standard Specification for Cured-In-Place Thermosetting Resin Sewer Piping Systems.

- #### B. Where reference is made to one of the above standards, the revision in effect at the time of the bid opening shall apply.

1.05 QUALITY ASSURANCE

- #### A. The purpose of the liner or top hat is to provide for a permanent seal of the annular space of the sewer pipe to lock the liner in place with the service connection and to provide a seal of the service lateral. Work may occur on existing unlined sewer mains and on lined sewer mains. For unlined sewer mains, liners or top hats shall be installed after the sewer main is lined and after the service lateral is re-instated in the mainline. For lined sewer mains, the

THE METROPOLITAN DISTRICT

sewer service lateral cured-in-place liner or top hat shall provide for the repair of a tapped service within the existing lined sewer mains.

- B. The Contractor performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner. Submit the following information for review and approval:
1. The number of years of experience installing sewer service lateral cured-in-place liners or top hats.
 2. The name of the manufacturer and supplier for this work and previous work listed below. The Contractor shall be an approved installer as certified and/or licensed by the liner manufacturer.
 3. A list of municipal clients within the United States of America that the Contractor has performed this type of work for without defects or performance problems.
 - a. The list shall contain names and telephone numbers of persons to be called to verify previous satisfactory performance.
 - b. A full description of the actual work performed.
 - c. The list of municipal clients and description of projects shall include the number of laterals rehabilitated over the past 3 years.
- C. The Contractor shall also be capable of providing crews as needed to complete the work without undue delay and within the contract time allotted.
- D. The liners or top hats shall be provided by a single manufacturer. The supplier shall be responsible for the provision of all test requirements specified herein as applicable. In addition, all liners or top hats to be installed under this Contract may be inspected at the plant for compliance with this Section by an independent testing laboratory provided by the Owner, at the Contractor's expense. The Contractor shall require the manufacturer's cooperation in these inspections.
- E. Inspection of the liners or top hats may also be made by the Engineer or other representative of the Owner after delivery and shall be subject to rejection at any time on account of failure to meet any of the requirements specified, even though sample liner may have been accepted as satisfactory at the place of manufacture. Liner rejected after delivery shall be marked for identification and shall be removed from the job site at once.
- F. Final Installed Liner Thickness. The final installed liner thickness shall not be less than, nor more than ten (10) percent greater than, the required thickness

THE METROPOLITAN DISTRICT

specified. The final installed liner thickness measurement shall be determined from liner samples, as deemed necessary by the Engineer. It shall be the Contractor's responsibility to consider site conditions and their installation process to determine the liner thickness to install.

- G. Any installation not meeting specified strengths shall have the defective sections of liner removed and replaced with a product acceptable to the Owner at the expense of the Contractor. The re-inspection requirements as listed above shall apply to this re-installed section of line.

1.06 SYSTEM DESCRIPTION

- A. The sewer service lateral cured-in-place liners shall be a seamless one-piece or two-piece product affixed to the walls of the lateral pipe and at the junction between the pipe and main sewer. All top hats shall be a seamless one-piece product at the junction between the main sewer and the service lateral. The junction between the collar and the lateral sleeve must be watertight and will consist of a lateral portion and a mainline portion.
- B. The liner or top hat material shall be capable of conforming to offset joints, bells and disfigured pipe sections. A corrosion resistant resin compatible with the installation process shall be used.
- C. The carrier packer shall be specifically designed for 6-inch diameter services connections and shall be manufactured to conform to either a wye, tee or break-in type connections.
- D. The mainline portion of the carrier packer will accommodate pipe diameters 6-in or greater.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in shipping, handling and storage to avoid damaging the liners or top hats. Extra care shall be taken during cold weather construction. Any liner or top hat damaged in shipment shall be replaced as directed by the Engineer.
- B. Any liner or top hat showing a split or tear, or which has received a blow that may have caused damage, even though damage may not be visible, shall be marked as rejected and removed at once from the job site.
- C. The liner or top hat shall be maintained at a proper temperature in refrigerated facilities to prevent premature curing at all times and shall be protected from UV light prior to installation. Any liner or top hats showing evidence of premature curing will be rejected for use and will be removed from the site immediately.

THE METROPOLITAN DISTRICT

1.08 PUBLIC NOTIFICATION

- A. All property owners shall receive notification that their sewage service will be interrupted during the CCTV inspection and while the liner or top hat is being installed. The Contractor shall distribute all written notices to each affected property owner at the following times:
 - 1. Seven (7) days prior to lining activities.
 - 2. Between 24 to 48 hours prior to lining activities.
 - 3. Within 24 hours after completion of lining activities.
- B. The Owner will provide copies of all public notifications for distribution by the Contractor.
- C. Each notice shall include the date, start time and estimated time when service will be completely restored. The Contractor shall provide a telephone number for property owners to call for information will work is in progress.
- D. The Contractor shall contact any home or business that cannot be activated within the time stated in the written notice.
- E. The maximum amount of time any home or business shall be without sanitary sewer service is eight (8) hours. Any home or business that is without sanitary service for longer than (8) hours will be bypassed to the sanitary sewer at no additional cost to the Owner.
- F. Contractor's schedule is subject to approval based on critical stakeholders and at no additional cost to the Owner.

1.09 WARRANTY

- A. All lateral rehabilitation work shall be fully guaranteed by the Contractor and manufacturer for a period of one (1) year upon substantial completion of the project. If the Contractor were to perform the CCTV at the one (1) year mark or shortly after, they are still liable to repair any defects that are discovered. Retainage will be held in accordance with the Agreement until the CCTV has been completed, submitted and accepted by the Engineer.
- B. A written warranty shall be submitted. During this period, all serious defects discovered by the Owner shall be removed and replaced in a satisfactory manner at no additional cost to the Owner. The Owner may conduct an independent television inspection of any lining work prior to the completion of the warranty period at its own expense. Any wrinkles, blisters, dry spots in resin or other defects in the finished liner or top hat, which in the opinion of the

THE METROPOLITAN DISTRICT

Engineer, negatively affect the integrity or strength or the flow capacity of the pipe, are unacceptable. Contractor will be responsible to remove and repair all such defects at their own expense. Defects include but are not limited to:

1. Leakage through the liner or between liner and pipe
 2. Visible reduction of the liner thickness
 3. Separation of the liner from the pipe
- C. The liner or top hat shall be as free as commercially practicable from visual defects such as foreign inclusions, dry spots, pinholes, and delamination. The liner surface shall be free of leaks, cracks, and crazing with a smooth finish. Some minor waviness that will not appreciably decrease the flow cross section or affect the flow characteristics shall be permissible.

PART 2 - PRODUCTS

2.01 MATERIALS

A. SERVICE LATERAL CURED-IN-PLACE LINER AND TOP HAT

1. The liner or top hat shall be a resin-impregnated, flexible polyester felt tube, matching the diameter of the lateral pipe, which is inserted into the service lateral to be rehabilitated and cured-in-place by an acceptable curing method. The resin shall be suitable for the design conditions as well as the curing process. The liner and top hat shall provide a service life of fifty (50) years and shall have the minimum structural properties listed below.

<u>Mechanical Property</u>	<u>Initial psi</u>	<u>Long-Term psi</u>
Flexural Strength (ASTM D790)	4,500	4,500
Flexural Modulus (ASTM D790)	350,000	175,000

2. The liner or top hat system shall consist of the lining described above and a collar, which is a minimum of 3 inches in length around the full circumference of the service lateral. Both the liner, collar section and top hat shall be compatible with the main line pipe and service lateral diameter as well as the lateral connection orientation.
3. The liner and top hat shall be designed, fabricated, and installed for the actual conditions encountered for this application including the material of the host pipe, in accordance with the applicable provisions of ASTM F1216, and shall meet the following minimum design conditions:

THE METROPOLITAN DISTRICT

- a. AASHTO H-20 live load with two trucks passing and applicable construction loads as required by the Contractor's means and methods.
 - b. Soil weight of 120 pounds per cubic foot.
 - c. Coefficient of friction $Ku' = 0.130$.
 - d. Groundwater: At the ground surface.
 - e. Fully deteriorated pipe with 2 percent (min.) ovality. If ovality of existing pipe is found to be worse, use actual percent up to 5 percent (max.).
 - f. Soil Modulus 1,000 psi.
 - g. Factor of Safety = 2
 - h. Soil Depth: Depth of Cover will be determined by field measurements.
4. The liner or top hat shall be designed to withstand all imposed loads, including live loads, construction related loads and hydrostatic pressure. The liner or top hat shall have sufficient wall thickness to withstand all anticipated external pressures and loads that may be imposed after installation. The design shall be performed and certified by a professional engineer licensed by the State of Connecticut.
 5. The liner or top hat shall extend from the mainline into the service to form a continuous, tight fitting, hard, impermeable liner that is watertight. This pipe-within-a-pipe system shall eliminate any visible ground water leakage and future root growth within the service lateral and at the lateral to mainline connection. The product system shall be compatible with the mainline and lateral pipe materials.
 6. The liner or top hat material and resin shall be completely compatible.
 7. The liner or top hat shall be capable of fitting into irregularly shaped pipe sections and through bends and dips within the pipeline.

B. RESIN SYSTEM

1. The resin system shall meet the requirements of ASTM D5813 or ASTM F1216. The resin system shall also comply with the structural requirements specified herein and shall provide chemical resistance for the flow media in the gravity pipe.
2. The resin shall be compatible with the rehabilitation process and shall be able to cure in the presence or absence of water or steam. The initiation

THE METROPOLITAN DISTRICT

temperature for cure will be as recommended by the resin manufacturer.

3. Submit documentation from the resin manufacturer specifically describing the chemical characteristics of the resin system, including allowable mixing, impregnation, and handling time, transportation and storage time, and recommended curing cycle including temperatures, pressures, and times. The resin manufacturer's documentation must also include maximum allowable time for handling the impregnated tube prior to insertion and the maximum allowable elapsed time from insertion to exotherm. If remedial measures are available to extend either of the maximum allowable times indicated above, without affecting the physical properties of the resin, the resin manufacturer should describe these measures and the time limits beyond which even these measures will not prevent alteration of the physical properties of the resin.

PART 3 - EXECUTION

3.01 CLEANING AND INSPECTION

- A. Each lateral shall be cleaned and inspected prior to rehabilitation. Cleaning and inspection shall be completed within thirty (30) days of the scheduled lateral rehabilitation. Property owners shall be notified within twenty four (24) to forty eight (48) hours in advance of lateral cleaning operations.
- B. A recorded video survey must be done on the main run and service laterals in accordance with Section 02764. The inspection shall confirm the location and clock reference of the lateral junctions to be lined, any offsets within the mainline or service lateral, any intrusion from the lateral into the main; the angle at which the connection comes in; any changes in angle of approach of the lateral for the length of the repair; the potential flows coming through the lateral pipe; the potential flows going through the main pipe; the diametric size of the connection for the length of the liner; the size of the main pipe at the service lateral connection and the presence of active infiltration within the vicinity of the work area.
- C. Two copies of the pre-lining inspection shall be submitted to the Engineer within thirty (30) days of each completed television inspection. The Contractor shall be responsible for having a copy of the pre-lining inspections in the field as well. Immediately prior to liner insertion, the camera shall traverse the lateral to inspect for debris which may have entered the line after the existing condition video recording.

3.02 LINE PREPARATION

- A. Prior to lateral rehabilitation activities, the area around the lateral sealing surface in both the main and lateral shall be inspected. Waste product build-up, hard

THE METROPOLITAN DISTRICT

scale, roots, lateral cutting debris or resin slugs must be removed using high pressure water jetting or in-line cutters. Clean each service lateral to be lined and dispose of any resulting material as specified in Section 02764. The term "cleaned" shall mean the removal of all sand, dirt, roots, grease, and all other solids or semisolid materials from the entire interior of the sewer lines.

- B. Built-up deposits on the main and lateral pipe walls shall be removed. The removal shall reach at least one foot beyond the designated rehabilitation length to allow the bladder to inflate tightly against the pipe walls ensuring a smooth transition from liner or top hat to the existing pipe wall.
- C. Where the main pipe has existing CIPP lining, a check should be made to ensure the prior lateral reopening work created a lateral opening that is flush with the lateral pipe. If this is not the case, the mainline CIPP must be trimmed back using a lateral cutter at no additional cost to the Owner.
- D. Any active infiltration that is present must be stopped in advance as recommended by the manufacturer.
- E. The Contractor shall be responsible for bypassing of sewage during lateral rehabilitation activities. In cases where the temporary backup of sewage is accepted as a replacement for bypassing, the Contractor is responsible for any and all damage caused.

3.03 INSTALLATION

- A. The liner or top hat shall be loaded inside a pressure apparatus above ground. The pressure apparatus, with an end attached to a robotic manipulator device, shall be positioned in the mainline pipe at the service connection that is to be rehabilitated. The robotic device together with a television camera will be used to align the repair product with the service connection opening. The inserted product will then be inspected using a TV camera to confirm the product is correctly positioned and/or centered in the lateral opening prior to curing. The robotic device shall hold the collar in place while air pressure, supplied to the pressure apparatus through a hose, shall be used to invert the liner into the lateral pipe. The insertion pressure will be adjusted to fully deploy the product into the lateral connection and hold the product tight to the main and lateral pipe walls.
- B. The pressure apparatus shall include a bladder of sufficient length in both the main and lateral lines such that the inflated bladder extends beyond the ends of both the lateral tube and main line collar segments. The apparatus shall press the edges of the liner or top hat flat against the internal pipe wall, thus forming a smooth transition without a step, ridge or gap between the liner or top hat and the inner diameters of the lateral and mainline pipes.

THE METROPOLITAN DISTRICT

- C. After insertion is completed, recommended pressure must be maintained on the impregnated product for the duration of the curing process. The Contractor shall apply a heat source and circulation system or other approved method to affect a cure of the resin system. The equipment shall be required to effect a complete curing of the resin system. The minimum cure period shall be as recommended by the system manufacturer.
- D. In no instance will sewage be used to invert or cure liners or calibration tubes.
- E. The liner or top hat shall not inhibit the post installation video inspection of the mainline and service lateral pipes or future pipe cleaning operations. During the warranty period, any defects with the liner or top hat that affect the performance or cleaning of the lateral connection shall be repaired at the Contractor's expense in a manner acceptable to the Owner and property owner.
- F. The Contractor shall inform the Engineer of service laterals in which liners or top hats cannot be installed. The conditions encountered in these services will be identified, documented, and video recorded. The Contractor will not attempt installation in these services unless directed by the Engineer.
- G. For each length of liner installed, provide field plate samples of acceptable length for testing of flexural properties.

3.04 FIELD TESTING AND ACCEPTANCE

- A. Following installation of the service lateral liners or top hats, conduct a television inspection of the completed work as specified in Section 02764, including the service lateral connections at the sewer main and the full length of all service laterals lined during the progress of the work. An additional CCTV inspection shall be performed one (1) year after substantial completion. If the Contractor were to perform the CCTV at the one (1) year mark or shortly after, they are still liable to repair any defects that are discovered. Retainage will be held in accordance with the Agreement until the CCTV has been completed, submitted and accepted by the Engineer.
 - 1. No more than two laterals shall be installed and inspected before installing additional laterals.
- B. Copies of these recordings and those made prior to the liner installation shall be submitted to the Engineer for approval and shall be retained by the Owner.
- C. Field acceptance of the liner or top hat shall be based on the Engineer's evaluation of the installation including TV inspection video recordings and a review of certified test data for the submitted pipe samples as well as testing the connection between the service lateral and the main as specified in Section 02764.

THE METROPOLITAN DISTRICT

- D. Groundwater infiltration of the liner shall be zero.
- E. The finished liner or top hat shall be free of dry spots, lifts, delamination and excess resin. There shall be no evidence of splits, cracks, breaks, lifts, kinks or crazing.
- F. If any defective liner or top hat is discovered after it has been installed, it shall be removed and replaced at no additional cost to the Owner. Repair methods shall be submitted to the Engineer for approval. **Any failure that requires excavation work to repair shall be initiated within two (2) hours of failure observation.**
- G. The Contractor shall clean up each project area after the work is completed and all testing is accepted. Remove and dispose of all excess materials and debris at each location as directed by the Engineer.

3.05 CERTIFICATION TESTING

- A. The Contractor shall provide sufficient specimens from each installation to allow an independent laboratory to conduct their separate tests for each of the flexural and tensile properties of the liner as specified below. The specimens shall be plate samples obtained in the field submitted as requested by the Engineer. Each specimen shall be clearly marked to indicate the installed location of the liner or top hat, the date of installation, the pipe diameter and the resin used. The following tests shall be performed for each installation as directed by the Engineer or Owner.
 - 1. Short-Term Flexural (Bending) Properties - The initial tangent flexural modulus of elasticity and flexural yield strength shall be measured in accordance with ASTM D790.
- B. Copies of the test results shall be sent directly to the Engineer by the laboratory. The certified results shall report the actual test results for each of the properties being tested.
- C. Each individual reported value shall meet or exceed the value of that property as specified in Subsection 2.01 or as used in the design calculations, whichever is higher.
- D. All the expenses related to certified testing of liners or top hats furnished under this contract shall be paid for by the Contractor.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02720

CATCH BASINS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section includes furnishing and installing new catch basin with Municipal standard curb backs to the lines and grades specified on the plans. Work shall include all excavation, removal, and proper disposal of existing catch basins and other surplus materials, trench support and stabilization, dewatering, handling of existing flows, placement of crushed stone base material under the proposed structure, furnishing, installation and/or construction of sump, walls, riser and curbed sections, connection on installation of existing and proposed pipes, installation of frames and grates, curb inlets, and replacement and/or resetting of adjacent sidewalk, curb, and pavement disturbed by this work.

1.02 RELATED SECTIONS

- A. Section 02053, Removal and Disposal of Existing Sewer, Manholes and Appurtenances
- B. Section 02140, Dewatering and Drainage
- C. Section 02160, Excavation Support Systems
- D. Section 02200, Earthwork
- E. Section 02202, Trench Refill

1.03 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. ASTM C139-73 (1989) - Concrete Masonry Units for Construction of Catch Basins and Manholes
- B. ASTM C32-73 (1989) - Sewer and Manhole Brick (Made from Clay or Shale), (for Grade SS, Hard Brick)
- C. ASTM C478-88 - Precast Reinforced Concrete Manhole Sections
- D. ASTM C913-08 - Standard Specification for Precast Concrete Water and Wastewater Structures

THE METROPOLITAN DISTRICT

- E. ASTM C207-79 (1988) - Hydrated Lime for Masonry Purposes
- F. ASTM A48-83 (1990) - Gray Iron Castings
- G. ASTM C159-89 - Portland Cement
- H. Section 5.07, CTDOT Form 817 – Catch Basins, Manholes and Drop Inlets
- I. Section M.03, CTDOT Form 817 – Portland Cement Concrete
- J. Article M.08.02, CTDOT Form 817 – Catch Basins, Manholes and Drop Inlets
- K. Article M.11.04, CTDOT Form 817 - Mortar.
- L. MDC Standard Details Manual.

PART 2 - PRODUCTS

2.01 MATERIALS.

- A. Catch basins shall conform in shape, size, dimensions, materials, and other respects to the details bound in the Specifications or as ordered by the Engineer.
- B. Catch basin walls shall be precast concrete masonry units or constructed of concrete block and mortar. The top of the cone (not to exceed 6-in.) shall be built of brickwork to permit adjustment of the frame to meet the finished surface.
- C. Catch basin sumps shall be one-piece precast concrete or concrete masonry units on cast-in-place or precast concrete bases. Provide two (2) foot minimum sumps unless otherwise directed by the Engineer.
- D. The cast-iron frames and grates shall conform to the details bound in the Specifications.
- E. All cast-in-place concrete shall be 3000 psi and shall conform to the requirements specified in Article M.03, CTDOT Form 817 – Portland Cement Concrete.

2.02 PRECAST CONCRETE MASONRY UNITS

- A. Circular precast concrete masonry units shall conform to the requirements of AASHTO M199 (ASTM C139) as supplemented below. Rectangular precast catch basins and drop inlets shall conform to ASTM C 913 as supplemented below:

THE METROPOLITAN DISTRICT

1. All materials used for concrete shall conform to the requirements of Section M.03, CTDOT Form 817 – Portland Cement Concrete.
2. Acceptance of the units will be on the basis of material tests and inspection of the completed product.
3. The Contractor shall submit 6 sets of manufacturer's information to the Engineer for approval prior to delivery of any units to the project site.
4. The manufacturer's name and the date of manufacture shall be clearly marked on the units.

2.03 PRECAST CONCRETE SUMPS

- A. Circular precast concrete sumps shall conform to the requirements of AASHTO M199 (ASTM C139) as supplemented below. Rectangular precast concrete sumps shall conform to ASTM C 913 as supplemented below:
 1. All materials used for concrete shall conform to the requirements of Section M.03, CTDOT Form 817 – Portland Cement Concrete.
 2. No more than two lift holes may be cast or drilled in each sump.
 3. Acceptance of the sumps will be on the basis of material tests and inspection of the completed product.
- B. All holes in sumps used for their handling shall be thoroughly plugged with rubber plugs made specifically for this purpose or with mortar. The mortar shall be one part cement to 1½ parts sand, mixed slightly damp to the touch (just short of "balling"), hammered into the holes until it is dense and an excess of paste appears on the surface, and then finished smooth and flush with the adjoining surfaces.

2.04 BRICKS

- A. Brick for catch basins or drop inlets shall conform to the requirements of AASHTO M 91, Grade SM, except that the depth shall be 2 1/4 inches (57 millimeters), the width 3 5/8 inches (92 millimeters) and the length 8 inches (203 millimeters), and except that the maximum water-absorption by 5-hour boiling shall not exceed the following limits:
- B. Rejected brick shall be immediately removed from the work site.

2.05 MORTAR

- A. Mortar shall conform to the requirements of Article M.11.04, CTDOT Form 817.

THE METROPOLITAN DISTRICT

2.06 CATCH BASIN FRAMES AND GRATES

- A. The Contractor shall furnish and install all cast-iron catch basin frames and grates conforming to the details in the MDC Standard Details Manual and bound in the Specifications.
- B. Castings shall be of good quality, strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects of every nature which would render them unfit for the service for which they are intended. Contact surfaces of grates and frame seats shall be machined to prevent cocking of grates.
- C. All castings shall be thoroughly cleaned and subject to a careful hammer inspection.
- D. Cast iron shall conform to the requirements of AASHTO M 105, Class 25 for the frames and Class 30 for grates.
- E. Cast steel shall conform to the requirements of ASTM A 27, Grade optional, and shall be thoroughly annealed.
- F. Structural Steel shall conform to the requirements of ASTM A 36, or A 283, Grade B or better, as to quality and details of fabrication, except that in the chemical composition of the steel, the 2/10 of 1% of copper may be omitted.
- G. Malleable iron shall conform to the requirements of the Specifications of ASTM A 47, Grade 22010. The materials and method of manufacture for drop inlets shall conform to the requirements as stated on the plans or as ordered.
- H. Before being shipped from the foundry, castings shall be given one coat of coal-tar pitch varnish, applied in a satisfactory manner so as to make a smooth coating, tough, tenacious, and not brittle nor with any tendency to scale off.
- I. Unless otherwise specified or indicated on the Contract Drawings, castings in paved areas shall be capable of withstanding AASHTO H-20 loading and shall meet the requirements of the municipality in which they are installed.

2.07 CURB INLETS

- A. Curb inlets shall conform to CTDOT or Municipality standards, using the appropriate concrete top as directed by the Engineer. For catch basin replacement locations, the existing curb inlet may be salvaged and reset as directed by the Engineer or as specified on the Contract Drawings.
- B. All new curb inlets shall be based on the Municipal standard and shall be stamped "Drains to Watercourse".

THE METROPOLITAN DISTRICT

- C. Where curb inlets are used to replace a section of existing curbing, the width of the curb inlet shall be the same as the adjoining existing curbing.

PART 3 - EXECUTION

3.01 EXCAVATION

- A. The pavement around the existing catch basin shall be sawcut, jack hammered or otherwise cut to limit the amount damaged by excavation and removal of the existing structure. The existing cast iron frames and grates shall be carefully removed, if in good condition, the frames and grates shall be transported to the Metropolitan District Yard at 125 Maxim Road and unloaded by the Contractor at no additional cost to the Owner. The remainder of the structure shall be removed by excavation and properly disposed. The volume of excavation shall be large enough to allow installation of the trench wall support necessary and also allow adequate room for proper construction of the catch basin to the lines and grades indicated on the plans and to allow for inspection of the structure.
- B. Handling of existing flows shall conform to S 02721 subsection 3.10.
- C. The catch basin sumps shall be set on a minimum base of 6" of crushed stone. The catch basin sumps shall be a precast unit or constructed of concrete block on a cast-in-place or precast concrete base.
- D. The walls of the catch basins may be constructed of precast concrete units or of concrete block and mortar. The Contractor is herewith advised that the proximity of adjacent utilities may dictate the type of construction necessary for the sump and the walls of the catch basins. No additional payment shall be made for changes in the type of construction required due to adjacent utilities.
- E. If concrete block is used, it shall not be laid when the air temperature in the shade or away from artificial heat is 40 degrees F or below and falling. The concrete block shall be laid in such a manner as to thoroughly bond with the mortar.
- F. All joints shall be completely filled with mortar. They shall be not less than 1/4 inch and not more than 1/2 inch in thickness, and the thickness shall be uniform throughout. All joints shall be finished properly as the work progresses, and on exposed faces, they shall be neatly struck, using the "weather joint."
- G. The top of each catch basin shall conform to the MDC Standard Details Manual or to the Contract Drawings.
- H. All cutting of existing masonry will be confined to the minimum necessary for installation of new pipes or construction of new inverts. Brick or blocks shall be

THE METROPOLITAN DISTRICT

cut out to the nearest joint. Pipes shall be cut flush with the walls and the space between the wall and pipe completely filled with mortar.

- I. Bricks shall be moistened by suitable means, as directed, until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.
- J. Each brick shall be laid as a header in a full bed and joint of mortar without requiring subsequent grouting, flushing or filling, and shall be thoroughly bonded as directed.
- K. The outside faces of block and concrete block masonry shall be plastered with mortar from 1/4" to 3/8" thick. If required, the masonry shall be properly moistened prior to application of the mortar. The mortar shall be carefully spread and trowelled. After hardening, the plaster shall be carefully checked for bond and soundness by tapping. Unbound or unsound mortar shall be removed and replaced.
- L. Brick masonry and plaster shall be protected from too rapid drying by the use of burlaps kept moist, or by other acceptable means, and shall be protected from the weather and frost, all as required.
- M. All concrete, (including bases) brickwork and masonry of catch basins and manholes to be removed shall be completely removed and shall be properly disposed of. No materials removed from catch basins or manholes shall be used as backfill.
- N. Except as otherwise indicated or ordered there shall be at the top of each catch basin a frame and grate or cover set to a full even bearing on cement mortar or the required line and grade.
- O. The Contractor shall not backfill around any catch basins until the masonry has set for 72 hours or until directed by the Engineer. The Contractor shall not permit any wheel load on any catch basins until permission is granted by the Engineer.
- P. Grates shall be left in place in the frames, for safety reasons, except while work is being performed.
- Q. The void around the newly constructed catch basin shall be filled and compacted with suitable material. If native material is unacceptable for backfill, material meeting the requirements of Section 02702 Trench refill shall be used.

3.02 LEAKAGE TESTS FOR CATCH BASINS

- A. The Engineer will visually inspect catch basins for possible leaks before backfilling is allowed. All joints shall be sealed to the satisfaction of the engineer.

THE METROPOLITAN DISTRICT

- B. The Engineer may require an exfiltration test as described for sewer manholes on any structure for which he/she deems appropriate.

