City of Cambridge
Purchasing Department

Cynthia H. Griffin
Purchasing Agent

TO: ALL BIDDERS

FROM: CITY OF CAMBRIDGE

DATE: FEBRUARY 9, 2010

RE: CONCORD AVENUE – WATER MAIN, STREET & SIDEWALK RECONSTRUCTION – FILE NO. 5150

Please note the attached Addendum No. 1.

All other particulars remain unchanged.

CYNTHIA H. GRIFFIN
PURCHASING AGENT

ADDENDUM NO. 1

Concord Avenue
Addendum #1
February 9, 2010

1. General: The attention of bidders submitting proposals for the above referenced project is called to the following Addendum to the contract plans and specifications. The items set forth herein, whether of omission, addition, substitution, or clarification are all included in the proposed work.

   Inclusion of the Addendum must be acknowledged by inserting its number on page 00300-2 of the Bid Proposal. Failure to acknowledge any or all addenda in the above-specified bid may be cause for rejection of the bid by the Owner on grounds that it is not responsive.

2. Agenda and Questions from February 2, 2010 Pre-Bid Meeting (see attached)

3. Replace Form for General Bid, Section 00300 pp 05 to 28 (see attached)
   a. Revise quantities for catch basin laterals (see item 4 below)
   b. Revise quantities for unclassified excavation to remove excavation associated with sidewalks and ramps, which is incidental to those items.
   c. Revise signal quantities for Moulton Street – See item 5 below
   d. Other minor corrections

4. Catch Basin Laterals
   a. Catch basin laterals should be ITEM 234.12 12" PVC DRAIN PIPE, unless there is less than 3' of cover, in which case ITEM 236.12 12" DUCTILE IRON PIPE shall be used.
      i. Quantities revised.
      ii. Eliminate ITEM 241.12 and 241.15.
      iii. Add ITEM 236.12.
      iv. Replace Section 00900 pp 45-48 (See attached)

5. Areas under new greenspace and new trees, as shown in the details listed below, shall be excavated to a depth of 2' and filled with topsoil.
   a. Sheet 11 Proposed Tree Well Section A-A
   b. Sheet 11 Existing Concrete Removal at Greenspace Areas
   c. Sheet 13 – Concrete Island Section A-A

6. Sheet 3 -- Revise General Note #31 and #32, Sketch SK-1

7. Sheet 9

   Delete the "Typical Butterfly Valve and Box Detail" and replace it with Sketch SK-2 "Typical Butterfly Valve and Box Detail"

   Add Sketch SK-3 "Typical Butterfly Valve and Box Detail – Elevation"

   Delete the "New Service Connection Typical Detail" and replace it with Sketch SK-4 "New Service Connection Typical Detail"

   Delete the "Connection to Existing Service Typical Detail" and replace it with Sketch Sk-5 "Connection to Existing Service Typical Detail"

8. Sheet 11

   Delete the "Typical Trench and Pavement Restoration Detail for Lateral Water Main and Service Trenches" and replace it with Sketch SK-6 "Trench and Pavement Restoration Detail for Lateral Water Main and Service Trenches".

   Delete the "Typical Trench and Pavement Restoration Detail for New 16" DI Water Pipe Along Concord Avenue" and replace it with Sketch SK-7 "Trench and Pavement Restoration Detail for New 16" DI Water Pipe Along Concord Avenue".

   Delete the "Irrigation Control Box Detail" and replace it with Sketch SK-8 "Irrigation Control Box Detail" .

9. Revise signal work at Moulton Street to accommodate new crosswalk location and relocate westbound bus stop
   a. See Sketches SK-9 and SK-10
   b. Add items 811.22, 811.31, 812.32 to bid form
   c. Add Specifications for ITEM 811.22, 811.31 and 812.32 (See attached)

10. Revised conduit detail for pedestrian flasher at Fawcett Street – Sketch SK-11

11. Revise typical trench restoration details to clarify use of screened gravel.
    a. See Sketches SK-6 and SK-7
    b. Revision to spec:
       i. Under item 301.60 Construction Methods – General replace the sentence "New pipes should be placed on a bedding of at least 12 inches of screened gravel (as specified herein) below their invert."
       ii. With the sentence "New pipes should be placed on a bedding of at least 4 inches of screened gravel (as specified herein) below their invert."

12. Utility Coordination – Replace Supplemental Conditions 00825 (Paragraph 22) in its entirety with:

> **22. EXISTING UTILITIES AND UTILITY COORDINATION**
>
> The location of existing underground utilities, cables, conduits and structures as shown has been collected from the available sources and the Owner together with its agents does not imply or guarantee the data and information in connection with underground pipes, cables, conduits, structures and such other parts as to their completeness not their locations as indicated. Prior to any excavation, it shall be the Contractor's responsibility to contact all utility owners and request marking the location of all utilities within the work areas. In locations of anticipated utility conflicts with proposed work and where markings are to be removed by excavation, the Contractor shall maintain a system of offset measurements to the utilities. The Contractor shall assume that there are existing water, gas, electric, and other utilities to each and every building, and that that there are existing street lateral main services at each street intersection, whether they appear on the Drawings or not. Any expense and/or delay caused by existing utilities and structures or damage thereto, including those not shown, shall be the responsibility of the Contractor at no additional expense to the Owner. Where existing utilities are in the way of or obstructing installation of the proposed work, Contractor shall coordinate with and allow for the utility owner to relocate any buried or visible utility in order to install the proposed work, at no additional cost to the Owner. No additional reimbursement will be made by the Owner for delays or Contractor expenses associated with utility coordination and/or relocation. In addition, Contractor shall see General Notes on Contract Drawings.
>
> Before proceeding with construction operations at any location, the Contractor shall make such supplemental investigations, including test pits, as it deems necessary and approved by the Owner to uncover and determine the exact location of utilities, structures, or other conditions, and the Contractor shall have no claims for damages due to encountering subsurface structures, utilities, or other conditions. The Contractor shall also have no claims for damages due to encountering subsurface structures, utilities or other conditions which are made known to the Contractor prior to construction operations.
>
> **Utility structures not correctly adjusted to the proper grade prior to paving or sidewalk installation or buried during the construction shall be uncovered, repaired if necessary, and re-graded at the Contractor's expense.**

13. ITEM 105.00 Tree Trimming – Replace in its entirety. (see attached)

14. ITEM 120.10 Unclassified Excavation – modify exclusions to clarify that excavation of reinforced concrete is paid under ITEM 127.10 and is not incidental.
    a. Remove "Excavation of existing pavements of all types (brick, asphalt, concrete) will not be paid for separately."
    b. Add "Excavation of existing pavements of all types (brick, asphalt, un-reinforced concrete will not be paid for separately. Excavation of existing reinforced concrete pavement will be paid under ITEM 127.10."

15. ITEM 399.20 Irrigation Control Box – Replace in its entirety (See attached)

16. ITEM 702.89 Rubber Paving Surface – modify to provide topsoil around newly planted trees, instead of dry crushed stone. Modify Construction Methods on Page 00900-108:
    a. Remove "Subbase shall be clean, dry crushed stone per Section 402 of the Standard Specifications."
    b. Add
        i. "For locations with existing trees, the rubber paving surface shall be placed on undisturbed earth."
        ii. "For locations with new trees, the rubber paving surface shall be placed on 2' of topsoil."

17. ITEM 815.99 Pedestrian Signal – Special Warning Devices modify specification and include sketch (see attached)

    Replace "Flashing Device: The flashing device shall consist of two rectangular LED yellow flashing beacons each 6" wide by 2.4" high, and placed 9" apart. A smaller LED white flashing beacon shall be mounted on the side of the device, facing the pedestrian which will also flash informing the pedestrian that the signal is activated."

    With "Flashing Device: The flashing device shall consist of two 12" yellow LED traffic signal heads (per the attached sketch) facing the vehicular traffic.

18. ITEM 819.10 Traffic Signal Controller Location No. 1 modify specification. Under Compensation:

    Replace "Payment for all work under this item shall be by the lump sum price, which price shall be full compensation of dismantling, loading, transporting, and stacking of the traffic controller as designated above, the excavation and disposal of the existing foundations, the supplying and replacing of compacted gravel backfill and restoration or replacement, in kind, of the area where foundations and posts are removed, supply and install new controller and new concrete base (including excavation)."

    With "Payment for all work under this item shall be by the lump sum price, which price shall be full compensation of dismantling, loading, transporting, and stacking of the traffic controller as designated above, the excavation and disposal of the existing foundations, the supplying and replacing of compacted gravel backfill and restoration or replacement, in kind, of the area where foundations and posts are removed, supply and install new controller, new foundation (including excavation), new service connection, and all wiring, controller programming and incidentals

necessary to ensure a fully operational traffic signal installation utilizing the existing phasing and timing programs. "

Add "The traffic controller shall be Eagle M52 Type controller per the city of Cambridge standards."

19. Sketches submitted to NStar showing proposed conduit locations, subject to NStar approval. See sketches
    a. Fawcett Street and Concord Avenue
    b. Neville Manor and Concord Avenue
    c. Smith Place and concord Avenue

20. Sieve analysis from borings (see attached)

21. Sketches of proposed work received from Verizon, subject to approval by the Pole and Conduit Commission (see attached)

22. Questions from Contractors.
    a. There is no sectional detail for the Proposed Scored Cement concrete buffer Detail shown on Sheet No. 12, Miscellaneous Details II.
        i. What is the proposed thickness of the cement concrete?
            1. THE THICKNESS WILL MATCH THE ADJACENT CONCRETE SIDEWALK, 4"AND 6" AT DRIVEWAYS.
        ii. Is the concrete to match the Cambridge city specification?
            1. YES. THE CONCRETE IS PER ITEMS 701.00 AND 701.10 AND PAID UNDER THOSE ITEMS.
        iii. What is the sectional detail of the score lines?
            1. THE SCORE LINES SHALL MATCH THE SPECIFICATIONS OF ITEMS 701.00 AND 701.10.
        iv. Can these scored lines be sawcut after the concrete has cured?
            1. YES
        v. What are the edge details as related to the asphalt bicycle lane and the cement concrete sidewalk?
            1. AN EXPANSION JOINT SHOULD BE PROVIDED BETWEEN THE SCORED CONCRETE AND THE BICYCLE LANE AND THE SIDEWALK.
    b. What is concrete scoring detail shown on No. 12 Miscellaneous Details II for?
        i. CONCRETE ISLAND AT SPINELLI WAY.
        ii. What is the proposed thickness of this concrete
            1. 6"

iii. Where is this to be used? Is it for Item 476.20 – 8" thick High Early Strength Cement Concrete Pavement for the concrete base?
    1. No.
iv. What is the sectional detail of the score lines?
    1. The score lines shall match the specifications if items 701.00 and 701.10.
v. Can this be a straight steel rake finish?
    1. No.
vi. Are the score lines to provide adhesion for the asphalt courses on top of it?
    1. NO.

c. Bid Item 476.20 High Early Strength Cement concrete Pavement, refers to the Standard Specifications. However, the Standard Specifications have several types of reinforcing specified. No reinforcing is called out on the plans. Should the reinforcing be per the 3300.3 Typical Welded Wire Fabric for concrete Fill Detail in appendix B Typical Details, Drawings and Sketches for an 8" thick slab?
    i. YES, THE REINFORCEMENT SHOULD BE PER THE TYPICAL DETAIL IN APPENDIX B.

CONCORD AVENUE- WATER MAIN & ROADWAY IMPROVEMENTS PROJECT

PRE-BID MEETING AGENDA- February 2, 2010

1. **Sign-In-Sheet**

2. **Project Summary**
   - New 16 " water main pipe, laterals, services, reconnections, valves, hydrants, and abandonment of existing 6 and 12 inch water mains, new catch basin structures with six foot sumps, pipe laterals, gutter inlet structures, drain and sump manholes, and replacement of collapse sewer section.
   - Granite curbing, raised cycle track and sidewalk reconstruction with wheel chair ramps, and driveway ramps, new pedestrian flashers, new traffic control cabinet, raised islands, tree plantings, and signage.
   - Roadway reconstruction by cold plane excavation (areas of 2" and 4") and overlay and pavement markings.

3. **Sequencing/Traffic Management**
   - Work is divided into 6 phases. Two way traffic must be maintained at all times with the exception of phase 5 - construction of the northerly curb, bike lane and sidewalk between station 106 and 111 (24' wide roadway) and phase 6 cold planning portion, where a lane closure and alternating traffic will be allowed from 9am to 3pm with advanced notice. Final paving will be between 8 pm and 5 am. City will entertain a detour during final paving.
   - Water main installation shall start on the Blanchard Road end and advance toward Wheeler St., in order to maximize reuse and stockpiling of existing suitable trench soils. Some of the soils for the most easterly 1/3 of the project are anticipated to be unsuitable for reuse as trench backfill.
   - Contractor must accommodate bicycle traffic. Pay particular attention to steel plates, raised castings, cold planning operations. Cyclists are very vulnerable to vertical changes.

4. **Excavation, Soil Backfill and Off- site Borrow/fill Testing Requirements (incidental)**
   - Note incidental geotechnical/physical, in-place density and analytical testing requirements located at the start of section 0900

5. **Dewatering (incidental)**
   - Note incidental requirement for dewatering design, permitting, furnishing equipment, etc, outlined in section 301.60 – Construction Methods - General

6. **ADA Issues**
   - Sidewalks and ramps must be compliant with ADA, AAB, and Mass Highway.

7. **Tree Protection**
   - Trees must be protected before construction starts.
   - Contractor shall coordinate tree planting location with the Engineer and the City Arborist.

8. **Standard Work Hours**
   - 7 a.m. – 4 p.m. Monday through Friday.

9. **Project Duration**
   - 18 months from the Notice to Proceed

10. **Coordination (contractor's responsibility)**
   - Cambridge Water Department – water main shut down and building service shutdown, adjust structures/valve covers
   - Cambridge Traffic Department. New flashers and line painting.
   - NSTAR Electric and Gas, Verizon, Comcast, and any other utility – Adjust structures, relocation of mains and services as needed to install proposed work.
   - Verizon – Coordinate w/ proposed installation of new underground duct bank (2-4" conduit) from an existing VZ MH at the corner of Concord and Blanchard and running down Griswold St.
   - NSTAR Electric – New work orders for 2 flashers and new control cabinet.
   - NSTAR Gas- most westerly 500 feet is cast iron. Encroached areas (and possibly more) will need to be replaced by NSTAR Gas.
   - MBTA- Any coordination and signage for temporary relocation of bus stops and shelters
   - Residents/businesses
     i. Right of Entry Permits - Written acceptance from property owner before work can be performed on private property.
     ii. Access to driveways

11. **Bid Submittal Requirements**
   - 00300 Form for General Bid
   - 00310 Bid bond
   - 00311 MBE Forms
   - 00312 Statement of Bidder's Qualifications
   - 00313 General Contractor's Certification
   - 00315 Projected Workforce Certification
   - 00317 OSHA General Contractor Certification Form
   - 00318 CREP General Contractor Certification Form
   - 00319 CREP Subcontractor Certification Form
   - 00322 CORI Compliance Form

12. **Bid Opening**
   - February 18, 2010 2:00 p.m. Purchasing Department

13. **Addendum**
    - **Should be issued by February 11, 2010**

14. **Open Discussion**
    - Comcast. Coordination w/ Comcast to address existing shallow conduit in way of proposed work. To date, we know Comcast is only 1" to 2" deep in areas and we believe their main is located beneath the proposed plantings sta 106 to 111 and therefore may need to be relocated by Comcast.

Pre-Bid Meeting for Concord Ave
February 2, 2010
Location: Cambridge Public Works

Reminders:

- All bidders must be pre-qualified by MHD. MHD "Certificate of Approval Form" is required by purchasing in order to obtain plans and specifications.
- Verizon may need to do additional work other than what they have proposed to DPW.
- Work hours are 7:00 am – 4:00 pm, paving will be done at night.
- Contractors have until Wednesday, February 10th for any additional questions.

Questions:

1. Will the City provide a lay down area?
   The City has no space to provide contractor.

2. Is there any buy America clause or stimulus funding?
   There is no stimulus funding.

3. Are there any MWRA mains?
   There are no 8m permits that need to be taken out for this job but DPW will confirm. (DPW has confirmed that there are no MWRA mains or easements within the project scope and therefore no 8 m permit will be required.)

4. Will there be a need for an MWRA dewatering permit?
   Dewatering will require NPDES and City of Cambridge permits, but not MWRA permits.

5. Will the addendum push off the bid closing date?
   No.

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
101.00	0.2	Clearing and Grubbing, at _____ _____ Per Acre				
102.00	20	Tree Removed (Diameter <2'), at _____ _____ Per Each				
103.00	5	Tree Removed (Diameter 2' and Over), at _____ _____ Per Each				
104.00	5	Stump Removed, at _____ _____ Per Each				
105.00	23	Tree Trimming, at _____ _____ Per Each				
106.00	23	Tree Protection and Maintenance, at _____ _____ Per Each				
120.10	*1020*	Unclassified Excavation, at _____ _____ Per Cubic Yard				

