INVITATION FOR BIDS

(IFB # 15-105)

Union Square Early Action Project

Bid Opening: 11:00 AM, Wednesday, July 1, 2015**

CITY OF SOMERVILLE, MASSACHUSETTS

Joseph A. Curtatone, Mayor

Purchasing Department
Angela M. Allen, Purchasing Director

Brad Rawson
Office Strategic Planning & Community Development.
City of Somerville
93 Highland Avenue
Somerville, MA 02143
PH: 617-625-6600 x2545
FX: 617-625-0722

Note: the due date is different than what was listed in the Central Register and local ad.

UNION SQUARE EARLY ACTION PROJECT

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PART 1 SECTION 00020:
CITY OF SOMERVILLE MASSACHUSETTS
INVITATION TO BID
UNION SQUARE EARLY ACTION PROJECT
Bid No. 15-105

Enclosed you will find an invitation to bid for:

UNION SQUARE EARLY ACTION PROJECT
Somerville Ave, Webster Ave, Prospect St. Somerville, MA.

Plans and specifications will be available from 8:30 AM to 4:30 PM, Monday through Wednesday, 8:30 AM to 7:30 PM on Thursday, and 8:30 AM to 12:00 Noon, Fridays, at the Purchasing Department, 1st Floor, City Hall, 93 Highland Avenue, Somerville, MA 02143 from **Wednesday, June 10, 2015**.

When submitting bid, please identify the bid item and number clearly. All bids must be sealed and delivered to Purchasing Department, City of Somerville, 93 Highland Ave., Somerville, MA 02143, **no later than 11:00AM, on Wednesday, July 1, 2015**.** Please mark the outside of all bid envelopes with the following:

"Bid #15-105, Union Square Early Action Project" on the bid envelope.

BIDS SUBMITTED MUST BE AN ORIGINAL.
The completion of the following forms is necessary for consideration of a potential contract award. When submitting bid documents, please retain the order of documents as provided below:

1) **Form for General Bid**
2) **Unit Price Form**
3) **Somerville Living Wage Form**
4) **Acknowledgement of Notice to Bidders**
5) **Quality Requirements Form**
6) **Certificate of Non-Collusion & Tax Compliance**
7) **Certificate of Signature Authority**
8) **Signature Form complete when submitting your bid.**
9) **Reference Form**
10) **5% Bid Deposit**
11) **Wages, Statement of Compliance Form**

NOTE: If Vendor is incorporated an updated "CERTIFICATE OF GOOD STANDING" from the Commonwealth of Massachusetts will be needed for the awarded vendor only.

CITY HALL HOURS HAVE BEEN CHANGED. WE ARE OPEN UNTIL 7:30 P.M. ON THURSDAYS AND CLOSE ON FRIDAYS AT 12:30 P.M.

Please review and return with your sealed bids as sent. Also, ensure that all forms are completed and that your bid response is submitted as requested.

Your cooperation is greatly appreciated.

Note: the due date is different than what was listed in the Central Register and local ad.

PART 1, SECTION 2:
INSTRUCTIONS TO BIDDERS

(Chapter 30:39M or 30B:5 – Construction- Competitive Sealed Bids)

1. **NAME OF PROJECT**

UNION SQUARE EARLY ACTION PROJECT

2. **AWARDING AUTHORITY**

The City of Somerville (City), acting by and through the Purchasing Department, invites sealed bids for the Union Square Early Action Project, in accordance with contract documents.

OSPCD Contact:
Brad Rawson
Office of Strategic Planning & Community Development
City of Somerville
93 Highland Avenue
Somerville, MA 02143
Phone (617) 625-6600 x2545
Fax: (617) 625-0722

3. LANDSCAPE ARCHITECT:

Parsons Brinckerhoff, Inc.
75 Arlington St.
Boston, MA 02116
614-426-7330

Contact: Rachel J. Burckardt
Burckardt@pbworld.com

4. **LOCATION OF PROJECT**

Somerville Ave, Webster Ave, Prospect St. Somerville, MA

5. **BRIEF DESCRIPTION OF WORK (see plans and specifications for more details):**

Construction documents for this project have been prepared by Parsons Brinckerhoff who will act as the agent of the City, and could potentially oversee construction to ensure conformity to construction drawings, specifications, and standards. The City's Office of Strategic Planning and

Community Development (OSPCD) is responsible for project management, and will also interact with the General Contractor during construction.

The Union Square Early Action Project is a streetscape and utility improvement project for segments of Prospect Street, Webster Avenue and Somerville Avenue in Somerville's Union Square. Subsurface utility work will consist of extending water main and sewer under Prospect Street between Somerville Avenue and the Fitchburg rail bridge. For surface-level improvements, Prospect Street and Webster Avenue are currently a one-way pair that will be returned to their historic two-way traffic operations. In order to implement the two-way configuration, four outdated traffic control signals will be replaced, including new mast arms and controllers. One small traffic island in Somerville Avenue will be removed, and a mid-block crosswalk will be installed on Somerville Avenue between Prospect Street and Webster Avenue.