3.03 CLEANING

- A. Thoroughly clean all new catch basins of all silt, debris and foreign matter of any kind, prior to final inspections.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02721

LAYING SEWER AND DRAIN PIPE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes the laying of sewer and storm drain piping.
- B. Contractor must notify Owner, Engineer and property owner of any service disruptions 48 hours prior to any Work.
- C. The Contractor shall furnish and install sewer and storm drain piping and service connection piping to the lines and grades and in the locations indicated on the Contract Drawings and/or as ordered by the Engineer.
- D. Installation shall include but not be limited to, all necessary equipment and materials required for the completed pipeline, including foundation, earth excavation, rock excavation, traffic control, dewatering, test pits, trench stabilization and support, and protection of existing utilities, facilities, structures, fittings, bedding, temporary and permanent reconnection of existing house connection laterals to new sewers or drains, support and protection of crossing utilities, installation of piping in tunneled portions of work, backfilling, trench compaction, utility detection tape, filter fabric envelope, temporary and permanent surface restoration, handling of sewage/storm/combined flows and removal and disposal of existing sewers, manholes and appurtenances and bulkheading and grout filling of same.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 01570, Maintenance and Protection of Traffic (MPT)
- C. Section 02011, Test Pits
- D. Section 02053, Removal and Disposal of Existing Sewers, Manholes and Appurtenances
- E. Section 02140, Dewatering and Drainage
- F. Section 02150, Bypass Pumping, Handling Storm Runoff and Sanitary Sewage Flows

THE METROPOLITAN DISTRICT

- G. Section 02160, Excavation Support Systems
- H. Section 02200, Earthwork
- I. Section 02202, Trench Refill
- J. Section 02510, Temporary and Permanent Paved Surface Restoration
- K. Section 02612, Reinforced Concrete Pipe
- L. Section 02616, Ductile Iron Pipe for Sanitary Sewer
- M. Section 02622, Polyvinyl Chloride Sewer and Drain Pipe
- N. Section 02905, Unpaved Surface Restoration and Reset Miscellaneous Items

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300.
- B. The Contractor shall provide the following:
 - 1. Name and address of materials (pipe, Manhole, etc.) suppliers and manufacturers.
 - 2. Name and address of Subcontractors for Engineer's approval.
 - 3. Guarantees and warranties of products to be installed on the project.
 - 4. Technical information for Engineer's approval of alternate methods and materials.
 - 5. Detailed description of the methods to be used to maintain, handle, and divert sanitary/storm/combined sewage flows, as specified in paragraph 3.04. Include in detail all methods, procedures, equipment and materials to maintain flows. Include technical data on all equipment. Include plans of the layout of equipment at each location.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. American Society for Testing & Materials (ASTM)

THE METROPOLITAN DISTRICT

1. ASTM D-3034 - Type PSM Poly (Vinyl Chloride) (PVC) sewer pipe and Fittings, Designation SDR-35 (6, 8, 10, 12, and 15-inch)
2. ASTM A-746 - Ductile Iron Gravity Flow Sewer Pipe, Class 52.

1.05 QUALITY ASSURANCE

- A. Product test reports, certificates and manufacturer's field reports and instructions are to be provided.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Delivery, storage and handling of plastic (PVC) pipe shall conform to the requirements of Section 02622.
- B. Delivery, storage and handling of reinforced concrete pipe (RCP) shall conform to the requirements of Section 02612.
- C. Delivery, storage and handling of ductile iron pipe shall conform to the requirements of Section 02615.
- D. In general, material storage at the site will not be permitted. Materials shall be protected from the weather, project operations and any other potential cause of damage and shall not be a hazard to or interfere with the safe operations of the project, traffic and safety of the workmen and general public.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Foundation, base, haunching, backfill and bedding shall be as shown in the MDC Standard Details Manual and as specified in Sections 02200 and 02202.
- B. Geotextile fabric shall have an effective opening size of 70 μ m.
- C. Utility Detection Tape:
 1. The tape shall be as specified in Section 02317.
 2. The tape shall be designed to withstand extended underground exposure.
 3. The tape shall be 6 inches in width.
 4. The tape shall be colored green and be durably imprinted with an appropriate warning indicating the presence of the buried pipe: "Caution Buried Sewer Line Below" or "Caution Buried Storm Drain Line Below".

THE METROPOLITAN DISTRICT

- D. Temporary surface in paved areas shall consist of hot bituminous concrete mix as specified in Section 02510.
- E. Permanent surface in paved areas shall be bituminous concrete and/or concrete or pre-mix material as approved by the appropriate authority and as specified or ordered by the Engineer, in accordance with Section 02510.
- F. Temporary and permanent unpaved surface restoration materials shall conform to the requirements of Section 02905.
- G. Sanitary Sewer and Storm Drain Piping. Refer to Sections 02610, 02612, 02615 and 02622 for specific requirements.

PART 3 - EXECUTION

3.01 EXECUTION

- A. Each length of pipe shall be examined to see that it is sound and free of hairline cracks, free of any debris and retains its normal shape (not out of round).
- B. When ordered by the Engineer, the Contractor shall provide for and complete manufacturer's certification test.

3.02 INSTALLATION

- A. The program of earthwork, rock excavation, dewatering, traffic control, support of excavation, environmental protection, backfilling and compacting, handling sanitary sewage and storm water flows, etc., shall be done in accordance with the applicable Sections of the Contract Documents.
- B. Removal and disposal of existing sewer and appurtenances shall be done in accordance with Section 02053. Handling of storm runoff and combined/sanitary sewage flows shall be done in accordance with paragraph 3.04 of this Section.
- C. Where and as shown on the Contract Drawings, the Contractor will be required to remove and relay portions of existing sanitary or storm house connection laterals, in conjunction with the installation of new sanitary sewers and storm drains. At certain other locations, Owner forces will be required to offset water services affected by the construction. At certain other locations other utility owners will be performing utility relocation work. The Contractor shall coordinate his scheduling of work with that of said utility owners.
- D. Pipe shall be installed in accordance with applicable pipe section of these Specifications.

THE METROPOLITAN DISTRICT

- E. Pipe shall be laid in a dry trench on a minimum of 6-inches of crushed stone base at the grade specified with stone haunching up the sides to level with top of all plastic pipe and up to the spring line of reinforced concrete piping, unless otherwise ordered by the Engineer and adequately hand tamped around all type and size pipes. Bell holes shall be made in the crushed stone bedding to ensure that all pipe is firmly supported on the entire barrel portion. Filter fabric shall be installed as shown on the Contract Drawing.
- F. Pipe shall be connected at joints with the use of a push-on integral rubber gasket on all plastic and reinforced concrete pipe conforming with the designated ASTM Specifications.
- G. Wyes, bends, inlets, tees, chimneys, etc., shall be installed as shown or directed in the pipeline. The Contractor shall have a sufficient quantity of fittings on hand that can be installed as required around existing utilities as directed by the Engineer.
- H. Existing house connection laterals (sanitary and storm) shall be temporarily reconnected to the new sanitary sewer or storm drain until such time as the permanent connection can be made.
- I. Backfill material shall be placed in lifts as specified in Section 02200 and compacted in the full width and length of the trench up to the approved height above the pipe and below the surface to be paved as specified.
- J. Trench stabilization and support systems shall be used for all installation work and shall conform with OSHA regulations. Where indicated on the Drawings and as specified or ordered by the Engineer, the excavation support system shall be installed and either be removed or left in-place, as determined by the Engineer.
- K. Trench dams shall be placed at the locations shown on the Contract Drawings. Backfill shall be placed evenly on each side of the trench plug as shown in the MDC Standard Details Manual.

3.03 FIELD QUALITY CONTROL

- A. Low pressure air tests and television inspections shall be performed by the Contractor in accordance with the requirements of Section 02610 and 02764.
- B. The Contractor shall also assist the Engineer in the monitoring of such tests and in the inspection and measurements to ensure the quality of the installed system.

3.04 HANDLING STORM RUNOFF AND SANITARY SEWAGE FLOWS

- A. The Contractor shall furnish, install, construct, operate and maintain temporary facilities such as pipes, structures, flow diversions, pumping equipment,

THE METROPOLITAN DISTRICT

bypasses and other protective facilities that are necessary for the proper conveyance, without interruption, of storm runoff and sanitary sewage flows through the limits of work during the construction, reconstruction or relocation of new and existing sanitary sewers, storm drains, house connections and manholes throughout the period of time in which the work occurs.

- B. The Contractor shall handle both dry and wet weather flows, regardless of source of quantity of flow, and the protection of existing structures, utilities, etc., and any or all of the finished construction during dry or wet weather flows. The Contractor shall remove and dispose of all such temporary facilities upon the completion of the permanent work.
- C. Refer to Section 02150 for handling storm runoff and sanitary sewage flows.
- D. All materials shall conform to the requirements of the applicable items of these Specifications and be subject to the approval of the Engineer.
- E. In general, the pertinent provisions of the Specifications shall govern the construction methods and procedures to be utilized by the Contractor for the work specified in this Section.
- F. The Contractor shall investigate and verify sanitary sewer flows to evaluate the scope of facilities required for the proper conveyance and maintenance of said flows.
- G. Sanitary flows may be bypassed to the parallel combined sewer on any street in this Contract provided the Contractor receives the prior written approval of the Engineer. The combined sewers may overflow during wet weather or high flow conditions and for this reason, flow conditions in both the sanitary pipe and combined sewer pipe must be closely observed to ensure that bypassing of sanitary flows to the combined sewer will not exacerbate surface water pollution at downstream locations.
 - 1. If the Contractor chooses to bypass to the combined sewer, the Contractor shall demonstrate to the satisfaction of the Engineer that bypassing in this manner will not contribute to surface water pollution at downstream locations.
 - 2. In general, bypassing to the combined sewer will not be allowed during non-working hours as weather conditions and flow rates in these pipes can change rapidly.
- H. The Contractor shall furnish the Engineer with his proposed detailing methods, procedures, equipment and materials to maintain flows and accomplish the work as described herein. The Contractor alone shall be responsible for the safety of

THE METROPOLITAN DISTRICT

the work, the protection of any facilities, utilities or adjoining properties, and for the successful completion of the work under this item.

- I. The Contractor is hereby notified that due to the age and condition of the existing sewer systems, the flows in said systems may increase during storms or wet weather in general. All flows, regardless of source or quantity, must be maintained in an acceptable manner, so as not to overflow, backup or otherwise create a nuisance or health hazards, or in any way endanger adjoining properties or facilities.
- J. To this end, the Contractor shall furnish, install or construct temporary facilities, connections or structures as necessary to convey and maintain the aforementioned flows during the prosecution of the work under this Contract. All such temporary facilities, structures or connections shall be designed and constructed to permit excavation for permanent work to the payment limits shown on the Drawings. Failures of such temporary facilities which endanger or prevent proper completion of permanent work shall be corrected at the sole expense of the Contractor.
- K. The Contractor shall provide, install, operate and maintain all temporary facilities such as pumping equipment and hoses, conduit, etc. to intercept flows before said flows reach points where they would interfere with the Contractor's work, to bypass the flows beyond the point of immediate construction and to return them to the drainage system of origination below said systems. The Contractor shall have on hand throughout the work such auxiliary pumping equipment, generators, etc., necessary to maintain flows in the event his primary equipment fails.
- L. The Contractor shall divert flows as necessary to construct or reconstruct inverts, benching, or other portions of manholes or chambers as indicated on the Drawings, or as directed by the Engineer.
- M. The Contractor shall make temporary connections to keep all house connections laterals, utility lateral connections and storm connections in service, where said connections are encountered during the course of excavation for the proposed facilities. In the event said connections are removed by the Contractor for his convenience to facilitate the installation of proposed facilities, the Contractor shall make temporary reconnections as directed by the Engineer, until such time permanent repairs to the connections can be accomplished.
- N. Unless otherwise provided for, or directed, all temporary facilities shall be bulkheaded and/or removed and disposed of in an approved manner when no longer required.

THE METROPOLITAN DISTRICT

- O. The Contractor shall have no claim for additional compensation by reason of any delay or inconvenience in adapting his operations to the requirement for maintaining and conveying sanitary sewage flows.
- P. No claim will be allowed for any delay, loss or expense to which the Contractor may become subject, directly to indirectly, by reason of the normal or wet weather flows in existing sanitary sewers or by reason of any damage to the existing sewers caused by his operations.
- Q. The Contractor shall in no way or manner anticipate any additional compensation for work performed in the removal and/or sand or grout filling of the existing sewer system. Additional costs, if any, shall be included in the appropriate bid items of this Proposal.

3.05 REMOVAL AND DISPOSAL OF EXISTING SEWERS AND MANHOLES

- A. See Section 02053.

3.06 UNDERGROUND UTILITY MARKING

- A. Warning Tape - See Section 02317.

3.07 INSTALLATION OF SERVICE LATERAL INSERT CONNECTIONS TO EXISTING SEWERS

- A. The Contractor shall cut a relief hole at each service connection. The relief hole shall be 85% of the diameter of the service connection (or as required to allow for a 6-inch Inserta Tee).
- B. The Contractor shall precisely cut a circular hole, per the manufacture's recommendations, in the pipe that will form a tight fit between the pipe, PVC hub and rubber boot.
- C. The rubber boot shall be installed into the cored hole, making sure the boot is properly oriented to the mainline. The rubber boot shall be lubricated with a special solution provided by the Inserta Tee manufacturer. The Contractor shall make sure the upper and lower ribs of the rubber boot are correctly seated against the inside and outside diameter of the liner pipe.
- D. The PVC hub shall be inserted into the rubber boot, per manufacturers recommended instructions. The stainless steel band shall be placed around the top of the rubber boot and tightened to form a watertight seal.
- E. The service lateral shall be installed or replaced as required.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02764

TELEVISION INSPECTION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all necessary labor, materials, equipment, services and incidentals required to visually inspect by means of color closed-circuit television all new and existing sewer and drain sections, including, but not limited to, all recording and playback equipment, materials and supplies such as tape or disk. All new sewer pipes shall be television inspected.
- B. The term "sewer", as used in this Section, shall apply to both stormwater mainlines and sewer mainlines (not laterals).
- C. The inspection shall be done one sewer line section (i.e., manhole to manhole) at a time.
- D. All inspections shall be witnessed by the Engineer.
- E. Video recordings shall be made of the television inspections and copies of both the recordings and printed inspection logs shall be supplied to the Owner.
- F. The Work specified in this Section shall be performed upon completion of the construction of the sanitary sewer, storm drains and appurtenances and then again at the end of the maintenance period, subsequent to trench consolidation and testing operations.
- G. For post-construction television inspection, the Contractor is responsible for adhering to NASSCO's Pipeline Assessment and Certification Program (PACP) guidelines. Verification of NASSCO PACP certification is required.

1.02 RELATED SECTIONS

- A. Section 02610, Sewer Testing and Cleaning

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. The television camera used for the inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100 percent humidity conditions. The camera, television monitor and

THE METROPOLITAN DISTRICT

other components of the video system shall be capable of producing a minimum 500-line resolution video picture. Picture quality and definition shall be to the satisfaction of the Engineer and if unsatisfactory, equipment shall be removed and no payment made for an unsatisfactory inspection.

PART 3 - EXECUTION

3.01 PROCEDURE

- A. The camera shall be moved through the line in either direction at a uniform rate, stopping when necessary to ensure proper documentation of the sewer's condition but in no case will the television camera be pulled at a speed greater than 30 fpm. Manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the television camera will not pass through the entire sewer line section, the equipment shall be removed and repositioned in a manner so that the inspection can be performed from the opposite manhole.
- B. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones, radios, or other suitable means of communication shall be set up between the two manholes of the sewer line being inspected to ensure that good communications exist between members of the crew.
- C. The accuracy of the measurements cannot be stressed too strongly. Measurement for location of defects shall be above ground by means of a meter device. Marking on cable, or the like, which would require interpolation for depth of manhole, shall not be allowed. Measurement meters shall be accurate to two-tenths of a foot over the length of the sewer line section being inspected. Accuracy of the measurement meters shall be checked daily by use of a walking meter, roll-a-tape, or other suitable device.
- D. For post-construction television inspection, the Contractor is responsible for adhering to NASSCO's PACP guidelines.

3.02 RECORDING OF FIELD OBSERVATIONS

- A. General
 - 1. The Contractor shall submit to the Engineer, two copies of digital recordings (images and video) of the pipeline television inspections and summary data on an external USB/portable hard drive. The CDR shall be written in accordance with the ISO-9660 Level 2 Specification. Each CDR shall be labeled with the appropriate identification of its contents. The label shall correspond to a schedule of every sewer reach contained on the CDR.

THE METROPOLITAN DISTRICT

2. The digital recordings shall be linked to software capable of performing multiple summaries, queries, and analysis. The software shall also have the capability of recording, digitizing and storing single frames of video images and full time live video, as well as collecting, storing and printing pipeline inspection data for display and report generation.
3. The included software package shall be a 32 bit Windows (most recent) application and shall be fully Object Oriented. It shall be capable of printing pipeline inspection reports with captured images of defects or other related significant visual information on a standard inkjet color printer. The software shall also have the capability of being linked with graphical software such as those used for Geographical Information Systems.

B. Field Data Recordings

1. Image Capture
 - a. Create still shots of video recordings. Selected digitized picture images shall be stored and the picture files shall be exportable to Industry Standard Formats to include JPEG, BMP, TIFF, formats and are transferable by disk to an external personal computer that utilizes standard viewers and printers. Picture files will be stored and exported with inspection data.
2. Video Capture
 - a. Full time live video and audio files shall be captured for each pipe inspected. The files shall be stored in industry standard MPEG (Moving Pictures Expert Group) format and can be transferable by an external USB/portable hard drive. The MPEG video shall be defined as ISO-MPEG Level 1 (MPEG-1) coding with a resolution of a minimum 352-pixel (x) by 240-pixel (y) and an encoded frame rate of 29.97 frames per second.
 - b. System shall perform an automatic disk image/file naming structure to allow saved video/data sections to be "Burned" to an external USB/portable hard drive.
 - c. The video recording shall be free of electrical interference and shall produce a clear and stable image. The audio recording shall be sufficiently free of background and electrical noise as to produce an oral report that is clear and discernable.
 - d. The recordings shall identify the location both within the pipe segment (physical location) and within the digital recording (video frame location) for each defect or observation. The digital recordings and inspection

THE METROPOLITAN DISTRICT

data shall be cross-referenced to allow instant access to any point of interest within the digital recording. A user defined, pipeline search mechanism shall be provided.

- e. The video inspection shall include segment information (start and ending manholes, station footage, date, time, client, address, etc.). A pointer shall be provided from each observation to the digital recording and any accompanying digital still images.

3. Data Base

- a. Develop a summary log of each sewer reach inspected. The system software shall be an MS Windows (most recent) based data acquisition system incorporating an ODBC windows standard data base format. Inspection files shall be able to be exported into other databases and other computers. Information on software file headers format shall be provided to allow the inspection database to be customized with the correct headers into the users unique application or software. The defect codes shall include standard defect codes and user defined codes. Defect severity codes shall include standard codes and user defined codes. There shall be graphical and tabular reports showing all observation points and pertinent data. All graphic and tabular reports shall be in color to match the defect severity codes. Inspection information shall be stored in a rational database management system that employs relationships to increase data integrity and reduce storage space.
- b. System shall have the capability of being customized to meet local area requirements and regulations as necessary. These available changes shall encompass variations of the operation layout, functions and printed reports. The program shall be capable of sorting all data stored using generic sort key and user defined sort fields.
- c. For post-construction television inspection, the Contractor is responsible for adhering to NASSCO's PACP guidelines. The Contractor shall submit to the Engineer all digital inspection videos and PACP exchange database on a portable hard drive provided by the Contractor. The hard drive shall be delivered to the Engineer and shall be labeled with the project name and date. The data on the hard drive shall consist of separate individual video files for each pipe segment taped. Each individual video file shall be named with the upstream to downstream manhole associated with the data presented.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02765

CURED-IN-PLACE SPOT REPAIR

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all materials, labor and equipment and perform all incidental work necessary to install and test cured-in-place spot repairs (CIPSR) as directed by the Engineer, including cleaning; removal and disposal of debris or obstructions; bypass pumping; pre- and post-construction television inspection to NASSCO PACP standards; removal of protruding taps; stopping active leaks that might interfere with the integrity of the liner to be installed; providing water; performing sample testing; and all else incidental to complete each CIPSR.
- B. Information relative to structures numbers, pipe sizes, pipe materials, and pipe lengths have been shown on the Contract Drawings.
- C. The Contractor shall comply with the Owner's Water Usage Procedures, as defined in Section 01046, paragraph 1.12.
- D. The Contractor shall consider all manholes to be Permit Required Confined Spaces in accordance with OSHA standard, 29 CFR 1910.146.

1.02 RELATED SECTIONS

- A. Section 01510, Maintenance of Flow in Existing Sewers
- B. Section 01570, Maintenance and Protection of Traffic
- C. Section 02150, Bypass Pumping
- D. Section 02610, Sewer Testing and Cleaning
- E. Section 02654, Removal of Protruding Taps
- F. Section 02764, Television Inspection
- G. Section 02766, Cured-in-place Pipe

1.03 SUBMITTALS

- A. Submit, in accordance with Section 01300, and within 15 days of the Effective Date of the Agreement, the name of CIPSR supplier and a list of materials to be furnished.

THE METROPOLITAN DISTRICT

- B. Provide two submittals of certified test reports to confirm that CIPSR materials have been manufactured and tested in accordance with the ASTM Standards specified herein.
 - 1. Within 15 days of the Effective Date of the Agreement, submit test reports for the materials to be used for this work. Test results shall be the manufacturer's standards for acceptance of field fabricated and installed CIPSR.
 - 2. Prior to the installation of any CIPSR, make test specimens from the materials to be utilized for this work. Make sufficient number of specimens for conducting the referenced testing. Specimens shall be cut from the resin-impregnated patch prior to insertion into the pipe.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
 - 2. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
 - 3. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 4. ASTM F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin Impregnated Tube
 - 5. ASTM D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
 - 6. ASTM F2599 – Standard Practice for Sectional Repair of Damaged Pipe by Means of an Inverted Cured-in-Place Liner.
 - 7. ASTM D2990 - Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics.
- B. Where referenced is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

THE METROPOLITAN DISTRICT

1.05 QUALITY ASSURANCE

- A. The Contractor or Subcontractor to furnish and install CIPSRs shall be fully qualified, experienced and equipped to complete the work in a timely and satisfactory manner. Submit the following information to the Engineer for review and approval before CIPSR work is performed.
 - 1. The number of years of experience in performing this type of specialized work.
 - 2. Name of the CIPSR manufacturer and supplier for this work and previous work performed. The Contractor shall be certified by the manufacturer to install the CIPSR patches.
 - 3. Submit list of ten (10) similar jobs within the past five (5) years along with the contact name, telephone number, and brief description of work performed.
 - 4. The Owner reserves the right to disapprove the use of the CIPSR Subcontractor based on the submitted qualifications.
- B. All CIPSR spot repairs, regardless of pipe size or length, shall be furnished, fabricated and installed by a single manufacturer.
- C. As directed by the Engineer, replace all CIPSRs that utilized materials or methods of installation other than that approved. Remove and replace the CIPSR section or replace the affected pipe with new pipe at no cost to the Owner.

1.06 GUARANTEE

- A. All CIPSRs shall be guaranteed by the Contractor for a period of 1 year from the date of substantial completion. During this period, all defects in the CIPSRs shall be repaired in a manner satisfactory to the Engineer or the affected pipe shall be removed and replaced with new pipe at no additional cost to the Owner.

1.07 PUBLIC NOTIFICATION

- A. All property owners shall receive notification that their sewage service will be interrupted during the CCTV inspection and while the liner is being installed. The Contractor shall distribute all written notices to each affected property owner at the following times:
 - 1. Seven (7) days prior to lining activities.
 - 2. Between 24 to 48 hours prior to lining activities.
 - 3. Within 24 hours after completion of lining activities.

THE METROPOLITAN DISTRICT

- B. The Owner will provide copies of all public notifications for distribution by the Contractor.
- C. Each notice shall include the date, start time and estimated time when service will be completely restored. The Contractor shall provide a telephone number for property owners to call for information while work is in progress.
- D. The Contractor shall contact any home or business that cannot be activated within the time stated in the written notice.
- E. The maximum amount of time any home or business shall be without sanitary sewer service is eight (8) hours. Any home or business that is without sanitary service for longer than (8) hours will be bypassed to the sanitary sewer at no additional cost to the Owner.
- F. Contractor's schedule is subject to approval based on critical stakeholders and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 CARRIER TUBE MATERIAL

- A. The CIPSR shall be a fiberglass and polyester felt sleeve or a non-woven fabric tube that is resin impregnated using a thermo-set resin with the physical and chemical properties appropriate for the application. The non-degradable carrier material is wrapped around an inflatable packer and positioned in the sewer to be rehabilitated and cured in place by circulating hot water to cure the resin.
- B. The CIPSR sleeve shall be fabricated one or more layers of carrier material. The tube will be continuous in length and shall exhibit a uniform minimum wall thickness with a smooth bore interior.
- C. The resin shall be two-part epoxy, polyester or vinyl ester with the proper catalysts required for the specific application.
- D. For carrier tubes that included fiberglass material, a minimum of two layers of fiberglass shall be used with a single layer of polyester felt sandwiched between the fiberglass layers. The material shall be sewn together with multiple polyester threads using zigzag stitching spaced evenly over the full width of the material. The three (3) layer composite reinforcement material shall have a minimum mass of 40.6 oz/sq yd with a thickness not less than 0.24-in. Fiberglass alone shall not be acceptable.
 - 1. The fiberglass shall be woven roving having a minimum weight of 24 ounces per square yard and shall be made of "E" glass coated with a sizing compatible with the resin being used.

THE METROPOLITAN DISTRICT

2. The polyester felt shall be needle punched and have a minimum weight of 16.5 oz/sq yd.
 3. The resin shall be a two-part epoxy type liquid thermosetting resin suitable for the intended use as well as the proposed curing method. The diluted epoxy resin shall contain at least 60 percent of bisphenol A, 10 to 20 percent of bisphenol F with the remainder of the mixture being a diluent. Epoxy resin shall be D.E.R. (R) 353 by the Dow Chemical Company; ME 948 by Miteq or equal.
 4. The epoxy resin shall be brought on site in the resin manufacturer's original containers. Each container shall be clearly labeled as to contents and product data. The resin shall be stored, mixed and applied in accordance with the manufactures recommendations.
- E. The CIPSR shall provide a service life of fifty (50) years and shall have, as a minimum, the initial and long term properties listed below.
- | <u>MECHANICAL PROPERTY</u> | <u>INITIAL</u> | <u>LONG-TERM</u> |
|--------------------------------|----------------|------------------|
| Flexural Strength | 8,000 psi | ----- |
| Flexural Modulus of Elasticity | 280,000 psi | 140,000 psi |
| Tensile Strength | 5,000 psi | ----- |
| Tensile Modulus of Elasticity | 280,000 psi | 140,000 psi |
- F. When cured, the CIPSR shall form a continuous, tight-fitting, hard, impermeable liner which is chemically resistant to any chemicals normally found in domestic sewage. The CIPSR shall have a suitable membrane coating for protection of the interior surface and to provide a uniform, smooth flow surface. No membranes or plastic coating shall be allowed between the repair patch and the pipe wall.
- G. The carrier tube shall be fabricated to a size that will tightly fit the sewer being rehabilitated after being installed and cured. The transition from the patch to the existing pipe must be smoothly tapered.
- H. Thickness of the cured liner shall be as recommended by the manufacturer, but shall not exceed 1/4-in when cured unless authorized in writing by the Engineer.
- I. Spot repairs shall have a minimum length of 3-ft and shall not exceed 10-ft in length. CIPSR lengths shall extend a minimum of 1-ft beyond the pipe defects at each end of the repaired section. Length of each required repair shall be verified in the field prior to installation.
- J. CIPSR shall not begin or end at a pipe joint.

THE METROPOLITAN DISTRICT

- K. All cured-in-place spot repairs shall be one piece. Separately fabricated or installed CIPSRs utilizing overlapped or "butted" ends shall not be acceptable.

PART 3 - EXECUTION

3.01 LINE OBSTRUCTIONS

- A. It shall be the responsibility of the Contractor to clear the line of all obstructions such as solids, joint sealing material, dropped joints, protruding service connections or collapsed pipe that will prevent the insertion of the CIPSR. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment, or an internal cutter to remove such things like protruding services which are to be included in this pay item, then the Contractor shall inform the Owner that a point repair excavation is required to uncover and remove or repair the obstruction. No excavation work shall be performed without the prior approval of the Owner.

3.02 INSTALLATION

- A. Clean each length of pipe to be lined in accordance with Section 02610 and dispose of any resulting material.
- B. All obstructions in the sewer which may impede the insertion of the liner shall be removed by the Contractor.
- C. After cleaning and removal of obstructions, conduct a television inspection of each length of pipe in accordance with Section 02764. Document the location of all active service connections and verify the lengths of repairs as directed by the Engineer. A copy of these videotapes shall be submitted to the Engineer and provided to the Owner.
- D. Furnish bypass pumping of sewage flows where the rehabilitation work is being performed. Bypass pumping shall be conducted in conformance with the requirements of Section 02150.
- E. The CIPSR material shall be measured, cut and impregnated with resin in the field to the measurements determined from the videotape inspections. The installation and curing of the CIPSRs shall be in complete accordance with the manufacturers' specifications and a representative of the manufacturer shall be present during the first day of installation.
- F. The installed spot repair shall be cured by circulating hot water through the resin impregnated patch.
- G. The inflatable element and hydrostatic pressure used during the installation process shall be sufficient to tightly hold the CIPSR to the existing pipe wall, producing dimples at all service connections and squeezing surplus resin into

THE METROPOLITAN DISTRICT

any cracks in the pipe. This pressure shall be great enough to overcome or prevent infiltration from entering the existing pipeline during the curing process.