Bidder's Name_____ Sub-Total_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
121.10	10	Rock and Boulder Excavation, at _____ _____ Per Cubic Yard				
125.10	1	Soil and Waste Management, at One Thousand and 00/100+ = _____ Dollars ($1,000+) = $. Per Lump Sum				
125.20	10	Handling Asbestos Contaminated Soil / Fill, at Fifty and 00/100+ = _____ Dollars ($50+) = $. Per Cubic Yard				
125.40	3,050	Reuse Excavated Material On-site as Backfill, at Five and 00/100+ = _____ Dollars ($5+) = $. Per Cubic Yard				
126.10	7,280	Disposal of Soil - Background Soils (Class A-1), at Five and 00/100+ = _____ Dollars ($5+) = $. Per Ton				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
126.20	2,129	Disposal of Soil - Impacted <RCS-1 (Class A-2), at Ten and 00/100+ = Dollars ($10+) = $. Per Ton				
126.30	2,129	Disposal of Soil - Daily Cover Unlined Landfill (Class B-1), at Ten and 00/100+ = Dollars ($10+) = $. Per Ton				
126.40	30	Disposal of Soil - Daily Cover Lined Landfill (Class B-2), at Twenty and 00/100+ = Dollars ($20+) = $. Per Ton				
126.50	30	Disposal of Soil - Non-Hazardous Solid Waste (Class B-3, B-4, B-5 and B-6), at Twenty and 00/100+ = Dollars ($20+) = $. Per Ton				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
126.90	30	Disposal RCRA Hazardous Waste (Class C-1 and C-2), at Eighty and 00/100+ = Dollars ($80+) = $. Per Ton				
126.99	10	Disposal of Asbestos Waste, at Thirty and 00/100+ = Dollars ($30+) = $. Per Ton				
127.10	715	Reinforced Concrete Excavation, at Per Cubic Yard				
129.02	7,220	Asphalt Pavement Excavation by Cold-Planer (0-3" Depth), at Per Square Yard				
129.04	10,558	Asphalt Pavement Excavation by Cold-Planer (3"-4" Depth), at Per Square Yard				
141.11	765	Test Pits, at Per Cubic Yard				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
142.00	610	Class B Trench Excavation, at _____ _____ Per Cubic Yard				
144.00	50	Class B Rock Excavation, at _____ _____ Per Cubic Yard				
146.00	20	Drainage Structure Removed _____ _____ Each				
150.20	2,692	Select Common Fill to Replace Unsuitable Trench Material, at _____ _____ Per Cubic Yard				
151.00	1,450	Gravel Borrow, at _____ _____ Per Cubic Yard				
152.20	1,180	Screened Gravel for Water System Construction, at _____ _____ Per Cubic Yard				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
153.00	1,185	Controlled Density Fill - Excavatable, at _____ _____ Per Cubic Yard				
156.20	565	Crushed Stone, at _____ _____ Per Cubic Yard				
170.00	8,715	Fine Grading and Compacting (Subgrade Areas), at _____ _____ Per Square Yard				
201.00	14	Catch Basin Type 1 - 6 Foot Sump, at _____ _____ Per Each				
202.00	5	Drain Manhole - Type 1, at _____ _____ Per Each				
202.04	7	Drain Manhole Type 2 - 4-Foot Sump, at _____ _____ Per Each				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
204.00	14	Gutter Inlet, at _____ _____ Per Each				
220.00	40	Sewer or Drainage Structure Adjusted at, _____ _____ Per Each				
220.20	6	Sewer or Drainage Structure Remodeled at, _____ _____ Per Each				
220.30	3	Drainage Structure Rebuilt at, _____ _____ Per Vertical Foot				
220.50	3	Drainage Structure Change in Type at, _____ _____ Per Each				
221.00	5	Frame and Cover, at _____ _____ Per Each				
222.00	18	Frame and Grate, at _____ _____ Per Each				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
225.52	13	Catch Basin Trap, at _____ _____ Per Each				
234.08	150	8" PVC Sewer Pipe, at _____ _____ Per Foot				
234.12	300	12" PVC Drain Pipe, at _____ _____ Per Foot				
234.15	150	15" PVC Drain Pipe, at _____ _____ Per Foot				
236.12	150	12" DI (Gravity) Pipe, at _____ _____ Per Foot				
302.04	185	4" Ductile Iron Water Pipe, at _____ _____ Per Foot				
302.06	640	6" Ductile Iron Water Pipe, at _____ _____ Per Foot				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
302.08	385	8" Ductile Iron Water Pipe, at _____ _____ Per Foot				
302.10	40	10" Ductile Iron Water Pipe, at _____ _____ Per Foot				
302.12	540	12" Ductile Iron Water Pipe, at _____ _____ Per Foot				
302.16	3,670	16" Ductile Iron Water Pipe, at _____ _____ Per Foot				
309.00	15,160	Ductile Iron Fitting for Water Pipe, at _____ _____ Per Pound				
347.10	310	1" Copper Tubing Type K, at _____ _____ Per Foot				
347.12	105	1-1/2" Copper Tubing Type K, at _____ _____ Per Foot				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
347.14	55	1-1/4" Copper Tubing Type K, at _____ _____ Per Foot				
347.20	220	2" Copper Tubing Type K, at _____ _____ Per Foot				
350.04	6	4" Gate Valve and Box, at _____ _____ Per Each				
350.06	17	6" Gate Valve and Box, at _____ _____ Per Each				
350.08	10	8" Gate Valve and Box, at _____ _____ Per Each				
350.10	2	10" Gate Valve and Box, at _____ _____ Per Each				
350.12	16	12" Gate Valve and Box, at _____ _____ Per Each				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
356.16	21	16" Gate Butterfly Valve and Box, at _____ _____ Per Each				
358.00	115	Water Valve Box Adjusted, at _____ _____ Per Each				
358.10	95	Water Valve Box Removed, at _____ _____ Per Each				
363.10	7	1" Corporation Stop, at _____ _____ Per Each				
363.12	3	1-1/2" Corporation Stop, at _____ _____ Per Each				
363.14	2	1-1/4" Corporation Stop, at _____ _____ Per Each				
363.20	6	2" Corporation Stop, at _____ _____ Per Each				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
371.04	6	4" Coupling, at _____ _____ Per Each				
371.06	9	6" Coupling, at _____ _____ Per Each				
371.08	9	8" Coupling, at _____ _____ Per Each				
371.10	4	10" Coupling, at _____ _____ Per Each				
371.12	5	12" Coupling, at _____ _____ Per Each				
371.16	2	16" Coupling, at _____ _____ Per Each				
376.00	14	Hydrant, at _____ _____ Per Each				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
376.30	7	Hydrant Removed, at _____ _____ Per Each				
381.20	20	Service Box Removed, at _____ _____ Per Each				
381.30	17	Service Box Adjusted, at _____ _____ Per Each				
384.01	7	1" Curb Stop, at _____ _____ Per Each				
384.012	3	1-1/2" Curb Stop, at _____ _____ Per Each				
384.014	2	1-1/4" Curb Stop, at _____ _____ Per Each				
384.02	6	2" Curb Stop, at _____ _____ Per Each				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
399.10	1	Manual Air Release Valve Assembly, at _____ _____ Per Each				
399.20	1	Irrigation Control Box, at _____ _____ Per Each				
399.30	1	Irrigation System (Leaky Pipe, at _____ _____ Per Each				
420.00	100	Hot Mix Asphalt Base Course, at _____ _____ Per Ton				
460.00	2,035	Hot Mix Asphalt, at _____ _____ Per Ton				
460.10	1,590	Hot Mix Asphalt Dense Binder, at _____ _____ Per Ton				
460.30	520	Hot Mix Asphalt - Leveling Course, at _____ _____ Per Ton				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
464.00	1,050	Bitumen for Tack Coat, at _____ _____ Per Gallon				
464.50	6,750	Hot Poured Rubberized Asphalt Sealer, at _____ _____ Per Foot				
472.00	580	Hot Mix Asphalt for Miscellaneous Work, at _____ _____ Per Ton				
472.10	910	Hot Mix Asphalt for Water Trench Temporary Pavement, at _____ _____ Per Ton				
476.20	100	High Early Strength Cement Concrete Pavement, at _____ _____ Per Cubic Yard				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
482.30	845	Sawing Asphalt Pavement, at _____ _____ Per Foot				
504.00	1,250	Granite Curb Type VA4 - Straight, at _____ _____ Per Foot				
504.04	400	Granite Curb Type VA4 - Straight 4-Inches, at _____ _____ Per Foot				
504.10	200	Granite Curb Type VA4 - Curved, at _____ _____ Per Foot				
509.00	480	Granite Transition Curb for Wheelchair Ramps - Straight, at _____ _____ Per Foot				
509.10	180	Granite Transition Curb for Wheelchair Ramps - Curved, at _____ _____ Per Foot				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
580.00	5,450	Curb Removed and Reset, at _____ _____ Per Foot				
594.00	1,820	Curb Removed and Discarded, at _____ _____ Per Foot				
602.10	2	Guardrail Post - Wood, at _____ _____ Per Each				
645.160	1,590	60-Inch Chain Link Fence (PTR) Vinyl Coated (Pipe Post, at) _____ _____ Per Foot				
652.060	4	60-Inch Chain Link Fence End Post, at _____ _____ Per Each				
653.060	8	60-Inch Chain Link Fence Corner or Intermediate Brace Post, at _____ _____ Per Each				
655.48	1,590	Fence Removed and Discarded, at _____ _____ Per Foot				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
666.48	565	Chain Link Fence - Remove and Reset, at _____ _____ Per Foot				
698.30	3,190	Geotextile Fabric, at _____ _____ Per Square Yard				
701.00	4,660	4" Cement Concrete Sidewalks, at _____ _____ Per Square Yard				
701.10	955	6" Cement Concrete Sidewalks (Driveways and Intersections), at _____ _____ Per Square Yard				
701.20	265	6" Cement Concrete Pedestrian Ramps, at _____ _____ Per Square Yard				
701.29	25	Cast-in-Place Detectable Tile, at _____ _____ Per Square Yard				
702.89	985	Rubber Paving Surface, at _____ _____ Per Square Foot				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
706.10	90	Brick Walk Removed and Relaid, at _____ _____ Per Square Yard				
707.93	20	Bicycle Post and Ring - In Concrete Surface _____ _____ Per Each				
751.00	225	Loam Borrow, at _____ _____ Per Cubic Yard				
765.00	2,375	Seeding, at _____ _____ Per Square Yard				
767.80	100	Bales of Hay for Erosion Control, at _____ _____ Per Each				
775.00	40	Street Tree (2-1/2" - 3" Caliper), at _____ _____ Per Each				
796.00	800	Perennials / Plantings, at _____ _____ Per Each				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
804.30	*340*	3 Inch Electrical Conduit Type NM-Plastic (UL), at _____ _____ Per Foot				
811.22	1	Electric Handhole SD2.022, at _____ _____ Per Each				
811.31	1	Pullbox, at _____ _____ Per Each				
811.35	1	Pullbox Adjusted, at _____ _____ Per Each				
811.55	150	Wired Type 11 - Loop Detector Lead In, at _____ _____ Per Foot				
811.80	3	Vehicle Loop Detector (Directional) Compensated Magnetic, at _____ _____ Per Each				
812.32	2	Pedestrian Signal Post, Foundation, Signal Head and Push Button Assembly, at _____ _____ Per Each				
815.99	2	Pedestrian Signal - Special Warning Devices, at _____ _____ Per Each				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
816.40	1	Traffic Control Signal Equipment Removed and Reset, at _____ _____ Per Lump Sum				
819.10	1	Traffic Signal Controller Location N. 1, at _____ _____ Per Lump Sum				
823.70	3	Highway Lighting Pole and Luminare Removed and Reset, at _____ _____ Per Each				
831.11	10	Pull Box 12x12 SD 3.031, at _____ _____ Per Each				
832.10	190	Warning - Regulatory and Route Marker - Aluminum Panel (Type A), at _____ _____ Per Square Foot				
854.01	7,150	Temporary Pavement Markings - 4" (Painted), at _____ _____ Per Foot				
854.10	7,150	Pavement Marking Removal, at _____ _____ Per Square Foot				
856.12	2	Portable Changeable Message Sign, at _____ _____ Per Each				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
856.14	100	Portable Changeable Message Sign, at _____ _____ Per Unit Day				
864.01	1,535	Pavement Arrows and Legends - Reflective White Tape, at _____ _____ Per Square Foot				
865.10	1,550	Crosswalks and Stop Lines, Reflective White - Thermo., at _____ _____ Per Square Foot				
865.20	575	Blue Preformed Thermoplastic, at _____ _____ Per Square Foot				
866.04	4,660	4" Reflectorized White Line - Thermo., at _____ _____ Per Foot				
866.06	275	6" Reflectorized White Line - Thermo., at _____ _____ Per Foot				
867.04	9,800	4" Reflectorized Yellow Line - Thermo., at _____ _____ Per Foot				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
868.00	30	Raised Pavement Marker - Two-Way Yellow / Yellow, at _____ _____ Per Each				
874.00	20	Street Name Sign, at _____ _____ Per Each				
874.40	45	Traffic Signs Removed and Stacked, at _____ _____ Per Each				
874.70	2	Memorial Sign Removed and Reset, at _____ _____ Per Each				
877.00	75	Traffic Sign Post, at _____ _____ Per Each				
878.00	1	Sign Removed, Modified and Reset, at _____ _____ Per Each				

Bidder's Name_____

CONCORD AVENUE
BASE BID

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			Dollars	Cents	Dollars	Cents
903.10	295	3000 PSI, 1.5 In, 470 Cement Concrete for Water System Construction _____ _____ Per Cubic Yard				
998.00	1	Erosion and Sediment Control (minimum amount = $5,000.00) _____ _____ Per Lump Sum				
999.00	1	Construction Staking, at _____ _____ Per Lump Sum				

Grand Total Amount of Bid:

_____ $_____

(Amount In Words) (Amount In Figures)

Bidder's Name_____

ITEM 105.00 TREE TRIMMING EACH

GENERAL:
The work performed under this Item shall conform to the relevant provisions of Section 100 of the Standard Specifications and the following:

Scope of Work

The work shall consist of the provision of all labor, materials, equipment, and transportation required to complete the pruning of City street trees, in strict accordance with the conditions and specifications of these Contract Documents. The work shall include, but is not necessarily limited to the following:

- Initial site visit and assessment with City representatives
- Securing necessary permits and approvals before commencement of work
- Posting work areas for parking restrictions
- Securing police details, if necessary
- Marking work zones for traffic and pedestrian control
- Providing a schedule of work for City review and approval
- Meeting with City staff on a periodic basis
- Visual assessment of each tree to be pruned
- Determination of pruning objectives
- Pruning cuts
- Wound care
- Wood waste and debris consolidation & disposal
- Site cleanup

Equipment

The following equipment and vehicles shall be considered a minimum requirement in order to be considered a responsible bidder under the terms and conditions of these Contract Documents. All gas- powered equipment and vehicles must be five years old or less.

- Two (2) aerial lift trucks with an articulating boom that have a working height of not less than sixty (60) feet. with Contractor's name painted on each side
- Two (2) chipper dump trucks with a minimum capacity of nine (9) cubic yards, with Contractor's name painted on each side
- Two (2) wood chippers with a capacity for 16" diameter limbs
- All relevant traffic control devices as prescribed by the Manual of Uniform Traffic Control Devices (MUTCD) of the U.S. Department of Transportation

Safety Standards

- Tree pruning shall be performed only by certified arborists or arborist trainees who, through related training or on-the-job experience, or both, are familiar with the practices and hazards of arboriculture and the equipment used in such operations.

- One certified arborist (as defined in the section labeled "Quality Requirements," and as identified in the "Statement of Bidder's Qualifications" of these Contract Documents) must be present at all times as the on-site project manager while tree pruning is performed:

- Tree pruning operations shall comply with the American National Standard for Tree Care Operations—Safety Requirements (ANSI Z133.1), as approved by the American National Standards Institute, and published by the National Arborists Association. Operations shall also comply with applicable Occupational Health and Safety Administration (OSHA) standards.

Pruning Objectives

The pruning operation shall focus on the following types of pruning:

- **Cleaning**. Cleaning shall consist of selective pruning to remove one or more of the following parts—dead, diseased, and/or broken branches. All deadwood that is two (2) inches or greater in diameter shall be removed. Branches with splits, large cavities or any defect that may result in failure shall be reduced, or removed to the trunk if reduction is not feasible.

- **Thinning**. Thinning shall consist of selective pruning to reduce density of live branches. Thinning shall result in an even distribution of branches on individual limbs and throughout the crown.

- **Raising**. Raising shall consist of selective pruning to provide vertical clearance. All branches extending lower than fifteen (15) feet above a public roadway and ten (10) feet above a public sidewalk shall be removed.

- **Reducing**. Reduction shall consist of selective pruning to decrease height and/or spread. Consideration shall be given to the ability of a tree species to tolerate this type of pruning. All branches obstructing park signs. street signs, traffic signs, traffic lights, and park or street lighting shall be removed. Branches shall be pruned away from all houses and buildings a minimum of five (5) feet, or more if appropriate to the tree shape and structure.

- **Specialty (Young Trees)**. For young yet established trees, branches that are rubbing or poorly attached shall be removed. A central leader or leaders as appropriate to the species should be developed. A strong, properly spaced scaffold branch structure should be selected. For newly planted trees, pruning shall be limited to cleaning.

Pruning Practices

- A certified arborist (the on-site project manager) shall visually inspect each tree before commencing work.

- If a condition is observed requiring attention beyond the original scope of work, the condition should be reported to the City within 24 hours. Such conditions may include structural weakness, rot or decay that cannot be corrected by cleaning, and dead trees.

- Equipment and work practices that damage living tissue and bark beyond the scope of work shall be avoided. Climbing spurs shall not be used when climbing and pruning trees.

- Pruning tools (e.g. chain saws, pole saws, hand saws, pole pruners, etc.) shall be sharp and regularly sharpened and maintained throughout the Contract Term.

- Not more than 25% of the foliage of an individual tree should be removed within an annual growing season. The percentage and distribution of foliage to be removed shall vary according to the tree species, age, health and site, in accordance with the types of pruning identified above.

- Not more than 25% of the foliage of a branch or limb shall be removed when it is cut back to a lateral. The lateral shall be large enough to assume apical dominance.

- Heading shall be permitted only by the expressed permission of the City, when needed to reach a defined objective.

- Topping and lion tailing shall be considered unacceptable pruning practices.

- All pruning cuts shall be made in accordance with the American National Standard for Tree Care Operations—Standard Practices (ANSI A300 Part 1), as approved by the American National Standards Institute, and published by the National Arborists Association (revised 2001). All terminology included in these Technical Specifications shall be defined by ANSI A300 Part 1.

- When tracing wounds, only loose, damaged tissue should be removed. No other wound treatments shall be used.

Wood Waste & Debris Consolidation/Site Cleanup

- Tree branches shall be removed in such a manner so as not to cause damage to other parts of the tree, or to surrounding people and property. Where necessary, ropes or other equipment shall be used to lower large branches to the ground.

Wood Waste & Debris Consolidation/Site Cleanup (cont.)

- All severed limbs shall be chipped. hauled away from the site, and disposed of in a legal manner. All wood waste, sawdust, leaves, and associated organic debris shall be collected from both public ways and adjacent private property, hauled away from the site, and disposed of in a legal manner.

- Site cleanup shall follow as closely as possible to the pruning operation.

- Under no circumstances shall any litter or debris be blown, swept or raked onto an adjacent street, gutter, or into a catch basin.

Inspection, Remedies, and Acceptance

The City shall inspect the sites within the scope of work of these Contract Documents on each day that the Contractor performs work there. The City shall inform the Contractor's on-site project manager, and inform the Contractor in writing if necessary, of any deficiencies in the work. The Contractor and the City shall agree on a timetable for the remedy of any deficiencies. Upon completion of the remedies, and after another inspection of the site, the City shall notify the Contractor of the City's acceptance of the work. The Contractor shall not invoice the City for any work that has not been accepted by the City. (Note: please refer to the sections entitled "Payments" and "Schedule of Values" in the General Conditions of these Contract Documents.)

COMPENSATION:
Payment shall be at the Contract bid unit price for each tree pruning, including all materials, labor, barrier and equipment required to complete the work.

ITEM 234.08	**8" PVC DRAIN PIPE**	**FOOT**
ITEM 234.12	**12" PVC DRAIN PIPE**	**FOOT**
ITEM 234.15	**15" PVC DRAIN PIPE**	**FOOT**
ITEM 236.12	**12" DI (GRAVITY) PIPE**	**FOOT**

GENERAL:

Work to be done under these items shall include the furnishing and installation of polyvinyl chloride (PVC) pipe or Ductile Iron (DI) pipe for connections from catch basins to existing and proposed drainage structures and pipelines, all as shown on the Drawings and as directed by the Engineer.

MATERIALS:

PVC Pipe

PVC pipe and fittings shall conform to ASTM D3034, latest revision, SDR 35 minimum wall thickness, with integral wall bell and spigot joints. The bell shall consist of an integral wall section with a solid cross-section rubber ring, factory assembled. Wyes, tees, saddles, bends and adapters, and any other fittings required shall be provided. The pipe shall be colored green for in-ground identification as sewer/drain pipe.

DUCTILE IRON PIPE

All ductile iron pipe shall conform to AWWA C151 class 52, pipe shall be restrained joint type, supplied in standard lengths as much as possible. Ductile-iron pipe barrels ANSI A21.15, ANSI A21.50 or ANSI A21.51, bear mark of Underwriters' Laboratories approval. Contractor shall submit a submittal drawing or product data for approval on the proposed Ductile Iron Pipe.

CONSTRUCTION METHODS:

Excavation:

The Contractor shall perform all work necessary to excavate and support the trench to allow for installation of the pipe (see Items 120.10 and 142.00 for technical requirements).

The Contractor is advised that brick and concrete pavements have been found to exist beneath the existing asphalt. Borings and test pit logs are included on the drawings. Excavation of existing hot mix asphalt, brick and concrete pavements as required for installation of drainage pipe is included under this item.

Pipe Installation

Each pipe shall be handled into its position in the trench and installed in such a manner as not to damage the pipe and so as to protect at all times the jointing surfaces of the pipe. Operations shall at times be conducted so as to prevent damage to existing structures, utilities, and the work in place.

The Contractor shall furnish proper and adequate equipment such as slings, straps, hoists, and other equipment and devices necessary for the safe and suitable lifting, handling, laying, and support of all pipe and appurtenances when it is lifted and placed into position.

All pipe, fittings, and appurtenances shall be carefully inspected by the Contractor for defects before installation and all defective, unsound or damaged pipe, fittings, or other materials, shall be rejected. The Engineer will make such additional inspections as he/she deems necessary, and the Contractor shall furnish all necessary assistance for such inspection. The interior of pipe shall be carefully and thoroughly cleaned of foreign matter before being lowered into the trench, and shall be kept clean during laying operations.

All pipe shall be bedded in 12" of 3/8-inch crushed stone (M2.01.6). Crushed stone shall be compacted in 6" lifts with a vibratory plate-type compactor to at least 90 percent of maximum density as determined by ASTM D1557. The crushed stone bedding material shall be placed in the bottom of the trench and shaped and compacted to give substantial uniform support to the lower half of the full length of pipe. Pipe laying shall proceed upgrade with the spigot ends of the pipe pointing in the direction of flow so that bells are installed upstream or uphill of spigot ends. The pipe shall be laid true to line and grade and in such manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line.

Pipelines shall be constructed in dry trenches and shall not be laid when the condition of the trench or the weather is unsuitable for such work. At times when work is not in progress, open ends of pipe shall be securely sealed so that no trench water, earth, or other substance will enter the pipe. Pipes shall not be used as conductors for trench drainage during construction.

Diversion and control of storm water flows and de-watering shall be the responsibility of the Contractor. The Contractor shall submit its planned methods for diversion and control to the Engineer for advance review and approval.

The Contractor will also be responsible for road surface drainage/flow at all times within the work zone. This includes taking preventative measures to keep water out of the trench and preventative measure to keep excavated materials out of nearby catch basins.

If during or after construction the City's catch basins within the work zone become partially or completely full of soil and/or debris, it will be the Contractor's responsibility to clean the catch basin and properly dispose of the material at no additional expense to the City.

Pipe Jointing:

Jointing of pipe shall be done by workmen thoroughly skilled in this type of work using the watertight gasket type joints and installed in strict accordance with the printed recommendations of the pipe manufacturer, and as approved. A gasket shall be placed in the groove of the spigot end of each pipe just prior to laying the pipe. After the pipe is aligned in the trench, ready to be joined, all joint surfaces shall be thoroughly cleaned.

Immediately before jointing the pipe together the bell shall be completely covered with a lubricant, as recommended by the pipe manufacturer, then be carefully pushed home into the

joint of the previously laid pipe. The position of the gasket and joint shall be carefully inspected to insure that the joint has been properly made, and that the gasket is properly positioned to insure a watertight joint. Joints that have been improperly made shall be taken apart and remade. It shall be the Contractor's responsibility to install the pipe in a manner that will maintain the gasket in adequate compression and proper position to insure watertight joints conforming to the latest testing requirements.

The installation of pipe, the details of gasket, attachment, and joint formation shall be in accordance with the pipe manufacturer's printed recommendations, and as approved by the Engineer.

Connecting Pipe - to – Pipe:

Connecting pipe to pipe shall be performed according to the manufacturers instructions or as directed by the Engineer.

Connecting/Re-Connecting Laterals:

Connecting/Re-connecting laterals shall be performed in the following manner or as approved by the Engineer.

Lateral connections shall be made into the top one half of the City's main, between the 1:00 and 3:00 o'clock position or 9:00 and 11:00 o'clock position using a saddle or wye connection. The connection shall be made such that flow from the lateral is compatible with the direction of flow in the main.

Storm drain connections shall be installed at a minimum slope of 1 percent.

For main pipe sizes up to 24 inches in diameter, laterals shall be connected using either flexible saddles or wye fittings. Combination saddle-wye fittings are prohibited. Connections directly into existing pipe without a saddle or full wye fitting are not allowed, unless approved by the Engineer.

For main pipe sizes greater than 24 inches in diameter, laterals shall be connected by saddles, resilient connectors with internal expansion rings, or methods approved by the Engineer. Resilient connectors shall conform to ASTM C923-89.

Connecting Pipe to New or Existing Structures:

Connecting pipe to new or existing structures shall be performed in one of the following manners or as approved by the Engineer:

MATERIALS:

1. **Flexible Pipe to Manhole Connectors-** Rubber flexible pipe to manhole connectors shall be manufactured in accordance with ASTM C923. Clamps and bands used to secure the Flexible Rubber Connectors shall be stainless steel Type 304 including screws, wedges and other appurtenances required to provide secure tight connections between the manholes and the pipe. The connectors shall be specifically designed for the pipe material and size to be connected to the structure.

2. **Brick & Mortar-** Mortar for patching holes in structure walls and at the connections of the pipe to the structure shall conform to Standard Specifications Material Specification M4.02.15. Brick shall conform to ASTM C32. Grade SS.

Backfill

Pipe joints and/or connections shall not be covered in any way until the Engineer has inspected them. Once inspected, the pipe and/or connection shall be completely enveloped with 6 inches of pea stone or crushed stone (i.e. both sides and above the crown of the pipe) conforming to ASTM D 448 prior to trench backfill.

The excavation shall be backfilled with gravel borrow and the trench shall be temporarily or permanently patched as specified under Item 472.00.

COMPENSATION:

Drain pipe will be measured for payment as specified in Section 230 of the Standard Specifications.

Payment for pipe items will be at the contract unit price per foot complete in place and shall include all sawcutting of existing pavement, trench excavation (including support) for excavation 5 feet or less in depth, disposal of construction debris (asphalt, concrete, brick, etc.) tree protection, steel plating, protection of existing utilities and repair of utilities damaged during construction, dust control, crushed stone bedding and pipe envelope, pipe and fittings, connections to existing pipe and structures, disposal of construction debris and any other incidentals necessary for the satisfactory completion of this work as specified.

Gravel borrow will be paid for under Item 151.00. Trench excavation greater than a depth of 5 feet will be paid for under Item 142.00. Rock excavation will be paid for under Item 144.00. Hot mix asphalt patching will be paid for under Item 472.00.

EXCLUSIONS:

Disposal of excavated soil is not included for payment under this item and shall be paid for separately.