- H. The Contractor shall ensure that the shroud covering the packer is completely removed from the repaired pipe.
- I. Where CIPSRs connect to existing manholes, form a tight seal at the manhole opening with no annular gaps using hydrophilic end seals. Materials and procedures used shall be submitted for approval as part of the CIPSR system submittal. All cut edges of the cured liner shall be thoroughly sealed with the same resin as was used in the CIPSR materials.
- J. Reopen all of the existing active service connections on each length of sewer following patching. The active service connections shall be reopened from inside the sewer by means of a cutting device controlled by a closed-circuit television camera. All cut out material shall be flushed out of the sewer.
- K. Each active service connection shall be cut completely open and shall have smooth edges with no protruding material capable of hindering flow or catching and holding solids contained in the flow stream.
- L. Following installation of the CIPSR's and reopening the active service connections, conduct a second videotape inspection of the completed work. This tape, along with the tape made in Paragraph 3.02C above shall become the property of the Owner.

3.03 CLEAN-UP OPERATIONS

- A. All materials removed from the sewer line and from the pipe lining process shall be satisfactorily disposed of offsite by the Contractor at no additional cost to the Owner.
- B. Prior to final acceptance, the Contractor shall demonstrate, in the presence of the Owner, the capability of the liner to perform as specified. Any deficiencies found in the liner shall be corrected at no additional cost to the Owner.

3.04 FIELD TESTING AND ACCEPTANCE

- A. Following installation of the CIPSRs, conduct a television inspection of the completed work as specified in Section 02764. An additional CCTV inspection shall be performed one (1) year after substantial completion. If the Contractor were to perform the CCTV at the one (1) year mark or shortly after, they are still liable to repair any defects that are discovered. Retainage will be held in accordance with the Agreement until the CCTV has been completed, submitted and accepted by the Engineer.
- B. Copies of these recordings and those made prior to the liner installation shall be submitted to the Engineer for approval and shall be retained by the Owner.

THE METROPOLITAN DISTRICT

- C. Field acceptance of the liner shall be based on the Engineer's evaluation of the installation including TV inspection video recordings and a review of certified test data for the submitted pipe samples.
- D. Groundwater infiltration of CIPSR shall be zero.
- E. All active service connections shall be open and clear.
- F. The finished CIPSR shall be free of dry spots, voids, lifts, delamination or excess resin. There shall be no evidence of splits, cracks, breaks, lifts, kinks, or crazing in the CIPSR.
- G. If any defective CIPSR is discovered after it has been installed, it shall be removed and replaced at no additional cost to the Owner. Any SLC liner failure that requires excavation work to repair shall be initiated within two (2) hours of failure observation.
- H. The Contractor shall clean up each project area after the work is completed and all testing is accepted. Remove and dispose of all excess materials and debris at each location as directed by the Engineer.
- I. If any defective liner is discovered after it has been installed, it shall be removed and replaced with either a sound liner or a new pipe at no additional cost to the Owner. Repair methods shall be submitted to the Engineer for approval. **Any liner failure that requires excavation work to repair shall be initiated within two (2) hours of failure observation.**

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02766

CURED-IN-PLACE PIPE FOR SEWER MAINS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, supervision, equipment, appliances and materials and performing all operations including cleaning; removal and disposal of debris; bypass pumping; pre- and post-construction television inspection (NASSCO PACP standards); performing sample testing; lining existing sanitary sewer lines; installing end seals; reconnecting active building connections; removing protruding taps by remote methods; stopping active leaks that might interfere with the integrity of the liner to be installed; providing water; complete and accepted, in accordance with the Contract Documents.
- B. Information relative to structures numbers, pipe sizes, pipe materials, and pipe lengths have been shown on the Contract Drawings.
- C. Removal and replacement of fences, repair to yards, lawns, sidewalks, driveways, and other public or private property, due to actions or processes related to the work being performed shall be included in the cost of the Work.
- D. The Contractor shall comply with the Owner's Water Usage Procedures, as defined in Section 01046, paragraph 1.12.
- E. The Contractor shall consider all manholes to be Permit Required Confined Spaces in accordance with OSHA standard, 29 CFR 1910.146.
- F. The Contractor is required to perform television (CCTV) inspection prior to construction to verify the existing conditions of each pipe. Additional CCTV inspections will be required at the completion of the CIPP and one (1) year after substantial completion. If the Contractor were to perform the CCTV at the one (1) year mark or shortly after, they are still liable to repair any defects that are discovered. Retainage will be held in accordance with the Agreement until the CCTV has been completed, submitted and accepted by the Engineer.

1.02 RELATED SECTIONS

- A. Section 01510, Maintenance of Flow in Existing Sewers
- B. Section 01570, Maintenance and Protection of Traffic
- C. Section 02150, Bypass Pumping
- D. Section 02654, Removal of Protruding Taps

THE METROPOLITAN DISTRICT

E. Section 02764, Television Inspection

1.03 SUBMITTALS

- A. Shop drawings, a list of materials, and technical data shall be submitted to the Owner for approval prior to any work being performed under this Section of the Specifications.
- B. The Contractor shall submit to Owner in writing the information below prior to or at the time indicated. Failure to do so will prevent progression of the work to the next step.
- C. Contractor required to submit the following:
 - 1. CIPP System Data
 - 2. Design Calculations
 - 3. Manufacturers Resin Data Test Results
 - 4. Resin Enhancer Manufacturers Data
 - 5. Certification of Applicability of Resin
 - 6. Experience Record of Contractor
 - 7. List of Subcontractors with Experience
 - 8. Locations of Additional Access Points
 - 9. Installation and Bypass Pumping Plan (including emergency plans)
 - 10. Pre/Post-Installation Video Inspection Tape
 - 11. Installation and Resin Curing Schedule
 - 12. Time Log Sheets and Tap Cut Sheets
 - 13. Copies of Quality Control Tests
 - 14. CIPP Repair Methods (if required)
 - 15. Point Repair Methods (if required)
 - 16. Daily Logs, Weekly Time Sheets
 - 17. Physical Samples
 - 18. Temperature and Cook

THE METROPOLITAN DISTRICT

- D. If pre-installation and post-installation inspections are combined onto one hard copy, submit copy after completion of each section lined per the schedule above described. Request may be made to include more than one segment to a hard copy in order to maximize use.
- E. Samples removed for testing will be individually labeled and logged to record the following:
 - 1. Owner's project number and title
 - 2. Sample number
 - 3. Segment number of line as noted on plans
 - 4. Date and time of sample
 - 5. Name of Contractor
 - 6. Date, location, and by whom tested
 - 7. Results of the test
- F. Samples shall be taken once (1) in every five (5) runs or at the Owner's request and numbered as follows:
 - 1. Sample #/A: resin sample
 - 2. Sample #/B: flat plate sample
 - 3. Sample #/C: upstream thickness test
 - 4. Sample #/D: downstream thickness test
 - 5. Additional samples will be lettered consecutively after "D".
 - 6. Updated copies of the log shall be submitted to the Owner after each Crew-day is completed.
- G. Report Format and Labeling
 - 1. Reports shall be submitted on 8-1/2" x 11" paper. Larger drawings shall be folded to this format. Submittals shall be stamped by Contractor to indicate Contractor, date of submittal, Owner's project title and number, applicable Section of Specifications to be referenced, and signature of preparer.
 - 2. Video's on external USB's/portable hard drive's s shall be submitted and labeled to indicate Owner's project number and name, date of video inspection, segment number of line, Contractor's name, and whether pre-

THE METROPOLITAN DISTRICT

installation or final inspection video (or both). All external USB's/portable hard drives shall be labeled.

- H. Within fourteen (14) days of any planned bypass, the Contractor shall submit a bypass plan for any proposed bypass or dewatering activity, in accordance with Section 02150.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. Whenever reference is made to the "Form 817" in these Specifications, it shall refer to "State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 817", and its latest supplements and revisions.
- B. When reference is made to a particular Section of "Form 817", it will be construed to include all related articles referred to in said Section.
- C. AASHTO Standard Specification for Highway Bridges.
- D. ASTM D543 - Test Method for resistance of plastics to chemical reagents.
- E. ASTM D790 - Test Method(s) for flexural properties of unreinforced and reinforced plastics and electrical insulating materials.
- F. ASTM F1216 (including Appendix XI) - Standard practice for rehabilitation of existing pipelines and conduits by the inversion and curing of a resin-impregnated tube.
- G. ASTM F1743-96 - Rehabilitation of existing pipelines and conduits by pulled-in-place installation of cured-in-place thermo-setting resin pipe (CIPP).
- H. ASTM D3567 - Standard practice for determining dimensions of reinforced thermosetting resin pipe (RTRP) and fittings.

1.05 QUALITY ASSURANCE

A. CONTRACTOR EXPERIENCE AND LINER SYSTEM APPROVAL

- 1. The Contractor shall have successfully managed and completed cured-in-place pipe (CIPP) rehabilitation projects on lines sizes defined in the Contract Documents in the United States within the last five (5) years previous to bid date. Alternatively, the Contractor may install a Qualification Project as defined by the Owner using the same system to be proposed/installed under this Specification prior to bidding on a particular project. Terms, conditions, and test results set forth in this Specification

THE METROPOLITAN DISTRICT

apply and shall be met by the Qualification Project. Because of the uniqueness of individual systems, Contractors, and products, the Owner reserves the sole right to determine approval/disapproval of a system or product for any/all reasons based on a Qualification Project. The testing shall be paid for by the Contractor and conducted at a testing laboratory of the Owner's designation.

2. The Superintendent-in-Charge of the installation shall have a minimum of five (5) years experience prior to bid date overseeing the installation of CIPP sewer liners in the United States. Jointly, the Contractor and the Superintendent-in-Charge shall have successfully installed 100,000 lineal feet of sewer liner in the United States prior to the bid date. Should the Superintendent-in-Charge be replaced during the Contract for any reason, the new Superintendent-in-Charge shall have experience equal to or greater than the original Superintendent-in-Charge and be approved in advance by the Owner.
3. For a product to be considered commercially proven, a minimum of 250,000 lineal feet or 1,000 manhole-to-manhole line sections of successful wastewater collection system installations in the U.S. must be documented to the satisfaction of the Owner to assure commercial viability. In addition, at least 25,000 lineal feet of the product shall have been in successful service for a minimum of five (5) years.
4. Linear Design Calculations shall be stamped by a Registered Professional Engineer licensed by the State of Connecticut. Design Calculations shall be submitted as described in Subsection 1.03.

B. WARRANTY

1. The liner shall be guaranteed against excessive infiltration, static loading and live loading as determined by using the modified AASTHO H-20 loading for a period of one (1) year from the date of substantial completion.

1.08 PUBLIC NOTIFICATION

- A. All property owners shall receive notification that their sewage service will be interrupted during the CCTV inspection while the liner is being installed. The Contractor shall distribute all written notices to each affected property owner at the following times:
 1. Seven (7) days prior to lining activities.
 2. Between 24 to 48 hours prior to lining activities.
 3. Within 24 hours after completion of lining activities.

THE METROPOLITAN DISTRICT

- B. The Owner will provide copies of all public notifications for distribution by the Contractor.
- C. Each notice shall include the date, start time and estimated time when service will be completely restored. The Contractor shall provide a telephone number for property owners to call for information will work is in progress.
- D. The Contractor shall contact any home or business that cannot be activated within the time stated in the written notice.
- E. The maximum amount of time any home or business shall be without sanitary sewer service is eight (8) hours. Any home or business that is without sanitary service for longer than (8) hours will be bypassed to the sanitary sewer at no additional cost to the Owner.
- F. Contractor's schedule is subject to approval based on critical stakeholders and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 TELEVISION INSPECTION

- A. The Mobile Unit and Video Equipment shall be as defined in Section 02764, Television Inspection

2.02 CARRIER TUBES

- A. The tube shall be fabricated to a size that when installed will neatly fit the internal circumference of the conduit specified by the Owner. Allowance shall be made for circumference stretching during insertion. Folds or abnormal wrinkles in the tube after installation will not be acceptable.
- B. The minimum length shall be that deemed necessary by the Contractor to effectively span the distance from the inlet to the outlet of the respective manholes unless otherwise specified. The Contractor shall verify the length and diameter size in the field before impregnation.
- C. Unless otherwise specified, the Contractor shall furnish a general purpose, unsaturated, polyester resin and catalyst system compatible with the utilized process that provides cured physical strengths specified herein.
- D. The liner shall have a uniform thickness that when compressed at installation pressures will meet or exceed the design thickness.
- E. An "inner liner" or "outer liner" film used for resin control which will remain a permanent part of the system may be used provided the liner film is made an integral part of the carrier tube by bonding or fusing to the carrier tube.

THE METROPOLITAN DISTRICT

- F. The wall color of the interior pipe surface of the CIPP after installation shall not be of a dark or non-reflective nature that could inhibit proper closed circuit television inspection.
- G. The tube shall contain no intermediate or encapsulated elastomeric layers. No materials that are subject to delamination in the cured state shall be included in the tube.
- H. If glass fiber reinforcement is used in the tube, there must be layers of unreinforced, resin absorbent material on the inside and outside of the tube to protect the fibers from being exposed to the pipe flow and external water.
- I. Any plastic coatings on the tube that will become the inside surface of the finished CIPP shall be a translucent flexible material that is compatible with the resin system used and be fully bonded to the absorbent tube material.
- J. Sewing of pieces of the liner together to form the length desired for a particular run will not be allowed without the approval of the Owner. In no case will multiple felt liners be allowed to be sewn together in a single run.
- K. Holes made in the felt liner during the wet out process or for whatever other reason shall be identified with an identifiable marker and repaired before delivery to the job site. Puncture marks or tears must be brought to the Owner's attention for approval before insertion into the pipe line.

2.03 RESINS

A. Acceptable Resin Types:

- 1. Polyester
- 2. Vinylester
- 3. Epoxy

B. Resin Definitions and Physical Characteristics

- 1. The liquid thermosetting resin used in this rehabilitation project shall produce a properly cured tube which will be resistant to abrasion caused by solids, grit, and/or sand. The cured tube shall also be resistant to corrosion due to acids and gases such as sulfuric acid, carbonic acid, hydrogen sulfide, methane, and carbon monoxide. The resin selected shall have proven resistance to municipal sewage.
- 2. Relevant information from the Contractor, resin manufacturer, or process licensee shall include, but may not be limited to, the following: specifications, characteristics and properties, ASTM C-581 test results, and methods of application. This data shall be submitted to the Owner per

THE METROPOLITAN DISTRICT

Subsection 1.03 Submittals prior to rehabilitation of the existing pipe. The Contractor shall also submit with the data a written certification from the resin manufacturer that the resin material to be used is compatible with the proposed application. Said certification shall also address curing temperature and curing schedule (i.e., duration of the temperature at all stages of curing). The curing schedule may be extended for longer cure times due to weather conditions, but shall not be accelerated (shortened) for any reason. The Contractor is hereby notified that his/her field installation practices will be checked against the aforementioned certification. (See Subsection 2.04.B Testing.) No variance shall be allowed without prior written approval of the Owner.

- C. The resin system to be used shall be manufactured by an approved company selected by the Cured-In-Place process manufacturer. Only corrosion resistant polyester, vinylester and epoxy resins complying with the following definitions shall be used:

1. Polyester Resin

- a. A resin created by condensation reactions between isophthalic/terathalic acid, maleic anhydride and a glycol. The polymeric product is characterized by reactive unsaturation located along the molecular chain. This resin is compounded with a reactive styrene monomer and reacted together with initiators/promoters to produce crosslinked copolymer matrices.

2. Vinylester Resin

- a. A resin created by reaction products of epoxy resins with methacrylic acid and characterized by reactive unsaturation located in terminal position of the molecular chain. This resin is compounded with a reactive styrene monomer and reacted together with initiators/promoters to produce crosslinked copolymer matrices.

3. Epoxy Resin

- a. A resin created by the reaction of epichlorohydrin and Bisphenol-A, Bisphenol-F, (or a Novalac in some cases) to yield a diglycidyl ether (triglycidyl ether in the case of Novalacs) having terminal epoxy rings as the reactive sites.

D. Resin Enhancers

1. Resin enhancers are allowed and may be used by the Contractor as proposed by the liner manufacturer. The Contractor or resin blender shall submit data certifying that the recommended and proposed limits have not been exceeded.

THE METROPOLITAN DISTRICT

2. The Contractor shall submit data on the resin enhancer used including size range (in microns), amount used in the formulated resin, bond enhancing coating material used, and certification from resin manufacturer or formulator that bond enhancer used is compatible with the resin system used.
3. Submit certification from enhancer manufacturer that the material is suitable for use in aqueous environments. Enhancer material must be made in a "batch method" procedure and attested to by the manufacturer.

E. Bond Enhancers

1. The Contractor's fiberglass reinforced felt shall utilize a suitable bond enhancing compound to increase the bond between resins and other materials.
2. The Contractor shall submit certification from bond enhancer manufacturer that the material is suitable for use in aqueous environments.

F. Other Additives

1. Additives required for viscosity control, fire retardant, physical or chemical resistance, or pot life extension may be used provided they do not interfere with visual inspection of the finished, installed product.

2.04 DESIGN PARAMETERS

A. STRUCTURAL REQUIREMENTS

1. The CIPP design shall assume no bonding to the original pipe wall.
2. External Buckling Design: Where the CIPP is designed as a stand alone pipe, a fully deteriorated condition, the Contractor shall furnish to the Owner, third party testing and verification of design analysis techniques for each manufacturer and/or CIPP product.
3. The bond between all CIPP layers shall be strong and uniform. All layers, after cure, must form one homogeneous structural pipe wall with no part of the tube left unsaturated by resin.
4. The following design parameters shall be used. Design parameters shall not be devalued in the event of an under-thickness liner.

THE METROPOLITAN DISTRICT

Parameter	CIPP System
Pipe Condition	Fully deteriorated
Soil Type	Saturated/unsaturated
Design Thickness	The output product thickness needs to at a minimum meet the design thickness.
Groundwater Depth	Ground surface level
Ovality of Pipe	2% of circumference (min.)
Soil Load	120 lbs./cf
Traffic Loads	AASHTO H-20 live load with two trucks passing and applicable construction loads as required by the Contractor's means and methods
Modulus of Soil	Max 1,000 psi
Long Term Flexural Strength	50% of initial (ASTM D-790)
Long Term Flexural Modulus of Elasticity	50% of initial (ASTM D-790)
<u>Maximum</u> Deflection (vertical axis)	7.5% (for stand alone purposes)
<u>Minimum</u> Safety Factor	2.0

5. Liner Thickness

- a. Liner thicknesses for the Work specified, will be calculated by the Contractor for each specific line segment shown in the Contract Drawings. The Contractor shall verify depth of cover for all line segments shown as part of the CIPP design. Contractor's design shall be based on actual depth of cover for each pipe segment shown.

6. Preliner Requirements

- a. If after the review of the pre-installation video, it is determined that there is excessive infiltration or voids in the host pipe, it will be the Contractor's responsibility to determine if a preliner tube shall be used to control resin loss and liner thickness. The preliner tube shall be reinforced plastic sheet formed into a tube sized to fit the host pipe being lined and shall be continuous from manhole to manhole. For long segments, several sections of preliner tube may be spliced together per the preliner manufacturer's recommendations to form a tube of adequate length. Installation of the preliner tube shall be witnessed by the Owner or

THE METROPOLITAN DISTRICT

Engineer. Failure to install the required preliner tube or installation of preliner tube over only part of the segment shall result in the completed CIPP for that segment being rejected (regardless of physical tests and thickness test results). During thickness testing, the preliner tube shall be removed from the thickness test core sample along with any inner liner film used.

- b. The use of a pre-liner, if needed, shall be included in the cost of the liner and it shall be the Contractor's responsibility to insure that infiltration does not effect the curing or strength of the final product.
7. The cured tube shall conform to the minimum structural standards, as listed below.

Cured Liner Minimum Structural Standards			
Property	ASTM	Initial Value (psi)	Long Term (psi)
Tensile Strength	D-638	4,000	4,000
Flexural Strength	D-790	4,500	4,500
Flexural Modulus	D-790	350,000	175,000
Maximum Pipe Deflection Allowed is 7.5%			
Strength values are Median Values for temperature Ranging from 40°F (4°C) - 70°F (21°C)			

B. TESTING REQUIREMENTS

1. Testing of the completed, installed liner consists of:
 - a. Field testing
 - b. Laboratory testing
2. The Contractor will pay for all initial and retests described herein.
3. The following samples shall be taken of the field setup, discussed below, similar lined sewer segments at the discretion of the Owner but not more frequent than once every 5 runs. No destructive test will be allowed to liner to be left in place.
 - a. Two cured plates, 6" x 16" in size. (see 2.04.B.3 and 4 - Physical properties and thickness). For clarification, the Engineer will require that field samples be taken from the cook down tube, not the liner in the pipe (No destructive test will be allowed to liner to be left in place).

THE METROPOLITAN DISTRICT

4. Field Test (Thickness): The liner shall be run through 24" long section of similar line-size to act as a mold for the liner and cured. One such sample shall be taken from liner at the ending manhole of the section being lined. One core sample shall be taken from the middle of each molded section and thickness determined per the method above. Cost for any excavating, sampling, and backfill shall be included in the bid.
5. Laboratory Testing (Resin, Physical Properties)-Samples obtained for these tests will be sent by the Contractor to an approved laboratory for the following tests.
 - a. Resin: Using the cured resin sample, an infrared spectrography chemical fingerprint shall be run and compared to the submitted fingerprint (Subsection 2.03.B Resin Definitions and Physical Characteristics) to verify the resin used is the resin submitted for use on this project. Unapproved resins or resins not submitted with the approved submittals are rejected and any liner installed with unapproved resin will be removed and replaced at Contractor's expense.
 - b. Physical Properties: The cured 6" x 16" plate will be used to test modulus of elasticity and flexural strength and to verify the requirements have been met.
6. Chemical Resistance: The CIPP shall meet the minimum chemical resistance for standard domestic sewer applications unless directed otherwise by the Owner. Chemical resistance tests should be completed in accordance with Test Method D 543. Exposure should be for a minimum of one month at 73.4° F (23° C). During this period, the CIPP test specimens should lose no more than 20% of their initial flexural strength and flexural modulus. A makeup of the chemical solutions is as defined below.

CIPP Chemical Resistance	
Chemical Solution	Concentration %
Tap water (pH 6-9)	100
Nitric Acid	5
Phosphoric Acid	10
Sulfuric Acid	10
Gasoline	100
Vegetable oil	100
Detergent	0.1
Soap	0.1

THE METROPOLITAN DISTRICT

7. Long-Term Reduction in Physical Properties: Long-term creep data in accordance with ASTM D2990 shall be submitted by each manufacturer and/or CIPP product. Duration of creep testing shall be a minimum of 10,000 hours. As an option, documentation for a minimum of 10,000 hours of pipe long term modulus evaluation by an outside test lab may be provided.
8. Hydraulic Capacity: Calculations must support that the CIPP shall have at least 100% of the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using a commonly accepted roughness coefficient for the original pipe material (as provided by the Engineer). The Contractor shall provide third party test data for denoting the typical roughness coefficient of the CIPP.
9. CIPP Field Samples: To verify past performance, the manufacturer shall submit a minimum of five (5) test results from previous field installations of the same resin system and tube materials, as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in Subsection 2.04.A.7 have been achieved.
10. If glass fiber reinforcement is used, CIPP strain-corrosion testing in accordance with D3681 must be submitted.

2.05 HYDROPHILIC END SEALS

- A. Contractor shall install hydrophilic pipe end seals at all manhole penetrations prior to mainline CIPP rehabilitation. The end seals shall be composed of hydrophilic rubber and molded as a one-piece cylinder with a minimum width of three (3) inches. When installed, the end seal shall form a 360 degree seal between the host pipe and the newly installed liner.
- B. Hydrophilic end seals shall be Insignia End Seals by Municipal and Contractors Sealing Products, 7740 Reinhold Drive Suite C, Cincinnati, Ohio 45237, 513-482-3300, or approved equal.
- C. The materials utilized for the hydrophilic end seal shall be as recommended by the manufacturer and shall be provided in kits that are designed to accommodate varying pipe diameters, manhole depths, junction configurations, and pipe liner products. The hydrophilic end seal kits shall be compatible with most cured-in-place lining products. Additionally, the hydrophilic end seals shall be compatible with cured-in-place lining installation and curing methods, including inversion, pull-in-place, hot water curing, steam curing, ultra violet curing, and ambient curing methods. The components of the hydrophilic end seal kits shall include a tubular sleeve, and a mechanical fastener.
- D. The use of caulking, rope or a band type end seal will not be allowed.

THE METROPOLITAN DISTRICT

PART 3 - EXECUTION

3.01 GENERAL

- A. Work performed under this Specification shall be done in accordance with Municipal, State, and Federal standards. Traffic control and safety are the responsibility of the Contractor.
- B. Contractor shall pay particular attention during very cold and very hot temperatures or sub-freezing weather that cure is not affected. Exposed host pipe, taps, saturated ground, shallow bury or other conditions, which may adversely affect cure, must be eliminated or remedied by the Contractor.
- C. Installation of the wet-out carrier tube may be by inversion or insertion as preferred by the Contractor. All equipment, labor, materials, and processes required to complete the work must be ready on-site before installation begins.

3.02 TIME OF OPERATION

- A. It is suggested that the Contractor schedule his/her operations to coincide with low flow levels in the existing pipe (if any). It will be necessary for the Contractor to determine the optimum time period for scheduling the work. It is the Contractor's responsibility to inspect the site of the work and determine site conditions.

3.03 DEWATERING

- A. It will be the Contractor's responsibility to dewater the sewer and maintain existing sewage flows at all times. A plan for dewatering must be submitted to the Engineer and the Owner for review and approval prior to commencement of any work.
- B. The Contractor shall be responsible to maintain the existing flows at all times in an acceptable manner so as not to create a nuisance or in any way endanger the adjoining properties, utilities or environment.
- C. By-passing to storm sewers or other watercourses shall not be allowed at any time.
- D. The Owner does not assume any liability to the Contractor for any delay, cancellation, loss or expense to which he may become subject, directly or indirectly, due to the normal or heavy flows in the existing sewer.

3.04 TV AND CLEANING

- A. The pipe to be lined must be cleaned and televised per Section 02764, Television Inspection and Section 02610, Sewer Testing and Cleaning. There is a pre-installation and post rehabilitation requirement for television inspection.

THE METROPOLITAN DISTRICT

- B. The pipe to be lined shall be cleaned such that no debris or obstructions remain and the pipe is free of all debris or obstructions that negatively affect the flow of wastewater through these pipes. Sanitary pipes not free of debris or obstructions may be removed from the work by the Engineer. The Engineer reserves the right to require additional cleaning of pipes to be lined to remove debris or obstructions at time of liner installation. Additional cleaning will be at no additional cost to the Owner.

3.05 LINE OBSTRUCTIONS

- A. It shall be the responsibility of the Contractor to clear the line of all obstructions such as solids, dropped joints, protruding service connections or collapsed pipe that will prevent the insertion of the liner. As a general guide, a 10% reduction in the pipe area should be considered for repair or removal. It is the intent of this Contract that all such reductions have been removed under previous Contracts. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment, or an internal cutter to remove such things like protruding services which are to be included in this pay item, then the Contractor shall inform the Owner that a point repair excavation is required to uncover and remove or repair the obstruction. No excavation work shall be performed without the prior approval of the Owner.

3.06 HYDROPHILIC END SEALS

- A. Access to the manhole interior using conventional methods shall be necessary to measure the pipe interior at the manhole prior to installation of the hydrophilic end seals. The pipe interior at the manhole shall be measured from 6:00 to 12:00 and from 3:00 to 9:00, with the mean determining the nominal inner pipe diameter.
- B. After the mainline and ends of pipe have been accessed, cleaned and inspected, the hydrophilic end seal product shall be placed inside the end of the pipe to be rehabilitated. The mechanical fastener is placed into a conformation such that the outer profile of the mechanical fastener is smaller than the diameter of the pipe to be rehabilitated, and the mechanical fastener is placed within the tubular sleeve. Dual-sided adhesive tape may be applied to the outer surface of the mechanical fastener to adhere the outer surface of the mechanical fastener to the inner surface of the tubular sleeve. The tubular sleeve is then placed inside the end of the pipe, and the mechanical fastener is placed into a conformation where the tubular sleeve is held to the pipe wall.

3.07 INSTALLATION

- A. Prior to installation, the bypass pumping system, including back-up pumps, shall be tested and running. The cost of these access points is incidental to the project. Locations for these manholes/access points shall be submitted per Subsection 1.03 Submittals.

THE METROPOLITAN DISTRICT

- B. Resin Impregnation: The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. The resin shall be uniformly distributed throughout the tube.
- C. The Contractor shall designate a location where the fiber tube will be impregnated ("wet out") with resin to thoroughly saturate the fiber tube prior to its dispatch for installation. The Contractor shall inform the Owner in advance to inspect the materials and the wet out procedure. A catalyst system or additive(s) compatible with the resin and tube may be used for viscosity control as provided by the resin manufacturer.
- D. Unless the Contractor uses the "over-the-hole" wet out method, the resin impregnated tube shall be transported and stored in a refrigerated truck until it is installed in an existing line by using an application of water, air, or cable and winch properly placing the tube between the upstream and downstream manholes. Liner installation head pressures (minimum and maximum for hot and cold conditions) shall not be exceeded, regardless of method of installation (stand pipe, pressure unit, etc.) is used.
- E. Using the "Inversion Procedure", the tube end shall initially be turned inside out and attached to a platform ring, standpipe, or as approved. The addition of water, air, or steam pressure will be adjusted to sufficient height/pressure to cause the impregnated tube to invert from manhole to manhole, and hold the tube tight against the existing pipe wall.
- F. Using the "Insertion Procedure", the tube is winched into position according to manufacturer's recommendations. The addition of water, air, or steam pressure will be adjusted to sufficient height/pressure to cause the calibration hose to invert from manhole to manhole and hold the tube tight against the existing pipe wall.
- G. No absorbent layers of tube shall be inserted into the existing pipe without being fully impregnated with resin.
- H. Tube installation forces or pressures shall be limited so as not to stretch the tube longitudinally by more than 10% of the original length.
- I. Any bladders or tubes used to inflate the tube material against the original pipe that were not fully bonded to the tube material prior to insertion into the original conduit shall be completely removed after CIPP installation.
- J. The existing pipe must be dewatered for any CIPP installation that does not use an inversion method to expand the tube against the pipe wall. The Contractor shall eliminate any incoming water (infiltration or inflow) and the removal of standing water, at no additional cost to the Owner.

THE METROPOLITAN DISTRICT

- K. Curing: After installation of the tube is completed, the Contractor shall supply a suitable heat source and water recirculation equipment. The equipment shall be capable of delivering hot water throughout the section by means of a perforated pre-strung hose to uniformly raise the water temperature above the temperature required to affect a cure of the resin. This temperature shall be determined by the resin catalyst system employed. Steam curing will be permitted provided the Contractor's lining system complies with all requirements of this Section. There will be no additional costs to the Owner due to change of curing methods during construction.
- L. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply. Another such gauge shall be placed between the impregnated tube and the pipe invert at the remote manhole to determine the temperature during cure. Water temperature in the line during the cure period shall be recommended by the resin manufacturer.
- M. Initial cure shall be deemed to be completed when the exposed portions of CIPP appear to be hard and sound and the remote temperature sensor indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin manufacturer, as modified by the designated process during which time the recirculation of the water and cycling of the heat exchanger to maintain the temperature continues.
- N. Cool Down: The Contractor shall cool the hardened CIPP to a temperature below 100° F before relieving any bladders or tubes used to inflate the tube material against the original pipe. Cool down may be accomplished by the introduction of cool water to replace water being used to cure the tube material. Care shall be taken in the release of the water column so that a vacuum will not develop that could damage the newly installed pipe.
- O. Finish: The finished CIPP shall be continuous over the entire length of the run and be as free as commercially practicable from visual defects such as foreign inclusions, dry spots, pinholes and delamination. It shall also meet the leakage requirements or pressure test specified herein for the main line and lateral connections.
- P. If due to broken or misaligned pipe at the manhole wall, the Contractor fails to make a tight seal, the Contractor shall apply a seal at that point. The seal shall be of a resin mixture compatible with the CIPP and at no additional cost to the Owner.
- Q. For post-construction television inspection, the Contractor is responsible for adhering to NASSCO's Pipeline Assessment and Certification Program (PACP) guidelines. Verification of NASSCO PACP certification is required.
- R. Video inspections and tap reopening shall be performed using a swivel head camera capable of looking directly up a tap. Cutting and trimming equipment

THE METROPOLITAN DISTRICT

shall be able to satisfactorily perform the operations. Satisfactory operation of cameras and other equipment must be demonstrated and approved before lining operations begin. After the tube has been cured in place, the Contractor shall reconnect all the existing service connections. The Owner reserves the right to use means such as dye testing to confirm activity, as necessary at the cost of the Owner. Opening the lateral connections shall be done without excavation, and in the case of non-man entry pipes, from the interior of the pipeline by means of a television camera and a cutting device that re-establishes them to not less than 90% capacity. The cuts shall be trimmed to a neat, clean, circular opening concentric with the service line pipe, free of jagged edges, "sawteeth", resin plugs or resin shelves. All cuts shall be brushed with a like resin or wire brush to form a smooth opening so as not to catch floatables in the sewage.

- S. The CIPP shall make a tight seal at the manhole opening with no annular gaps using hydrophilic end seals as specified herein. Materials and procedures used shall be submitted for approval as part of the CIPP system. Where the liner continues through the manhole, the upper portion of the liner will be removed and the bottom half to remain resulting in a smooth, continuous flowline through the manhole. Inverts may be rebuilt using epoxy grout or the CIPP liner material should be sealed to the invert and bench with quick-set epoxy mortar or high viscosity epoxy. These procedures shall be completed before proceeding to the next manhole section.
- T. The Contractor shall make sure through video inspection or whatever other means necessary that each active lateral connection is opened, free to discharge and is not plugged or backed up as a result of the lining operation.

3.08 INSPECTION

- A. For each continuous length designated by the Owner in the Contract Documents or each production run of liner utilized (in the case where resins are applied as part of the manufacturing process), one liner sample shall be prepared from a section of the cured pipe at an intermediate manhole or at the termination point. (note: In areas with limited space and larger diameter pipes, other sampling techniques may be required).
- B. The liner samples shall be tested in accordance with the applicable ASTM procedures for the resin being used i.e. ASTM F1216.
- C. CCTV inspections will be required at the completion of the CIPP and one (1) year after substantial completion. If the Contractor were to perform the CCTV at the one (1) year mark or shortly after, they are still liable to repair any defects that are discovered.
- D. If the liner fails to meet the test criteria, it will be repaired as necessary by the Contractor, and retested, at no additional expense to the Owner. The pipe line

THE METROPOLITAN DISTRICT

will not be considered acceptable until it successfully passes the requirements of this test.

- E. The Contractor shall be responsible for all costs, and delays incurred due to efforts to locate and repair any leaks in any sewer pipeline which fails the test, regardless of whether the failure is due to workmanship, material failure or the result of improperly installed equipment.
- F. All testing will be conducted by the Contractor or his/her approved Sub-contractor in the presence of the Owner's representative. The Contractor or his/her Subcontractor shall keep a written record that will show the results of the tests conducted. The records shall include sufficient data on length of line, weir levels, time, and related features noted during the testing of each segment of the line. A copy of records shall be given the Owner's Representative and Engineer.
- G. Payment for work will not be considered until post videos are received, reviewed and accepted by the Owner. The Owner reserves the right to re-review tapes after payment for final acceptance. The post video shall include full mainline surveillance as well as the viewing of all laterals for adequate cutting of openings.

3.09 CLEAN-UP OPERATIONS

- A. All materials removed from the pipe line and from the pipe lining process shall be satisfactorily disposed of offsite by the Contractor.
- B. Prior to final acceptance, the Contractor shall demonstrate, in the presence of the Owner, the capability of the liner to perform as specified. Any deficiencies found in the liner shall be corrected at no additional cost to the Owner.

3.10 FIELD TESTING AND ACCEPTANCE

- A. Following installation of each cured-in-place pipe, conduct a television inspection of the completed work as specified in Section 02764. An additional television inspection shall be performed one (1) year after substantial completion. If the Contractor were to perform the CCTV at the one (1) year mark or shortly after, they are still liable to repair any defects that are discovered. Retainage will be held in accordance with the Agreement until the CCTV has been completed, submitted and accepted by the Engineer.
- B. Field acceptance of the liner shall be based on the Engineer's evaluation of the installation including inspection videos and a review of certified test data for the installed pipe samples.
- C. Groundwater infiltration of the liner shall be zero.
- D. All service connections shall be open and clear.

THE METROPOLITAN DISTRICT

- E. There shall be no evidence of splits, cracks, breaks, lifts, kinks, delaminations or crazing in the liner.
- F. If any defective liner is discovered after it has been installed, it shall be removed and replaced with either a sound liner or a new pipe at no additional cost to the Owner. Repair methods shall be submitted to the Engineer for approval. **Any liner failure that requires excavation work to repair shall be initiated within two (2) hours of failure observation.**

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02767

MANHOLE REHABILITATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required to rehabilitate existing sewer manholes, including removing existing brick or concrete block chimneys and replacing with new brick and mortar chimneys, identifying correct sizes of and installing new frames and covers, repair or rebuild invert channels, sealing pipe connections and stopping active infiltration with chemical sealant in the manholes as shown on the Contract Drawings.
- B. The Contractor shall accurately field measure and size each individual manhole as required. The Contractor is reminded that each existing sewer manhole designated for rehabilitation may have a different configuration and varying field dimensions.
- C. The Contractor shall consider all manholes to be Permit Required Confined Spaces in accordance with OSHA standard, 29 CFR 1910.146.

1.02 RELATED SECTIONS

- A. Section 01510, Maintenance of Flow in Existing Sewers
- B. Section 01570, Maintenance and Protection of Traffic
- C. Section 02053, Removal and Disposal of Existing Pipe, Manholes and Appurtenances
- D. Section 02150, Bypass Pumping
- E. Section 02200, Trenching, Backfilling and Compaction
- F. Section 02510, Pavement Repair and Resurfacing and Surface Restoration
- G. Section 02605, Precast Concrete Manholes
- H. Section 02768, Manhole Monolithic Lining System
- I. Section 02769, Manhole Chimney Lining System
- J. Section 02770, Manhole Cleaning

THE METROPOLITAN DISTRICT

1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings, product data, materials of construction and details of installation. Submittals shall include the following as a minimum:
 - 1. Information regarding compounds for chemical sealing and installation equipment.
 - 2. Sewer brick with notarized certificate indicating compliance with ASTM C32, Grade SS.
 - 3. Building brick with notarized certificate indicating compliance with ASTM C62.
 - 4. Manhole frame and cover with notarized certificate indicating compliance with ASTM A48, Class 30.
 - 5. Sewer flow control plug plan.
- B. Name of the supplier and a list of materials to be furnished.
- C. Within fourteen (14) days of any planned bypass, the Contractor shall submit a bypass plan for any proposed bypass or dewatering activity.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM A48 – Standard Specification for Gray Iron Castings
 - 2. ASTM C32 - Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
 - 3. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale).
 - 4. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
 - 5. ASTM C150 - Standard Specification for Portland Cement.
 - 6. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
 - 7. ASTM 1248 - Standard Specification for Polyethylene Plastic Molding and

THE METROPOLITAN DISTRICT

Extrusion Materials

8. ASTM D4101 – Standard Specification for Propylene Plastic Injection and Extrusion.
- B. American Association of State Highway and Transportation Officials (AASHTO)
 1. Standard Specifications for Highway Bridges
- C. Occupational Safety and Health Administration (OSHA)
- D. Where reference is made to one of the above standards, the revision in effect at the time of Bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. All material shall be new and unused.
- B. Material quantity, manufacturing process and finished sections are subject to inspection and approval by Engineer, Owner, or Owner representative. Inspection may be made at place of manufacture, at work site following delivery, or both.
- C. Materials will be examined for compliance with ASTM standards, this Section and approved manufacturer's drawings. Additional inspection criteria include: appearance, dimension(s), blisters, cracks and soundness.
- D. Materials shall be rejected for failure to meet any requirements specified herein. Rejection may occur at place of manufacture, at work site, or following installation. Mark for identification rejected materials and removed from work site immediately. Rejected materials shall be replaced at no cost to the Owner.
- E. Repair minor damage to precast concrete sections by approved methods, if repair is authorized by the Engineer.
- F. For a product to be considered commercially proven, a minimum of 1,000 vertical feet of manhole rehabilitation must have been completed over a period of at least five years with the material proposed by the Contractor. Submit a description of each project including material used, vertical feet of manhole rehabilitation performed and the owner's contact information including telephone number.

1.06 PUBLIC NOTIFICATION

- A. All property owners shall receive notification that their sewage service will be interrupted while the manhole is being rehabbed. The Contractor shall distribute all written notices to each affected property owner at the following times:

THE METROPOLITAN DISTRICT

1. Seven (7) days prior to lining activities.
 2. Between 24 to 48 hours prior to lining activities.
 3. Within 24 hours after completion of lining activities.
- B. The Owner will provide copies of all public notifications for distribution by the Contractor.
- C. Each notice shall include the date, start time and estimated time when service will be completely restored. The Contractor shall provide a telephone number for property owners to call for information while work is in progress.
- D. The Contractor shall contact any home or business that cannot be activated within the time stated in the written notice.
- E. The maximum amount of time any home or business shall be without sanitary sewer service is eight (8) hours. Any home or business that is without sanitary service for longer than (8) hours will be bypassed to the sanitary sewer at no additional cost to the Owner.
- F. Contractor's schedule is subject to approval based on critical stakeholders and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Reference to a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration.
- B. Like items of materials/equipment shall be the end products of one manufacturer in order to provide standardization for appearance, operation, maintenance, spare parts and manufacturer's service.

2.02 DESCRIPTION OF WORK

- A. Each manhole to be rehabilitated shall be thoroughly cleaned and then inspected for loose or missing bricks, loose mortar, holes, etc. These deficiencies shall be corrected to the satisfaction of the Owner before any work is conducted.
- B. Manhole monolithic lining as specified in Section 02768 or manhole chimney lining as specified in Section 02769 shall not be implemented until all active leaking has been stopped.

THE METROPOLITAN DISTRICT

2.03 SEALING MATERIALS TO STOP ACTIVE INFILTRATION

A. General

1. Mixing, handling and application of chemical sealing materials shall be in strict accordance with the manufacturer's instructions.
2. While being injected, the chemical sealant must be able to react/perform in the presence of water.
3. The cured sealing material must prevent the passage of water through the manhole defect. The sealing material must withstand submergence in water without degradation, remain flexible after curing, and must be able to withstand freeze/thaw and wet/dry cycles without adversely affecting the seal.
4. The cure sealant must be chemically stable and resistant to acids, alkalis and organics normally found in sewage and must not be biodegradable.
5. Residual sealing materials must be easily removable from the sewer line and manhole to prevent reduction or blockage of sewage flow.
6. Handling, formulation and storage of the sealing gel compound shall be in strict conformance with the manufacturer's instructions. The uncured gel shall be delivered to the site in unopened containers, with the date of manufacture clearly indicated, no uncured gel manufactured more than six months prior to the date of application shall be utilized. Any uncured gel compound determined to be more than six months old shall be immediately removed from the site. Once a container of uncured gel has been opened, it shall be used as soon as practically possible. If a container of gel is not used within 24 hours of being opened, the Contractor shall ensure that the gel has not been contaminated. Any gel found to be contaminated shall be removed from the site.

B. Acrylic base gel chemical sealing material shall have the following characteristics:

1. A minimum of 10% acrylic base material by weight in the total sealant mix. A higher concentration (%) of acrylic base material may be used to increase strength of set during injection.
2. The ability to tolerate some dilution and react in moving water during injection.
3. A viscosity of approximately 2 centipoise which can be increased with additives.
4. A constant viscosity during the reaction period.

THE METROPOLITAN DISTRICT

5. A controlled reaction time from 5 seconds to 6 hours.
 6. The ability to increase mix viscosity, density and gel strength by the use of additives.
 7. Use root inhibitor (50% active dichlobenil) when roots are present in manholes.
 8. Acrylic base gel chemical sealing material shall be AV-118 by Avanti or approved equal.
- C. Urethane base gel chemical sealing material shall have the following characteristics:
1. One part urethane prepolymer thoroughly mixed with between 5 and 10 parts of water weight. The recommended mix ratio is one part urethane prepolymer to 8 parts of water (11% prepolymer).
 2. A liquid prepolymer having a solids content of 77% to 83%, specific gravity of 1.04 (8.65 lbs/gal) and a flash point of 20°F.
 3. A liquid prepolymer having a viscosity of 600 to 1200 centipoise at 70°F than can be pumped through 500 feet of ½-in hose with a 1,000 psi head at a flow rate of 1 ounce per second.
 4. Water used to react the prepolymer shall have a pH between 5 and 9.
 5. A cure time of 80 seconds at 40°F, 55 seconds at 60°F and 30 seconds at 80°F, when 1 part prepolymer is reacted with 8 parts of water only. Cure time shall be adjustable by the use of additives to the reaction water.
 6. Use root inhibitor (50% active dichlobenil) when roots are present in manholes.
 7. Urethane base gel chemical sealing material shall be AV-350 by Avanti or approved equal.
- D. Acrylamide Base Gel sealing material shall have the following basic properties:
1. A controllable reaction time ranging from ten (10) seconds to greater than one (1) hour.
 2. Viscosity that can be made near two (2) centipoise or greater.
 3. Viscosity to remain constant throughout the induction period.
 4. The ability to tolerate some dilution and react in moving water.

THE METROPOLITAN DISTRICT

5. The final reaction shall produce a homogeneous chemically stable, non-biodegradable, firm, flexible gel.
 6. The gel shall not be rigid or brittle.
 7. The gel shall have a negligible corrosion rate on mild steel plates.
 8. The base compounds may be varied considerably by additives to increase the strength, adhesion, solution density and viscosity.
 9. The gel shall be prepared from a minimum of ten percent (10%) (by weight) aqueous solution of the basic chemicals. The activator and initiator catalysts shall be introduced in such proportions, as recommended by the manufacturer, as to produce the most effective gel time for the existing field conditions and temperatures.
 10. Proportion control tests shall be made daily to determine that the proper amount of catalysts and additives are being used for the prevailing conditions. The concentration of the initiator (ammonium persulfate) shall be less than three percent (3%) by weight.
 11. Acrylamide base gel shall be AV-100 as manufactured by Avanti International, or an approved equal.
 12. If an acrylamide gel is used then an additive to increase the compressive and tensile strength as well as elongative properties shall be added to the grout mix. Additive shall be AV-257 as manufactured by Avanti International, or an approved equal. Mixing ratio shall be a minimum of 4 gallons in lieu of water per 30 gallon mix if acrylamide base gel is used. The grout shall be mixed as defined by the manufacturer.
- E. The Contractor shall receive the Owner's approval prior to using any grouting material.
- F. A representative of the grout manufacturer shall be on site for a minimum of five days at the start of the project to assure that all requirements are met.

2.04 BRICK MASONRY

- A. All bricks shall be sound, hard, uniformly burned, regular and uniform in shape and size. Underburned or salmon brick shall not be acceptable. Only whole brick shall be used, except where shown otherwise.
1. Sewer brick shall conform to ASTM C32, Grade SS except that the mean of five tests for absorption shall not exceed 8 percent and no individual brick exceed 11 percent.

THE METROPOLITAN DISTRICT

- B. Mortar shall be composed of 1 part Portland cement, 2 parts sand and hydrated lime not to exceed 10 pounds to each bag of cement. Portland cement shall be ASTM C150, Type II; hydrated lime shall conform to ASTM C207.
- C. Sand shall be washed, cleaned, screened and well graded, with all particles passing a No. 4 sieve and conform to ASTM C33.

2.05 MANHOLE FRAME AND COVER

- A. Manhole frames and covers for existing manholes shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind which render them unfit for the service for which they are intended. Manhole covers and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30.
- B. See Section 02605 for the specified manhole frame and cover types.
- C. Manhole frames and covers shall be suitable for highway traffic, including H20 wheel loads.
- D. Contractor shall confirm manhole cover dimensions in the field prior to ordering product.

PART 3 - EXECUTION

3.01 MANHOLE SEALING BY INJECTION METHOD

- A. Sealing active leaks shall be by the Injection Method or equal. Generally, this shall be accomplished by forcing chemical sealing gel materials through a system of pumps and hoses. Jetting or driving pipes from the surface that could damage or cause undermining of the pipelines, shall not be allowed. Except where specifically shown as such on the Contract Drawings, or called for in this Section, uncovering the manhole by excavation of pavement and soil to existing pipe grades, which would disrupt traffic, undermine adjacent utilities and structures, and cause further damage to the manholes being repaired, shall not be allowed.
- B. As a minimum, each manhole to be sealed shall have gel insert sleeves placed, every two feet, vertically and horizontally, into the shelf, invert, pipe connections and manhole wall joints of each manhole with active leaks.
- C. Into each insert sleeve, sealant materials shall be pumped through the hose system at controlled pressures, which exceed groundwater pressures. As a minimum, sufficient gel shall be delivered to effectively seal the manhole dry. Install additional insert sleeves and sealant as necessary, depending on the type and size of the leak encountered, type of soil and type voids being filled.

THE METROPOLITAN DISTRICT

- D. Allow one day for the sealant material to dry and then inspect each manhole. If leaks are observed in the sealed area of the manhole, place new gel insert sleeves and apply more sealant as necessary to stop the leak. The process shall be repeated as necessary to stop each leak.

3.02 DISPOSAL

- A. The Contractor shall make provisions for the collection of cleaning solvents used in the cleaning of sealing equipment. Collected solvents shall be disposed of by an approved solvent recovery process. Disposal of cleaning solvents into the sewer system or into natural watercourses will be strictly prohibited.

3.03 SEWER FLOW CONTROLS

- A. To effectively conduct the inspection and sealing operations, one or more of the following methods of flow control shall be used:
 - 1. A sewer line plug shall be inserted into the line at a manhole upstream from the section to be inspected, tested and/or sealed. The plug shall be so designed that all or any portion of the sewage flows can be released. During the inspection portion of the operation, flows shall be shut off or substantially reduced in order to properly inspect the pipe at the invert. After the inspection is complete, flows shall be restored to normal or not more than $\frac{1}{4}$ of the pipe diameter during the joint testing and sealing operation.
 - 2. Where pumping is required, in the opinion of the Engineer, to assure completion of the inspection and sealing work, the Contractor will be required to furnish pumping and by-passing equipment.
- B. See Section 01510, Maintenance of Flow in Existing Sewers and Section 02150 Bypass Pumping, for additional requirements.

3.04 REPAIR BRICK CHIMNEYS

- A. The Contractor shall repair brick chimneys as required to complete manhole rehabilitation work, including removal of damaged bricks and mortar, and thoroughly cleaning all surfaces in and around the bricks that were removed. After the area to be repaired has been thoroughly cleaned, the Contractor will replace the missing bricks with new bricks and mortar as specified.

3.05 REMOVE AND REPLACE BRICK CHIMNEYS

- A. The Contractor shall remove and replace brick or concrete chimneys as required to complete manhole rehabilitation work, including completely dismantling the existing chimney and all bricks or materials that comprise the chimney, and removal of the existing frame and cover. The chimney will then be rebuilt using new sewer brick and mortar as required to set the frames and covers to the required height.

THE METROPOLITAN DISTRICT

3.06 SETTING FRAMES AND COVERS

- A. Set frames and covers in a full mortar bed. Utilize brick and mortars to assure frame and cover are set to the finished grade. Set the manhole frame and cover to finished grade prior to placement of final paving.

3.07 REPAIR OR REBUILD INVERT CHANNELS

- A. The Contractor shall repair or rebuild invert channels in existing sewer manholes where no defined invert channels or manhole shelves currently exist. After the area to be repaired has been thoroughly cleaned, construct channels and shelves of brick and concrete as shown in the MDC Standard Details Manual. Brick lined channels shall correspond in shape with the lower half of the pipe. Set shelf elevation at crown of highest pipe and slope 1-in/ft to drain toward the flow through channel. Construct brick surfaces exposed to sewage flow with nominal 2-in by 8-in face exposed (i.e. bricks on edge).

B. Materials

1. Cement shall be domestic portland cement conforming to ASTM C150, Type II.
2. Lime for mortar shall be hydrated, conforming to ASTM C207, Type S.
3. Sand shall be clean, hard, sharp, durable particles, preferably siliceous and with not more than 5 percent in volume of loam, mica, clay, or other deleterious substances and free from injurious amounts of organic matter. The sand shall be graded from fine to coarse so that, when tested dry, it will conform to the limits of ASTM C144. Sand for grout shall be of such size that when dry, 100 percent shall pass a No. 4 sieve and not over 5 percent by weight shall pass a No. 100 sieve.
4. Water shall be free from injurious amounts of oils, acids, alkalis or organic matter and shall be potable.
5. Brick shall be sound, hard and uniformly burned, regular and uniform in shape and size, of compact texture and satisfactory to the Engineer. Bricks shall comply with ASTM C32, Grade SS (from clay or shale) except that the mean of five tests for absorption shall not exceed 8 percent and no individual brick exceed 11 percent. Underburned or salmon brick will not be acceptable and only whole brick shall be used unless otherwise permitted.

C Installation

1. Mortar shall consist of 1 part cement, 1/4 part lime and 2 parts sand and shall be mixed only in such quantity as may be required for immediate use and shall be used before the initial set has taken place. Mortar shall not be

THE METROPOLITAN DISTRICT

retained for more than 1-1/2 hours and shall be constantly worked over with hoe or shovel until used. Prepared mortar shall not be allowed to stand in beds during the noon hour or overnight. It must be mixed in the exact proportions specified herein and approximate measurement of quantities will not be permitted.

2. Anti-freeze mixtures will not be allowed in the mortar.
3. Bricks shall be cleaned and thoroughly wetted shortly before they are put into the work and each brick shall be laid in a full bed and joint of mortar without requiring subsequent grouting, flushing or filling. Joints between bricks shall not exceed 1/2-in and shall be pointed. Bricks forming the shaped inverts in manholes shall be laid on edge.
4. Manhole inverts shall be constructed to conform to the sizes of flow-through sewers. At changes in directions, the inverts shall be laid out in curves of the longest possible radii tangent to the centerline of the sewer pipes. Shelves shall be constructed to the elevation of the highest pipe crown and sloped to drain toward the flowing-through channel.

3.08 INTERNAL WALL WATERPROOFING

- A. After completion of surface preparation of precast manholes, apply a trowelable epoxy mortar to the precast manhole joints as recommended by the manufacturer. The epoxy shall be 100-percent solids, three component system, which is low in odor, non-sagging, permanently impermeable and chemical resistant. Monolithic lining of precast manholes may be required at certain locations as directed by the Engineer and specified in Section 02678 Manhole Monolithic Lining Systems.
- B. After completion of surface preparation of brick and concrete block manholes, apply two coats of a brush applied or trowel applied acrylic modified cementitious, hydraulic waterproof coating to the manhole walls as specified in Section 02768, Manhole Monolithic Lining Systems.
- C. All waterproof coatings shall be stored, handled, mixed and applied as recommended by the manufacturer. The walls of the manholes shall be thoroughly wetted with water prior to application of the first coat to assure a good bond to the existing walls.
- D. The first coating shall be of a different color than the final coating. The final coat shall be applied in the opposite direction from the first coat.
- E. Apply all waterproof coatings over the entire height of the wall.

THE METROPOLITAN DISTRICT

- F. The materials for internal wall waterproofing in existing precast concrete sewer manholes shall be Drycon by I.P.A. Systems; Brush-Bond by Fosroc or equal.

3.09 SURFACE PREPARATION FOR INTERNAL SEALING

- A. Any area to be repaired which requires bonding of new cementitious, asphaltic or waterproofing material to old cement or masonry shall be prepared as follows:
 - 1. Clean area with high-velocity water cleaning equipment to remove all foreign matter, oil, grease, wax and dirt.
 - 2. If necessary to remove foreign material remaining after high-velocity water blasting, clean the manhole surface using an acid wash. The acid wash shall be muriatic acid (hydrochloric acid) at a ratio of 1 part acid (HCl) to 10 parts of water. The mixing, application and removal of the acid solution shall be in strict accordance with the manufacturers' recommendations and safety procedures. The acid solution shall remain on the manhole surface until all signs of foreign material have been removed. Afterward, the acid solution shall be completely washed off with water.
 - 3. Chip or chisel away all loose or defective material from the areas to be repaired. Furnish a firm mechanical key by undercutting whenever possible.
 - 4. The interior surfaces of the manhole shall be allowed to thoroughly dry before the application of any conditioner or waterproofing coatings.
 - 5. No additional payment for surface preparation shall be made.