ITEM 399.20 IRRIGATION CONTROL BOX EACH

MATERIALS:

Irrigation control boxes shall be the standard required by the Cambridge Water Department (CWD) in the latest edition of their Construction and Operating Procedures. Corporation stop, copper service tubing, curb stop, service and valve boxes, and adapters and fittings of the necessary size required shall be the same as that specified for water service connections in Section 300. Stop and waste curb stop shall be the kind and type approved by the CWD. The purpose of the stop-and-waste curb-stop valve is to isolate the domestic irrigation line and allow the water to drain out of the stop-and-waste hole from the isolation valve to the piping prior to backflow assembly so as to help prevent the piping and some parts of the backflow assembly from freezing in the late fall and winter. Water meters, strainers and reduced pressure zone backflow preventers (RPZ) shall be of the standard type in current use and approved by the CWD as outlined in their Construction and Operating Procedures. RPZ's shall be of the size shown on the Drawings and body shall be constructed of bronze for sizes less than 2 1/2-in and a compact design. Each bronze unit shall be complete with two companion full bore ball valves equipped with test connections. Valves shall be of similar material as that of the backflow device body. Unit shall have replaceable bronze seats and captured springs. Each unit shall be provided with a complete set of spare parts. Units shall be supported on galvanized steel floor stanchions with floor flange secured to floor. Units shall be of the manufacture that meets the approval of the CWD. Irrigation control boxes are to be provided in suitable enclosures, the final size to be determined by the Contractor based on components as offered. The enclosure shall be of reinforced aluminum construction painted black, providing access through doors for testing of backflow preventer and meter. It must also be totally removable for maintenance purposes. The enclosure shall be structurally lined with a unicellular, non-wicking insulation consisting of a sandwich laminate or applied by spray. Insulation shall provide a minimum R-10 rating. No wood or "particle board" shall be allowed in assembly. Insulation mounted with glue will be cause for rejection. The enclosure shall contain drain openings sized to accommodate the maximum discharge of the reduced pressure zone assembly. Drain openings shall open to discharge under the most severe conditions. These openings are protected against intrusion of wind, debris or animals. The enclosure shall be provided with a permanent backflow prevention assembly and water meter shall be protected within the enclosure. The enclosure is to be provided with a means of permanent, lockable access doors and/or lid to prohibit theft or vandalism. All portions of the components shall be protected within the enclosure. The enclosure shall be factory assembled and delivered to the site ready to install with no drilling, screwing or riveting of enclosure required on site. The final enclosure size shall be based on the selected equipment it is to house. The enclosure shall have the necessary provisions and Contractor shall coordinate with CWD for Automatic Meter Reading (AMR) system requirements. Enclosure shall be a Watts Regulator Company Series WattsBox, Safe-T-Cover, Hot Box a division of cdf Systems Inc., or equal. Provide pipe supports as required to properly support equipment and valves. It is not warranted that all supports are shown on the Drawings. Pipe supports shall be galvanized steel floor stanchions with floor flange secured to floor.

CONSTRUCTION METHODS:
Irrigation control boxes shall be set at the locations as shown on the Drawings and bedded on a firm foundation with suitable concrete pad foundation. The CWD and DPW shall review and approve of the final locations for all irrigation control boxes. Corporation stop, copper service tubing, stop and waste curb stop and service and valve boxes shall be installed in accordance with these items for water service connections in Section 300. Concrete or equal foundation pad and final enclosure shall be installed in accordance with the manufacturer's instructions. The final enclosure size shall be based on the selected equipment it is to house.

COMPENSATION:
Price and payment for furnishing and installing irrigation control boxes shall be full compensation for all work as shown on the Drawings including furnishing and placing foundation bedding material; furnishing and placing concrete or equal foundation pad; furnishing and installing mechanical floor sleeves; setting, installing, jointing, installing and connecting all corporation stops, stop and waste curb stops, service and valve boxes, adapters, fittings, piping, water meters, strainers, backflow preventers, and valves as shown on the Drawings; furnishing and installing pipe supports as required; furnishing and installing enclosure of the required type and size as specified and per the manufacturer's recommendations; making the necessary provisions and coordinating with the CWD for Automatic Meter Reading (AMR) system requirements; testing; chlorinating; furnishing and installing all backfill material as specified or as shown on the Drawings; restoring all physical features to grade; and all else incidental thereto as shown on the Drawings for which separate payment is not provided under other items in the Bid Form.

ITEM 811.22	**ELECTRIC HANDHOLE- SD2.022**	**EACH**
ITEM 811.31	**PULL BOX 12-in X 12-in – SD2.031**	**EACH**

Work under these items shall conform to the relevant provisions of Section 800 and the following:

The work shall consist of furnishing and installing electrical handholes for electrical connections in pavement, sidewalk, median, and planted areas. All handholes proposed in the roadway must be installed with heavy-duty frame and cover, capable of sustained loading of HS-20 or better in conformance with the Standard Specifications for Highways and Bridges, at no additional cost. Where 3 inch interconnect or signal conduit enters a handhole, the bottom of the conduit shall be 30 inches beneath the finished grade. Where 1 ½ inch loop lead-in conduit enters a pull box, the top of the conduit shall be 18 inches below finished grade. The cost to sawcut existing sidewalk, and to repair and/or replace damaged sidewalk and pavement surfaces (cement and hot mix asphalt) as a result of handhole or pull box installation shall be considered incidental to these items.

The Contractor shall excavate at locations of proposed handholes to a depth necessary to locate the existing conduit. The Contractor shall then sawcut the existing conduit and provide adequate fittings and adjustments to provide sweeps into the new handhole, at a grade appropriate for the final location of the handhole based on the details provided in the plans. The handhole shall be installed according to the Standard Specifications for Highways and Bridges and shall be placed at a finished grade level with the pavement or sidewalk surface. Only controlled density fill (CDF) shall be used to backfill locations where electric handholes have been installed. No handholes shall be installed other than shown on the plans, specifically to avoid installation of handholes in gutters which will result in flooding of the electrical appurtenances.

No separate payment shall be made for Controlled Density Fill, or any incidental materials, but all costs in connection therewith shall be included in the Contract unit price per each for Item 811.22 and 811.31.

ITEM 812.32PEDESTRIAN SIGNAL POST, FOUNDATION, SIGNAL HEAD & PUSH BUTTON ASSEMBLY EACH

Work under this item shall conform to the relevant provisions of Section 800 and the following:

Post and Base

Signal posts and bases shall be steel shafts with octagonal bases. Signal base foundations shall not obstruct a sidewalk or crosswalk so that passage by physically challenged persons is impaired. If any base foundations are in the sidewalks, they shall be installed so that they are flush with the finish grade. Signal posts shall be painted powder-coated black.

Pedestrian Head

Pedestrian head indications shall be illuminated LED type displaying the graphical symbols of a walking person and/or upraised hand. All LED indications on the pedestrian signal shall have an automatic dimming circuit for night illumination to reduce long-term degradation to the LEDs. Pedestrian heads shall be made of aluminum and painted powder-coated black.

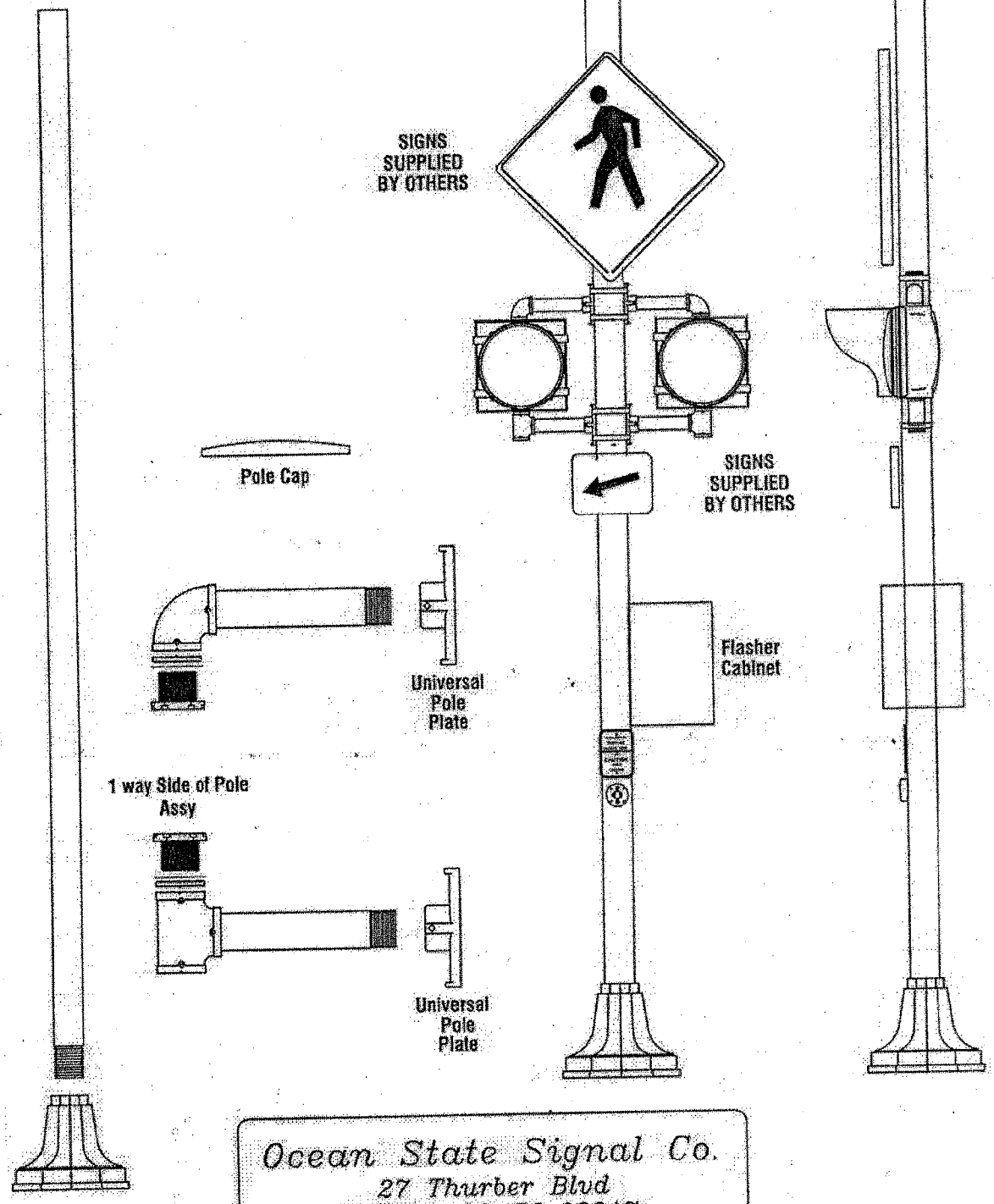
Pedestrian Push Button

Pedestrian push button controls shall be raised from or flush with their housings and shall be a minimum of 2-in in the smallest dimension. The force required to activate the controls shall be no greater than 5-lbs. Pedestrian push buttons shall be located as close as practicable to the sidewalk curb ramp serving the controlled crossing and shall permit operation from a clear ground space. If two crosswalks, oriented in different directions, end at or near the same location, the positioning of pedestrian push buttons and/or legends on the pedestrian push button signs should clearly indicate which crosswalk signal is actuated by each pedestrian push button.

The mounting height of the pedestrian push buttons. shall be 42 inches above the finish sidewalk grade.

The work under item 812.32 shall be paid for at the Contract lump sum price per item, which price shall include all labor, material, equipment and incidental costs required to install new pedestrian signal posts, foundations, signal heads , push button assemblies, all wiring, and controller modifications.

Conduit shall be paid for separately under Item 804.3 3-Inch Electrical Conduit. Handholes and pull boxes shall be paid for separately under Items 811.22 and 811.31 respectively.



Ocean State Signal Co.
27 Thurber Blvd
Smithfield, RI 02917
(401) 231-6780 Fax: (401) 231-4390
www.oceanstatesignal.com

GENERAL NOTES (CONT.)

30. CONTRACTOR SHALL PROVIDE A MINIMUM OF 72 HOURS NOTICE PRIOR TO STARTING ANY CONSTRUCTION. IT MAY BE NECESSARY TO PERFORM WATER MAIN CONSTRUCTION WORK DURING PERIODS OTHER THAN NORMAL WORKING HOURS FOR THE PURPOSE OF OBTAINING SHUT DOWNS AND/OR TO FACILITATE THE INSTALLATION OF NEW WORK. THE CONTRACTOR SHALL COORDINATE ALL WORK TO BE PERFORMED OUTSIDE NORMAL WORKING HOURS WITH THE CAMBRIDGE WATER DEPARTMENT, CAMBRIDGE DEPARTMENT OF PUBLIC WORKS AND CAMBRIDGE POLICE AND FIRE DEPARTMENTS.

31. THE CAMBRIDGE WATER DEPARTMENT WILL BE RESPONSIBLE FOR OPERATION OF ALL EXISTING VALVES, HYDRANTS, SERVICE CONNECTIONS AND OTHER WATER SYSTEM APPURTENANCES. CONTRACTOR SHALL NOTIFY THE CAMBRIDGE WATER DEPARTMENT AT LEAST A WEEK IN ADVANCE TO EXERCISE AND TEST VALVES PRIOR TO SHUTDOWN. CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION TO IMPACTED ABUTTERS 72 HOURS IN ADVANCE.

32. CONTRACTOR SHALL INTERRUPT WATER SERVICE AND DISRUPT THE NORMAL FUNCTIONING OF THE DISTRIBUTION SYSTEM AS LITTLE AS POSSIBLE. THE NEW 16 INCH WATER MAIN IN CONCORD AVE SHALL BE INSTALLED, TESTED, AND DISINFECTED AS SPECIFIED WHILE THE EXISTING WATER MAINS AND SERVICE CONNECTIONS REMAIN ACTIVE. UPON SUCCESSFUL TESTING AND ACCEPTANCE OF THE NEW 16 INCH WATER MAIN, IT IS SUGGESTED THAT THE NEW 16 INCH MAIN BE CONNECTED TO THE EXISTING DISTRIBUTION SYSTEM VIA ONE END. EXISTING SERVICE CONNECTIONS AND LATERAL WATER MAINS FOR SIDE STREETS SHALL THEN BE TRANSFERRED TO THE NEW 16 INCH WATER MAIN. ONCE ALL SERVICES AND LATERAL MAINS HAVE BEEN TRANSFERRED TO THE NEW 16 INCH MAIN IN CONCORD AVENUE, THE EXISTING WATER PIPES SHALL BE ABANDONED. THESE SUGGESTIONS HAVE BEEN PRESENTED TO ILLUSTRATE THE DESIGN INTENT, BUT THE MEANS AND METHODS OF CONSTRUCTION ARE THE CONTRACTOR'S RESPONSIBILITY. CONTRACTOR SHALL COORDINATE ALL TEMPORARY SHUT DOWNS OF EXISTING WATER MAINS AND SERVICE CONNECTIONS WITH THE CAMBRIDGE WATER DEPARTMENT AND EACH AFFECTED USER. CONTRACTOR IS FURTHER ADVISED THAT THERE ARE SENSITIVE WATER USERS IN THIS AREA, AND SHALL ENDEAVOR TO MINIMIZE DISRUPTION OF THEIR WATER SERVICE.

33. THE CAMBRIDGE WATER DEPARTMENT RESERVES THE RIGHT TO LIMIT THE AMOUNT OF EXISTING WATER MAINS AND HYDRANTS WHICH MAY BE OFFLINE OR OUT OF SERVICE AT ANY TIME DURING CONSTRUCTION. THE SAFETY AND INTEGRITY OF THE WATER DISTRIBUTION SYSTEM IS OF PRIME IMPORTANCE.

34. CONTRACTOR SHALL SAW CUT ALL EXISTING PAVEMENT PRIOR TO EXCAVATION FOR INSTALLATION OF NEW WATER MAINS, INCLUDING REINFORCED CONCRETE SUBBASE, IF ENCOUNTERED, TO ITS FULL DEPTH. BORING LOGS THAT DOCUMENT EXISTING PAVEMENT AND SOIL CONDITIONS ARE PROVIDED IN THE CONTRACT DOCUMENTS. CONTRACTOR IS ADVISED THAT A REINFORCED CONCRETE SUBBASE EXISTS BELOW THE PAVEMENT IN MUCH OF THE PROJECT AREA.

35. WHERE INOPERABLE SIDE LINE VALVES PREVENT WATER MAIN SHUT DOWNS FOR NEW WATER MAIN CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE A TEST PIT, CUT INTO THE EXISTING WATER MAIN AND INSERT A TEMPORARY CAP OR PLUG. ALL OF THIS WORK SHALL BE PAID FOR UNDER THE RESPECTIVE ITEMS FOR TEST PITS AND DI FITTINGS ON THE BID FORM.

36. CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING WATER MAINS AND APPURTENANCES NECESSARY TO MAKE REQUIRED CONNECTIONS. ALL EXISTING WATER MAINS TO BE ABANDONED SHALL BE DRAINED AND CAPPED/PLUGGED. ABANDONED WATER MAINS SHALL NOT REMAIN UNDER PRESSURE. CONTRACTOR SHALL REMOVE ALL EXISTING VALVE BOXES AND COVERS FOR EXISTING VALVES ON WATER MAINS TO BE ABANDONED IN PLACE THROUGHOUT THE ENTIRE PROJECT AREA.

37. ALL EXISTING WATER PIPE, VALVES, HYDRANTS, SERVICE CONNECTIONS AND APPURTENANCES REMOVED SHALL BE DISPOSED OF BY THE CONTRACTOR IN FULL ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.

38. INSTALL NEW PIPES, VALVES, FITTINGS AND HYDRANTS AS SHOWN ON THE DRAWINGS. THE MINIMUM BURY DEPTH FOR NEW WATER MAINS SHALL BE AT LEAST 5 FEET. APPROXIMATE LOCATIONS OF EXISTING UTILITIES WHICH CROSS THESE NEW WATER MAINS ARE SHOWN ON THE DRAWINGS. LOCATIONS OF NEW WATER MAINS MAY BE ADJUSTED BY THE ENGINEER TO AVOID CONFLICTS WITH OTHER UTILITIES OR BASED ON FIELD CONDITIONS ENCOUNTERED DURING CONSTRUCTION. HYDRANTS SHALL BE INSTALLED AT THE BACK EDGE (PROPERTY SIDE) OF ALL SIDE WALKS IN SUCH A LOCATION SO AS TO ALLOW FOR COMPLETE TURNING OF A STANDARD HYDRANT WRENCH. THE CAMBRIDGE FIRE DEPARTMENT SHALL BE CONTACTED BY THE CONTRACTOR TO APPROVE ANY FIELD ADJUSTMENTS TO PROPOSED HYDRANT LOCATIONS.

39. CONTRACTOR SHALL MAINTAIN A MINIMUM VERTICAL CLEARANCE OF AT LEAST 12 INCHES BETWEEN NEW WATER MAINS AND ALL OTHER UTILITIES EXCEPT SANITARY SEWERS. CONTRACTOR SHALL MAINTAIN AN 18 INCH MINIMUM VERTICAL CLEARANCE BETWEEN THE BOTTOM OF NEW WATER MAINS AND THE CROWN OF ANY SEWER WHEN THE WATER MAIN IS LAID WITHIN 10 FEET EDGE TO EDGE OF THE SEWER OR DRAIN. TO THE EXTENT POSSIBLE, THE CONTRACTOR SHALL MAINTAIN A MINIMUM 10 FOOT LATERAL SEPARATION BETWEEN NEW WATER MAINS AND ANY EXISTING SEWER, EXCEPT WHEN IT IS NECESSARY TO CROSS AN EXISTING SEWER OR UNLESS OTHERWISE DIRECTED BY THE ENGINEER. THE HORIZONTAL DISTANCE BETWEEN NEW WATER MAINS AND ALL OTHER UTILITIES SHALL BE AT LEAST 3 FEET.

40. NEW WATER MAINS SHALL PASS UNDER ALL EXISTING UTILITIES EXCEPT SEWERS, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. IF WATER MAINS MUST CROSS UNDER SEWERS, THE NEW WATER MAIN SHALL BE CONCRETE ENCASED BY THE CONTRACTOR. TO THE EXTENT POSSIBLE, THE CONTRACTOR SHALL INSTALL ONE FULL LENGTH OF NEW WATER PIPE CENTERED BELOW THE SEWER CROSSING SO THAT THE WATER MAIN JOINTS WILL BE AS FAR AWAY FROM THE SEWER AS POSSIBLE. WATER MAINS THAT MUST CROSS UNDER EXISTING SEWERS SHALL BE CONSTRUCTED OF MECHANICAL JOINT PIPE, RESTRAINED AS NECESSARY. THE CROWN OF ANY NEW WATER MAIN THAT MUST CROSS UNDER AN EXISTING SEWER AT MINIMUM SHOULD BE 18 INCHES BELOW THE INVERT OF THE SEWER.

41. UNLESS SPECIFICALLY SHOWN, NEW DUCTILE-IRON VERTICAL BENDS ARE NOT SHOWN ON THE DRAWINGS. CONTRACTOR SHALL INSTALL VERTICAL BENDS OF THE NECESSARY SIZE REQUIRED TO CROSS EXISTING UTILITIES AND TO COMPLETE ALL REQUIRED CONNECTIONS BASED ON FIELD CONDITIONS ENCOUNTERED.

42. ALL NEW WATER MAIN FITTINGS AND VALVES SHALL BE RESTRAINED AS SPECIFIED. MINIMUM THRUST RESTRAINT REQUIREMENTS FOR WATER MAIN CONSTRUCTION ARE SHOWN ON THE DRAWINGS.

43. ALL NEW VALVES IN STREET INTERSECTIONS SHALL BE CONNECTED DIRECTLY TO NEW CROSSES AND TEES, UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR DIRECTED BY THE ENGINEER OR CAMBRIDGE WATER DEPARTMENT.

44. CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING HYDRANTS WHERE AND AS SHOWN ON THE DRAWINGS.

45. CONTRACTOR SHALL USE CAUTION AND TAKE CARE TO AVOID DAMAGE TO ALL EXISTING UTILITIES AND SERVICES DURING CONSTRUCTION. CONTRACTOR SHALL PROTECT AND SUPPORT ALL EXISTING UTILITIES DURING THE INSTALLATION OF NEW WATER MAINS, VALVES, HYDRANTS, SERVICES AND APPURTENANCES. ANY DAMAGE RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY HIM/HER AT HIS/HER EXPENSE AND AT NO ADDITIONAL COST TO THE CITY OF CAMBRIDGE.