3.10 SEALING OF PIPE CONNECTION LEAKS, INVERTS, SHELVES AND LOWER WALLS

- A. Before completion of interior surface preparation, use an injection method as herein, to plug all leaks in the specified manhole inverts, shelves and pipe connections.
- B. Leaks which are determined to be too large to be effectively eliminated by the injection method shall be plugged with hydraulic cement prior to initiating the injection of the grout. The hydraulic cement shall require no additives, shall set in 45 to 90 seconds, and shall be dimensionally stable, freeze/thaw resistant and sulfate resistant.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02768

MANHOLE MONOLITHIC LINING SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required for manhole rehabilitation for the purpose of eliminating infiltration and exfiltration, providing corrosion protection, repair of voids and restoration of the structural integrity of the existing manholes by applying a monolithic fiber-reinforced structural/structurally enhanced cementitious liner to the wall and bench surfaces of brick, concrete, pre-cast or any other masonry construction material encountered.
- B. Manhole monolithic lining should extend from the invert to the bottom of the manhole frame casting for all manhole types unless otherwise directed by the Engineer. The monolithic surfacing shall be used to rehabilitate the interior of the designated existing sewer manholes as shown on the Contract Drawings and in the MDC Standard Details Manual.
- C. The Contractor shall accurately field measure and size each individual manhole. The Contractor is reminded that each existing sewer manhole designated to receive a monolithic surfacing may have a different configuration and varying field dimensions. All field measurements shall conform to the requirements of the monolithic surfacing manufacturer.
- D. Described are procedures for manhole preparation, cleaning, application and testing. The applicator shall be approved and trained by the manufacturer and shall furnish all labor, equipment and materials for applying a cementitious mix to form monolithic liner of a minimum ½ inch thickness, with machinery specifically designed for the application. All aspects of the installation shall be in accordance with the manufacturer's recommendation and with the following included:
 - 1. The removal of any loose and unsound material; and the removal of protrusions or other such obstructions.
 - 2. Cleaning of the area to be sprayed with high pressure water.
 - 3. The repair and filling of any voids.
 - 4. The repair and sealing of the invert, pipe connections and benches.

THE METROPOLITAN DISTRICT

5. The elimination of all active infiltration from the chimney, walls, seams, holes, pipe connections, etc., prior to application of the manhole lining system.
 6. The spray application of a cementitious mix to form a structural/structurally enhanced monolithic liner.
- E. The Contractor shall consider all existing manholes to be Permit Required Confined Spaces in accordance with OSHA standard 29 CFR 1910.146.

1.02 RELATED SECTIONS

- A. Section 01510, Maintenance of Flow in Existing Sewers
- B. Section 01570, Maintenance and Protection of Traffic
- C. Section 02150, Bypass Pumping
- D. Section 02764, Television Inspection
- E. Section 02767, Manhole Rehabilitation
- F. Section 02769, Manhole Chimney Lining System
- G. Section 02770, Manhole Cleaning

1.03 SUBMITTALS

- A. Contractor and manufacturer of the selected manhole monolithic lining system shall furnish engineering data covering the design and installation. Submittals shall include:
 1. Method of rehabilitation for each manhole type and condition.
 2. Diameter, length, wall thickness and all structural design calculations for each manhole type and condition. All design calculations shall be stamped by a Registered Professional Engineer of the State of Connecticut.
 3. Method of rebuilding bench and invert and sealing pipe at manholes.
 4. Sewer flow control plug plan.
- B. Submit to the Engineer the name of the supplier and a list of materials to be furnished.
- C. Test Reports

THE METROPOLITAN DISTRICT

1. Prior to each shipment of materials, submit certified test reports that the materials for this Contract were manufactured and tested in accordance with the ASTM Standards specified herein.
- D. Within fourteen (14) days of any planned bypass, the Contractor shall submit a bypass plan for any proposed bypass or dewatering activity.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

A. American Society for Testing and Materials (ASTM)

1. ASTM C78 - Standard Test Method for Flexural Strength of Concrete
2. ASTM C94 – Standard Specification for Ready-Mixed Concrete
3. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
4. ASTM C150 - Standard Specification for Portland Cement
5. ASTM C234 - Standard Test Method for Comparing Concretes on the Basis of the Bond Developed with Reinforcing Steel
6. ASTM C267 - Standard Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing
7. ASTM C293 – Test Method for Flexural Strength of Concrete
8. ASTM C321 – Test Method for Bond Strength of Chemical-Resistant Mortars
9. ASTM C495 – Test Method for Compressive Strength of Lightweight Insulating Concrete
10. ASTM C496 – Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
11. ASTM C579B – Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing
12. ASTM C596 – Test Method for Drying Shrinkage of Mortar Containing Portland Cement

THE METROPOLITAN DISTRICT

13. ASTM C666 - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
 14. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
 15. ASTM C952 - Standard Test Method for Bond Strength of Mortar to Masonry Units
 16. ASTM C-1244 - Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
 17. ASTM D2240-97e1 - Standard Test Method for Rubber Property Durometer Hardness
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALIFICATIONS

- A. The Contractor or Subcontractor performing the manhole monolithic lining system work shall be fully qualified experienced and equipped to complete this work expeditiously and in a satisfactory manner. The Contractor shall submit the following information to the Engineer for review and approval before any work is performed:
1. The number of years of experience in performing this type of specialized work; with a minimum of 5 years experience.
 2. Name of the manufacturer and supplier for this work and previous work listed below. The Contractor shall be an approved installer as certified and licensed by the manufacturer.
 3. A list of municipal clients that the Contractor has performed this type of work over the past 5 years.
 - a. The list shall contain names and telephone numbers of persons who can be called to verify previous satisfactory performance.
 - b. Installation dates and a description of the actual work performed.
 - c. The manufacturer shall provide an installation list of his product used for similar sewer manhole rehabilitation projects. The list shall provide the same information as required in paragraphs 3.a. and 3.b. above.

THE METROPOLITAN DISTRICT

- B. The Contractor shall also be capable of providing crews as needed to complete this work without undue delay.
- C. All manhole monolithic lining systems shall be from a single manufacturer. The supplier shall be responsible for the provisions for all test requirements specified in the referenced ASTM Standards as described herein as applicable for manhole monolithic lining. Inspections of any materials required for manhole monolithic lining may be made by the Engineer or other representatives of the Owner after delivery. All materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample materials may have been approved. Any materials rejected after delivery shall be marked for identification and shall be removed from the job site.

1.06 GUARANTEE

- A. All manhole monolithic lining placed shall be guaranteed by the Contractor for a period of one (1) year from substantial completion. During this period, all defects discovered in the monolithic lining, as determined by the Owner or Owner's representative shall be repaired or replaced in a satisfactory manner at no cost to the Owner. Retainage will be held in accordance with the Agreement until the manhole repair is completed and accepted by the Engineer.
- B. The Contractor is responsible for properly preparing the existing manhole for lining prior to the installation of the monolithic lining system, including stopping all leaks, patching voids, removing steps/manhole rungs, cleaning, removing rubble, root removal, etc.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in shipping, handling and placing to avoid damaging any manhole monolithic lining system materials. Extra care will be necessary during cold weather construction. Any materials damaged in shipment shall be replaced as directed by the Engineer.
- B. Any materials required for manhole monolithic lining showing deterioration, or which have been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.
- C. While stored, all materials required for manhole monolithic lining shall be adequately packaged and protected, and shall be stored in a manner as recommended by the manufacturer.

THE METROPOLITAN DISTRICT

1.08 PUBLIC NOTIFICATION

- A. All property owners shall receive notification that their sewage service will be interrupted while the manhole is being rehabbed. The Contractor shall distribute all written notices to each affected property owner at the following times:
 - 1. Seven (7) days prior to lining activities.
 - 2. Between 24 to 48 hours prior to lining activities.
 - 3. Within 24 hours after completion of lining activities.
- B. The Owner will provide copies of all public notifications for distribution by the Contractor.
- C. Each notice shall include the date, start time and estimated time when service will be completely restored. The Contractor shall provide a telephone number for property owners to call for information while work is in progress.
- D. The Contractor shall contact any home or business that cannot be activated within the time stated in the written notice.
- E. The maximum amount of time any home or business shall be without sanitary sewer service is eight (8) hours. Any home or business that is without sanitary service for longer than (8) hours will be bypassed to the sanitary sewer at no additional cost to the Owner.
- F. Contractor's schedule is subject to approval based on critical stakeholders and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MANHOLE MONOLITHIC LINING SYSTEM

- A. Refer to Appendix B for Owner's approved materials list for approved cementitious manhole monolithic lining systems. Other manufacturers that meet the requirements of this specification must submit product data in accordance with these Specifications.
- B. When cured, the system shall form a continuous, tight fitting, hard, impermeable surfacing which is suitable for sewer system service and chemically resistant to chemicals and vapors normally found in sewer systems.
 - 1. The system shall provide a minimum service life of 25 years.

THE METROPOLITAN DISTRICT

2. The cured system shall be continuously bonded to all brick, mortar, concrete, chemical sealant, grout, pipe and other surfaces inside the sewer manhole. Provide bond strength data on cured system based ASTM C882.
 3. Chemical sealants, grouts or patching materials used to seal active manhole leaks, to patch cracks, to fill voids and to otherwise prepare the manhole surface prior to application of the system shall be fully compatible with the system.
- C. A cementitious sprayable material shall be used to form a structural/structurally sound enhanced monolithic liner covering all interior manhole surfaces and shall be mixed and applied according to manufacturer's recommendations. The liner mix shall have the following minimum physical properties at 28 days:
- | | |
|--------------------------------------|---|
| 1. Compressive Strength (ASTM C579B) | 1,400 psi, 6 hours
2,000 psi, 24 hours
3,000 psi, 28 days |
| 2. Tensile Strength (ASTM 496) | 300 psi |
| 3. Flexural Strength (ASTM C293) | 600 psi |
| 4. Shrinkage (ASTM C596) | 0% at 90% Relative Humidity |
| 5. Bond Strength (ASTM C321) | 150 psi, 28 days |
| 6. Cement | Sulfate resistant |
| 7. Density, when applied | 105 + 5 pcf |
- D. In applications where there is evidence of severe sulfide conditions or a pH less than 3.0, the Engineer shall be notified immediately. High Performance Mix by Strong Seal, Aluminaliner by Quadex or approved equal, shall be used according to the manufacturer's instructions at manhole locations as directed by the Engineer. If this work is required, price and payment shall be based on a negotiated change order.

2.03 INFILTRATION CONTROL MIX

- A. A rapid-set cementitious product specifically formulated for leak control shall be Strong Plug by Strong Seal, Quad-Plug by Quadex or approved equal and shall be used to stop minor water infiltration and shall be mixed and applied according to manufacturer's recommendations. The infiltration control mix shall have the following minimum physical properties:
- a. Compressive Strength (ASTM C579B) 600 psi, 1 hour

THE METROPOLITAN DISTRICT

	1,000 psi, 24 hours
b. Shrinkage (ASTM C596)	0% at 90% Relative Humidity
c. Bond Strength (ASTM C321)	40 psi, 1 hour 80 psi, 24 hours

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Manhole monolithic lining systems shall not be installed until all other manhole rehabilitation, including frame and cover replacement and invert repair work is completed. For any manholes near related work on sewer mains under this Contract, manhole monolithic lining systems shall not be installed until all sewer main repair work is completed.
- B. The Contractor shall clean each sewer manhole to be surfaced and shall dispose of any resulting material as specified in Section 02770 and in accordance with the manufacturer's recommendations.
- C. Equipment used in the application of the liner system shall be as recommended by the manufacturer and shall be complete with water storage, metering system and hydraulically powered mixer and pump.
- D. The Contractor shall place covers over the invert to prevent extraneous material from entering the sewer system.
- E. Prior to any manhole interior surface preparation work, all active leaks shall be stopped using an injection method as specified in Section 02767. Leaks which are determined to be too large to be effectively eliminated by the injection method shall be plugged with hydraulic cement prior to the injection of grout. The hydraulic cement shall require no additives, shall set in 45 to 90 seconds, shall be dimensionally stable, freeze/thaw resistant and sulfate resistant.
- F. The Contractor shall remove internal drop connections anchored to manhole walls, where encountered, prior to installing the manhole lining system. After installation and proper curing of the liner, the Contractor shall install new internal drop connections in their original location prior to removal, as required.
- G. Existing manhole rungs shall be cut off and ground smooth.
- H. After all preparation work has been completed, the Contractor shall remove all loose material and wash the manhole walls again. Any bench, invert or service line repairs shall be made at this time using the quick setting patching per the manufacturer's recommendations.

THE METROPOLITAN DISTRICT

- I. The liner mix shall be mixed as specified by the manufacturer for 30 seconds to 1 minute after all materials have been placed in the mixing hopper. Mixing shall be accomplished such that the mix can be sprayed in a continuous manner without interruption until each application is complete.
- J. Prior to spraying, the surface shall be clean and free of all foreign material and shall be damp without noticeable free water droplets or running water, but totally saturated, just prior to application. Materials shall be spray applied from the bottom of the wall to the top of the wall, to minimum uniform thickness, to insure that all cracks, crevices and voids are filled and a relatively smooth surface remains after light troweling. The light troweling is performed to compact the material into voids and to set the bond.
- K. A second application shall be applied after the first application has begun to take an initial set, identified by the disappearance of surface sheen which could be 15 minutes to 1 hour depending on ambient conditions. The second application shall ensure a minimum total thickness of ½ inch. Again, application shall be from the bottom up. The surface shall then be troweled to a smooth finish being careful not to over-trowel and bring additional water to the surface and weaken the applied liner. The manufacturer's recommendations shall be followed whenever more than 24 hours have elapsed between applications. A brush finish shall be acceptable at the applicator's discretion.
- L. The covers placed over the invert shall be removed and the bench sprayed such that the gradual slope is produced from the walls to the invert with thickness at the edge of the invert being no less than ½ inch. The wall/bench interface shall be rounded to a uniform radius for the full circumference of the interface.
- M. Caution should be taken to minimize exposure of applied product to sunlight and air movement. At no time shall the finished product be exposed to sunlight or air movement for longer than 15 minutes before replacing the manhole cover. The final application shall have a minimum of four (4) hours cure time before being subjected to active flow. Traffic shall not be allowed over manholes for 24 hours after work is complete.
- N. No application shall be made to frozen surfaces or if freezing is expected to occur inside the manhole within 24 hours after application. If ambient temperatures are in excess of 95 degrees F, precautions shall be taken to keep the mix temperature at time of application below 90 degrees F. Mix water temperature shall not exceed 85 degrees F. Chill with ice if necessary.
- O. The Contractor shall provide bypass pumping of sewage flows where and when the rehabilitation work is being performed, as directed by the Engineer in accordance with Section 01510 and Section 02150.

THE METROPOLITAN DISTRICT

- P. All cutting and/or sealing of manhole monolithic lining systems at manhole pipe, cured-in-place liner, rungs and top connections shall provide watertight seals.
- Q. The Contractor shall reopen all of the existing active pipe connections as directed by the Engineer in each sewer manhole following surfacing or lining.
- R. The existing frame and covers, pipe connections and inverts shall be restored to an acceptable condition as approved by the Engineer.

3.03 FIELD TESTING AND ACCEPTANCE

- A. Field acceptance of each manhole shall also be based on the Engineer's evaluation of the proper monolithic lining of the manhole and on the Engineer's evaluation of the appropriate installation and curing test data along with review of the manhole inspections.
- B. The finished manhole surface shall be continuous and as free from significant defects as commercially practical. Any defects which will affect the integrity or strength of the manhole during the warranty period, one (1) year from substantial completion or in the foreseeable future shall be repaired at the Contractor's expense, in a manner mutually agreed upon by the Engineer and the Contractor. If the Contractor were to perform the inspection at the one (1) year mark or shortly after, they are still liable to repair any defects that are discovered. Retainage will be held in accordance with the Agreement until the manhole repair is completed and accepted by the Engineer.
- C. The Contractor shall visually verify the absence of leaks and perform vacuum testing as follows:
 - 1. The test shall be made using an inflatable compression band, vacuum pump, and appurtenances specifically designed for testing manholes. Test procedures shall be in accordance with the equipment manufacturer's recommendations. Contractor shall be fully familiar with the vacuum testing equipment and shall provide a minimum of 4 hours of instruction by a factory-authorized representative at the outset of the project.
 - 2. Each manhole shall be tested immediately after installation of manhole monolithic lining system and after all active pipe connections have been reopened.
 - 3. All pipes entering the manhole shall be plugged and braced to prevent the plug from being drawn into the manhole.
 - 4. After the test equipment is in place the test shall be run at the following rate and test times:
 - a. For 4.0 ft or 5.0 ft diameter manholes.

THE METROPOLITAN DISTRICT

- (1) Initial pressure test - 10-in Hg.
 - (2) Test time - 1-in Hg drop to 9-in Hg in 1 minute minimum allowable, for 0-10 ft deep manholes; 1 minute 15 seconds minimum allowable for 10-15 ft deep manholes; 1 minute 30 seconds minimum allowable for 15-25 ft deep manholes.
- b. If the pressure drop exceeds 1-in Hg in the specified time the manhole shall be repaired in accordance with approved procedures and retested.
 - c. If a manhole drops more than 1-in Hg in the specified time after repairs, the unit shall be water exfiltration tested and repaired as necessary.
- D. As an alternative to the vacuum test, exfiltration testing may be performed at the Contractor's discretion on all lined manholes in accordance with the following:
1. All wastewater lines coming into the manhole shall be sealed with an internal pipe plug.
 2. The manhole shall be filled with water and maintained full for at least one hour. The maximum leakage for hydrostatic testing shall be 0.025 gallons per foot diameter per foot of manhole depth per hour. If a manhole fails a leakage test, the manhole must be made watertight and retested.
- E. If the manhole scheduled for monolithic lining has been lined through with cured-in-place, vacuum testing will not be required. The upper portion of the liner will be removed and the bottom half to remain resulting in a smooth, continuous flow line through the manhole. Inverts may be rebuilt using epoxy grout or the CIPP liner material should be sealed to the invert and bench with quick-set epoxy mortar or high viscosity epoxy. These procedures shall be completed before proceeding to the next manhole.
- F. Four (4), 2-inch cubes shall be cast each day, or from every 50 bags of product used, and shall be properly labeled and sent in for testing, in accordance with the Engineer's directions, for compression strength testing as described in ASTM C579B.
- G. The manhole monolithic lining system shall provide a continuous monolithic surface with uniform thickness throughout the manhole interior. If the thickness is not uniform or is less than specified, it shall be repaired or replaced at no additional cost to the Owner.
- H. Groundwater infiltration of the complete manhole monolithic lining system shall be zero.
- I. All pipe connections shall be open and clear.

THE METROPOLITAN DISTRICT

- J. There shall be no cracks, voids, pinholes, uncured spots, dry spots, lifts, delaminations or other type defects in the manhole monolithic lining system.
- K. If any defective manhole monolithic lining system is discovered after it has been installed, it shall be repaired or replaced in a satisfactory manner within 72 hours and at no additional cost to the Owner. This requirement shall apply for the entire one (1) year guarantee period.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02769

MANHOLE CHIMNEY LINING SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required for manhole chimney lining to preventing leakage of water into the manhole through the frame joint area and the area above the manhole cone or corbel, including all extensions to the chimney area. Extensions shall include, but are not limited to, lifting rings, brick, and/or block. Additional work includes providing corrosion protection, repair of voids and restoration of the structural integrity of the chimney as a result of applying an aromatic flexible urethane resin coating to the manhole chimney. Lining should extend from the cone or top of the manhole or manhole corbel to the inside of the casting, as detailed in the manufacturer's recommendations. The manhole chimney lining system shall be used to rehabilitate the internal chimney of existing sewer manholes as shown on the Contract Drawings and in the MDC Standard Details Manual.
- B. The Contractor shall accurately field measure and size each individual manhole. The Contractor is reminded that each existing sewer manhole designated to receive chimney lining may have a different configuration and varying field dimensions. All field measurements shall conform to the requirements of the chimney lining system manufacturer.
- C. Described are procedures for chimney preparation, cleaning, application and testing. The applicator shall be approved and trained by the manufacturer and shall furnish all labor, equipment and materials for applying a flexible urethane resin with a minimum thickness of 170 millimeters, with machinery specially designed for the application. All aspects of the installation shall be in accordance with the manufacturer's recommendation and with the following included:
 - 1. The removal of any loose and unsound material; and the removal of protrusions or other such obstructions.
 - 2. Cleaning of the area to be sprayed with high pressure water.
 - 3. The repair and filling of any voids.
 - 4. The elimination of all active infiltration prior to making the application.

THE METROPOLITAN DISTRICT

5. The application of an aromatic flexible urethane resin to form a water-tight seal from the casting to the cone or corbel of existing sewer manholes.
- D The Contractor shall consider all manholes to be Permit Required Confined Spaces in accordance with OSHA standard, 29 CFR 1910.146.

1.02 RELATED SECTIONS

- A. Section 01510, Maintenance of Flow in Existing Sewers
- B. Section 01570, Maintenance and Protection of Traffic
- C. Section 02150, Bypass Pumping
- D. Section 02767, Manhole Rehabilitation
- E. Section 02768, Manhole Monolithic Lining System
- F. Section 02770, Manhole Cleaning

1.03 SUBMITTALS

- A. Contractor and manufacturer of the selected manhole chimney lining system shall furnish engineering data covering the design and installation. Submittals shall include:
 1. Method of rehabilitation for each chimney type and condition.
 2. Diameter, length, wall thickness and all structural design calculations for each manhole type and condition. All design calculations shall be sealed by a Registered Professional Engineer of the State of Connecticut.
 3. Sewer flow control plug plan.
- B. Test Reports
 1. Prior to each shipment of materials, submit certified test reports that the materials for this Contract were manufactured and tested in accordance with the ASTM Standards specified herein.

1.04 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. American Society for Testing and Materials (ASTM)

THE METROPOLITAN DISTRICT

1. ASTM C94 – Standard Specification for Ready-Mixed Concrete
 2. ASTM C150 - Standard Specification for Portland Cement
 3. ASTM C293 – Test Method for Flexural Strength of Concrete
 4. ASTM C321 – Test Method for Bond Strength of Chemical-Resistant Mortars
 5. ASTM C495 – Test Method for Compressive Strength of Lightweight Insulating Concrete
 6. ASTM C496 – Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
 7. ASTM C579B – Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing
 8. ASTM C596 – Test Method for Drying Shrinkage of Mortar Containing Portland Cement
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALIFICATIONS

- A. The Contractor or Subcontractor performing the manhole chimney lining system work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner. The Contractor shall submit the following information to the Engineer for review and approval before any work is performed.
1. The number of years of experience in performing this type of specialized work with a minimum of 5 years of experience.
 2. Name of the manufacturer and supplier for this work and previous work listed below. The Contractor shall be an approved installer as certified and licensed by the manufacturer.
 3. A list of municipal clients that the Contractor has performed this type of work during the past 5 years.
 - a. The list shall contain names and telephone numbers of persons who can be called to verify previous satisfactory performance.

THE METROPOLITAN DISTRICT

- b. Installation dates and a description of the actual work performed.
 - c. The manufacturer shall provide an installation list of his product used for similar sewer manhole rehabilitation projects. The list shall provide the same information as required in paragraphs 3a and 3b above.
- B. The Contractor shall also be capable of providing crews as needed to complete this work without undue delay.
- C. All manhole chimney lining systems shall be from a single manufacturer. The supplier shall be responsible for the provisions for all test requirements specified in the referenced ASTM Standards as described herein as applicable for manhole chimney lining. Inspections of any materials required for manhole chimney lining may be made by the Engineer or other representatives of the Owner after delivery. All materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample materials may have been approved. Any materials rejected after delivery shall be marked for identification and shall be removed from the job site.

1.06 GUARANTEE

- A. All manhole chimney lining placed shall be guaranteed by the Contractor for a period of one (1) year from the date of acceptance. During this period, all defects discovered in the chimney lining, as determined by the Owner or Owner's representative shall be repaired or replaced in a satisfactory manner at no cost to the Owner. Retainage will be held in accordance with the Agreement until the manhole repair is completed and accepted by the Engineer.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in shipping, handling and placing to avoid damaging the manhole chimney lining materials. Extra care will be necessary during cold weather construction. Any materials damaged in shipment shall be replaced as directed by the Engineer.
- B. Any manhole chimney lining materials showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.
- C. While stored, any manhole chimney lining materials shall be adequately packaged and protected, and shall be stored in a manner as recommended by the manufacturer.

THE METROPOLITAN DISTRICT

1.08 PUBLIC NOTIFICATION

- A. All property owners shall receive notification that their sewage service will be interrupted while the manhole is being rehabbed. The Contractor shall distribute all written notices to each affected property owner at the following times:
 - 1. Seven (7) days prior to lining activities.
 - 2. Between 24 to 48 hours prior to lining activities.
 - 3. Within 24 hours after completion of lining activities.
- B. The Owner will provide copies of all public notifications for distribution by the Contractor.
- C. Each notice shall include the date, start time and estimated time when service will be completely restored. The Contractor shall provide a telephone number for property owners to call for information will work is in progress.
- D. The Contractor shall contact any home or business that cannot be activated within the time stated in the written notice.
- E. The maximum amount of time any home or business shall be without sanitary sewer service is eight (8) hours. Any home or business that is without sanitary service for longer than (8) hours will be bypassed to the sanitary sewer at no additional cost to the Owner.
- F. Contractor's schedule is subject to approval based on critical stakeholders and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 INTERNAL CHIMNEY LINING SYSTEM

- A. Refer to Appendix B for Owner's approved materials list for approved manufacturers of the manhole chimney lining system. Other manufacturers that meet the requirements of this Specification must submit product data in accordance with these Specifications.
- B. When cured, the system shall form a continuous, tight fitting, hard, impermeable surfacing which is suitable for sewer system service and chemically resistant to chemicals and vapors normally found in sewer systems.
 - 1. The system shall provide a minimum service life of 25 years.

THE METROPOLITAN DISTRICT

2. The cured system shall be continuously bonded to all brick, mortar, concrete, HDPE, butyl sealant, chemical sealant, grout, cast iron and other surfaces inside the sewer manhole. Provide bond strength data on cured system based ASTM C882.
3. Chemical sealants, grouts or patching materials used to seal active chimney leaks, to patch cracks, to fill voids and to otherwise prepare the chimney surface prior to application of the system shall be fully compatible with the system.

2.02 URETHANE RESIN COATING

- A. An aromatic flexible urethane resin coating material shall be used to prevent leakage of water into the manhole through the frame joint area and the area above the manhole corbel or cone.
- B. The seal shall remain flexible, allowing for the repeated vertical or horizontal movements of the frame due to frost lift, ground movement or the thermal movement of pavement.
- C. The final liner material shall be made of no less than 170 millimeters of corrosion resistant aromatic flexible urethane resin coating to be applied to the inside wall of the entire chimney area. Mil thickness may vary depending on the local climate. The Contractor shall contact the manufacturer for thickness recommendations. The product shall have an elongation of 600% to 800% and a hardness (Durometer) of 75. Final liner shall have a minimum tensile and adhesion strengths of 1,150 psi and 175 pli (pounds per linear inch), respectively.
- D. The manhole chimney lining system shall conform to the physical properties of ASTM D412, with a minimum of 170 millimeters thickness for durability and resistance elongation and tearing. The lining product shall have an aromatic flexible urethane coating on the complete surface.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Internal chimney lining systems shall not be installed until all other manhole rehabilitation, including frame and cover replacement and manhole monolithic lining, is completed. For any manholes scheduled for chimney lining near related work on sewer mains under this Contract, the manhole chimney lining systems shall not be installed until all sewer main repair work is completed.
- B. The Contractor shall clean each sewer manhole to be surfaced and shall dispose of any resulting material as specified in Section 02770.

THE METROPOLITAN DISTRICT

- C. Equipment used in the application of the liner system shall be as recommended by the manufacturer and shall be complete with water storage, metering system and hydraulically powered mixer and pump.
- D. The Contractor shall place covers over the invert to prevent extraneous material from entering the sewer system.
- E. All loose or protruding mortar or brick that would interfere with the lining performance shall be removed. Any lips for gravel pan supports shall be cut off flush with casting. All sealing of any loose material or excessive voids and patching cement shall conform to the manufacturer's requirements. Cement shall not be used to create an entirely new surface on top of the existing chimney. Any patching cement work will require the Contractor to contact the sealant manufacturer to determine, in writing, the proper time required for the cement to completely cure prior to installing manhole chimney lining system.
- F. Active leaks or infiltration should be eliminated by a method approved by the Engineer prior to installation of the manhole chimney lining system.
- G. Preparation of the surface should utilize a sandblaster and/or water-blasting machine. The water-blasting machine shall deliver the water in a steady stream at a minimum of 3,500 psi.
- H. After water/sandblasting, ensure that the entire area is free of any loose debris that may have been deposited. The substrate surface must be free of sand, loose debris, latencies, dust, oil, grease or chemical contamination.
- I. A blower may be required to completely dry the substrate surface or as recommended by the manufacturer. Use of a propane torch to dry the substrate surface shall be prohibited unless otherwise directed by the Engineer.
- J. Ensure casting and structure surfaces are clean and dry where the primer is intended to adhere, and then apply primer.
- K. After the primer is sufficiently dry, Flex-Seal Utility Sealant by Sealings System Inc., or approved equal, may be applied by brush to the required thickness. Apply as evenly as possible over the entire chimney area, including the frame joint area, the area above the manhole cone or top, and the extensions to the chimney area. The sealant may require the proper mixing of agents, as recommended by the manufacturer.
- L. If coating the manhole surface with a cementitious, epoxy or fiberglass material, do not place any material onto the casting frame. The manhole chimney lining sealant will form the bond between the frame and the structure.