46. CONTRACTOR SHALL REPLACE SERVICE CONNECTIONS AS SHOWN ON THE DRAWINGS AND AS SPECIFIED. EXISTING SERVICE CONNECTIONS SHALL BE REPLACED WITH A NEW CORPORATION STOP, COPPER SERVICE TUBING, CURB STOP AND FITTINGS AND ADAPTERS OF THE NECESSARY SIZE REQUIRED AND AT LEAST EQUAL TO THE EXISTING SERVICE CONNECTION SIZE. THE MINIMUM SIZE OF ALL NEW SERVICE CONNECTIONS IS ONE INCH. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, EXISTING SERVICE CONNECTIONS ARE TO REMAIN AND SHALL BE CONNECTED TO NEW WATER MAINS BY THE CONTRACTOR. THE LOCATION OF EXISTING SERVICE CONNECTIONS IS PROVIDED FOR CONVENIENCE ONLY. IT IS NOT WARRANTED THAT ALL EXISTING SERVICE CONNECTIONS ARE SHOWN ON THE DRAWINGS. THIS DOES NOT RELIEVE THE CONTRACTOR OF DETERMINING THE LOCATION OF SERVICE CONNECTIONS TO BE RECONNECTED TO NEW WATER MAINS. CONTRACTOR SHALL ENSURE THAT ALL EXISTING SERVICE CONNECTIONS, WHETHER OR NOT THEY ARE SHOWN ON THE DRAWINGS, HAVE BEEN TRANSFERRED AND PROPERLY ACTIVATED/SUPPLIED BY THE NEW WATER MAINS. CONTRACTOR SHALL COORDINATE THIS REQUIREMENT WITH THE CAMBRIDGE WATER DEPARTMENT.

47. CONTRACTOR SHALL VERIFY ALL EXISTING WATER MAINS AND SERVICES TO BE ABANDONED WITH THE CAMBRIDGE WATER DEPARTMENT.

48. ALL NEW MATERIALS FOR WATER SYSTEM CONSTRUCTION SHALL BE AS SPECIFIED AND BE OF THE TYPE CURRENTLY USED BY THE CAMBRIDGE WATER DEPARTMENT. ALL MATERIALS SHALL BE INSTALLED AS SPECIFIED.

49. AS SHOWN ON THE DRAWINGS, THE NEW 16" WATER MAIN IN CONCORD AVENUE SHALL BE INSTALLED WITHIN THE LIMITS OF THE BIKE PATH ON THE SOUTH SIDE OF CONCORD AVENUE. CONTRACTOR SHALL INSTALL NEW WATER MAINS AS SPECIFIED AND AS SHOWN ON THE DRAWINGS. WATER MAIN TRENCHES SHALL BE BACKFILLED AND COMPACTED AND THE PAVEMENT SUBBASE RESTORED AS SPECIFIED AND AS SHOWN ON THE DRAWINGS. CONTRACTOR SHALL FURNISH AND INSTALL TEMPORARY TRENCH-WIDTH PAVEMENT FOR ALL WATER MAIN TRENCHES. FINAL PAVEMENT, SIDEWALK AND LANDSCAPE RESTORATION SHALL BE COMPLETED AS PART OF THE CONCORD AVENUE ROADWAY RESTORATION PART OF THIS CONTRACT.

50. THE CAMBRIDGE WATER DEPARTMENT WILL PROVIDE A SOURCE OF SUPPLY FROM THE EXISTING TREATED WATER DISTRIBUTION SYSTEM FOR CONTRACTOR'S USE IN FILLING AND FLUSHING WATER MAINS. AN AIR BREAK SHALL BE MAINTAINED AT ALL TIMES BETWEEN THE DISTRIBUTION SYSTEM AND CONTRACTOR'S EQUIPMENT TO PREVENT CROSS-CONNECTION. CONTRACTOR SHALL PROVIDE A SUITABLE MEANS OF BACKFLOW PREVENTION TO PREVENT CROSS-CONNECTION. THE MEANS AND METHODS EMPLOYED FOR BACKFLOW PREVENTION ARE SUBJECT TO THE REVIEW AND APPROVAL OF THE CAMBRIDGE WATER DEPARTMENT. CONTRACTOR SHALL ALSO PROVIDE MEANS OF MEASURING THE TOTAL VOLUME OF WATER USED FOR CONSTRUCTION PURPOSES (FLUSHING, PRESSURE/LEAKAGE TESTS, DISINFECTION, FILLING LINES, ETC). EVIDENCE OF CALIBRATION SHALL BE FURNISHED BY CONTRACTOR FOR ANY METERING DEVICES. CONTROLLER SHALL NOT KNOWINGLY ALLOW WATER TO LEAK OR RUN TO UNNECESSARY WASTE. THE CAMBRIDGE WATER DEPARTMENT RESERVES THE RIGHT TO LIMIT THE QUANTITY OF WATER PROVIDED TO THE CONTRACTOR AT NO COST FOR CONSTRUCTION PURPOSES.

51. ANY EXISTING TRAFFIC SIGNAL EQUIPMENT SCHEDULED TO BE RETAINED (INCLUDING CONDUIT AND LOOP DETECTORS) DAMAGED BY CONTRACTOR'S ACTIVITIES SHALL BE REPLACED IN KIND AT NO ADDITIONAL COST.

MINIMUM THRUST RESTRAINT REQUIREMENTS

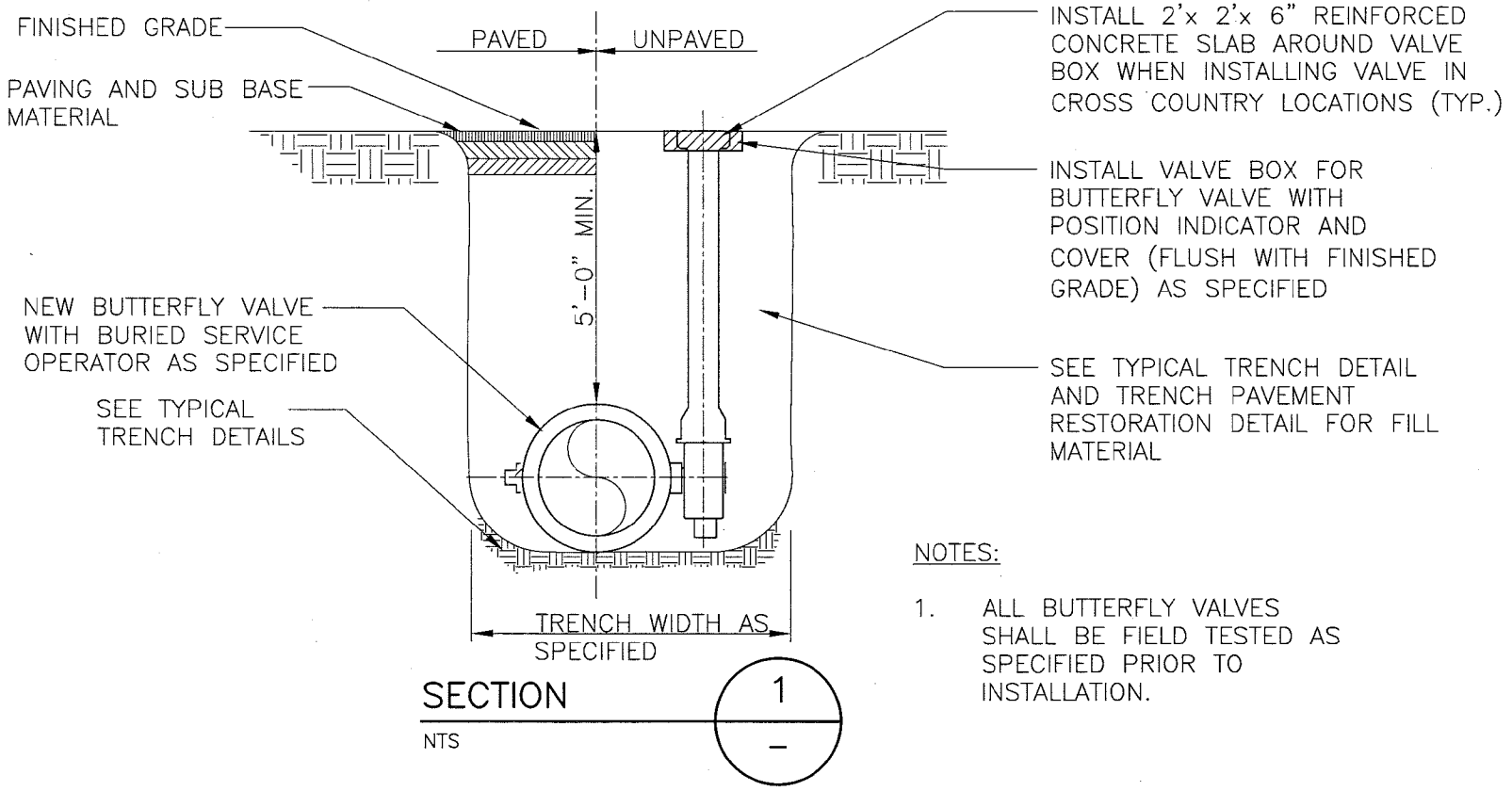
FITTING TYPE	FITTING SIZE	RESTRAINT LENGTH (FEET)	THRUST BLOCK BEARING AREA (SQUARE FEET)	THRUST BLOCK VOLUME (CUBIC FEET)
HORIZONTAL BENDS	16"-1/4	76	32	N/A
	16"-1/8	32	12	N/A
	16"-1/16	15	6	N/A
	16"-1/32	8	3	N/A
	12"-1/4	61	12	N/A
	12"-1/8	25	7	N/A
	12"-1/16	12	4	N/A
	12"-1/32	6	2	N/A
	10"-1/4	52	9	N/A
	10"-1/8	22	5	N/A
	10"-1/16	10	3	N/A
	10"-1/32	5	2	N/A
	8"-1/4	43	6	N/A
	8"-1/8	18	3	N/A
	8"-1/16	9	2	N/A
	8"-1/32	4	1	N/A
	6"-1/4	33	3	N/A
	6"-1/8	14	2	N/A
	6"-1/16	7	1	N/A
	6"-1/32	3	1	N/A
	4"-1/4	24	2	N/A
	4"-1/8	10	1	N/A
	4"-1/16	5	1	N/A
	4"-1/32	2	1	N/A
TEES	16"x16"	166	16	N/A
	16"x12"	129	9	N/A
	16"x10"	109	6	N/A
	16"x8"	89	4	N/A
	16"x6"	67	3	N/A
	16"x4"	45	1	N/A
	12"x12"	129	9	N/A
	12"x10"	109	6	N/A
	12"x8"	90	4	N/A
	12"x6"	68	3	N/A
	12"x4"	46	1	N/A
	10"x10"	110	6	N/A
	10"x8"	90	4	N/A
	10"x6"	69	3	N/A
	10"x4"	47	1	N/A
	8"x8"	90	4	N/A
	8"x6"	69	3	N/A
	8"x4"	47	1	N/A
	6"x6"	69	3	N/A
	6"x4"	48	1	N/A
REDUCERS	16"x12"	71	7	N/A
	16"x10"	99	10	N/A
	16"x8"	122	12	N/A
	16"x6"	141	13	N/A
	16"x4"	154	15	N/A
	12"x10"	36	3	N/A
	12"x8"	59	5	N/A
	12"x6"	94	7	N/A
	12"x4"	113	8	N/A
	10"x8"	37	3	N/A
	10"x6"	66	4	N/A
	10"x4"	80	5	N/A
	8"x6"	38	5	N/A
	8"x4"	66	3	N/A
	6"x4"	36	2	N/A
VALVES / CAPS / PLUGS	16"	167	16	N/A
	12"	136	9	N/A
	10"	111	6	N/A
	8"	91	4	N/A
	6"	71	3	N/A
	4"	50	1	N/A
VERTICAL OFFSETS / BENDS (UPPER BEND)	16"-1/4	59	5	367
	16"-1/8	33	2	145
	16"-1/32	16	1	74
	12"-1/8	54	3	168
	12"-1/16	26	1	82
	12"-1/32	13	1	42
	10"-1/8	46	2	105
	10"-1/16	22	1	57
	10"-1/32	11	1	29
	8"-1/8	36	2	67
	8"-1/16	18	1	37
	8"-1/32	9	1	19
	6"-1/8	29	1	36
	6"-1/16	14	1	21
	6"-1/32	7	1	11
	4"-1/8	21	1	17
	4"-1/16	10	1	19
	4"-1/32	5	1	5
VERTICAL OFFSETS / BENDS (LOWER BEND)	16"-1/8	32	5	267
	16"-1/16	15	2	145
	16"-1/32	8	1	74
	12"-1/8	26	3	168
	12"-1/16	13	1	82
	12"-1/32	6	1	42
	10"-1/8	22	2	105
	10"-1/16	10	1	57
	10"-1/32	5	1	29
	8"-1/8	18	2	67
	8"-1/16	9	1	37
	8"-1/32	4	1	19
	6"-1/8	14	1	36
	6"-1/16	7	1	21
	6"-1/32	3	1	11
	4"-1/8	10	1	17
	4"-1/16	5	1	10
	4"-1/32	2	1	5

WATER MAIN THRUST RESTRAINT TABLES

CDM

CITY OF CAMBRIDGE, MASSACHUSETTS
CONCORD AVENUE
WATER MAIN AND ROADWAY RECONSTRUCTION

0139-68660	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
DATE 02/11/10	3	GENERAL NOTES	1	SK-1



NOTES:

1. ALL BUTTERFLY VALVES SHALL BE FIELD TESTED AS SPECIFIED PRIOR TO INSTALLATION.

SECTION 1/–

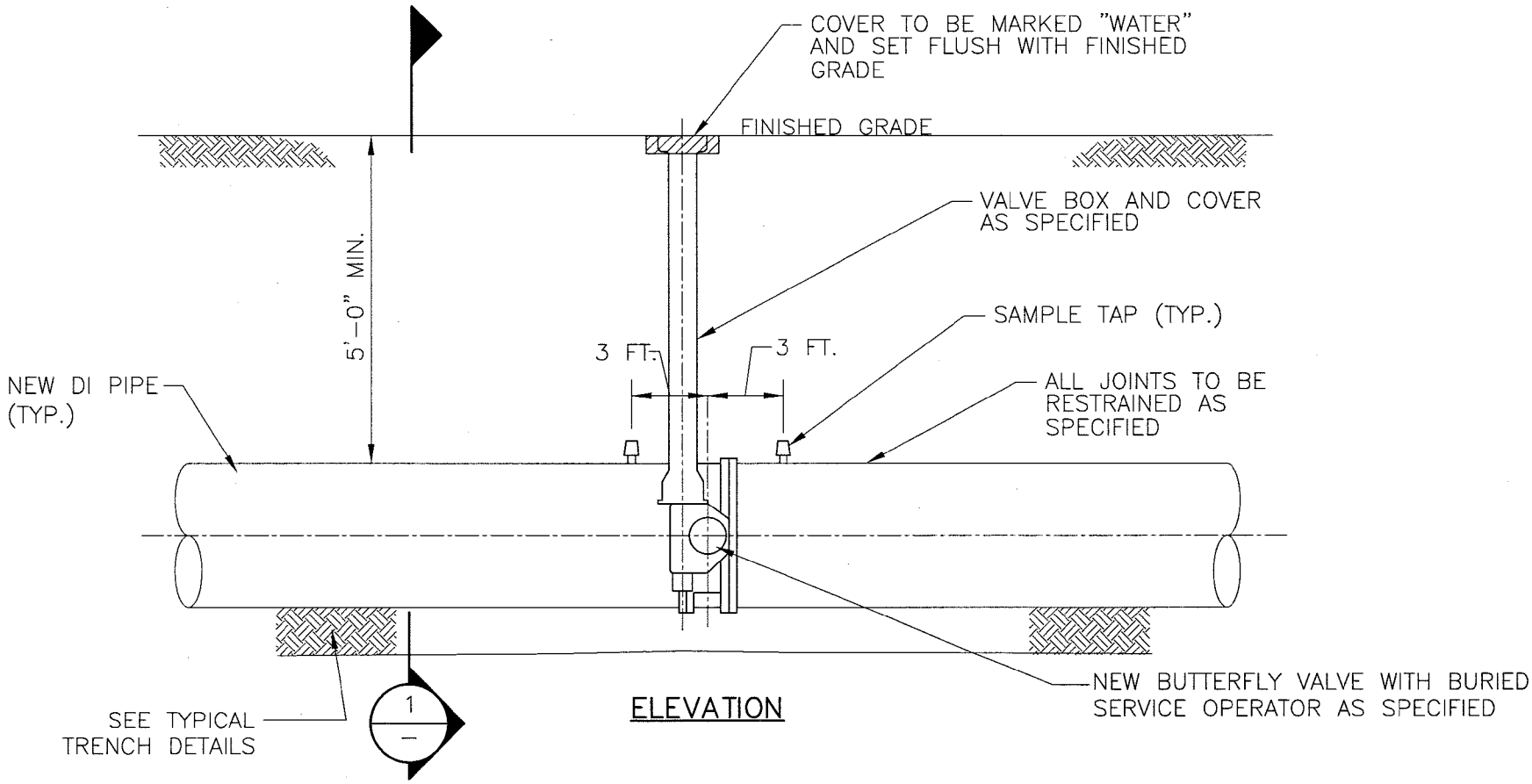
NTS

TYPICAL BUTTERFLY VALVE AND BOX DETAIL

NTS

CDM

CITY OF CAMBRIDGE, MASSACHUSETTS CONCRD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION			ADDENDUM NO.	FIGURE NO.
0139–68660	SHEET NO.	LOCATION		
DATE 02/11/10	9	WATER MAIN CONSTRUCTION DETAILS I	1	SK–2

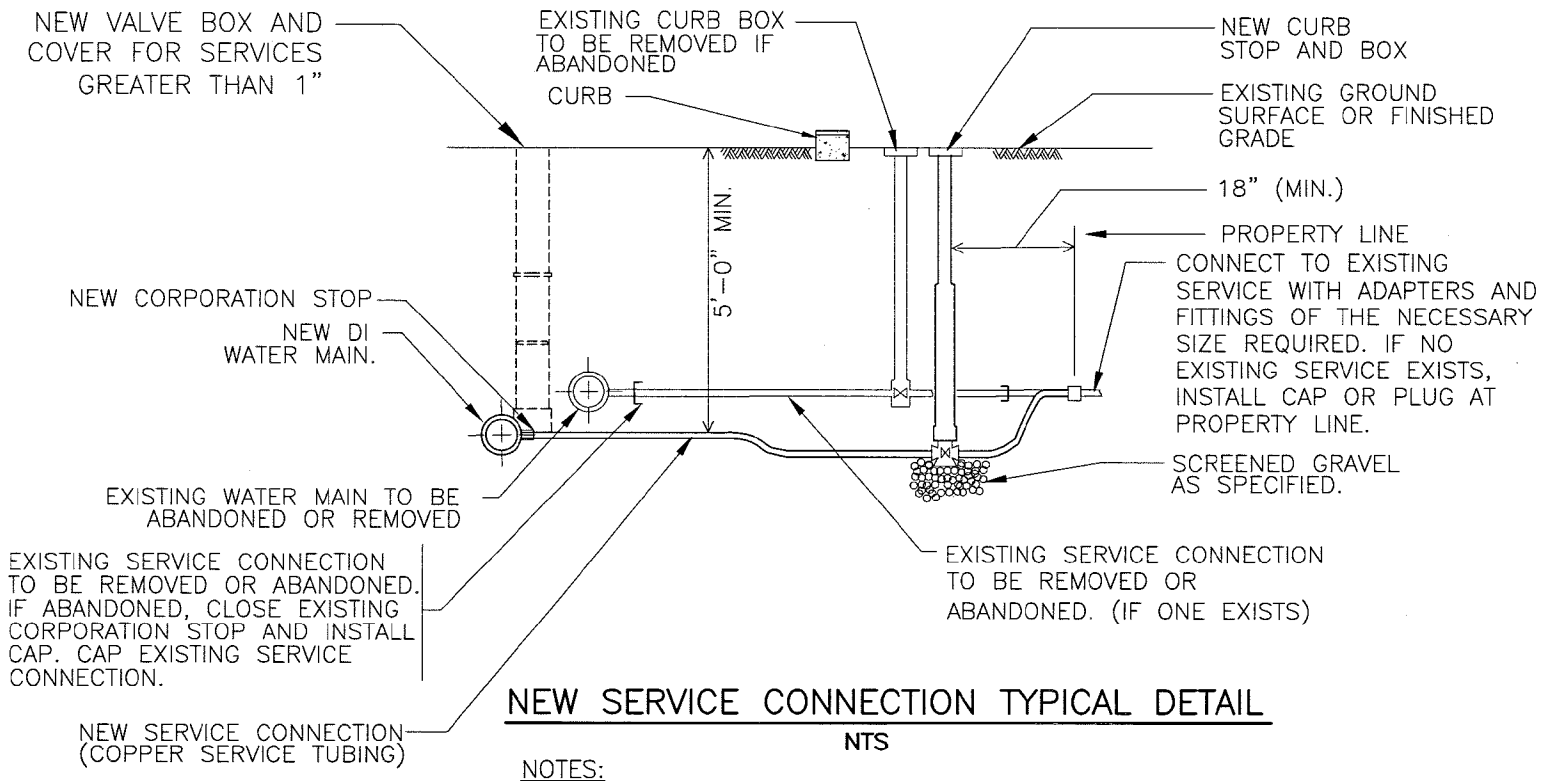


TYPICAL BUTTERFLY VALVE AND BOX DETAIL

NTS

CDM

CITY OF CAMBRIDGE, MASSACHUSETTS CONCRD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION			ADDENDUM NO.	FIGURE NO.
0139-68660	SHEET NO.	LOCATION		
DATE 02/11/10	9	WATER MAIN CONSTRUCTION DETAILS I	1	SK-3



NEW SERVICE CONNECTION TYPICAL DETAIL

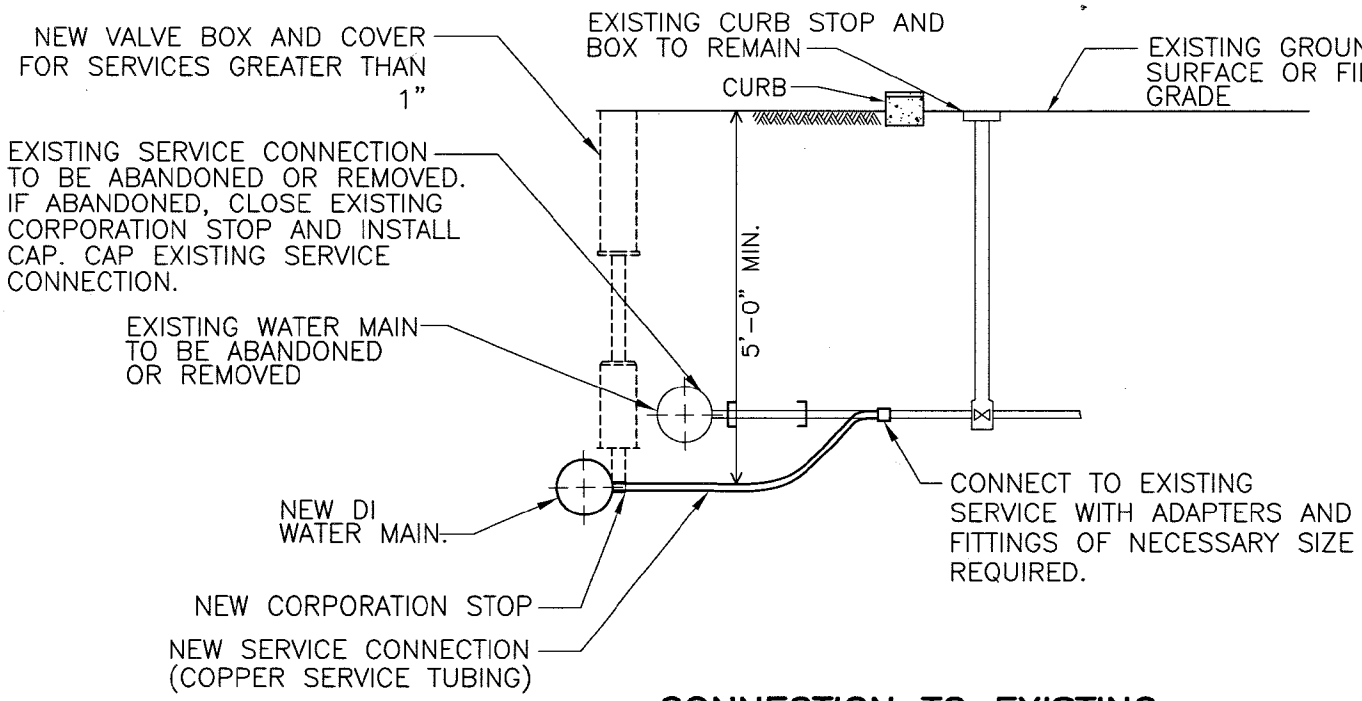
NTS

NOTES:

1. FOR SERVICES GREATER THAN 1" AND UP TO 2", A VALVE BOX AND COVER SHALL BE INSTALLED OVER THE NEW CORPORATION STOP AT THE MAIN AND NO CURB STOP AND BOX IS REQUIRED.

2. ALL CONNECTIONS OF SERVICE CONNECTIONS TO WATER MAINS SHALL RUN 90° PERPENDICULAR (THE TAPPING ANGLE IS 90° PERPENDICULAR) TO THE MAIN LINE WATER PIPE.

CDM	CITY OF CAMBRIDGE, MASSACHUSETTS CONCRD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION			ADDENDUM NO.	FIGURE NO.
	0139-68660	SHEET NO.	LOCATION		
	DATE 02/11/10	9	WATER MAIN CONSTRUCTION DETAILS I	1	SK-4



CONNECTION TO EXISTING SERVICE TYPICAL DETAIL

NTS

NOTES:

1. FOR SERVICES GREATER THAN 1" AND UP TO 2", A VALVE BOX AND COVER SHALL BE INSTALLED OVER THE NEW CORPORATION STOP AT THE MAIN AND NO CURB STOP AND BOX IS REQUIRED.

2. ALL CONNECTIONS OF SERVICE CONNECTIONS TO WATER MAINS SHALL RUN 90° PERPENDICULAR (THE TAPPING ANGLE IS 90° PERPENDICULAR) TO THE MAIN LINE WATER PIPE.

CDM	CITY OF CAMBRIDGE, MASSACHUSETTS CONCRD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION			ADDENDUM NO.	FIGURE NO.
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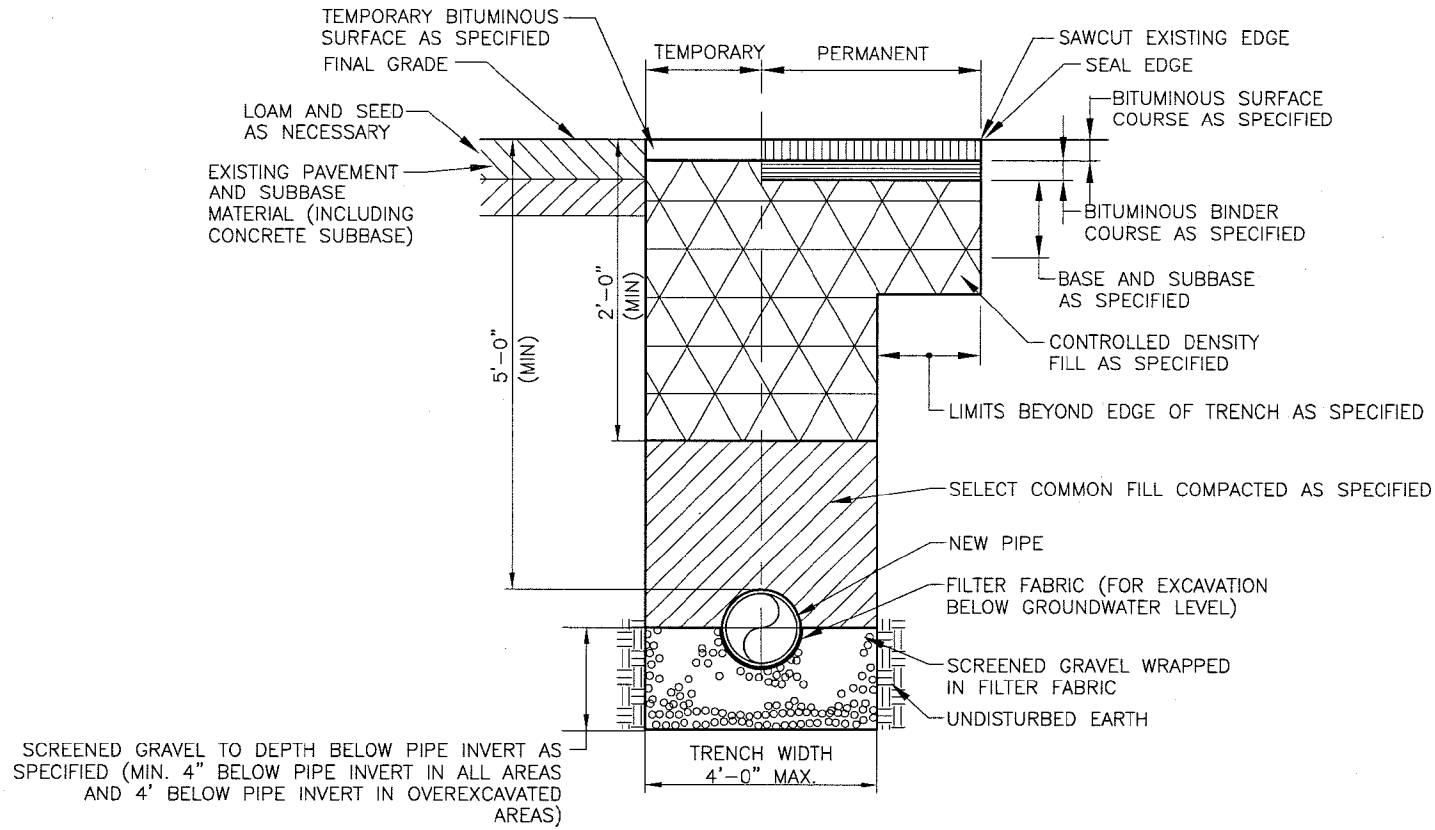


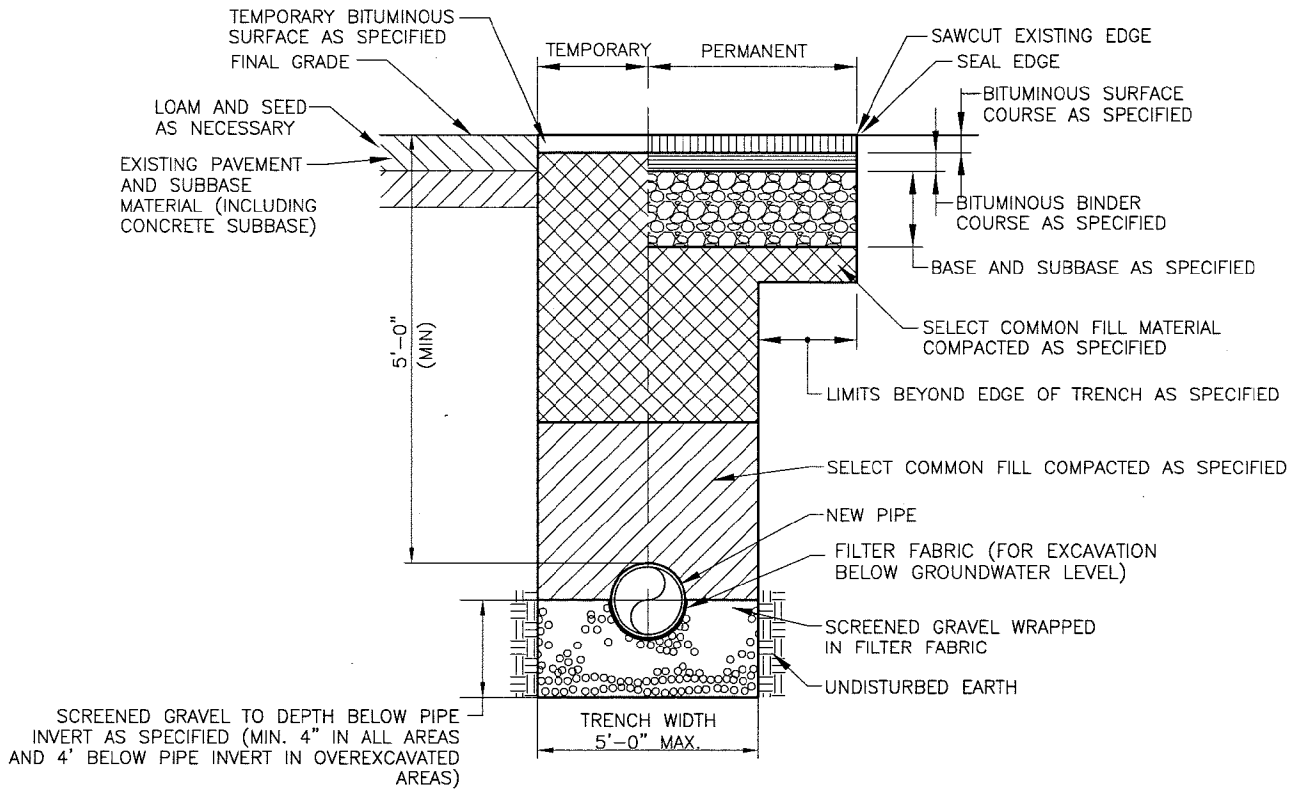
TRENCH AND PAVEMENT RESTORATION DETAIL FOR LATERAL WATER MAIN AND SERVICE TRENCHES (12" DIAMETER AND SMALLER PIPES)

NTS

NOTES:

1. BACKFILL, COMPACTION AND PAVEMENT RESTORATION SHALL BE AS SPECIFIED.

CDM	CITY OF CAMBRIDGE, MASSACHUSETTS CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION			ADDENDUM NO.	FIGURE NO.
	0139-68660	SHEET NO.	LOCATION		
	DATE 02/11/10	11	MISCELLANEOUS DETAILS I	1	SK-6



TRENCH AND PAVEMENT RESTORATION DETAIL FOR NEW 16" DI WATER PIPE ALONG CONCORD AVENUE

NTS

NOTES:

1. BACKFILL, COMPACTION AND PAVEMENT RESTORATION SHALL BE AS SPECIFIED.

CDM	CITY OF CAMBRIDGE, MASSACHUSETTS CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION			ADDENDUM NO.	FIGURE NO.
	0139-68660	SHEET NO.	LOCATION		
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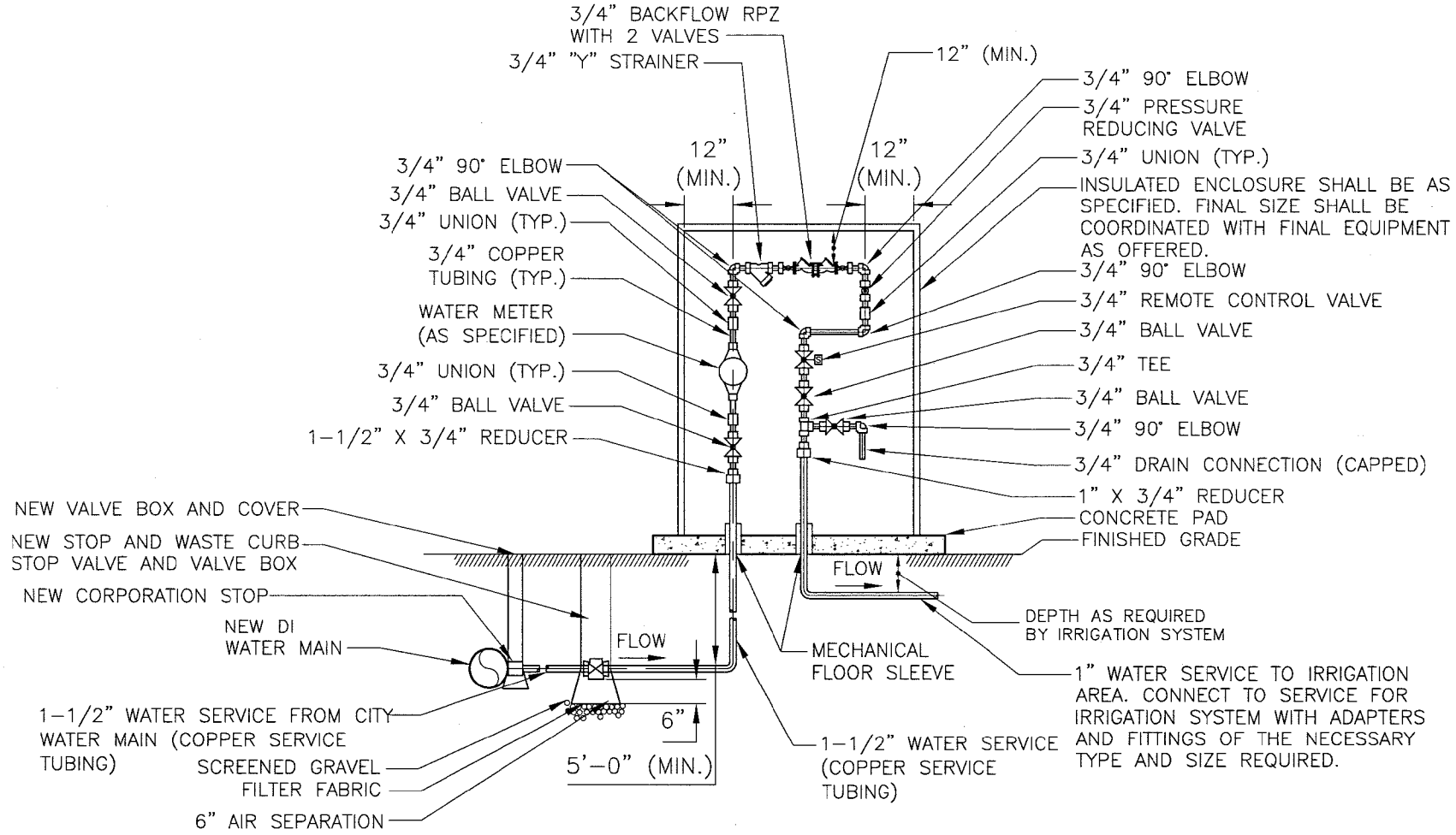
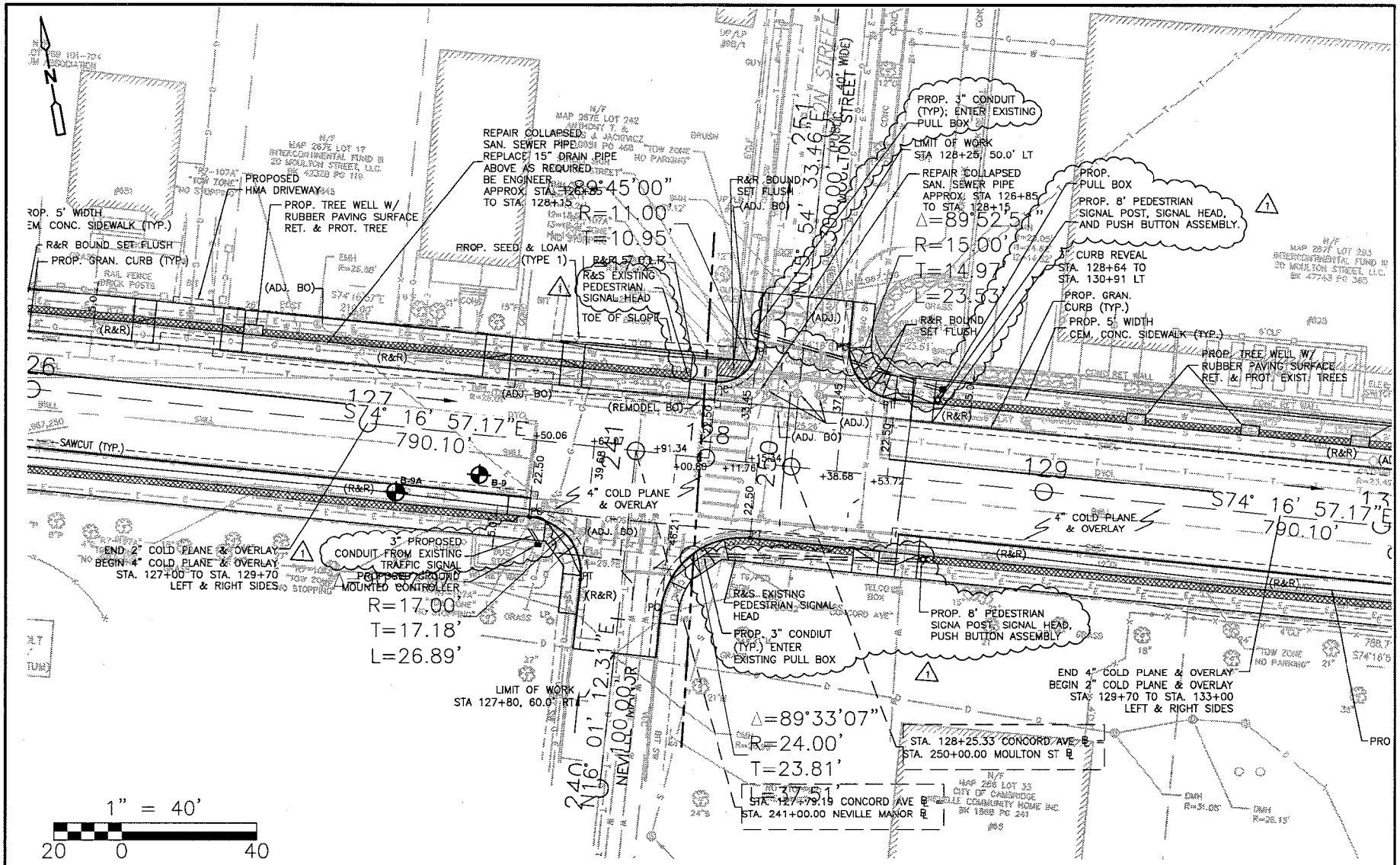


IRRIGATION CONTROL BOX DETAIL

NOT TO SCALE

CDM

CITY OF CAMBRIDGE, MASSACHUSETTS CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION			ADDENDUM NO.	FIGURE NO.
0139-68660	SHEET NO.	LOCATION		
DATE 02/11/10	11	MISCELLANEOUS DETAILS I	1	SK-8