THE METROPOLITAN DISTRICT

- M. If using cementitious materials for other related rehabilitation work, the Contractor shall contact the manufacturer for the proper preparation required to bond urethanes to their material and the amount of time required for the cement to completely cure.

3.03 FIELD TESTING AND ACCEPTANCE

- A. Field acceptance of each chimney shall also be based on the Engineer's evaluation of the proper lining of the chimney and on the Engineer's evaluation of the appropriate installation and curing test data along with review of the chimney inspections.
- B. The finished chimney surface shall be continuous and as free from significant defects as commercially practical. Any defects which will affect the integrity or strength of the chimney during the warranty period or in the foreseeable future shall be repaired at the Contractor's expense, in a manner mutually agreed upon by the Engineer and the Contractor.
- C. The manhole chimney lining system shall provide a continuous surface with uniform thickness throughout the manhole interior. If the thickness is not uniform or is less than specified, it shall be repaired at no additional cost to the Owner.
- D. There shall be no cracks, voids, pinholes, uncured spots, dry spots, lifts, delaminations or other type defects in the manhole chimney lining systems.
- E. If any defective manhole chimney lining system is discovered after it has been installed, it shall be repaired in a satisfactory manner within 72 hours and at no additional cost to the Owner. This requirement shall apply for the entire one (1) year guarantee period.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02770

MANHOLE CLEANING

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required to perform high pressure water jetting, brushing, and flushing of designated manholes prior to manhole rehabilitation or lining work.
- B. The Contractor shall consider all manholes to be Permit Required Confined Spaces in accordance with OSHA standard, 29 CFR 1910.146.

1.02 RELATED SECTIONS

- A. Section 01510, Maintenance of Flow in Existing Sewers
- B. Section 01570, Maintenance and Protection of Traffic
- C. Section 02150, Bypass Pumping
- D. Section 02767, Manhole Rehabilitation
- E. Section 02768, Manhole Monolithic Lining
- F. Section 02769, Manhole Chimney Lining System

1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings, product data, materials of construction and details of installation. Submittals shall include the following as a minimum:
 - 1. Sewer flow control plug plan.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 PREPARATION

- A. Selection of cleaning equipment shall be based on the conditions of each manhole at the time the work commences. The equipment and methods

THE METROPOLITAN DISTRICT

selected shall be acceptable to the Engineer. Acceptance of the proposed method of cleaning does not relieve the Contractor of the responsibility to adequately clean the manholes to allow performance of other work.

- B. Preparation of the surface should utilize a sandblaster and/or water-blasting machine. The water-blasting machine shall deliver the water in a steady stream at a minimum of 3,500 psi.
- C. After water/sandblasting, ensure that the entire area is free of any loose debris that may have been deposited. The substrate surface must be free of sand, loose debris, latencies, dust, oil, grease or chemical contamination.
 - 1. Equipment used shall be capable of removing scale, tuberculation and mineral deposits.

3.02 PERFORMANCE

- A. Each designated sewer manhole section shall be cleaned using hydraulically propelled, high velocity jet, or mechanically powered equipment. The equipment selected for cleaning shall be capable of removing dirt, grease, rocks, sand and other deleterious materials and obstructions from the manholes. Blockages, if any, shall be reported to the Engineer immediately.
- B. During all cleaning operations, satisfactory precautions shall be taken to protect the manholes from damage that might be inflicted by the improper use of cleaning equipment. Contractor is responsible for repairs resulting from damage, at no additional cost to Owner.
- C. All sludge, dirt, sand, rocks, grease and other solid or semisolid residue, debris and material resulting from cleaning operations shall be removed by the Contractor. Passing material from manhole section to manhole section which could result in line stoppages, accumulations of sand in wet wells, or damage to pumping equipment shall not be permitted.
- D. All debris, residue and other materials resulting from cleaning operations shall be removed from each site at the end of each workday and shall be disposed of in an approved manner. Under no circumstances will the accumulation of debris, residue and other materials be stored on site or other locations unless prior written authorization is provided by the Owner. Any debris, residue and other materials designated for storage shall be place in totally enclosed containers as approved by the Owner.

THE METROPOLITAN DISTRICT

3.03 FIELD TESTING

- A. Acceptance of manhole cleaning shall be contingent upon the satisfactory completion of an inspection. All cleaned manholes will be inspected by the Engineer prior to acceptance. Any manhole that is deemed unsatisfactory by the Engineer shall be re-cleaned and re-inspected, at no additional cost to the Owner.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02771

GRANITE CURBING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes the installation, repair and replacement of granite curbing.

1.02 RELATED SECTIONS

- 1. Section 02202, Trench Refill
- 2. Section 02510, Temporary and Permanent Paved Surface Restoration

1.03 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1986 Edition, as amended
- B. Standard Technical Specifications for Streets and Roads, Traffic, and Streetscape Construction, as applicable to the Municipality where the work is taking place.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Granite Curbing
 - 1. Granite curbing shall be hard and durable, fundamentally of light color, of general uniform texture, of smooth splitting appearance, and free from seams or imperfections.
 - 2. No top projections shall exist and no more than 1-inch projections shall exist on the back and bottom of each section.
 - 3. Vertical Granite Curbing
 - a. Vertical granite curbing shall conform to the requirements of the

THE METROPOLITAN DISTRICT

Municipality's Standard Technical Specifications

- b. Standard laying length shall be no less than 6-feet.

B. Mortar

- 1. Mortar shall conform to the Municipality's Standard Technical Specifications.
- 2. In general, mortar shall be one part Portland cement and two parts (by volume) dry fine aggregate.
- 3. Hydrated lime in an amount of less than 4 pounds of lime to each bag of Portland cement may be added if approved by the Owner.

C. Processed Stone Base

- 1. Provide processed stone base that complies with the Municipality's Standard Technical Specifications and as shown in the MDC Standard Details Manual.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All granite curbing, inlets, and comers shall be installed in accordance with the Municipality's Standard Technical Specifications and as shown in the MDC Standard Details Manual.
- B. Excavation shall be made of sufficient depth and width to accommodate the granular base.
- C. The line of the curbing shall be set straight and true for the full depth.
- D. The processed stone base shall be fine graded and thoroughly compacted with approved mechanical compactors. Concrete fill shall be placed on the front and back of the granite curbing in lieu of gravel backfill in locations where a sidewalk does not directly abut the back of curb. In locations where a sidewalk directly abuts the back of the curb, concrete fill is only required on the front side.
- E. Where edging is to be set on a radius between 10 feet and 160 feet, the maximum laying length shall be 3 foot. Where edging is to be set on a radius of 10 feet or less, the maximum laying length shall be 1 foot.
- F. The joints of all granite curbing shall be filled with cement mortar and neatly pointed on exposed surfaces. The joints of the stone curbing shall be pointed with

THE METROPOLITAN DISTRICT

mortar for the full depth of the curbing. Excess mortar shall be satisfactorily cleaned from the curb.

- G. At approximately 50-foot intervals, a ½ inch joint shall not be filled with mortar to be left free for expansion. The joints of all granite curbing shall be filled with cement mortar and neatly pointed on exposed surfaces. Excess mortar shall be satisfactorily cleaned from the curb.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02900

LANDSCAPING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required and complete all planting and related landscaping work indicated on the Contract Drawings and as specified herein, including but not necessarily limited to the following:
 - 1. Supplying of loam for all plant pits and planting beds. Be responsible for all loam preparation, testing, conditioning and fertilization and shall ensure the overall quality of the material. Topsoil stockpiled and screened from other construction operations under this Section may be used.
 - 2. Excavation of pits for trees.
 - 3. Furnishing and planting trees and shrubs as shown on the Contract Drawings.
 - 4. Supplying accessory materials, guying, and staking of all trees.
 - 5. Pruning of plant materials.
 - 6. Supplying and spreading mulch for tree pits and planting beds as specified herein.
 - 7. Maintenance and guarantee.
 - 8. Final cleanup and all other work required to complete the job in accordance with the Contract Drawings and Specifications.
- B. The planting work shall be performed by a landscape contractor who is fully experienced in projects of this scope and whose main business is landscaping. Selection of the landscape contractor will be subject to approval by the Owner.

1.02 RELATED SECTIONS

- A. Section 02930, Loaming, Seeding and Sodding

1.03 SUBMITTALS

THE METROPOLITAN DISTRICT

- A. Submit samples of all materials for inspection and approval including advance notice of wholesale plant materials sources of supply.
- B. Upon delivery to the site, all deliveries shall include submittal of vendor's invoice, designating kind, size, quantity and sources of supply and certificates of inspection in accordance with M.13.07-8. Certificates of Inspection as specified in CTDOT Form 817.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction (CTDOT Form 817).
- B. American Standards for Nursery Stock (ASNS), current edition.

PART 2 - PRODUCTS

2.01 LOAM

- A. Loam shall be as specified in Section 02930.
- B. No loam shall be delivered or spread in a frozen or muddy condition.

2.02 PLANT MATERIALS

- A. Furnish and install trees and shrubs as shown on the Contract Drawings. Plants shall conform to M.13.07-2 Nursery Grown Plants as specified in CTDOT Form 817 and shall be nursery grown under climatic conditions similar to those in the locality of the project and shall conform to the variety and sizes indicated. Plants shall conform also to the indicated botanical names and standards of size, culture and quality for the highest grades and standards as adopted by the American Association of Nurserymen in the ASNS.
- B. All plants shall be freshly dug. No heeled-in plants or plants from cold storage shall be used. All plants shall be typical of their species or variety and shall have a normal habit of growth. Plants shall be sound, healthy and vigorous, well-branched and densely foliated when in leaf; shall be free of disease, insect pests, eggs or larvae and shall have healthy, well-developed root systems. All parts of the plant shall be moist and shall show active green cambium when cut.
- C. The height of trees, measured from the crown of roots to the top of the top branch, shall not be less than the minimum size designated and plants within each group shall match the mid-point of the size range.

THE METROPOLITAN DISTRICT

- D. The trunk of each tree shall be a single trunk growing from a single unmutilated crown of roots. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety. The trunk shall be free from sun-scald, frost cracks, or wounds resulting from abrasions, fire, or other causes. No pruning wounds shall be present having a diameter of more than 3/4-in and such wounds must show vigorous bark on all edges.
- E. For deciduous trees, take caliper measurements 6-in above ground for trees up to and including 4-in caliper and 12-in above ground for trees above 4-in caliper.
- F. Evergreen trees shall be branched to within 1-ft of the ground. All evergreen trees shall have a single leader unless otherwise approved by the Engineer.

2.03 INSPECTION OF PLANT MATERIALS

- A. Inspection of plants before digging will be at the option of the Engineer and in accordance with M.13.07-4. Inspections as specified in CTDOT Form 817. Be present if requested by Engineer, for inspection of plants at nursery.
- B. Plants shall be subjected to inspection and approval upon delivery for conformity to specified requirements as to quality, size and variety. Such approval shall not impair the right of inspection and rejection during the progress of the work.
- C. Plants shall be accompanied by Certificate of Inspection in accordance with M.13.07-8 Certificates of Inspections as specified in CTDOT Form 817.

2.04 FERTILIZER, SOIL AND PLANT CONDITIONERS

- A. Fertilizer shall be commercial mixed free flowing granules or pelleted fertilizer, 10-10-10 (N-P₂O₅-K₂O). Fertilizer shall be delivered to the site in original unopened containers each showing the manufacturer's guaranteed analysis conforming to applicable state fertilizer laws. Store fertilizer in weatherproof place and in such a manner that it will be kept dry and its effectiveness will not be impaired.
- B. Compost: Shall conform to M.13.06-Compost as specified in CTDOT Form 817.
- C. Peat: Shall conform to M.13.07-13 as specified in CTDOT Form 817.
- D. Weed Retardant: Shall be Preen by Lebanon or equal, delivered in manufacturer's containers and used according to manufacturer's instructions.
- E. Anti-desiccant: Shall be an emulsion which provides a protective film over plant surfaces to help retain moisture, but permeable enough to permit transpiration. Anti-desiccant shall be delivered in the manufacturer's containers and shall be

THE METROPOLITAN DISTRICT

mixed with water in proportions recommended by manufacturer, conforming to M.13.07.14-(g) as specified in CTDOT Form 817.

- F. Bone Meal: Shall be commercial raw bone meal, finely ground, having a minimum analysis of 4 percent nitrogen and 20 percent phosphoric acid.
- G. Mulches: Bark mulch shall be shredded Pine Bark Mulch consisting of pine bark strips no longer than 2-in in any dimension, free of wood chips, stones or other undesirable matter with a pH range between 4 and 5. Washed gravel shall be off-white river washed gravel, clean, granular material graded from $\frac{3}{4}$ -in to 1-1/2-in in size. Washed gravel shall be obtained from natural deposits and unprocessed except for removal of unacceptable sizes and materials. Washed gravel shall not contain vegetation, roots or other organic matter and shall be washed prior to placing. Deliver to the site a sample which conforms to the above requirements. After examination and approval by the Engineer, all materials incorporated into the work shall match the approved samples.
- H. Water used in this work shall be furnished by the Contractor and shall be suitable for irrigation and free from ingredients harmful to plant life. Hose and other watering equipment required for the work shall be furnished by the Contractor. See Section 01060 Regulatory Requirements for procedures and charges if using water obtained from Owner's facilities.

2.05 ACCESSORY MATERIALS

- A. Stakes: Shall be used for supporting all trees and shall be of sound wood, uniform in size, reasonably free of knots and capable of standing in the ground at least 2 years. Stakes shall be treated with a non-toxic preservative stain with a rich dark brown color. A sample shall be provided for approval by the Engineer. Stakes shall be 2 by 4 and not less than 8-ft in length.
- B. Hose: To encase wires, shall be two-ply fiber-bearing black rubber garden hose conforming to M.13.07.14-(c) as specified in CTDOT Form 817, and a minimum of 8-in in length.
- C. Wire: For tree staking, shall conform to M.13.07.14-(d) as specified in CTDOT Form 817.

PART 3 - EXECUTION

3.01 DIGGING, HANDLING AND PROTECTION OF PLANTS

- A. Methods shall conform to the requirements of 9.49.03 as specified in CTDOT Form 817.
- B. At the nursery, plants shall be dug with firm natural balls of earth, of sufficient diameter and depth to include most of the fibrous roots and conforming to the

THE METROPOLITAN DISTRICT

standards of AAN. No plants will be accepted with plastic burlap or if the ball is cracked or broken.

- C. Roots or balls of plants shall be adequately protected at all times from sun and from drying winds.
- D. No plant shall be bound with wire or rope at any time so as to damage the bark or break branches.
- E. Protect plants in accordance with 9.49.03-2 Protection as specified in CTDOT Form 817.

3.02 PLANTING SEASON

- A. Planting shall conform to the requirements of 9.49.03-1 Planting Season as specified in CTDOT Form 817.

3.03 PLANTING OPERATIONS

- A. Planting: Shall be done by experienced workmen familiar with planting procedures under the supervision of a qualified foreman.
- B. Layout of plant materials shall conform to the requirements of 9.49.03-3 Layout with the following additions:
 - 1. Plant material locations and bed outlines will be staked on the project site by the Contractor for review and approval by the Engineer, before any plant pits or beds are excavated.
- C. Excavation for planting beds and tree pits shall conform to the requirements of 9.49.03-4 Excavation as specified in CTDOT Form 817.
- D. Tree pits shall conform to the requirements of 9.49.03-5 Pits as specified in CTDOT Form 817 with the following additions:
 - 1. Where possible, the depth of all pits shall be to undisturbed soil. If backfill is required under the rootball, set plants at such a level that after settlement they bear the same relation to the surrounding ground as they bore from the ground from which they were dug.
- E. Shrub Beds: Shall be tilled to 18-in below top of loam.

3.04 OBSTRUCTIONS BELOW GROUND

- A. In the event that underground boulders, underground construction work, or obstructions are encountered in any pit excavation work under this Contract,

THE METROPOLITAN DISTRICT

alternate locations may be selected by the Engineer at no additional cost to the Owner.

3.05 PREPARATION OF BACKFILL

A. Preparation of backfill shall conform to requirements of 9.49.03-7 of CTDOT Form 817 with the following additions:

1. Plant backfill mixture: Loam for backfilling all tree pits shall have 3 lbs of fertilizer and 1 lb of bone meal per tree and 1 lb of fertilizer and 1/2 lb of bone meal per shrub, incorporated with peat moss at a ratio of 2 parts loam to 1 part peat moss.

3.06 SETTING PLANTS

A. Plants shall be set in center of pits plumb and straight conform to requirements of 9.49.03-8 of CTDOT Form 817 with the following additions:

1. When balled and burlapped plants are set, loam shall be compacted around bases of balls to fill all voids. All burlap, ropes or wires shall be removed from the top 2/3 of the balls. Plastic burlap shall be completely removed.
2. Loam shall be backfilled in layers of not more than 9-in and each layer watered sufficiently to settle before the next layer is put in place.
3. Spray all plants with anti-desiccant, including trunk, branches, foliage and buds. Follow manufacturer's instructions and recommendations for application of anti-desiccant.
4. Relocated plants shall be removed and relocated according to AAN standards and guaranteed for 1 year after installation.

3.07 GUYING AND STAKING

A. Guy and stake trees in conformance with the requirements of 9.49.03-11 as specified in CTDOT Form 817 with the following additions:

1. Trees shall be inspected for injury to trunks, evidence of insect infestation and improper pruning before guying and staking.
2. All shade trees, flowering trees and evergreen trees 5 to 6-ft in height and larger shall be staked in accordance with the tree staking detail.

THE METROPOLITAN DISTRICT

3.08 PRUNING AND MULCHING

- A. Each plant shall be pruned to conform with the requirements of 9.49.03-13 as specified in CTDOT Form 817 with the following additions:
 - 1. Preserve the natural character of the plant and as directed.
 - 2. Pruning shall be done with clean, sharp tools.
 - 3. Do not use tree wound paint for pruning cuts.
- B. Immediately after planting, pruning, and anti-desiccant spraying operations are completed, all tree pits and shrub beds shall be covered with a 4-in layer of the specified mulch in conformance with the requirements of 9.49.03-15 as specified in CTDOT Form 817 with the following additions:
 - 1. Shrub and ground cover beds shall be treated with weed retardant in accordance with manufacturer's instructions prior to covering with mulch.
 - 2. Washed gravel shall be placed to a 6-in depth in all areas as shown on the Contract Drawings. Prior to placement of gravel the areas shall be treated with a weed retardant in accordance with manufacturer's instructions.

3.09 WATERING

- A. Plantings must be flooded with water twice within the first 24 hours of the time of planting and not less than twice per week from April 1 to October 1, until provisional acceptance.
- B. Application of suitable water for planting and maintenance will be the responsibility of the Contractor. The Contractor shall furnish his/her own hose and hose connections or other watering equipment.

3.10 MAINTENANCE

- A. Maintenance shall begin immediately after each plant is installed in conformance with the requirements of 9.49.03-17 as specified in CTDOT Form 817 with the following additions:
 - 1. Plants shall be mulched, sprayed, fertilized, and otherwise maintained and protected until provisional acceptance.
 - 2. Settled plants shall be reset to proper grade and position, planting saucer restored and dead material removed. Guys shall be tightened and repaired.
 - 3. Defective work shall be corrected as soon as possible after it becomes apparent and as weather and season permit.

THE METROPOLITAN DISTRICT

4. Upon completion of planting and prior to provisional acceptance, remove from the site excess soil and debris and repair all damage resulting from planting operations.

3.11 INSPECTION AND PROVISIONAL ACCEPTANCE

- A. The Engineer will inspect all work for provisional acceptance, at the end of the establishment period in conformance with the requirements of 9.49.03-17 as specified in CTDOT Form 817 with the following additions:
 1. Contractor shall submit a written request for provisional acceptance, to be received at least 10 days before the anticipated date of inspection.
 2. Furnish full and complete written instructions for maintenance of the planting to the Owner at the time of provisional acceptance.
 3. After all necessary corrective work has been completed and maintenance instructions have been received by the Owner, the Engineer will certify in writing the provisional acceptance of the planting.

3.12 GUARANTEE PERIOD AND REPLACEMENTS

- A. All plants, including relocated material shall be guaranteed for not less than one full year from the time of provisional acceptance.
- B. At the end of this period, any plant that is missing, dead, not true to name or size as specified, or not in satisfactory growth, as determined by the Engineer, shall be replaced. In case of any question regarding the condition and satisfactory establishment of a rejected plant, the Engineer's decision is final. Furnish a guarantee for all replacement plants for at least one full growing season.
- C. All replacements shall be plants of the same kind and size as specified. They shall be furnished and planted as specified herein. The cost of replacement shall be borne by the Contractor except where it can be definitely shown that loss resulted from vandalism.

3.13 FINAL INSPECTION AND FINAL ACCEPTANCE

- A. At the end of the guarantee period, inspection will be made by the Engineer upon written request submitted by the Contractor at least 10 days before the anticipated date.
- B. After all necessary corrective work has been completed, the Engineer will certify in writing the final acceptance of the planting.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02905

UNPAVED SURFACE RESTORATION AND RESET MISCELLANEOUS ITEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing, planting, installing and restoring all surfaces, including shrubs, trees, bushes, grasses, sod, milestones, signs, mailboxes, unpaved cross walks and driveways, walls, fences, guide rails and similar structures that are in any way disturbed by the work under the Contract. All items shall be restored to a condition equal to or better than existed prior to beginning the work. The Work includes, all as shown, specified or directed, transporting materials, clearing, disposing of unused excavated materials, removing and disposing of all excavated sod, grass, shrubs, trees, etc., furnishing and planting trees, shrubs, grass, sod, etc., topsoil, gravel, mulch, fertilizer, watering, cleanup, etc., replacing signs, mailboxes, fences and similar structures and all incidental work, except as otherwise provided for.
- B. The restoration of lawn areas and the planting of trees and shrubs shall be done by an experienced landscape contractor, whose work history for the last 5 years consists primarily of landscaping work and who has sufficient experience, satisfactory to the Engineer, in performing landscape restoration of this scope. Contractor shall provide the name of the landscaper prior to performing the actual restoration work along with a list of his references.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 01725, Preservation and Restoration of Project Features
- C. Section 02200, Earthwork
- D. Section 02900, Landscaping
- E. Section 02930, Loaming, Seeding and Sodding

1.03 SUBMITTALS

- A. Contractor shall provide the following:
 - 1. Name and address of Contractor's Landscape Subcontractor.

THE METROPOLITAN DISTRICT

2. Name and address of Contractor's supplier for topsoil, seed and nursery stock.
3. Grass seed mixture showing proportions of the different grass species by weight and their percent purity and germination in accordance with the testing provisions of the Association of Official Seed Analysts.

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. Article M.13, CTDOT Form 817 – Roadside Development

PART 2 - PRODUCT

2.01 MATERIALS

All unpaved surface restoration materials shall conform to the latest edition of Section M.13, CTDOT Form 817 and the following additional requirements:

- A. All unpaved surface restoration material shall be equal to or better than the materials removed.
- B. All miscellaneous items, including but not limited to, milestones, signs, mailboxes, walls, fences, guide rails, etc., to be replaced shall be equal to or better than the items replaced. (Refer to Subsection 3.07)
- C. The seed shall be delivered to the project accompanied by a properly executed affidavit for each type and shipment of seed. The affidavit shall be of the form shown in Section M.13 CTDOT Form 817, or latest revision, with the phrase "Connecticut Department of Transportation Project number(s)" replaced by "The Metropolitan District Contract Number" and shall be on the Official Stationery of the Supplier. For additional requirements refer to Section 02930.

PART 3 - EXECUTION

3.01 GENERAL

- A. Where the Contractor's activities disturb, damage or kill lawn areas, plantings, gardens or trees, or where the Contractor's activities disturb or damage milestones, signs, mailboxes, unpaved cross walks and driveways, walls, fences, guide rails and similar structures the Contractor's Landscaper shall fully restore or replace the disturbed, damaged or dead item to the satisfaction of the Engineer and affected homeowner. The landscaper shall perform all the work required to restore or replace each item affected in accordance with this Section and related Sections

THE METROPOLITAN DISTRICT

including but not limited to Section 02900, Landscaping and Section 02930, Loaming, Seeding and Sodding.

3.02 TOPSOIL

- A. Where trenches are excavated through cultivated or grassed lands, ornamental plantings, etc., the turf and topsoil shall be removed and saved separately, and shall be replaced to its former position and depth. If the topsoil is lost, mixed with other materials or for other reasons should this material be insufficient to make replacements of topsoil to the former depths, similar soil shall be furnished to provide a fill at the top of the trench not inferior to the soil there prior to the excavation. However, in no case shall the thickness of the topsoil be less than six (6) inches.

3.03 SEEDING, SODDING

- A. Refer to Section 02930.

3.04 TREES, SHRUBS, BUSHES, ETC

- A. Certain trees, bushes, shrubs, etc., if so noted on the Contract Drawings shall be satisfactorily replaced (with the carefully removed and preserved existing stock or with new stock) and maintained for the duration of the Contract.
- B. All trees, bushes or shrubs which are not to be removed shall be preserved and protected. Should any trees, bushes or shrubs, which are to be preserved and protected, become damaged by the conduct of the work, they shall be replaced at no additional cost to the Owner. The cost of clearing trees, bushes and shrubs and all special work or protection relative to trees, bushes and shrubs will be considered as having been included in the price bid per linear foot of pipe line, and/or other appropriate bid items in this Proposal.
- C. Brush, small branches, slash, large trunks, stumps and all other surplus material and debris shall be removed from the site of the work, at no additional cost to the Owner.

3.05 GRAVEL DRIVEWAY

- A. All gravel removed from driveways shall be replaced to the same grade and depth as the original. The gravel fill shall be of the same gradation as the original gravel removed. The Engineer shall inspect and give final approval of the gravel prior to placement. (Refer to Section 02510)

THE METROPOLITAN DISTRICT

3.06 WATERING AND FERTILIZER

- A. Appropriate watering and fertilizer shall be provided for planted grass, sod, trees, shrubs, bushes, etc., until the materials have become rooted to sustain normal growth. Watering, fertilizing and maintenance for all new or replaced vegetation will be the sole responsibility of the Contractor. See Section 01060 Regulatory Requirements for procedures and charges if using water obtained from Owner's facilities.

3.07 MISCELLANEOUS ITEMS

- A. All miscellaneous items (milestones, signs, mailboxes, bollards, walls, fences, guiderails and similar structures) encountered during the work shall be carefully protected for resetting during surface restoration. Any item damaged shall be replaced at no additional cost to the Owner. Each item shall be reset as close to its original location as practicable. All work shall be as approved by the Engineer. All milestones, iron pins or other property markers disturbed will be reset by a licensed State of Connecticut Land Surveyor, at no additional expense to the Owner.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02930

LOAMING, SEEDING AND SODDING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment, and incidentals required to place loam, including rough and fine grading, compaction, application and incorporation of soil amendments, application of seed or sod, and water and maintain seeded or sodded areas as shown on the Contract Drawings and as specified herein, including areas disturbed by Contractor's activities.

1.02 RELATED SECTIONS

- A. Section 02900, Landscaping
- B. Section 02905, Unpaved Surface Restoration and Reset Miscellaneous Items

1.03 SUBMITTALS

- A. In accordance with Section 01300, submit complete shop drawings, materials and equipment furnished under this Section including soil test results and recommendations, copies of seed tag and sod tag showing mixtures, soil amendments, product label information, equipment for seed and sod establishment. Include source names and contact information for seed and sod.
- B. Submit completed Affidavit of Fertilizer Form as specified in M.13.03 as specified in CTDOT Form 817.
- C. Submit completed Affidavit of Seed Form as specified in M.13.04 as specified in CTDOT Form 817.
- D. Samples of all materials shall be submitted for inspection and acceptance upon request.
- E. Submit schedule for application of loam, soil amendments, seed and/or sod materials, including maintenance periods.
- F. Submit full and complete written instructions for maintenance of seeded and/or sodded areas at the time of provisional acceptance.

THE METROPOLITAN DISTRICT

1.04 REFERENCES

The following standards based on the latest edition form a part of this Specification as referenced:

- A. State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction (CTDOT Form 817).
- B. Guideline Specifications to Turfgrass Sodding by Turfgrass Producers International 2 East Main Street East Dundee, IL 60118 (TPI).

PART 2 - PRODUCTS

2.01 LOAM

- A. Loam shall conform to the requirements of M.13.01 as specified in CTDOT Form 817 for Topsoil with the following additions:
 - 1. Organic matter shall not measure less than 2 nor more than 8 percent matter as determined by loss on ignition of oven dried samples at 105 degrees centigrade.
 - 2. Loam pH shall be between 5.5 and 6.5.
 - 3. Rocks and stones shall be less than 1-in in any dimension.
 - 4. Silt Loam is not acceptable.
- B. Loam shall be fertile, natural soil, typical of the locality, free from large stones, roots, sticks, clay, peat, weeds and sod and obtained from naturally well drained areas. It shall not be excessively acid or alkaline nor contain toxic material harmful to plant growth.
- C. Topsoil stockpiled and screened under other Sections may be used as loam, but the Contractor shall furnish additional loam at his/her own expense if required.
- D. Loam Testing Program
 - 1. Provide samples of loam to ensure loam fulfills specified requirements regarding textural analysis, organic matter content, pH and fertility as follows:
 - a. Provide one 20 lb sample of loam from each site that will be used as a loam borrow area in accordance with the provisions of other Sections herein. Submit samples at least 15 days prior to beginning stripping

THE METROPOLITAN DISTRICT

operations or 3 weeks prior to commencing loaming operations on the site; whichever is greater.

- b. At least 3 weeks prior to anticipated start of loaming operations, a one pint sample of loam material for each site from which loam is to be stripped shall be delivered to a certified soils testing laboratory for analysis and recommendations such as University of Connecticut Cooperative Extension telephone 860-486-4274, or A&L Eastern Agricultural Laboratories, 7621 Whitepine Road, Richmond, VA, 23237 telephone (804) 743-9401.
- c. Loam samples shall be submitted to the approved laboratory for analysis by test methods to include: Particle-sized Analysis (texture) by hydrometer (% sand, % silt, % clay), Basic Soil Test Package S1M (for organic matter, estimated nitrogen release, available phosphorus, exchangeable potassium, magnesium, calcium and hydrogen, soil pH, buffer index, cation exchange, capacity and percent base saturation of cation elements), Soluble Salts, and Lead Content. Copies of test results, complete with laboratory recommendations to bring non-conforming aspects to Specifications, and with laboratory recommendations for amendments and procedures to promote healthy vegetative growth, shall be provided to the Engineer. All costs shall be the responsibility of the Contractor.
- d. Based on test results, the loam shall be identified as "Acceptable", "Acceptable with certain fertilizer and limestone applications" or "Unacceptable". If the loam is found acceptable, the fertilizer and limestone requirements will be as specified or as recommended. If the loam is found unacceptable, identify another source of loam and incur all expenses associated with testing additional samples. All loam incorporated into the site shall match the samples provided for testing.

2.02 SOIL AMENDMENTS

- A. Lime shall conform to the requirements of M.13.02 as specified in CTDOT Form 817 for Agricultural Ground Dolomitic Limestone.
- B. Fertilizer shall conform to the requirements of M.13.03 as specified in CTDOT Form 817 for fertilizer.
- C. Water shall be potable. Refer to Section 01060 Regulatory Requirements for procedures and charges if using water obtained from Owner's facilities.
- D. Where seed is applied hydraulically, a protective mulch layer shall be provided. Mulch shall be a specially processed wood cellulose fiber containing no growth or germination-inhibiting factors. It shall be manufactured in such a manner that

THE METROPOLITAN DISTRICT

after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous slurry. When sprayed on the ground, the material shall allow absorption and percolation of moisture. Each package of the wood cellulose fiber shall be marked by the manufacturer to show the air dry weight content and shall conform to M.13.05-3 as specified in CTDOT Form 817 for wood fiber mulch. Paper fiber is not acceptable. Straw mulch is also acceptable to protect newly seeded areas and promote germination. Straw mulch shall be made of threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold, or other objectionable material. The straw mulch shall contain at least 50% by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment. Salt hay is not acceptable. With straw mulch, use a latex acrylic copolymer as a straw mulch tacking agent.

2.03 SEED

- A. Seed shall be labeled in accordance with USDA Rules and Regulations under the Federal Seed Act and applicable State seed laws. Seed shall be furnished in sealed bags or containers bearing the date of the last germination, which date shall be within a period of 6 months prior to commencement of planting operations. Seed shall be from same or previous year's crop; each variety of seed shall have a purity of not less than 85 percent, a percentage of germination not less than 90 percent, shall have a weed content of not more than 1 percent and contain no noxious weeds. The seed mixtures shall consist of seed proportioned by weight as follows:

1. Naturalized Area Seed Mix (NASM)

- a. Shall conform to M.13.04 (a) as specified in CTDOT Form 817 for seed mixtures.

2. Lawn Area Seed Mix (LASM)

a. Species	% by Wt.
Kentucky Bluegrass	35
Creeping Red Fescue	35
Fiesta 4 Perennial Ryegrass	20
Express II Perennial Ryegrass	10

3. Temporary Grass Seed (TGS)

- a. Shall conform to M.13.04 (b) as specified in CTDOT Form 817 for temporary grass seed.

- B. Seed mixture materials shall conform to remaining portions of M.13.04 as specified in CTDOT Form 817.

THE METROPOLITAN DISTRICT

- C. Seed shall be furnished and delivered premixed in the proportions specified above. A manufacturer's certificate of compliance to the specified mixes shall be submitted by the manufacturer for each seed type. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed and also the net weight and date of shipment. No seed may be sown until the certificates have been submitted.
- D. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.
- E. Mulch shall be a specially processed cellulose wood fiber containing no growth or germination-inhibiting factors. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous slurry. When sprayed on the ground, the material shall allow absorption and percolation of moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content.

2.04 SOD

- A. Sod shall conform to TPI Specifications and shall conform to Number 1 Quality/Premium standards as follows:
 - 1. The standard of sod quality shall conform to Premium Grade turfgrass sod and shall contain only the species and variety of turfgrass shown on the invoice/sales slip, and contain no weeds or foreign grasses (i.e. no other varieties or species). It shall have no visible signs of disease or insect stress. The turfgrass sod shall be neatly mowed and be mature enough that when grasped at one end, it can be picked-up and handled without damage.
 - 2. The turf shall be of sufficient density so that no surface soil is visible when mowed to a height of 1.5-in. Maximum mowing height shall be 2.5-in. At the time of sale, the turf shall contain no more than one percent undesirable grasses or clover and not more than two weeds per 50 sq. yards. The thickness of the cut shall be machine cut at a uniform soil thickness of 0.60-in, plus or minus 0.25-in, at the time of cutting.
 - 3. Measurement for thickness shall not include top growth and thatch.
 - 4. Individual pieces of sod shall be cut to the supplier's standard width and length. Maximum allowable deviation from standard lengths and widths shall be plus or minus 5% on length, and plus or minus ½-in on width. Broken pads and torn or uneven ends will not be acceptable.

THE METROPOLITAN DISTRICT

- B. Sod shall be grown by an established commercial sod grower, as approved, and shall consist of a minimum of 2 varieties of Kentucky bluegrass, and a minimum of 3 varieties of Fescue in the following range of blends:

<u>Botanical Name</u>	<u>Common Name</u>	<u>Percent by Wt.</u>
Poa pratensis	Kentucky Bluegrass	80-90
Festuca rubra/longifolia	Red/Hard Fescue	20-10

- C. A sample of the sod will be required to match the existing sod.

PART 3 - EXECUTION

3.01 LOAM

- A. Do not destroy loam through excessive or unnecessary handling and compaction. Inappropriate handling leading to the compaction or deterioration of soil structure will result in the rejection of loam for use.
- B. Loam shall be placed in accordance with 9.44.03 of CTDOT Form 817 for Construction Methods of Topsoil with the following additions:
1. Unless otherwise shown on the Contract Drawings, loam shall be placed to a minimum compacted depth of 6-in. on all lawn areas and 6-in. in areas indicated to be naturalized.
 2. The subgrade of all areas to be loamed and seeded shall be raked and all rubbish, sticks, roots, and stones greater than 2-in. shall be removed. Subgrade surfaces shall be raked or otherwise loosened immediately prior to being covered with loam. Subgrade shall be inspected and approved by the Engineer before loam is placed.
 3. Loam shall be placed over approved areas to a depth sufficiently greater than required so that after natural settlement and light rolling with a hand roller weighing not more than 100 lbs/ft or width, the complete work will conform to the lines, grades and elevations indicated. During rolling, depressions caused by settlement of rolling shall be filled with additional loam and the surface shall be regraded and rolled until a smooth and even grade is created.
 4. No loam shall be spread in water or while frozen or muddy.

3.02 SOIL AMENDMENTS

- A. Lime shall be applied in accordance with soil test recommendations. For purposes of bidding, lime shall be applied in accordance with 9.46.03 of CTDOT

THE METROPOLITAN DISTRICT

Form 817 for Construction Methods of Liming (Seeding Methods) and 9.53.03 3 of CTDOT Form 817 for Construction Methods of Sodding (Sodding Methods) with the following additions:

1. Apply lime at a rate of 25 lbs/ per 1,000 sq ft, or in accordance with recommendation results from Loam Testing Program above.
- B. Fertilizer shall be applied in accordance with soil test recommendations. For purposes of bidding, fertilizer shall be applied in accordance with 9.50.03-3 of CTDOT Form 817 for Construction Methods of Turf Establishment (Seeding Methods) and 9.53.03 3 of CTDOT Form 817 for Construction Methods of Sodding (Sodding Methods) with the following additions:
1. Apply fertilizer at the rate of 30 lbs/1,000 sq ft, or in accordance with recommendation results from Loam Testing Program above.
- C. The application of fertilizer and lime may be performed hydraulically in one operation with hydroseeding and mulching. If lime is applied in this manner, clean all structures and paved areas of unwanted deposits.
- D. Water for seeded areas shall be applied at a minimum rate of 1-in per week after application of seed, during, and after a 6 week germination period for the seed. Throughout this period, ensure the seed bed is maintained in a continuous moist condition, satisfactory for good germination and growth of grass. Water in areas to be sodded shall be applied 12-24 hours prior to laying sod, and immediately during and after laying of sod to a depth sufficient that the underside of the new sod pad, and soil immediately below the pad are thoroughly wet. Keep seeded and/or sodded areas in a moist condition until provisional acceptance.
- E. Wood fiber mulch shall be hydraulically applied at the rate of 20 lbs/1,000 sq ft. Straw mulch shall be applied at a rate of 100 lbs/1,000 sq ft and tackfied with latex acrylic copolymer at a rate and diluted in a ratio per manufacturer's instructions.

3.03 SEEDING

- A. Seeding shall be performed in accordance with 9.50.03-1 through 7 of CTDOT Form 817 for Construction Methods of turf establishment (Seeding Methods) with the following additions:
1. Naturalized Area Seed Mix (NASM) shall be applied at a minimum rate of 6 lbs per 1000-sf.
 2. Lawn Area Seed Mix (LASM) shall be applied at a minimum rate of 8 lbs per 1000-sf

THE METROPOLITAN DISTRICT

3. Temporary Grass Seed (TGS) shall be applied at a minimum rate of 4 lbs per 1000-sf.
4. The subgrade of all areas to be loamed and seeded shall be raked and all rubbish, sticks, roots and stones larger than 2-in shall be removed. Subgrade surfaces shall be raked or otherwise loosened immediately prior to being covered with loam. Subgrade shall be inspected and approved by the Engineer before loam is placed.
5. Loam shall be placed over approved areas to a depth sufficiently greater than required so that after natural settlement and light rolling, the complete work will conform to the lines, grades and elevations indicated. No loam shall be spread in water or while frozen or muddy.
6. After loam has been spread, it shall be carefully prepared by scarifying or harrowing and hand raking. All large stiff clods, lumps, brush, roots, stumps, litter and other foreign material shall be removed from the loamed area and disposed of. The areas shall also be free of smaller stones. The whole surface shall then be rolled with a hand roller weighing not more than 100 lbs/ft of width. During the rolling, all depressions caused by settlement of rolling shall be filled with additional loam and the surface shall be regraded and rolled until a smooth and even finished grade is created.
7. Hydroseed only on a calm day.
8. If lime and fertilizer are to be spread mechanically rather than in one operation with the hydroseeding, then:
 - a. After the loam is placed and before it is raked to true lines and rolled, limestone shall be spread evenly over loam surface and thoroughly incorporated with loam by heavy raking to at least 1/2 the depth of loam.
 - b. Fertilizer shall be uniformly spread and immediately mixed with the upper 2-in of topsoil.
9. Seeding, mulching and conditioning shall only be performed during those periods within the seasons which are normal for such work as determined by the weather and locally accepted practice, as approved by the Engineer.
10. Schedules for seeding and fertilizing must be submitted to the Engineer for approval prior to the work. Seeding as specified herein shall be accomplished between the period of April 1 to June 1 or August 15 to October 1. Seeding during the period from October 2 to March 31 shall only be undertaken upon approval of the Engineer. Seeding during the period from June 1 to August 14 shall only be performed if irrigation is provided.

THE METROPOLITAN DISTRICT

11. Seeding shall be done within 10 days following soil preparation. Seed shall be applied hydraulically at the rates and percentages indicated. The spraying equipment and mixture shall be so designed that when the mixture is sprayed over an area, the grass seed and mulch shall be equal in quantity to the specified rates. Prior to the start of work, furnish a certified statement for approval as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of seeding that can be covered with the quantity of solution in the Hydroseeder.
12. In order to prevent unnecessary erosion of newly graded slopes and unnecessary siltation of drainage ways, carry out seeding and mulching as soon as satisfactory completion of a unit or portion of the project. A unit of the work will be defined as not more than 20,000 sq ft.
13. When protection of newly graded areas is necessary at a time that is outside of the normal seeding season, protect those areas by whatever means necessary (such as straw applied with a tar tack).
14. On slopes in addition to straw mulch and tackifier, provide against washouts by an approved method. Any washout which occurs shall be regarded and reseeded at the Contractor's expense until a good turf is established.

3.04 SEEDING IN WOODED AND UNGRADED AREAS

- A. For preparation and seeding in wooded areas under this Contract and where no grading is required, all of the specified materials and procedures shall be utilized except that no disking shall be performed within the drip line of trees to be preserved. The seed bed shall be prepared by the addition of a thin layer of top soil roughly 1-in deep.

3.05 SODDING

- A. Sodding shall be performed in accordance with 9.53.03 of CTDOT Form 817 for Construction Methods of Sodding with the following additions:
 1. Perform sodding within 10 days following soil preparation.

3.06 MAINTENANCE AND PROVISIONAL ACCEPTANCE

- A. Keep all seeded and/or sodded areas watered and in good condition, reseeding or resodding if and when necessary until a good, healthy, uniform growth is established over the entire area. Maintain these areas in an approved condition including a minimum of four mowing's of the lawn areas until provisional acceptance.

THE METROPOLITAN DISTRICT

- B. The 12 week maintenance period shall occur during the growing season April 15 to October 15. Maintenance occurring October 16 through April 14 shall only be performed upon written approval by the Engineer.
- C. On slopes, provide against washouts by an approved method. Any washout that occurs shall be regraded and reseeded or resodded at the Contractor's expense until a satisfactory stand of grass is established.
- D. All work will be inspected for provisional acceptance at the end of the 12 week grass maintenance period, upon the written request, received at least 10 days before the anticipated date of inspection.
- E. A satisfactory stand will be defined as a section of grass of 10,000 sq ft or larger that has:
 - 1. No bare spots larger than 3 sq ft.
 - 2. No more than 10 percent of total area with bare spots larger than 1 sq ft.
 - 3. Not more than 15 percent of total area with bare spots larger than 6-in square.
- F. Furnish full and complete written instructions for maintenance of the lawns at the time of provisional acceptance.
- G. The inspection will determine whether maintenance shall continue in any area of manner.
- H. After all necessary corrective work and clean-up has been completed and maintenance instructions have been received by the Owner, the Engineer will certify in writing the provisional acceptance of the seeded and/or sodded areas. Maintenance of grassed areas or parts of grassed areas shall cease on receipt of provisional acceptance.

3.07 GUARANTEE PERIOD AND FINAL ACCEPTANCE

- A. All seeded and/or sodded areas shall be guaranteed for not less than 1 full year from the time of provisional acceptance.
- B. At the end of the guarantee period, inspection will be made by the Engineer upon written request submitted at least 10 days before the anticipated date. Grass areas not demonstrating satisfactory stands as outlined above, as determined by the Engineer, shall be renovated, reseeded or resodded and maintained meeting all requirements as specified herein and the 1 year warranty period will restart.

THE METROPOLITAN DISTRICT

- C. After all necessary corrective work has been completed, the Engineer shall certify in writing the final acceptance of the grassed areas.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 02971

CLEANUP

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes the contract area to be cleaned of all rubbish and surplus materials, and promptly put into good order comparable to conditions prior to the start of the Contract as the work progresses.
- B. If the Contractor shall fail to clean up the site promptly, the Engineer, after giving notice to the Contractor to do so and affording him reasonable time, may employ others to cleanup the site where conditions warrant such action, and may deduct the cost of such work from any sum or sums due or to become due to the Contractor.
- C. Cleanup and general housekeeping will be required daily.
- D. Additional cleanup requested by the Engineer due to unsatisfactory conditions shall be completed by Contractor at no expense to the Owner.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

Division 3 – Concrete

THE METROPOLITAN DISTRICT

SECTION 03100

CONCRETE FORM WORK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Forms shall be used for all concrete masonry including footings, except as otherwise permitted. Forms shall be so constructed and placed that the resulting concrete will be of the shape, lines, dimensions, and to the elevations indicated on the Contract Documents, and exposed concrete will be substantially free from board or grain marks, poorly matched joints, and other irregularities or defects.

1.02 RELATED SECTIONS

- A. Section 03302, Miscellaneous Concrete

PART 2 - PRODUCTS

2.01 FORM MATERIALS

- A. For surfaces to be given burlap-rubbed finish, the form surface in contact with the concrete shall be made of heavy gage steel, new plywood (used plywood which, in the opinion of the Engineer, is substantially equal to new plywood may be used), tempered wood fiber boards with smooth surface, or similar materials. Steel forms or form linings shall have square edges so that the concrete will not have fins or fluting. Joints between form panels shall be well fitted so as to be tight and result in substantially flush concrete surfaces on opposite sides of the joints. Forms shall not be pieced out by use of materials different from those in the adjacent form in such manner as will detract from the uniformity to the finished surface.
- B. For surfaces other than those to be given burlap-rubbed finish, forms shall be made of wood, steel, or other acceptable material. Wooden forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots. Plywood shall be reasonable good, as accepted. Steel forms shall be of an acceptable type for the work involved. Edges of forms in contact with concrete shall be flush within 1/16 in.
- C. All forms shall be of suitable material, design, and construction as to be rigid, tight enough to prevent the passage of mortar, and plane surfaces shall be plane within 1/16 in. in 4 ft. Maximum deviation of the finished surface at any point shall not exceed 1/4-in from the intended surface indicated. Tape, gasket, plug, and/or caulk all joints and gaps in forms to provide watertight joints that will

THE METROPOLITAN DISTRICT

withstand placing pressures without exceeding specified deflection limits or creating surface patterns. Particular care shall be taken to ensure that forms are true to line where deviations in the concrete would be obvious or objectionable, as where building superstructures are to be built thereon, or where the tops of walls are exposed. All such deviations which may occur shall be corrected by, and at the expense of the Contractor, as directed, even to the extent of tearing down and rebuilding the concrete.

- D. Forms for walls, columns, or piers shall have removable panels at the bottom for cleaning, inspection, and scrubbing-in of bonding grout. Forms for thin sections (such as walls or columns) of considerable height shall be arranged with suitable openings so that the concrete can be placed in a manner that will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the fresh concrete, unless special spouts are used to place concrete, and so that construction joints can be properly keyed and treated.
- E. Forms shall be sufficiently rigid to prevent displacement or sagging between supports, and so constructed that the concrete will not be damaged by their removal or require grinding or repair after their removal. The Contractor shall be entirely responsible for their adequacy.

2.02 FORM TIES

- A. Form ties to be encased in concrete shall not be made of through-bolts or common wire, but shall be of a well-established type, so made and installed as to embody the following features:
 - 1. After removal of the protruding part of the tie, there shall be no metal nearer than 1½-in. to the face of the concrete.
 - 2. The part of the tie which is to be removed shall be at least ½-in. in diameter, or if smaller, it shall be provided with a wood or metal cone 1½-in. long placed against the inside of the forms. Cones shall be carefully removed from the concrete after the forms have been stripped.
 - 3. Ties which pass through walls subject to hydrostatic pressure shall be provided with acceptable water stops, such as washers, securely fastened to the ties.

2.03 FORM RELEASE AGENT

- A. Form release agent shall be an effective non-staining, non-residual, water based, bond-breaking form coating that will not impair the bond of paint, sealant, waterproofing, damproofing or other coatings.

THE METROPOLITAN DISTRICT

PART 3 - EXECUTION

3.01 GENERAL

- A. Design, construct, and surface forms in accordance with ACI 347 and meet the additional requirements specified herein.
- B. Coat all forms in contact with concrete using form release agent prior to form installation.
- C. During installation, the forms shall not be used as storage platforms nor as working platforms until the forms have permanently fastened in position.
- D. The surface of installed forms shall not be overloaded.
- E. Before form material is reused, all surfaces that are in contact with the concrete shall be thoroughly cleaned, all damaged pieces repaired, holes filled, protrusions smoothed, and all projecting nails withdrawn, to maintain a "like new" condition of the form that will produce surfaces equivalent in smoothness and appearance to those produced by new plywood panels.

3.02 REMOVAL OF FORMS

- A. Conform to the requirements of ACI 301, Section 2 and ACI 347, Chapter 3.7, Do not remove forms until site cured test cylinder develop 75% of 28-day strength.
 - 1. Removal of Forms and Supports: Continue curing in accordance with section 03300, Cast-In-Place-Concrete.
- B. Form facing materials shall remain in place a minimum of four days after concrete placement, unless otherwise approved by Engineer.
- C. Do not remove supporting forms or shoring until the members have acquired a minimum of 90 percent of the specified compressive strength. Results of suitable control tests of field-cured specimens may be used as evidence that the concrete has attained sufficient strength and that the supporting forms and shoring may be removed.
- D. The time for removal of all forms will be subject to Engineers approval.

3.03 INSPECTION

- A. Notify the Engineer when the forms are complete and ready for inspection, at least six working hours prior to the proposed concrete placement. The Engineer

THE METROPOLITAN DISTRICT

will inspect the forms to ensure overall conformance with the contract documents.

- B. Failure of the forms to comply with the requirements specified, or to produce concrete complying with requirements specified shall be grounds for rejection of that portion of the concrete work. Repair or replace rejected work as directed by the Engineer at no additional cost to the Owner. Such repair or replacement shall be subject to the requirements of these Specifications and approval of the Engineer.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 03200

CONCRETE REINFORCING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The work specified in this section includes furnishing and placing concrete reinforcing steel bars, welded wire fabric and accessories as shown on the Contract Drawings, complete as shown, specified and directed.

1.02 RELATED SECTIONS

- A. Section 03100, Concrete Framework
- B. Section 03300, Concrete

1.03 QUALITY ASSURANCE

- A. All materials shall be inspected and tested at the place of manufacture as required by the standard specifications to which the material is manufactured.
- B. All materials shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the place of manufacture by a representative of the District.
- C. In addition, the District reserves the right to have any or all materials inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the District's expense.

1.04 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. ANSI/ASTM A185 - Specification for Steel Welded Wire Fabric for Concrete Reinforcement.
- B. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- C. CRSI Manual of Standard Practice.
- D. ACI 315 – Details and Detailing of Concrete Reinforcement.

THE METROPOLITAN DISTRICT

- E. ACI 318 – Building Code Requirements for Structural Concrete.

1.05 SUBMITTALS

- A. In accord with Section 01300, six (6) copies of the shop drawings for the materials of this Section shall be submitted for approval.
- B. A certified statement that inspection and all of the specified tests have been made and met shall also be submitted.
- C. Drawings for fabrication, bending, and placement of concrete reinforcement shall conform to the recommendations of ACI 315 for placement drawings and as specified herein.
 - 1. Placement drawings. For walls, show elevations from the outside, looking towards the structure, at a minimum scale of 1/4-in to one foot. For slabs, show top and bottom reinforcement on separate plan views, as needed for clarity. For beams and columns, show schedules with sections and/or elevations and stirrup/tie spacing. Show additional reinforcement around openings, at corners and at other locations indicated, diagrams of bent bars, arrangements and assemblies, all as required for the fabrication and placement of concrete reinforcement. Reference bars to the same identification marks shown on the bar bending details. Identify bars to have special coatings and/or to be of special steel or special yield strength.
 - 2. Bar bending details. Reference bars to the same identification marks shown on the placement drawings. Identify bars to have special coatings and/or to be of special steel or special yield strength.

1.06 DELIVERY, HANDLING AND STORAGE

- A. Store reinforcement off the ground, protect from moisture and keep free from rust, mud, dirt, grease, oil, ice, or other injurious contaminants.

PART 2 - PRODUCT

2.01 REINFORCING STEEL BARS

- A. The reinforcement steel bars shall be newly rolled stock substantially free from mill scale, rust, dirt, grease, or other foreign matter. Bars shall be of carbon steel and, unless otherwise indicated, shall be Grade 60 bars.
- B. Carbon steel bars conform to ASTM A615.
- C. All bars shall be rolled by an acceptable mill. Certified copies of tests of the bars furnished shall be submitted. The tests shall be as specified in the appropriate

THE METROPOLITAN DISTRICT

ASTM Specification referred to above and shall be made by an acceptable laboratory.

- D. Reinforcing bars shall be accurately formed to the dimensions indicated on the Contract Drawings and in the MDC Standard Details Manual. Bend bars around a revolving collar having a diameter not less than that recommended by the CRSI or ACI 318. All bars shall be bent cold. Do not straighten or rebend bars during fabrication or erection.
- E. Bars shall be shipped to the work with bars of the same size and shape fastened in bundles with securely wired-on metal identification tags giving size and mark.
- F. Deformations on bars for concrete reinforcement shall conform to the requirements of the above-mentioned ASTM Specifications.

2.02 ACCESSORY MATERIALS

- A. Welded steel wire fabric shall conform to the ASTM A185. The gage and spacing of wires shall be as indicated on the Contract Drawings and in the MDC Standard Details Manual.
- B. Tie Wires for Reinforcement shall be 16-gauge or heavier black annealed wire.

PART 3 - EXECUTION

3.01 PLACING REINFORCING

- A. Before being placed in position, reinforcing bars shall be thoroughly cleaned of loose mill and rust scale, dirt, and other coatings, including ice, that tend to interfere with development of proper bond. Where there is delay in depositing concrete after reinforcing is in place, bars shall be reinspected and cleaned when necessary.
- B. Reinforcing shall be accurately positioned as indicated on the Contract Drawings and in the MDC Standard Details Manual, and secured against displacement by using annealed iron wire ties or suitable clips at intersections. Concrete blocks having a minimum bearing area of 2 inches by 2 inches and equal in quality to that specified for the slab shall be used for supporting reinforcing bars for slabs on grade. Where the underside of slabs will be exposed to view in the finished work, stainless-steel supports shall be used. For other concrete, metal supports, spacers, or hangers may be used. Wood blocks, stones, brick chips, etc., shall not be used to support reinforcement.
- C. Clear cover to reinforcing steel shall be in accordance with ACI 318 unless otherwise indicated on the Contract Drawings.

THE METROPOLITAN DISTRICT

- D. Lap splices for reinforcing steel shall be in accordance with ACI 318 unless otherwise indicated on the Contract Drawings. Tension lap splices shall be Class B tension lap splices.
- E. Reinforcing which is to be exposed for more than 60 days after having been placed shall be painted with heavy coat of cement grout, if required.
- F. All concrete reinforcing shall be placed as shown on the Contract Drawings, MDC Standard Details Manual and as herein specified. Concrete reinforcing in sizes No. 3 (3/8 in.) and larger shall be deformed steel bars of the shapes and sizes indicated on the Contract Drawings.
- G. Do not weld reinforcing steel bars during fabrication or erection unless indicated on the Drawings or as specified herein, or unless prior written approval has been obtained from the Engineer. Remove immediately all bars that have been welded, including tack welds, without such approval. Comply with AWS D1.4 when welding of reinforcement is shown on the Drawings, specified, or approved.
- H. The Contractor shall advise the Engineer of the Contractor's intentions to place concrete and shall allow the Engineer adequate time to inspect all reinforcing steel in place. Any repairs, correction, cleaning, removal of debris, etc. necessary shall be accomplished prior to concrete being placed in that area. Wall forms and any deep form work shall be inspected before closing the form, as well as immediately prior to placing concrete.
- I. The Engineer reserves the right to inspect the manufacturer's facilities while fabrication of reinforcing steel for this project is being performed.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 03302

MISCELLANEOUS CONCRETE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and placing concrete of 3,000 psi, 28-day strength not included under any other Sections for bulkheads, piers, pipe and duct and utility or structure supports, anchors, thrust blocks, etc. as shown on the Contract Drawings or directed by the Engineer. The Work includes excavation, form work, cleaning areas to receive concrete, furnishing and placing concrete and reinforcing steel as detailed on the Contract Drawings, disposing of unused excavated materials, support of excavation, dewatering, and all incidental work, except as otherwise herein provided for.