CDM		CITY OF CAMBRIDGE, MASSACHUSETTS CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION			ADDENDUM NO.	FIGURE NO.
		0139–68660	SHEET NO.	LOCATION		
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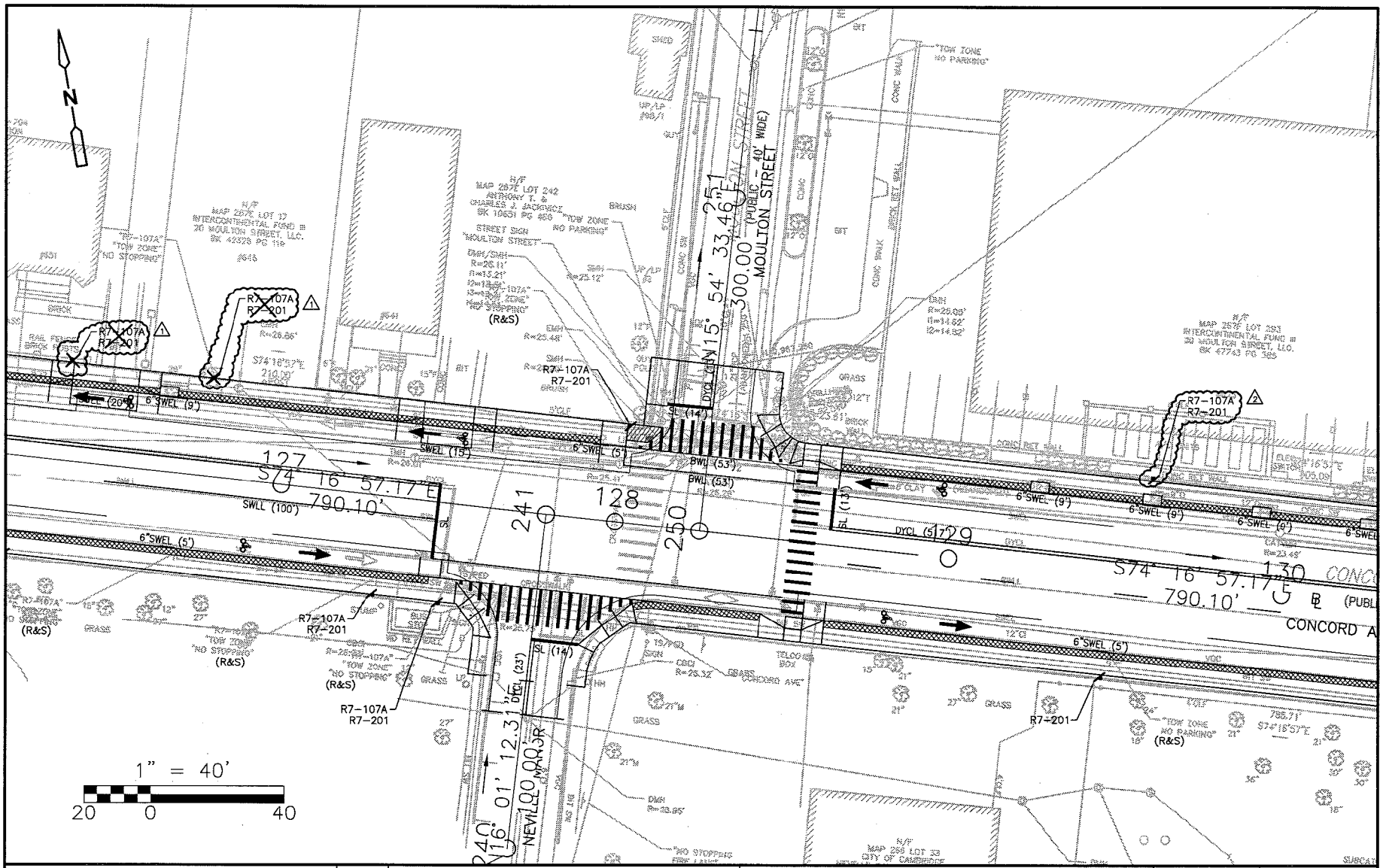
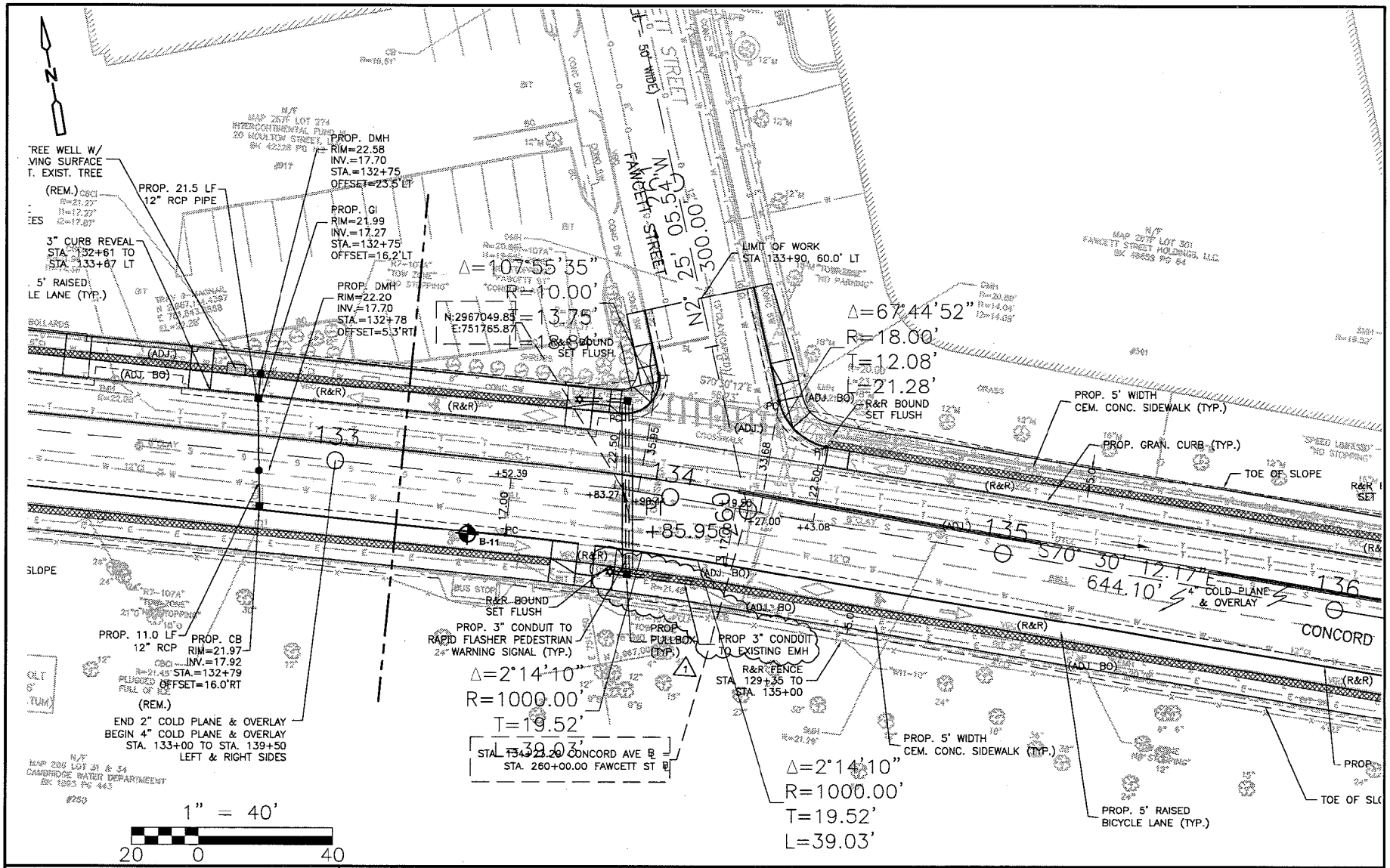
	NUMBER DESCRIPTION REVISIONS					



CDM		CITY OF CAMBRIDGE, MASSACHUSETTS CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION			ADDENDUM NO.	FIGURE NO.
		0139-68660	SHEET NO.	LOCATION		
2	ADD SIGN LEGEND, LEADER, AND SYMBOL	DATE 02/11/10	61	STA 126+50 TO STA 130+25	1	SK-10
1	REMOVE SIGN LEGEND, LEADER, AND SYMBOL					
NUMBER	DESCRIPTION					
	REVISIONS					



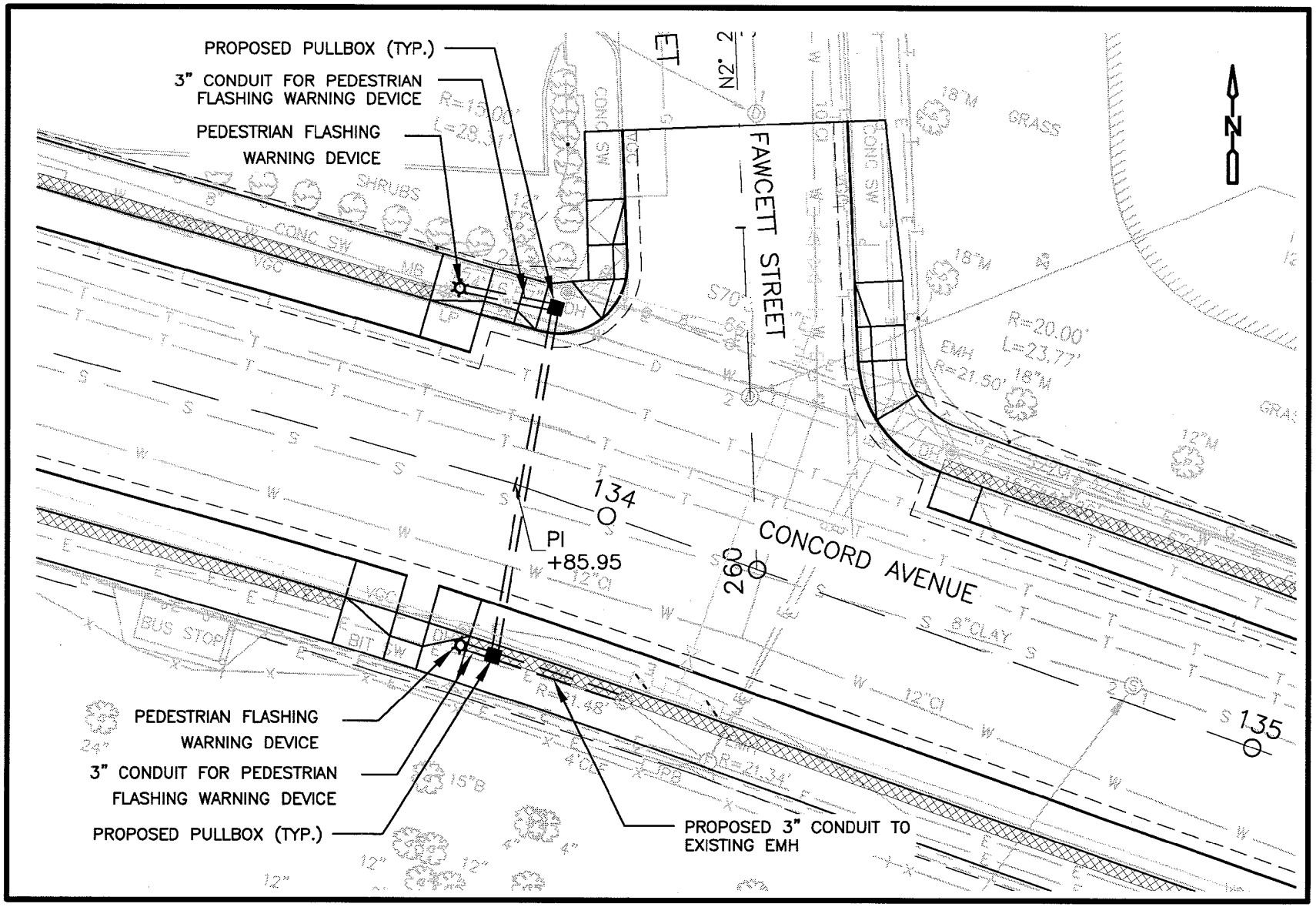
CDM

NUMBER	DESCRIPTION
1	ADDED NOTES & CONDUIT, MOVED PEDESTRIAN FLASHER

REVISIONS

CITY OF CAMBRIDGE, MASSACHUSETTS
CONCORD AVENUE
WATER MAIN AND ROADWAY RECONSTRUCTION

0139-68660	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
DATE 02/11/10	36	STA. 132+10 TO STA. 136+15	1	SK-11



CDM

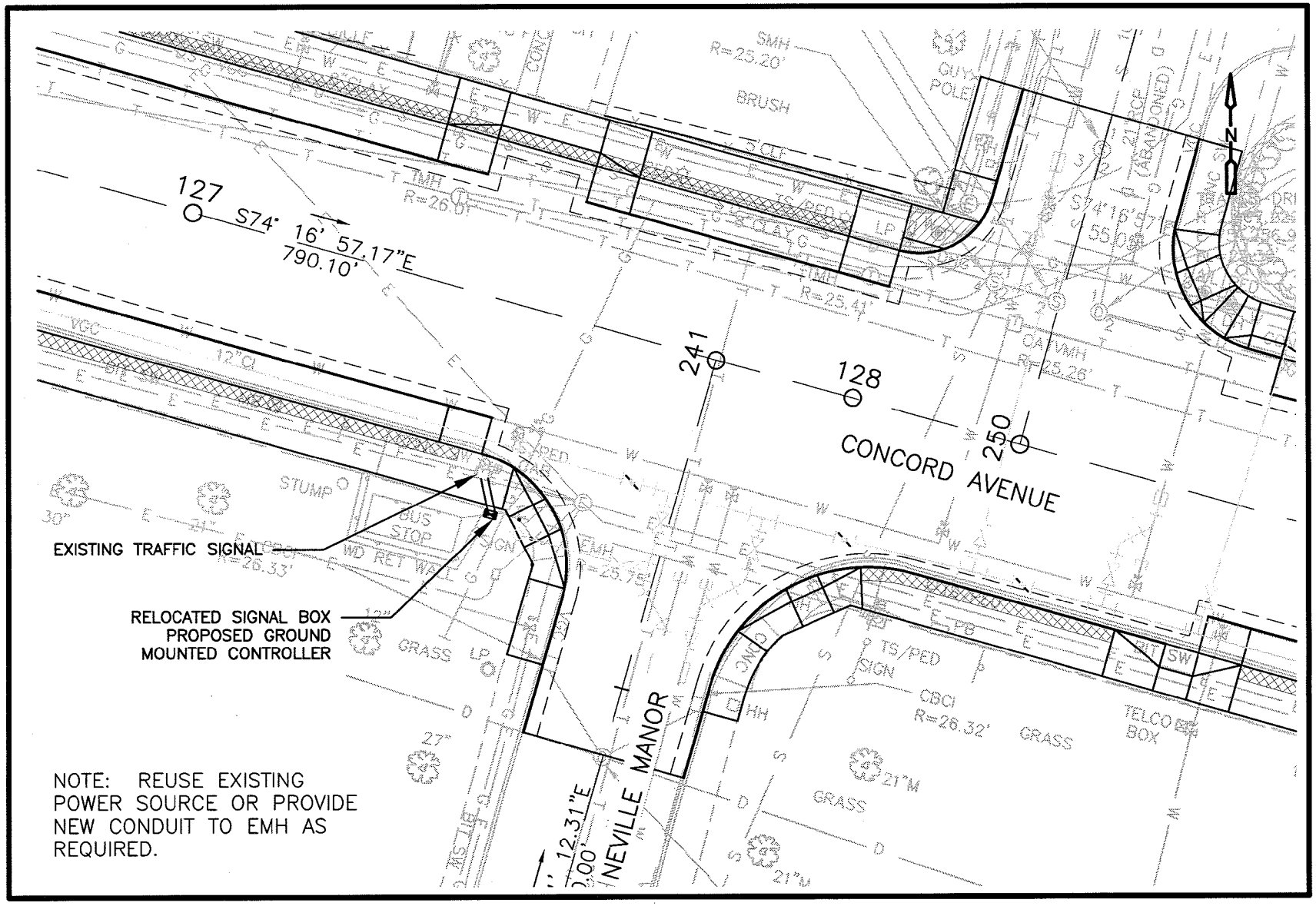
consulting • engineering • construction • operations

1" = 20'

10 0 20

Figure No. ---
Figure Titile

FAWCETT STREET AND CONCORD AVENUE



CDM

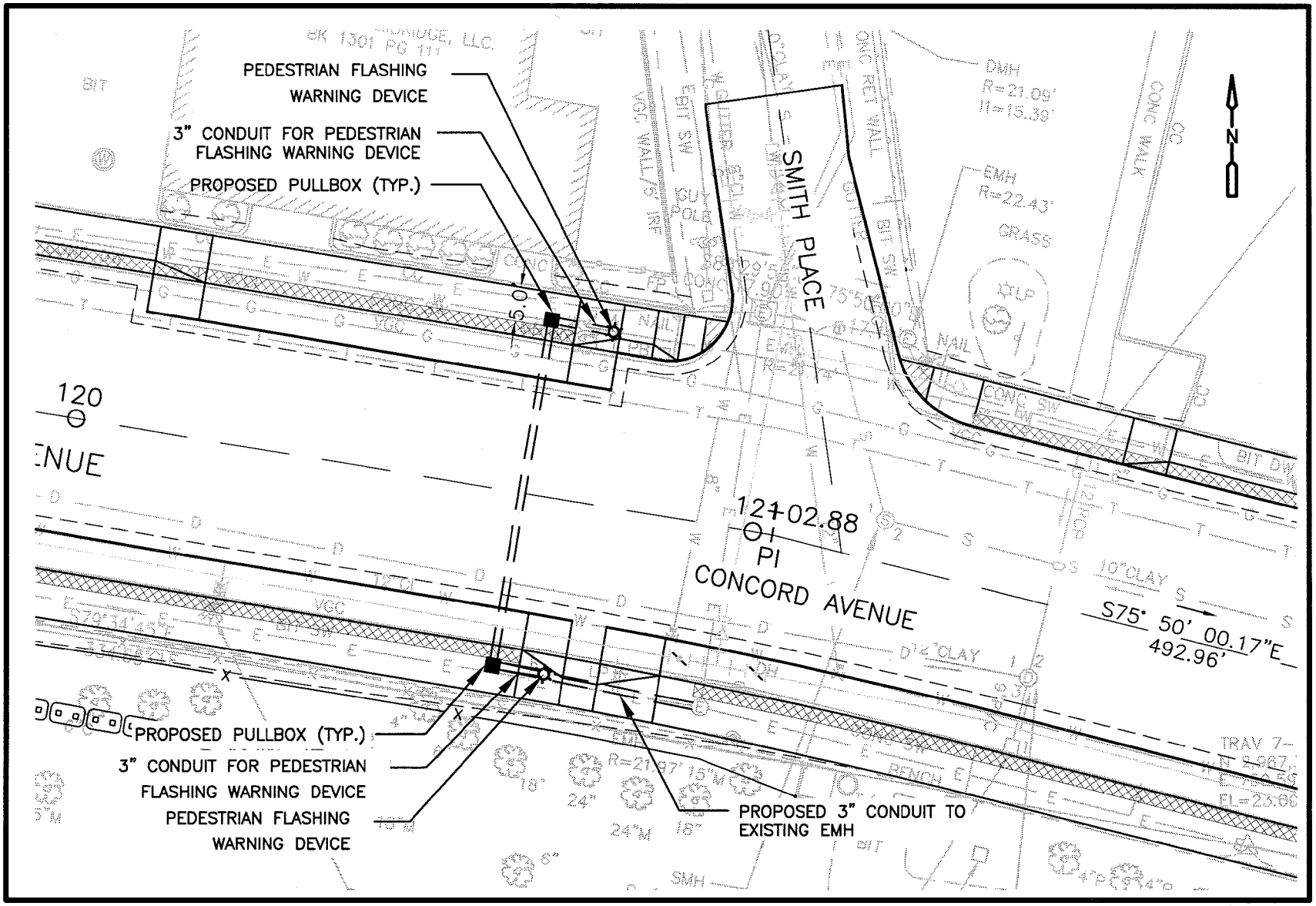
consulting • engineering • construction • operations

1" = 20'

10 0 20

Figure No. ---
Figure Titile

NEVILLE MANOR AND
CONCORD AVENUE



CDM

consulting • engineering • construction • operations

1" = 20'