1.02 RELATED SECTIONS

- A. Section 01110, Environmental Protection Procedures
- B. Section 02140, Dewatering and Drainage
- C. Section 02160, Excavation Support Systems
- D. Section 02200, Earthwork

1.03 REFERENCES

The following standards based on the latest edition form a part of this specification as referenced:

- A. SECTION M.03, CTDOT FORM 817 - Portland Cement Concrete
- B. ARTICLE M.06.01, CTDOT FORM 817 - Reinforcing Steel
- C. ACI 305R – Hot Weather Concreting
- D. ACI 306R - Cold Weather Concreting

1.04 SUBMITTALS

- A. In accord with Section 01300 six (6) sets of the concrete mix design shall be submitted for approval.

THE METROPOLITAN DISTRICT

PART 2 - PRODUCT

2.01 CONCRETE

- A. Concrete shall conform to the requirements of Section M.03, CTDOT FORM 817. The concrete 28-day compressive strength shall be 3,000 pounds per square inch.

2.02 REINFORCING STEEL

- A. Reinforcing steel bars shall be new and conform to Article M.06.01, CTDOT FORM 817, Grade 60.

2.03 CONTROLLED LOW STRENGTH MATERIAL (CLSM)

- A. Controlled Low Strength Material (CLSM) used as backfill and fill shall be comprised of a mixture of Portland cement, coarse aggregate, fine aggregate and water. Materials, methods of preparation, and placement techniques shall comply with the requirements specified in Section 03301 as for concrete. Mix shall result in a flowable material with a 28-day compressive strength of approximately 60 psi. Recommended mix shall be as follows:

Portland Cement	40 lbs/cu yd
Coarse Aggregate	1700 lbs/cu yd
Fine Aggregate	1900 lbs/cu yd
Water	325 lbs/cu yd, or as needed

2.04 PUMPABLE CONTROLLED LOW STRENGTH MATERIAL (CLSM)

- A. Pumpable Controlled Low Strength Material (CLSM) used for pipe fill applications shall be a mixture of cement, pozzolan, fine aggregate, admixtures, and water, mixed in accordance with ASTM C94-Ready Mixed Concrete. Recommended mix design shall be as follows:

Total Cementitious 300 lbs. for pumpability
50 lbs. of Portland cement / 250 lbs. of fly ash
Approximately 2,200 lbs. of fine aggregate
42 gallons of water
Slump 7" +/- 2"

- B. Lightcrete Powder by Sika, Master Cell by Master Builders, Flow Air by Axim, DaraFill by W.R. Grace, or approved equal shall be added to the mixture to increase the air content in the 20% to 30% range. The increased air content will produce a fluid material with minimal shrinkage and reduce water bleed.
- C. In the event of market shortages additional Portland cement or Slag may be substituted in the absence of fly ash.

THE METROPOLITAN DISTRICT

PART 3 - EXECUTION

3.01 PREPARATION

- A. Before placing concrete, all excavation for concrete, forms, access, etc., shall be complete, forms and the space to be occupied by the concrete shall be thoroughly cleaned, and reinforcing steel and embedded metal shall be free from dirt, oil, mill scale, loose rust, paint or other material which would tend to reduce the bond. All excavation shall be properly shored and dewatered.
- B. Earth, concrete, masonry, or other water permeable material against which concrete is to be placed shall be thoroughly saturated with water immediately before concrete is placed.
- C. No concrete shall be placed until the consolidation of the ground and the arrangement and details of forms and reinforcing have been inspected and approved by the Engineer.
- D. Concrete thrust and anchor blocks, pipe supports, etc. shall conform to the details shown in the MDC Standard Details Manual or as directed by the Engineer and be placed against undisturbed earth. Wooden side forms shall be used to provide satisfactory lines and dimensions for thrust and anchor blocks. Felt roofing paper shall be placed to protect joints. No concrete will be placed so as to cover joints, bolts or nuts, or to interfere with the removal of the joints. Tar paper or strips of 1-inch thick flexible plastic foam shall be placed and tied around the water pipe prior to pouring the concrete for supporting other existing underground pipes as shown. Construction joints shall be formed in concrete cradles if so shown or ordered.

3.02 CONCRETE PLACING DURING COLD WEATHER

- A. Concrete shall not be placed on frozen ground and no frozen material or material containing ice shall be used. Materials for concrete shall be heated when temperature is below 40°F, or is expected to be below 40°F within 72 hours, and the concrete after placing shall be protected by covering, heat, or both.
- B. All details of Contractor's handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Engineer. All procedures shall be in accordance with provisions of ACI 306.

3.03 CONCRETE PLACING DURING HOT WEATHER

- A. Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing shall be sprinkled with cold water. Every effort to minimize delays which will result in excessive mixing of the concrete after arrival on the job shall be taken.

THE METROPOLITAN DISTRICT

- B. During periods of excessively hot weather (90°F or above), ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to maintain the temperature of the concrete at permissible levels all in accord with the provisions of ACI 305. Any concrete with a temperature above 90°F, when ready for placement, will not be acceptable, and will be rejected.

3.04 FIELD QUALITY CONTROL

- A. Concrete inspection and testing may be performed by the Engineer or by an inspection laboratory, designated by the Engineer, engaged and paid for by the District. Testing equipment will be supplied by the laboratory, and the preparation of samples and all testing will be performed by the laboratory personnel. Full assistance and cooperation, concrete for samples, and such auxiliary personnel and equipment as needed shall be provided.
- B. At least 4 standard compression test cylinders may be made and tested. Minimum of one (1) slump test from each day's placement of concrete may also be made. A minimum of four compression test cylinders may be made and tested for each 100 cubic yards of each type and design strength of concrete placed. Two cylinders will be tested at 7 days, and two at 28 days. If job experience indicates additional cylinder tests or other tests are required for proper control or determination of concrete quality, such tests will be made.
- C. The Engineer shall have the right to reject concrete represented by low strength tests. Rejected concrete shall be promptly removed and replaced with concrete conforming to the specifications. The decision of the Engineer as to whether substandard concrete is to be accepted or rejected shall be final.

3.05 CONTROLLED LOW-STRENGTH MATERIAL

- A. Consolidate the CLSM by hand-spreading, rodding or tamping.
- B. Bring the CLSM to the correct level within the excavations.
- C. Cure concrete as necessary.
- D. Placement of materials over the CLSM shall not be done until the material has reached a compression strength of 100 psi.
- E. Test cylinders shall be taken weekly or as directed by the Engineer to verify that the maximum design strength has not been exceeded.

3.06 PLACEMENT PRECAUTIONS WITH CLSM

- A. CLSM should be protected from freezing until it has hardened.

THE METROPOLITAN DISTRICT

B. Hydrostatic pressure

1. CLSM is often placed in a practically liquid condition and thus will exert a hydrostatic pressure against basement walls and other structures until it hardens. On deep fills, it is often necessary to place the CLSM in multiple lifts.

C. Quick condition

1. Liquid CLSM in deep excavations is essentially a quick-sand hazard and therefore shall be covered until hardening occurs.

D. Floating tanks, pipes and cables

1. Underground utilities and tanks must be secured during CLSM placement.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 03604

NON-SHRINK CONSTRUCTION GROUT

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing and installing non-shrink grout for interior and exterior use, as indicated.

1.02 SUBMITTALS

- A. Submit certificate of compliance attesting to conformance of products to the requirements of Section 01300.
- B. Submit manufacturers' product data, installation and application instructions for products.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original, tightly sealed, polyethylene lined, multiple ply bags, clearly labeled with manufacturer's name, brand name and number, and batch number of the material.

1.04 JOB SITE CONDITIONS

- A. Ensure surfaces to be grouted or patched are clean and sound, and are not feathered at edges. Handle grout as concrete with regard to temperature and curing, as specified in Section 03302.
- B. Observe safety precautions as outlined in the manufacturer's literature and as printed on containers and labels.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Premixed grout comprised of blended Portland cements, graded silica aggregates, special plasticizing agents and other ingredients.
- B. Conform to the requirements of U.S. Army Corps of Engineers CRD-C-621, and to the following performances requirements listed in Article 2.02 when tested at the moderate fluidity, flowable, level.

THE METROPOLITAN DISTRICT

- C. The grout shall exhibit a small but predictable amount of expansion sufficient to counteract the normal shrinkage of cement, and shall be dimensionally stable. The expansion shall occur after initial set to insure maximum contact between grout and base plates. The grout shall be flowable at low water levels and shall not bleed at the moderate fluidity level specified nor exhibit segregation of aggregates. At a highly flowable consistency, high compressive strength shall be attainable in a 24-hour period with continuous build-up for 28 days. The resulting cured material shall be very hard and highly resistant to penetration and breakdown by oils, water or vibration. Grout shall contain no iron particles, gypsum, gas forming agents, no added chloride, and shall not react with magnesium.

2.02 PERFORMANCE REQUIREMENTS

- A. When tested as provided herein, grout shall meet the following performance requirements:
 - 1. Expansion at 3, 14, and 28 days: 0.34 percent maximum at any of these ages.
 - 2. Expansion at 3 and 14 days: not greater than expansion at 28 days.
 - 3. Shrinkage at 28 days: none, these requirements will be met if expansion tests give a positive value at 28 days.
 - 4. Compressive strength:
 - a. At seven days: 3,500 psi min.
 - b. At 28 days: 5,000 psi min.
 - 5. Time of final setting: eight hours max.
 - 6. Moderate fluidity, flowable: 124 - 145 flow (flow table, 5 drops, CRDC-277).

2.03 DEGREASING AND ETCHING CHEMICAL

- A. Composition and Materials: Blend of organic and inorganic acids with a special solvent system incorporating wetting agents for emulsification.
- B. Color: Water White.
- C. Flash Point: Above 150 degrees F.
- D. Weight per gallon: 9.0 Pounds.

THE METROPOLITAN DISTRICT

PART 3 - EXECUTION

3.01 PREPARATION OF CONCRETE SURFACES

- A. Remove dust, laitance, grease, curing compounds, impregnations, waxes, foreign particles, disintegrated materials or other deleterious substances which may affect the bond or performance of the grout by mechanical abrasion methods such as sandblasting. Sandblast structural and reinforcing steel to remove loose material and expose sound metal.
- B. If the concrete surfaces are sound and it is only necessary to remove laitances, grease or dust, the Contractor may, with the prior written approval of the Engineer, forego sandblasting and wash the concrete with a degreasing and etching chemical applied in accordance with the manufacturer's written instructions and as specified herein.
- C. Application of Degreaser and Etching Compound. Prewet concrete surfaces with clean water. Brush concentrated cleaner onto concrete surface. Let stand three to four minutes and reapply, brushing stained areas vigorously- Rinse off with fresh water applied at a minimum pressure of 800 psi and a minimum volume of five gallons per minute.
- D. Construct appropriate sturdy forms to contain grout at the fluidity level at which it will be used. Saturate foundations and forms for a minimum of 24 hours prior to grouting. Remove all standing water or puddles prior to application of grout. Take special care to eliminate water from bolt holes and other cavities.

3.02 MIXING

- A. Mix in accordance with manufacturer's recommendations. Mix only with cool, clean, drinkable water. Do not overwater grout. Do not mix more grout than can be properly placed within 20 minutes of mixing. Do not add cement, sand, pea gravel or admixtures without prior approval by the Engineer.

3.03 APPLICATION

- A. Apply and cure grout in accordance with manufacturer's recommendations.
- B. Place grout to avoid entrapping air. Provide adequate air vent holes. Work or flow grout into place, filling all cavities. Shut down near-by equipment which may cause vibration. Allow adequate curing time for strength development before placing a load on the grout.
- C. Place grout within twenty minutes of the addition of water to the batch.

THE METROPOLITAN DISTRICT

- D. Reinforce grout pads or applications three inches or more in thickness with wire mesh or reinforcement bars as approved by the Engineer.
- E. Rodding or chaining is acceptable to assist in placement or consolidation of grout. Vibration may cause segregation of aggregates and will not be permitted.
- F. Cool mixing water and grout when temperature exceeds 80 degrees F. in the area to be grouted. Comply with ACI-305. Cure and seal exposed grout with epoxy membrane curing compound to prevent rapid surface drying, shrinkage and cracking, or damp cure the grout.
- G. Heat mixing water and grout when temperature falls below 50 degrees F in the area to be grouted. Do not exceed 80 degrees F. Comply with ACI-306. Do not add accelerators to grout.
- H. Maintain temperatures of the base plate, supporting concrete, and grout between 40 and 90 degrees F during grouting and for at least 24 hours after placement, until grout compressive strength reaches 1,000 psi or as recommended by the grout manufacturer, whichever is longer. Do not allow differential heating or cooling of baseplates and grout during the curing period.
- I. Just before the grout reaches its final set, cut back the grout to the substrate at a 45 degree angle from the lower edge of bearing plate unless otherwise ordered and approved by the Engineer. Finish this surface with a wood float or brush finish.
- J. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at least 24 hours after placement, until grout compressive strength reaches 1,000 psi or as recommended by the manufacturer, whichever is longer. Saturate the grout surface by use of saturated burlap bags, soaker hoses or ponding. Provide sunshades. If drying winds inhibit the ability of a given curing method to keep grout moist, erect wind breaks until wind is no longer a problem or curing is finished.

3.04 AGGREGATE EXTENSIONS

- A. Where indicated, extend the yield of expansive-cement type grout by utilizing aggregate filler in the size range of 3/8 inch washed pea gravel. Run trial mixes verifying the acceptability of this extended grout mix to the Engineer prior to use.

END OF SECTION

THE METROPOLITAN DISTRICT

SECTION 03740

MODIFICATIONS TO EXISTING CONCRETE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work specified in this Section includes furnishing all labor, materials, equipment and incidentals required and cut, repair or otherwise modify parts of existing concrete structures or appurtenances as shown on the Drawings and as specified herein.
- B. Work under this Section shall also include bonding new concrete to existing concrete.
- C. No existing structure or concrete shall be shifted, cut, removed, or otherwise altered until authorization is given by the Engineer.
- D. When removing materials or portions of existing structures and when making openings in existing structures, all precautions shall be taken and all necessary barriers, shoring and bracing and other protective devices shall be erected to prevent damage to the structures beyond the limits necessary for the new work, protect personnel and to prevent damage to the structures or contents by falling or flying debris. Unless otherwise permitted, shown or specified, line drilling will be required in cutting existing concrete.

1.02 RELATED SECTIONS

- A. Section 01045, Cutting, Coring and Patching
- B. Section 02050, Demolition of existing structures
- C. Section 02200, Trenching, Backfilling and Compaction
- D. Section 02202, Granular Fill Materials
- E. Section 03200, Concrete Reinforcement
- F. Section 03300, Concrete

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

THE METROPOLITAN DISTRICT

2. ASTM C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
 3. ASTM C883 - Standard Test Method for Effective Shrinkage of Epoxy-Resin Systems Used with Concrete.
 4. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
 5. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
 6. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics.
 7. ASTM D732 - Standard Test Method for Shear Strength of Plastics by Punch Tool.
 8. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Bonding Compound

1. General
 - a. The bonding compound shall be a two-component, solvent-free, moisture insensitive epoxy resin material suitable for use as a bonding adhesive to bond fresh, plastic concrete to clean, sound hardened concrete and for grouting bolts and the bonding of mating materials.
2. Material
 - a. The epoxy material shall conform to the following requirements:
 - 1) Component A - Component A shall be a modified epoxy resin of the epichlorohydrin bisphenol A type containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.
 - 2) Component B - Component B shall be primarily a reaction product of a selected amine blend with an epoxy resin of the epichlorohydrin bisphenol A type containing suitable viscosity control agents, pigments and accelerators.

THE METROPOLITAN DISTRICT

- 3) The ratio of Component B:A shall be 1:1 by volume.
- 4) The material shall not contain asbestos.
- b. Properties of the mixed material*
 - 1) Pot Life - 25 to 35 minutes
 - 2) Tack-Free Time to Touch (20 mil thickness) - 3 to 5 hours
 - 3) Initial Viscosity (Brookfield Viscometer Spindle No. 3; Speed 100) - 1900 to 3700 cps
 - 4) Color - Gray
- c. Properties of the cured material*
 - 1) Compressive Properties (ASTM D695) at 28 days
 - a) Compressive Strength - 8500 psi minimum
 - b) Modulus of Elasticity - 375,000 psi minimum
 - 2) Tensile Properties (ASTM D638) at 14 days
 - a) Tensile Strength - 4000 psi minimum
 - b) Elongation at Break - 1.5 to 2.25 percent
 - c) Modulus of Elasticity - 275,000 psi minimum
 - 3) Flexural Properties (ASTM D790) at 14 days
 - a) Flexural Strength (Modulus of Rupture) - 6300 psi minimum
 - b) Tangent Modulus of Elasticity in Bending - 400,000 psi minimum
 - 4) Shear Strength (ASTM D732) at 14 days
 - a) Shear Strength - 5000 psi minimum
 - 5) Water Absorption (ASTM D570; Section 6.5) at 14 days
 - a) Water Absorption - 1 percent maximum
 - 6) Bond Strength (ASTM C882) Hardened to Plastic

THE METROPOLITAN DISTRICT

a) Bond Strength (14 days moist cure) - 1500 psi minimum

7) Effective Shrinkage (ASTM C883)

a) Effective Shrinkage - Passes Test

* All test data is based upon material and curing conditions of 73 plus or minus 2 degrees F, 50 plus or minus 5 percent Relative Humidity

3. Approval Requirements

- a. Furnish notarized certification that the material proposed for use meets all of the above requirements.
- b. Bonding agent shall be, Sikadur 32 Hi-Mod, by Sika Corporation, Lyndhurst, NJ or equal.

B. Repair Mortar

1. General

- a. Repair mortar shall be a two-component, polymer-modified, cementitious, fast-setting, trowel grade, structural repair mortar suitable for use on horizontal, vertical and overhead surfaces, on grade above and below grade on concrete and mortar.

2. Material

- a. The polymer modified cementitious system shall consist of a factory preproportioned two-component system whose components conform to the following requirements:
 - 1) Component A shall be a liquid polymer emulsion of an acrylic copolymer base and additives. This acrylic copolymer shall have the following properties:
 - a) pH 4.5 to 6.5
 - b) Minimum film forming temperature approximately 68 degrees F
 - c) Tear Strength approximately 990 to 1420 psi
 - d) Elongation at break 500 to 900 percent
 - e) Particle Size Range Less than 0.1 micron

THE METROPOLITAN DISTRICT

- 2) Component B shall be a blend of selected Portland cements, specially graded aggregates, organic accelerator and admixtures for controlling setting time, water reducers for workability and a corrosion inhibitor.
 - 3) The component ratio A:B shall be 1:7.2 by weight. The system shall not contain chlorides, nitrates, added gypsum, added lime, or high alumina cements. The system shall be non-combustible, either before or after cure.
- b. Typical Properties of Mixed Components
- 1) Application Time (Working Time) - 15 minutes after combining components
 - 2) Finishing Time - 20 to 60 minutes after combining components
 - 3) Color - Concrete Gray
- c. Typical Properties of Cured Material
- 1) Abrasion Resistance - 6 times that of controlled concrete
 - 2) Bond Strength (pull off method) - 100 percent concrete substrate failure
 - 3) Modulus of Elasticity - 4,500,000 psi minimum
 - 4) Surface Scaling (Deicing salt solution freeze/thaw) - No deterioration after 120 cycles
 - 5) Compressive Strength (2 hours 50 percent RH) - 150 psi minimum
 - 6) Compressive Strength (28 days 50 percent RH) - 5,550 psi minimum
 - 7) Flexural Strength (28 days 50 percent RH) - 1,300 psi minimum
 - 8) This system shall conform with ECA/USPHS Standards for surface contact with potable water.
 - 9) This system shall not produce a vapor barrier.
 - 10) This system shall be thoroughly compatible with concrete.
 - 11) Stone may be added.
 - 12) System may be finished with power trowel.

THE METROPOLITAN DISTRICT

d. Approval Requirements

- 1) Furnish notarized certification that the material proposed for use meets all of the above requirements.
- 2) Repair mortar shall be SikaTop 122 Plus by Sika Corporation, Lyndhurst, NJ or equal.

C. Crack Sealant

1. General

- a. Crack sealant shall be a two-component, solvent-free, moisture insensitive epoxy resin material suitable for crack grouting, by injection or gravity feed and bolt grouting and as a binder for mortar, concrete or grout in thermally stable environments and as a concrete sealer.

2. Material

- a. The epoxy material shall conform to the following requirements:

- 1) Component A - Component A shall be a modified epoxy resin of the epichlorohydrin bisphenol A type, containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.
- 2) Component B - Component B shall be primarily a reaction product of a selected amine blend with an epoxy resin of the epichlorohydrin bisphenol A type containing suitable viscosity control agents and accelerators.
- 3) The ratio of Components B:A shall be 1:2 by volume.
- 4) The material shall not contain asbestos.

- b. Properties of the mixed components*

- 1) Pot Life - 20 to 30 minutes
- 2) Tack free time to touch (3 to 5 mils) - 2 to 4 hours
- 3) Initial Viscosity (Brookfield Viscometer Spindle No. 2, Speed 100) - 300 to 450 cps
- 4) Color - Amber

THE METROPOLITAN DISTRICT

c. Properties of the cured material*

- 1) Compressive Properties (ASTM D695) at 28 days
 - a) Compressive Strength - 10,500 psi minimum
 - b) Modulus of Elasticity - 300,000 psi minimum
- 2) Tensile Properties (ASTM D638) at 14 days
 - a) Tensile Strength - 5500 psi minimum
 - b) Elongation at Break - 2 to 5 percent
 - c) Modulus of Elasticity - 60,000 psi minimum
- 3) Flexural Properties (ASTM D790) at 14 days
 - a) Flexural Strength (Modulus of Rupture) - 12,500 psi minimum
 - b) Tangent Modulus of Elasticity in Bending - 325,000 psi minimum
- 4) Shear Strength (ASTM D732) at 14 days
 - a) Shear Strength - 4500 psi minimum
- 5) Water Absorption (ASTM D570; Section 6.5) at 7 days
 - a) Water Absorption - 1.5 percent maximum
- 6) Bond Strength (ASTM C882)
 - a) Bond Strength (2 days dry) - 2000 psi minimum
 - b) Bond Strength (2 days dry plus 12 days moist) - 2000 psi minimum
- 7) Effective Shrinkage (ASTM C883)
 - a) Effective Shrinkage - Passes Test
- 8) When tested following the procedure prescribed by the Environmental Control Administration of the U.S. Public Health Service, the cured material shall be in conformity with the Federal Regulation requiring water extractables of less than 0.5 mg/in² of exposed surface for potable water containers.

THE METROPOLITAN DISTRICT

- * All test data is based upon material and curing conditions of 73 plus or minus 2 degrees F, 50 plus or minus 5 percent R.H.

3. Approval Requirements

- a. Furnish notarized certification that the material proposed for use meets all of the above requirements.
- b. Crack sealant shall be Sikadur 35 Hi-Mod LV, by Sika Corporation, Lyndhurst, NJ or equal.

D. Epoxy Paste Adhesive

1. General

- a. Epoxy paste adhesive shall be a two-component, solvent-free, moisture insensitive epoxy resin material suitable for bolt grouting, as an adhesive for mating surfaces where the glue line is 1/8-in or less and to bond fresh, plastic concrete to clean, sound, hardened concrete.
- b. The material shall be classified as Type I, Grade 3, Class B and C and a Type II, Grade 3, Class B and C adhesive in conformity to ASTM C881.

2. Material

- a. The epoxy material shall conform to the following requirements:
 - 1) Component A - Component A shall be a modified epoxy resin of the epichlorohydrin bisphenol A type, containing suitable viscosity control agents and pigments. It shall not contain butyl glycidyl ether.
 - 2) Component B - Component B shall be primarily a reaction product of a selected amine blend with an epoxy resin of the epichlorohydrin bisphenol A type containing suitable viscosity control agents, pigments and accelerators.
 - 3) The ratio of Component B:A shall be 1:2 by volume.
 - 4) The material shall not contain asbestos.
- b. Properties of the mixed material*
 - 1) Pot Life - 25 to 45 minutes
 - 2) Tack-Free-Time to Touch - 2 to 3 hours
 - 3) Consistency (1/2-in thick) - Non-Sag

THE METROPOLITAN DISTRICT

4) Color - Gray

c. Properties of the cured material*

1) Compressive Properties (ASTM D695) at 28 days

a) Compressive Strength, psi - 10,000 minimum

b) Modulus of Elasticity, psi - 700,000 minimum

2) Tensile Properties (ASTM D638) at 14 days

a) Tensile Strength, psi - 3000 minimum

b) Elongation at Break, percent - 0.3 minimum

c) Modulus of Elasticity, psi - 630,000 minimum

3) Flexural Properties (ASTM D790) at 14 days

a) Flexural Strength (Modulus of Rupture), psi - 3700 minimum

b) Tangent Modulus of Elasticity in Bending, psi - 850,000 minimum

4) Shear Strength (ASTM D732) at 14 days

a) Shear Strength, psi - 2800 minimum

5) Water Absorption (ASTM D570; Section 6.5) at 7 days

a) Water Absorption, percent - 1.0 maximum

6) When tested following the procedure prescribed by the Environmental Control Administration of the U.S. Public Health Service, the cured material shall be in conformity with the Federal Regulation requiring water extractables of less than 18 mg/sq in of exposed surface for potable water containers.

* All test data is based upon material and curing condition of 73 plus or minus 2 degrees F; 50 plus or minus 5 percent Relative Humidity

3. Approval Requirements

a. Furnish notarized certification that the material proposed for use meets all of the above requirements.

THE METROPOLITAN DISTRICT

- b. Epoxy paste adhesive shall be Sikadur 31 Hi-Mod Gel, by Sika Corporation, Lyndhurst, NJ or equal.

E. Special Joint Sealant

1. Sealant shall be foamed polyurethane strip saturated with polybutylene waterproofing material. Sealant shall be applied to joint in a precompressed state.
2. When compressed to 50 percent of its original volume, sealant shall produce a hydrostatic seal.
3. Sealant shall maintain its resiliency to temperatures as low as minus 40 degrees F. Sealant shall be waterproof (when compressed to 50 percent of its original volume) in temperatures from minus 40 degrees F to plus 200 degrees F.
4. Elongation shall be at least 325 percent with a tensile strength of not less than 53 psi. The polybutylene compound in the polyurethane strip shall not migrate.

- F. Metal primer shall be an approved organic zinc rich primer containing 95 percent zinc dust by weight.

G. Non-shrink Grout

1. Non-shrink grout for setting new anchor bolts in existing concrete shall be ready-to-use formulation, which when mixed with specific amounts of water will provide a pourable cementitious mixture.
2. Non-shrink grout for setting new anchor bolts shall be Super POR-ROK by Minwax Construction Products Division of Sterling Drug Inc., or equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Concrete removal, repairs and fabrication shall be as shown on the Drawings and as specified herein.
- B. Except as otherwise indicated, in all locations where new concrete is to be deposited against existing concrete, bonding compound shall be applied to the surfaces of the existing concrete prior to placement of new concrete.
- C. In all cases where the joint between new concrete and existing concrete will be exposed in the finished work, except as otherwise shown or specified, the limit of concrete removal shall be defined by a 1-1/2-in deep saw cut on each exposed surface of the existing concrete.

THE METROPOLITAN DISTRICT

- D. When the finished surface is not specified to be coated, the color of new concrete in the exposed surfaces shall match the color of the existing adjoining concrete as closely as possible.
- E. Where indicated or specified, existing concrete shall be removed to the depth indicated or required to expose sound concrete. The surface exposed shall be roughened by chipping, sandblasting, scarifying or other appropriate means before applying bonding compounds, or repair material as specified.
- F. The Engineer may from time to time direct the Contractor to make repairs to existing concrete. These repairs shall be made as specified herein or by such other methods as may be appropriate.
- G. Reinforcing in existing concrete which is exposed as a result of removal of deteriorated concrete shall be wire brushed to remove all loose material and products of corrosion before proceeding with the repair.
- H. All commercial products specified in this Section shall be stored, mixed and applied in strict accordance with the manufacturer's recommendations.
- I. In all cases where concrete is repaired in the vicinity of an expansion joint or isolation joint the repairs shall be made so as to preserve the isolation between components on either side of the joint.
- J. Where exposed embedded metal is required to be painted, prepare substrate as approved and paint with two coats zinc rich primer before installation of adjacent new materials.

3.02 SURFACE REPAIR AND PATCHING

- A. Remove fractured, loose, deteriorated and unsound concrete by saw cutting, bush hammering, chipping or other appropriate means. Restore area to original limits or as shown using repair mortar.

3.03 EXPANSION JOINT REPAIR

- A. Where indicated, existing premolded joint filler shall be removed and replaced with premolded joint filler. Special joint sealant shall be installed as indicated in accordance with manufacturer's instructions.

3.04 CRACK REPAIR

- A. Cracks on horizontal surfaces shall be repaired by gravity feeding crack sealant into cracks.

THE METROPOLITAN DISTRICT

- B. Cracks on vertical surfaces shall be repaired by pressure injecting crack sealant through polyethylene valves sealed to surface with epoxy paste adhesive.

END OF SECTION