10 0 20

Figure No. ---
Figure Titile

SMITH PLACE AND CONCORD AVENUE

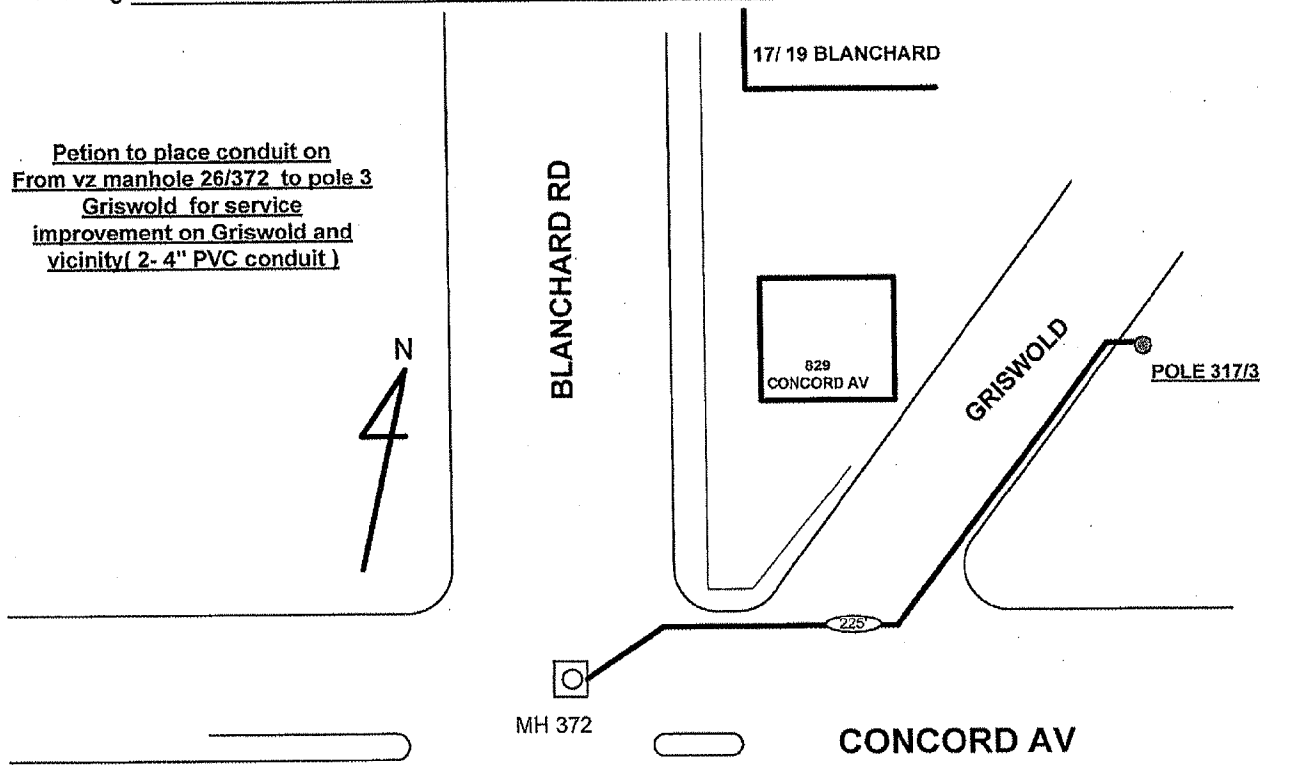
PETITION PLAN

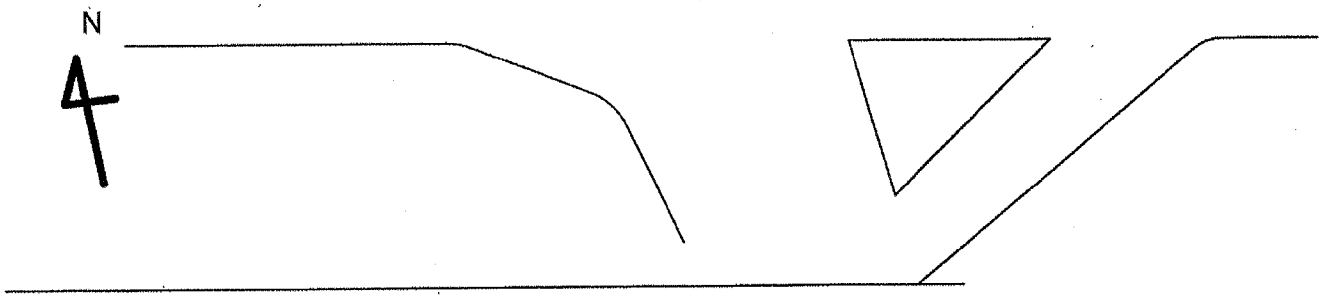
JOB No. _____

Municipality CAMBRIDGE Date 11/17/09

VERIZON NEW ENGLAND INC

Showing A REQUEST TO PLACE CONDUIT FROM MH 372 ON CONCORD AVE TO POLE 3 ON GRISWOLD



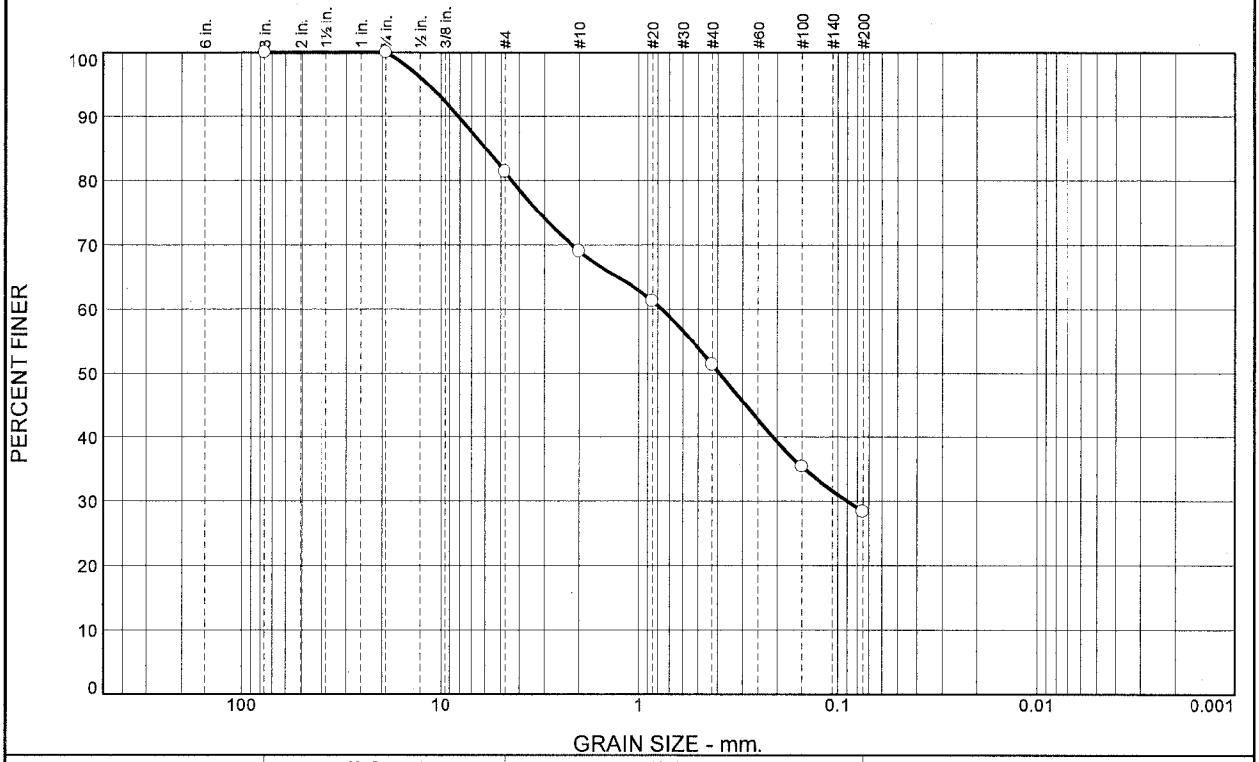


Prepared by P.Desroses DISTANCES SHOWN ARE APPROXIMATE Checked by

LEGEND

- ● - Proposed VERIZON Pole Location
- ⊘ - Existing Joint Pole to Remain
- ⊘ VERIZON- Location to be Abandoned
- ✳ - Power Co. Pole Location to be Abandoed
- ○ VERIZON Pole Location to Remain
- ⊗ - Present Joint Pole Location to be Abandoned
- ⊗ - Proposed Joint Pole Location
- ⊗ - Power Co. Location to be Held Jointly
- ⊗ VERIZON. Location to be Held Jointly
- ▭ - Existing VERIZON Manhole
- ▬ - Proposed VERIZON Conduit Location
- ▬ - Proposed VERIZON Manhole Location
- — — - Existing VERIZON. Buried Cable
- ------ - Proposed VERIZON. Buried Cable Location
- ——— - Existing VERIZON Conduit

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.7	12.3	17.7	22.9	28.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	81.3		
#10	69.0		
#20	61.2		
#40	51.3		
#100	35.4		
#200	28.4		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 5.9455 D_{60}= 0.7663 D_{50}= 0.3922
D_{30}= 0.0899 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=14.7%

Sample No.: S-2 **Source of Sample:** B-1 **Test Date:** 4/7/09
Location: **Elev./Depth:** 4-6

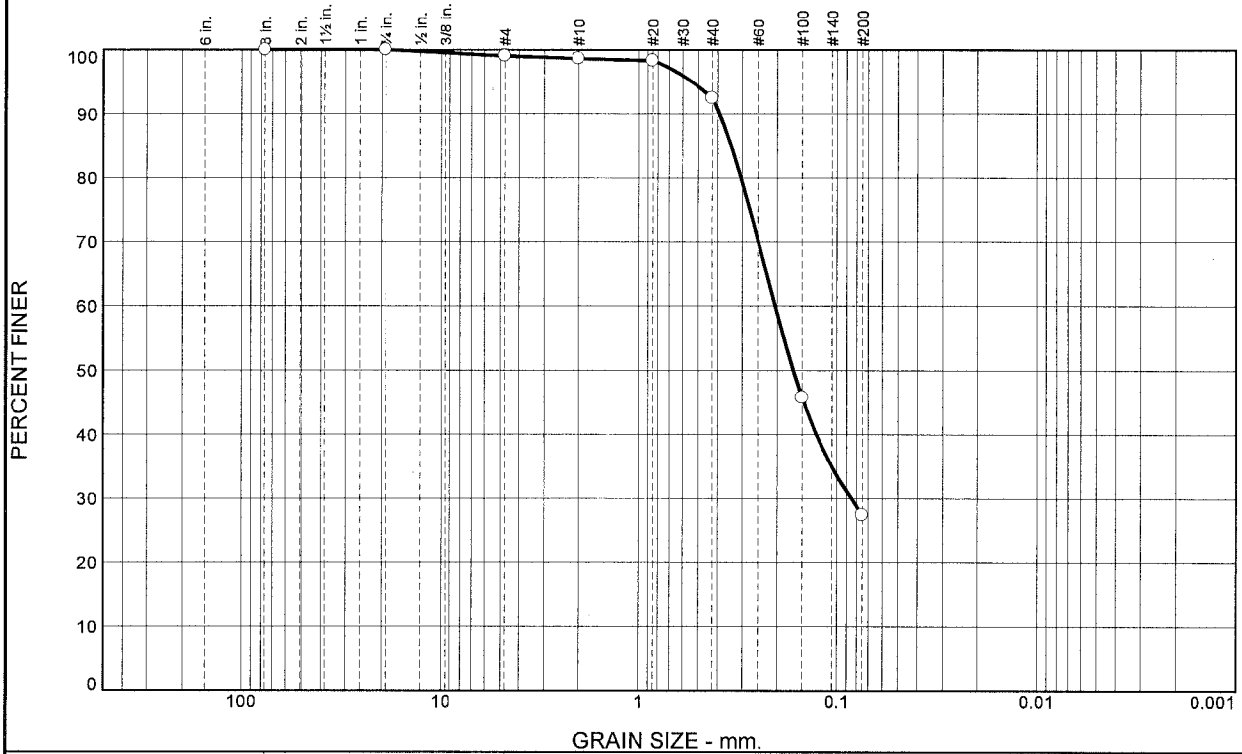
CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements

Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.9	0.5	6.2	64.9	27.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	99.1		
#10	98.6		
#20	98.3		
#40	92.4		
#100	45.8		
#200	27.5		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 0.3423 D_{60}= 0.2045 D_{50}= 0.1659
D_{30}= 0.0851 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=7.1%

Sample No.: S-2 **Source of Sample:** B-2 **Test Date:** 4/7/09
Location: **Elev./Depth:** 4-6

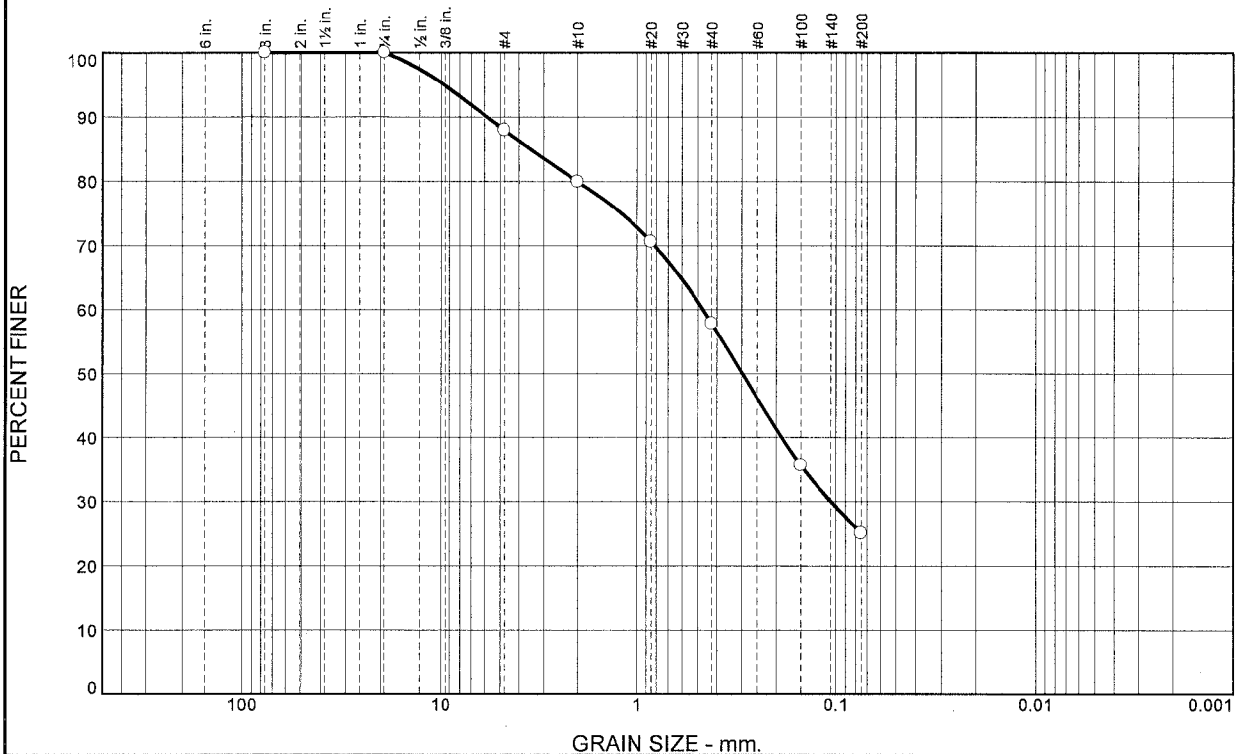
CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements

Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	12.0	8.1	22.1	32.7	25.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	88.0		
#10	79.9		
#20	70.6		
#40	57.8		
#100	35.7		
#200	25.1		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 3.4876 D_{60}= 0.4714 D_{50}= 0.2980
D_{30}= 0.1059 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=7.0%

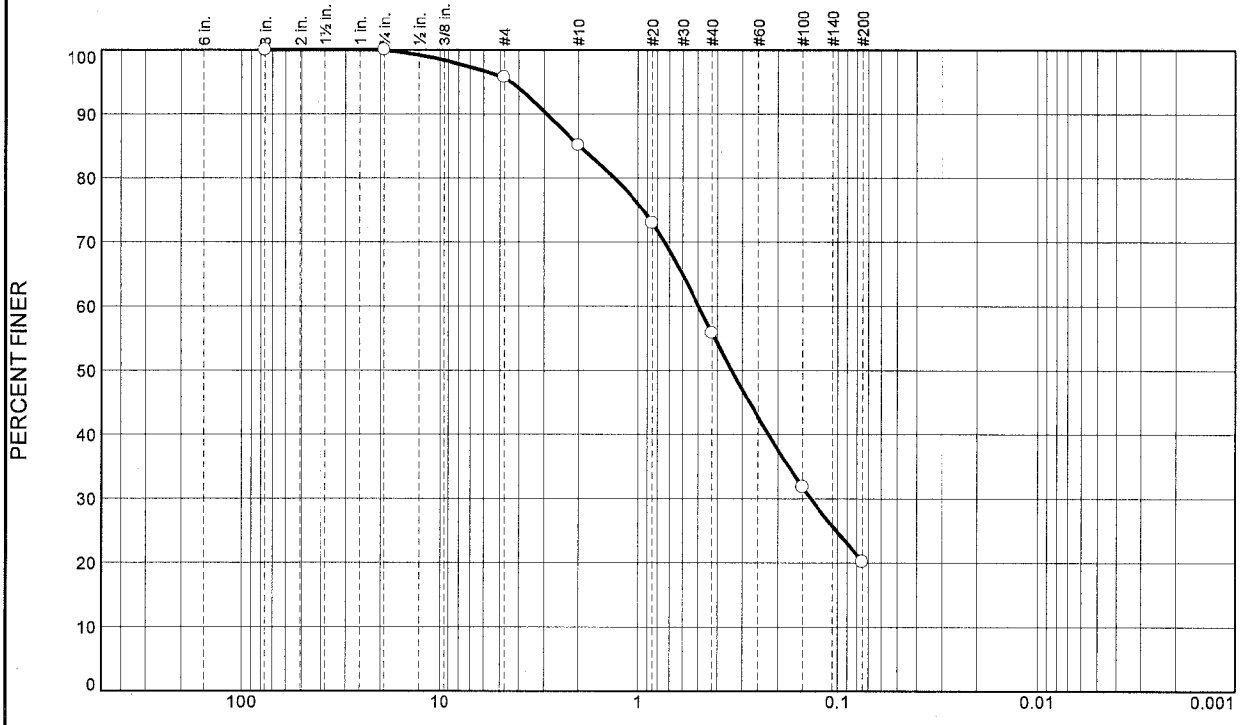
Sample No.: S-2 **Source of Sample:** B-3 **Test Date:** 4/7/09
Location: **Elev./Depth:** 4-6

CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements
Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.2	10.7	29.2	35.7	20.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	95.8		
#10	85.1		
#20	73.0		
#40	55.9		
#100	31.8		
#200	20.2		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 1.9769 D_{60}= 0.4970 D_{50}= 0.3385
D_{30}= 0.1360 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=6.6%

Sample No.: S-2 **Source of Sample:** B-4 **Test Date:** 4/7/09
Location: **Elev./Depth:** 4-6

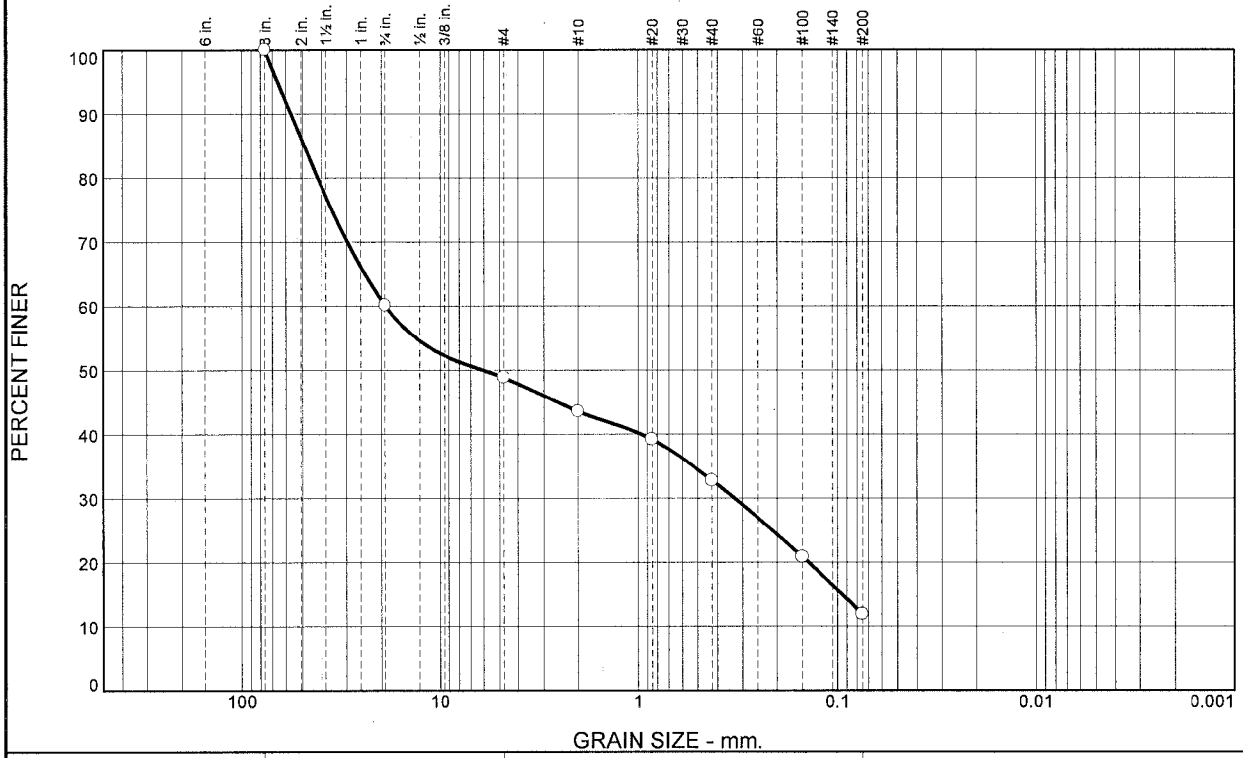
CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements

Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	39.9	11.3	5.2	10.8	21.0	11.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	60.1		
#4	48.8		
#10	43.6		
#20	39.2		
#40	32.8		
#100	20.8		
#200	11.8		

* (no specification provided)

Soil Description

poorly graded gravel with silt and sand

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 48.8326 D_{60}= 18.9427 D_{50}= 6.0539
D_{30}= 0.3283 D_{15}= 0.0953 D_{10}=
C_u= C_c=

Classification

USCS= GP-GM AASHTO=

Remarks

As received moisture content=1.1%

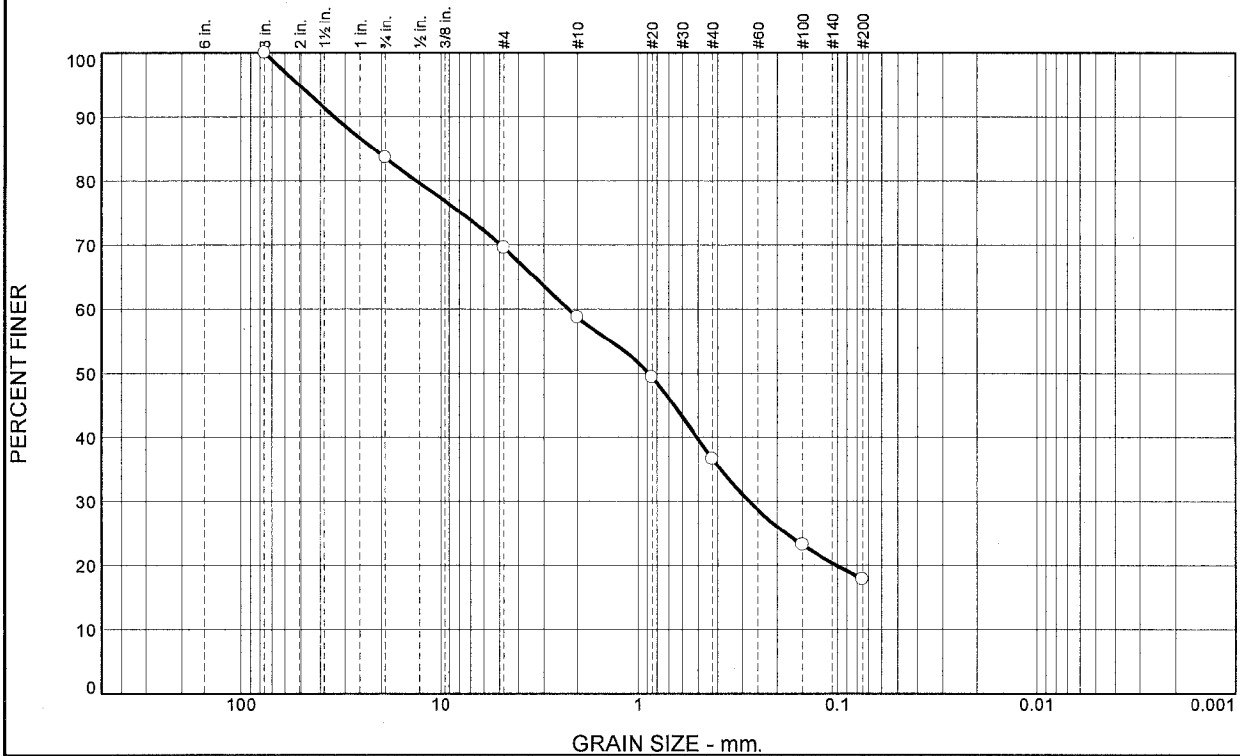
Sample No.: S-2 **Source of Sample:** B-5 **Test Date:** 4/7/09
Location: **Elev./Depth:** 4-6

CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements
Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.4	14.0	10.9	22.1	18.8	17.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	83.6		
#4	69.6		
#10	58.7		
#20	49.4		
#40	36.6		
#100	23.2		
#200	17.8		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 21.7339 D_{60}= 2.2465 D_{50}= 0.8859
D_{30}= 0.2781 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=6.3%

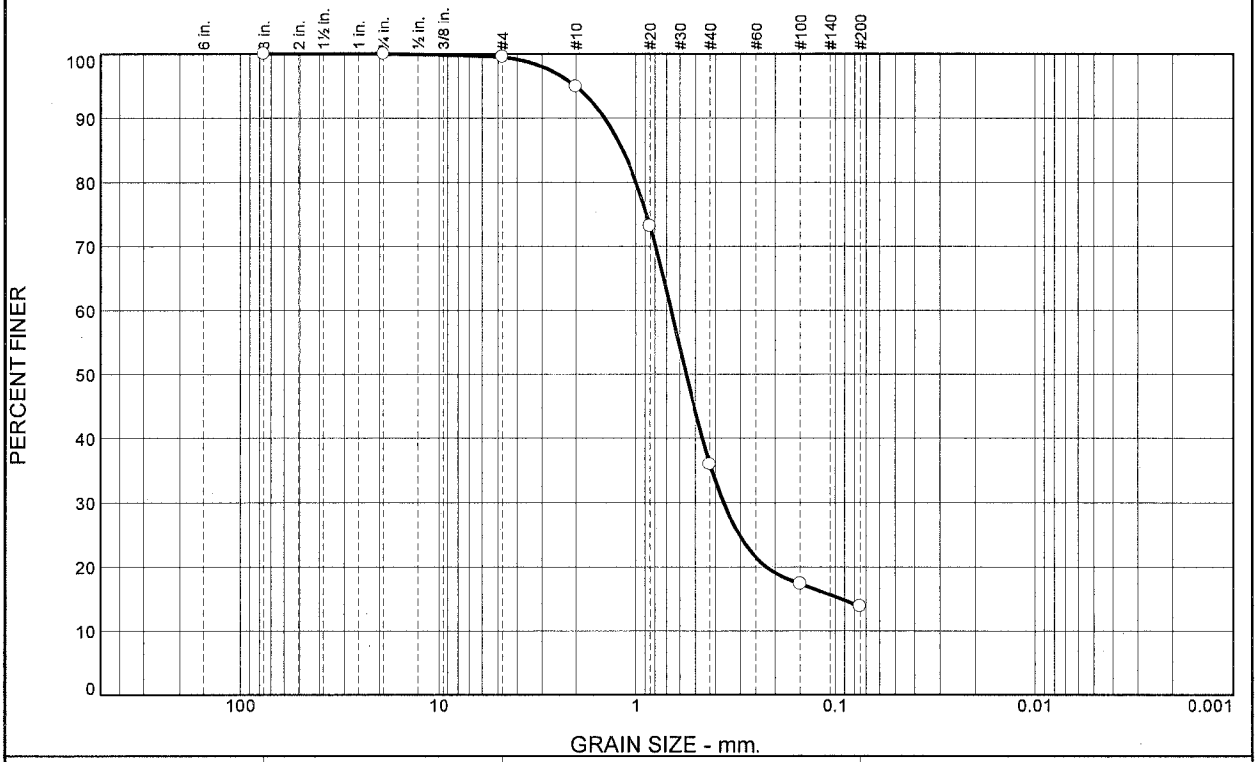
Sample No.: S-2 **Source of Sample:** B-6 **Test Date:** 4/6/09
Location: **Elev./Depth:** 4-6

CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements
Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	4.6	58.9	22.2	13.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	99.5		
#10	94.9		
#20	73.2		
#40	36.0		
#100	17.4		
#200	13.8		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 1.1667 D_{60}= 0.6635 D_{50}= 0.5577
D_{30}= 0.3639 D_{15}= 0.0939 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=5.0%

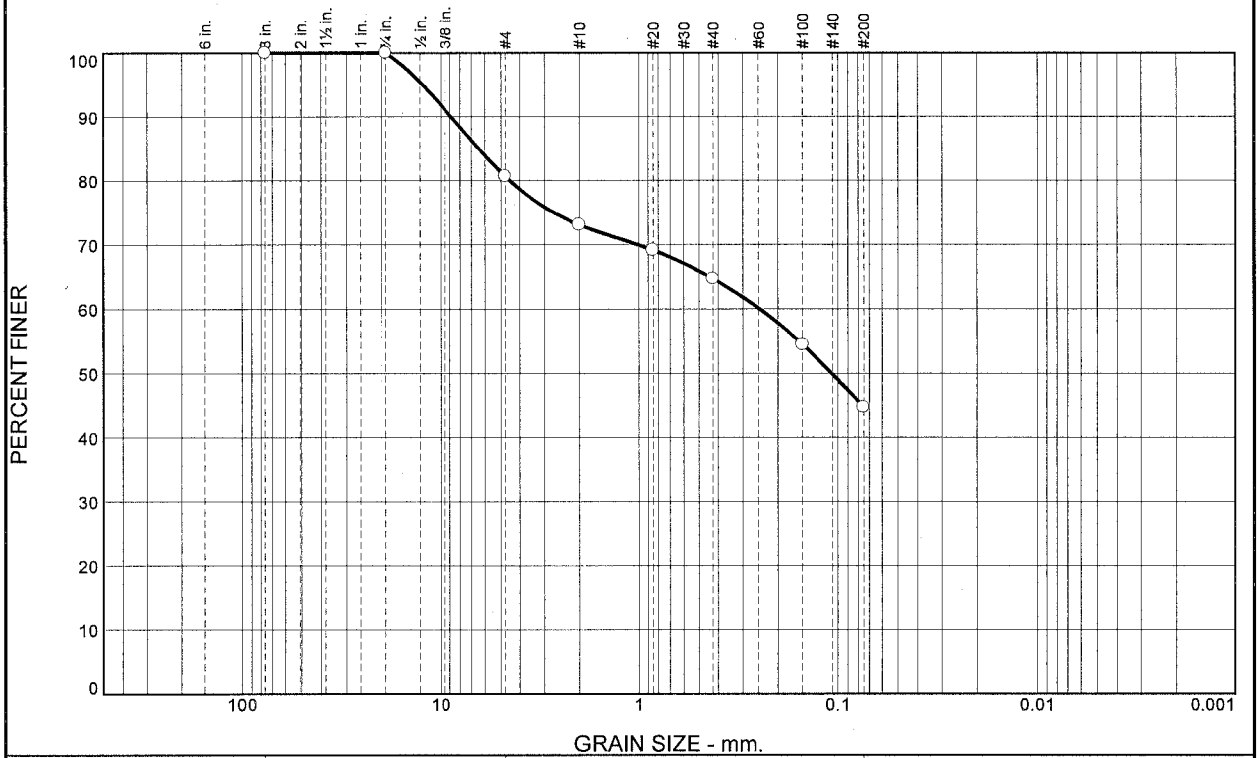
Sample No.: S-2 **Source of Sample:** B-7 **Test Date:** 4/6/09
Location: **Elev./Depth:** 4-5.8

CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements
Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.3	7.6	8.4	20.0	44.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	80.7		
#10	73.1		
#20	69.2		
#40	64.7		
#100	54.5		
#200	44.7		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 6.4320 D_{60}= 0.2466 D_{50}= 0.1078
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=11.8%

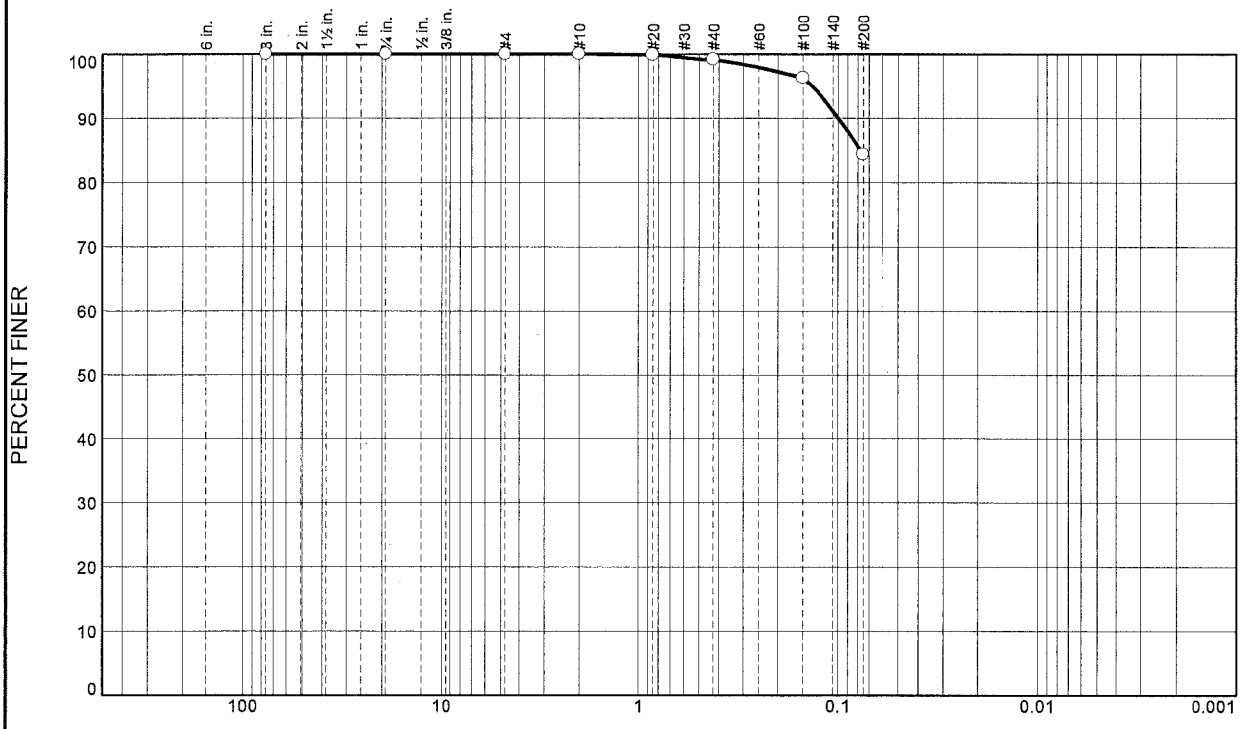
Sample No.: S-2 **Source of Sample:** B-8 **Test Date:** 4/2/09
Location: **Elev./Depth:** 4-6

CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements
Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.8	14.8	84.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	100.0		
#10	100.0		
#20	99.9		
#40	99.2		
#100	96.3		
#200	84.4		

* (no specification provided)

Soil Description

silt with sand

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 0.0774 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

As received moisture content=17.7%

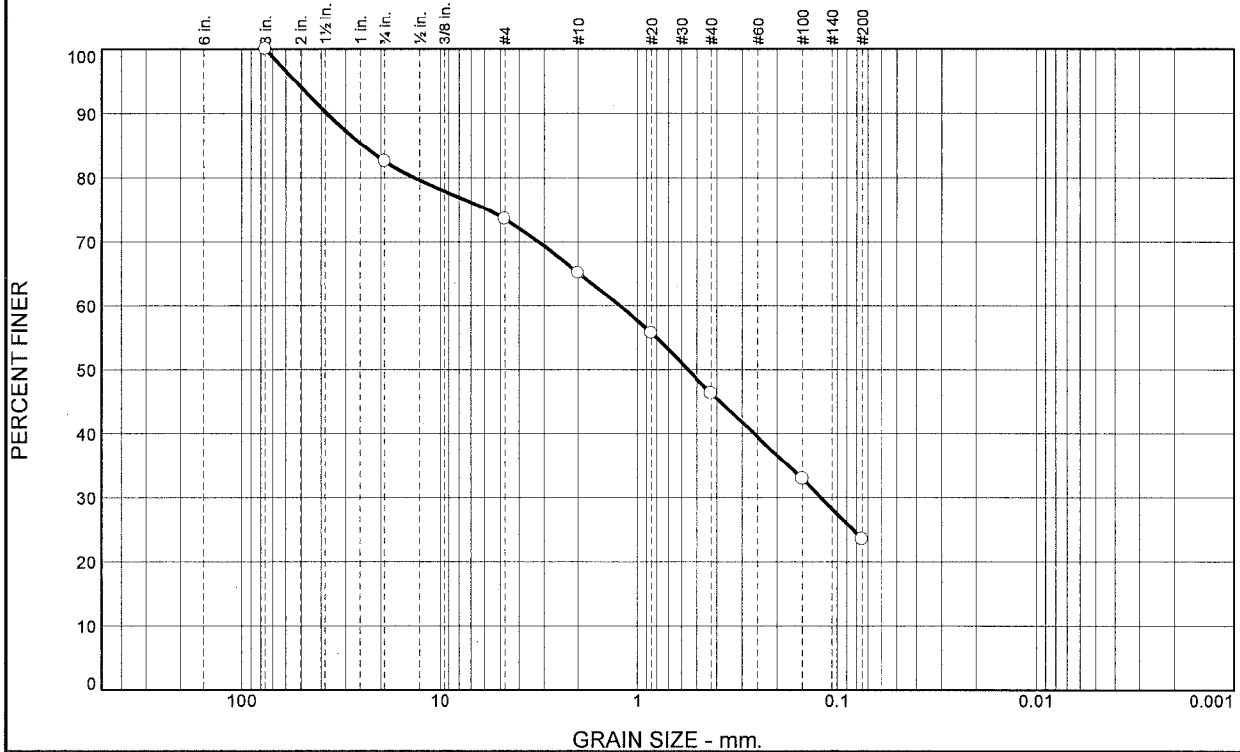
Sample No.: S-2 **Source of Sample:** B-9 **Test Date:** 4/3/09
Location: **Elev./Depth:** 4-6

CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements
Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.4	9.0	8.5	18.8	22.8	23.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	82.6		
#4	73.6		
#10	65.1		
#20	55.7		
#40	46.3		
#100	32.9		
#200	23.5		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 24.4766 D_{60}= 1.2319 D_{50}= 0.5559
D_{30}= 0.1205 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=8.0%

Sample No.: S-2 **Source of Sample:** B-10 **Test Date:** 4/2/09
Location: **Elev./Depth:** 4-6

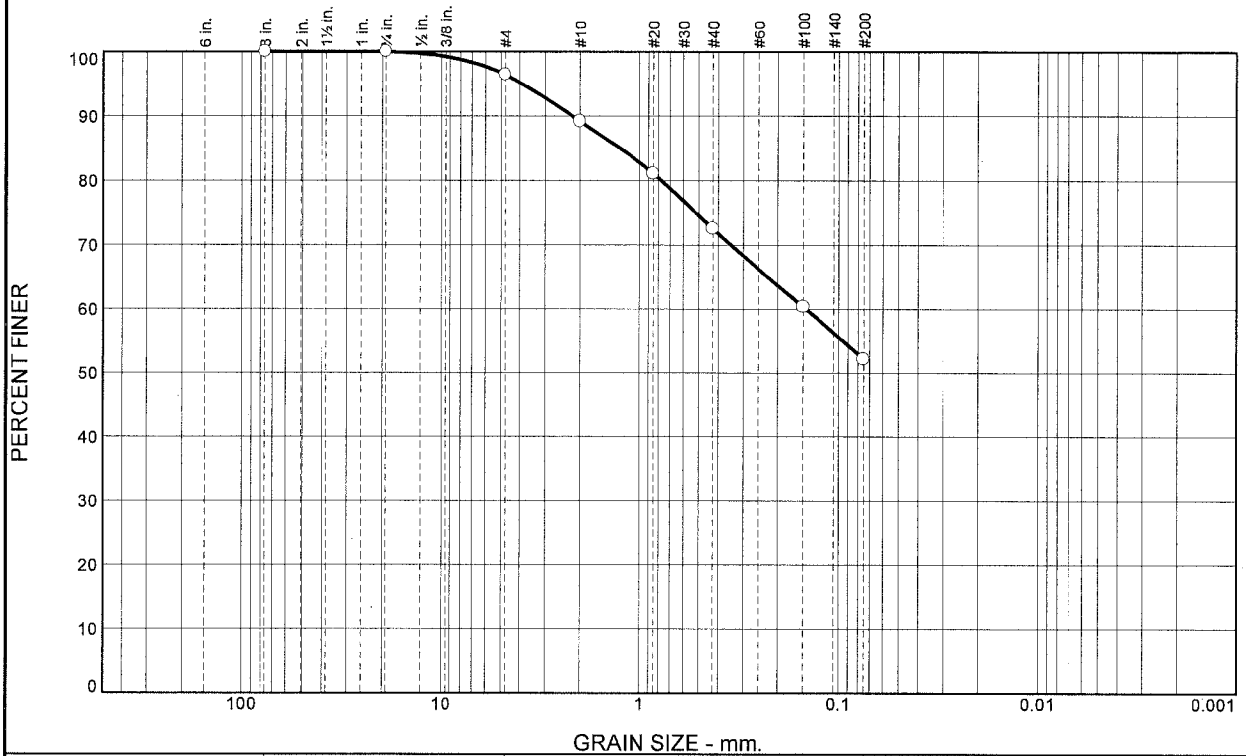
CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements

Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.6	7.2	16.7	20.4	52.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	96.4		
#10	89.2		
#20	81.1		
#40	72.5		
#100	60.4		
#200	52.1		

* (no specification provided)

Soil Description

sandy silt

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 1.2538 D_{60}= 0.1454 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

As received moisture content=23.0%

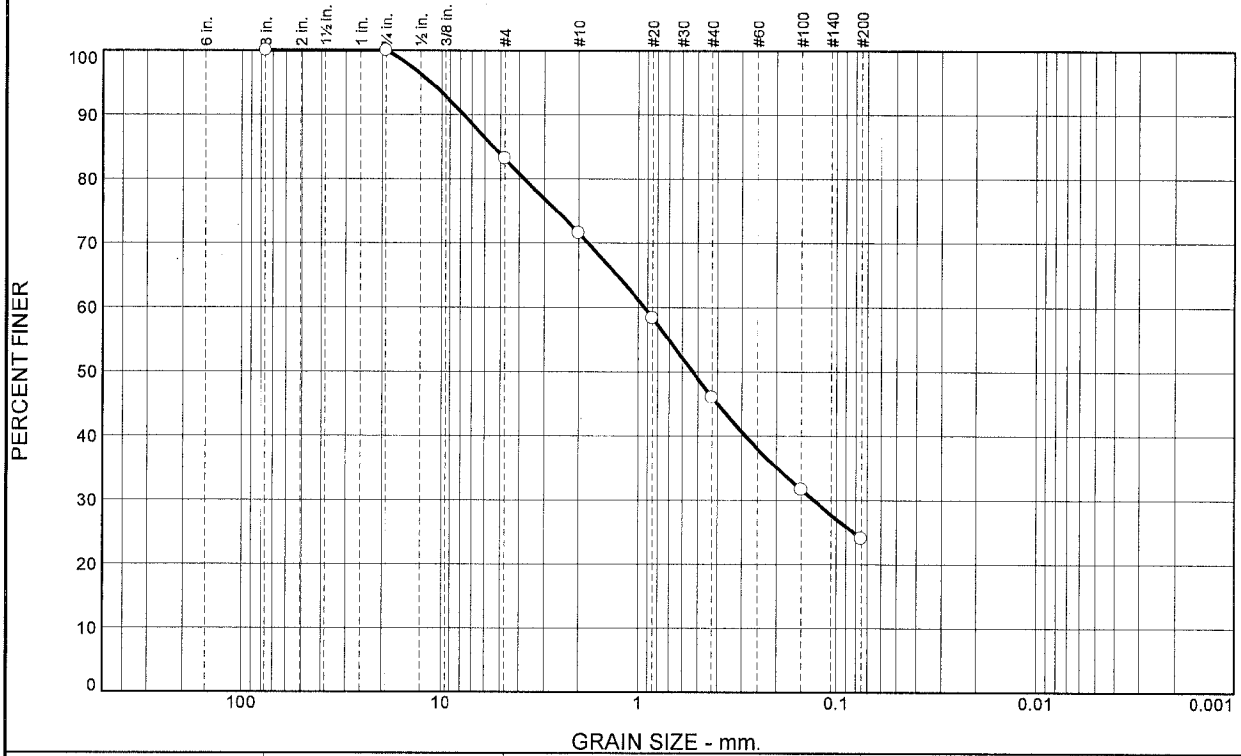
Sample No.: S-2 **Source of Sample:** B-11 **Test Date:** 4/6/09
Location: **Elev./Depth:** 4-6

CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements
Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	16.8	11.7	25.5	22.0	24.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	83.2		
#10	71.5		
#20	58.4		
#40	46.0		
#100	31.7		
#200	24.0		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 5.4139 D_{60}= 0.9356 D_{50}= 0.5334
D_{30}= 0.1297 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=14.6%

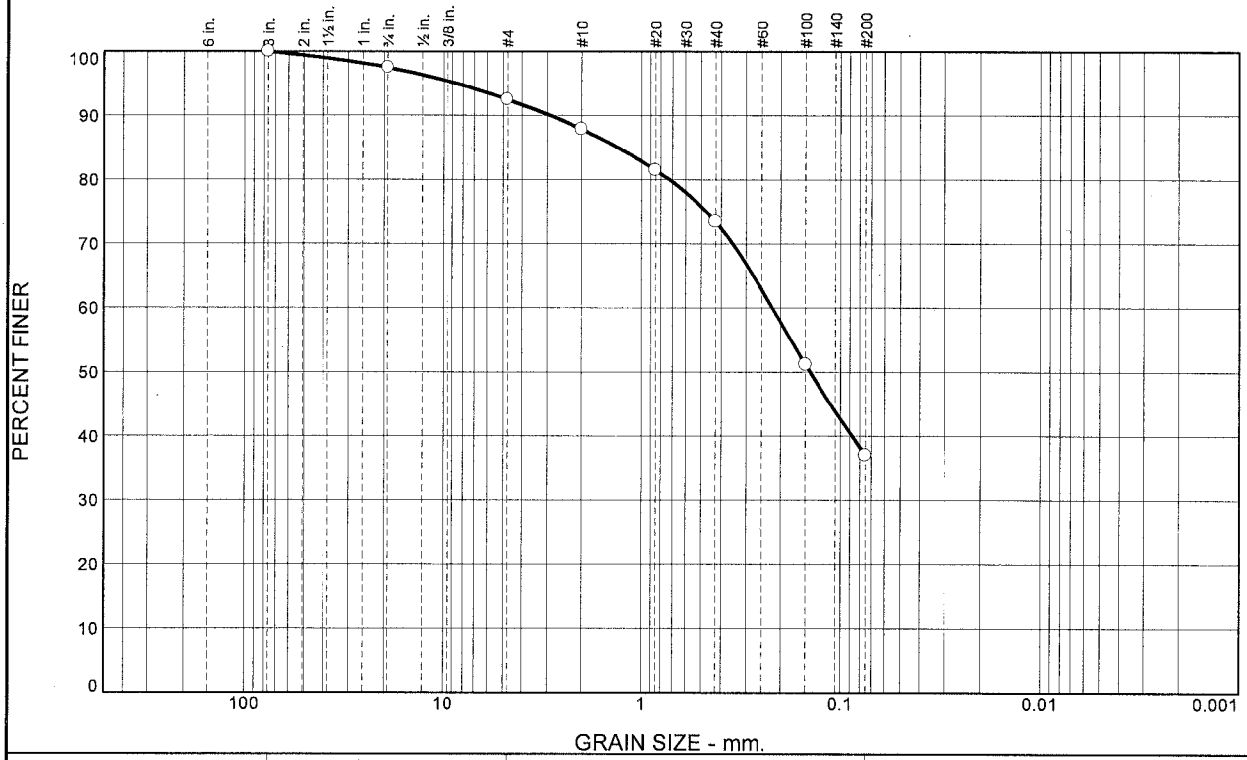
Sample No.: S-2 **Source of Sample:** B-12 **Test Date:** 4/2/09
Location: **Elev./Depth:** 4-6

CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements
Project No: 139-68660 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.5	5.0	4.6	14.5	36.4	37.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	97.5		
#4	92.5		
#10	87.9		
#20	81.5		
#40	73.4		
#100	51.2		
#200	37.0		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= -- LL= -- PI=

Coefficients

D_{85}= 1.3171 D_{60}= 0.2208 D_{50}= 0.1422
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

As received moisture content=16.7%

Sample No.: S-2 **Source of Sample:** B-13 **Test Date:** 4/2/09
Location: **Elev./Depth:** 4-6

CDM

Cambridge, Massachusetts

Client: City of Cambridge, MA
Project: Concord Avenue Roadway & Water Main Improvements
Project No: 139-68660 **Figure**