6. ESTIMATED CONSTRUCTION COST OF THE PROJECT

The estimated cost for the project is $ 2,100,000.00

7. PROJECT SCHEDULE:

Estimated Construction Start: September 1, 2015

Date of Substantial Completion: December 30, 2015

Date of Final Completion: To Be Finalized Post Award
100% completion of all work.

Bidders are instructed to the dates of: Substantial Completion and Final Completion. For the purpose of meeting these deadlines, the City may be prepared to authorize extended work hours beyond those prescribed by City ordinance, to include work on Sundays with the prior permission of the City.

Contractor submission of all paperwork required for the Construction Contract, including but not limited to insurance certificates, performance and payment bonds, a certificate of good standing from the Secretary of Corporations, and signature pages shall be submitted to the Purchasing Director no later than 5 working days from award of the contract.

The successful bidder shall be required to submit a preliminary construction schedule within 10 days of the established date of award of the Contract and a more detailed Gantt-type construction schedule within 15 days of the established award of the contract, which shows the dates of substantial and final completion.

While the work is not scheduled to start until September 1, 2015, the City is requesting that the Contractor be mobilized on that date and any materials should be ordered as soon as possible, after contract execution, to prevent delays. However, the City cannot pay for any work prior to September 1, 2015.

8. GOVERNING LAW

Massachusetts General Laws, c. 30, §39M.

9. SALES TAX EXEMPTION

Materials, equipment, and supplies for this project are exempt from sales tax in accordance with M.G.L. Chapter 64H, Section 6 (d). The city will furnish the successful bidder with its sales tax exemption number.

10. PERMIT FEES (Contractor responsible obtaining permits/City of Somerville permit fees waived)

DPW permits to obstruct or excavate the public streets and/or sidewalks; ISD building code permits; and Traffic and Parking permits; are waived by the City of Somerville. However, license fees are not waived by the City of Somerville. The Contractor shall pay all license fees (e.g., drain layer's license fee). The City of Somerville Traffic and Parking Department must be contacted directly for all required permits. The vendor must also provide the City of Somerville Traffic and Parking Department with a traffic management plan, prior to the start of all work

If water usage is required in the commitment of this project, the Contractor needs to contact the DPW Water Dept., and make arrangements for a water meter. There will be a charge for the water meter and the water usage.

The Contractor is responsible for obtaining NSTAR work orders and for all costs and fees associated with NSTAR.

Permits to excavate the public way cannot be issued until the applicant has notified the appropriate utility companies, as required by Massachusetts General Laws, Chapter 370 of the Acts of 1963. The applicant must either: 1) obtain written receipts from the affected utilities, and provide copies of same to the owner; or 2) utilize the Dig-Safe System for the required notifications, and also submit written notifications for those utilities not participating in the Dig-Safe System. Written notifications must state that utility companies have been notified and the contractor cleared to begin work.

The following utility companies must be notified in writing:
M.B.T.A. Engineering and Maintenance Division 617-722-5454
Attn: Mr. William Bregoli, Chief Engineer
500 Arborway

Jamaica Plain, MA 02130

M.W.R.A. Sewer Division 617-242-6000
100 First Avenue
Charlestown Navy Yard
Boston, MA 02129

M.W.R.A. Water Division 617-242-6000
100 First Avenue
Charlestown Navy Yard
Boston, MA 02129

The following utility companies must be notified in writing or through Dig-Safe;

Algonquin Gas Transmission Corp. 617-254-4050
Attn: Mr. James Grasso
Manager of Land and Public Relations
1284 Soldiers Field Road
Brighton, MA 02135

Verizon 781-290-5154
Attn: Mr. Jim Warren
460 Totten Pond Road
Waltham, MA 02154

Boston Edison 617-541-5730
Attn: Mr. William Lemos
Right of Way
1165 Massachusetts Avenue
Dorchester, MA 02125

Boston Gas Company 617-323-9210
Attn: Mr. Dennis Peri
201 Rivermoor Street
West Roxbury, MA 02132

N-Star Electric 617-497-1236, x4195
Attn: Mr. Wendell Berthelson
46 Blackstone Street
Somerville, MA 02139

N-Star Steam 617-225-4568
Attn: Mr. Thomas Connelly
Supervisor of Maintenance
265 First Street

Somerville, MA 02142

N-Star Gas 617-369-5591
Attn: Mr. Steve Richmond
303 Third Street
Somerville, MA 02142

A T & T Broadband 981-658-0400, x2210
Attn: Mr. Rich Ferrucci
760 Main Street
Malden, MA 01887

Somerville Public Works Department 617-625-6600, x5200
One Franey Road
Somerville, MA 02145

Somerville Fire Department 617-625-6600, x8100
266 Broadway
Somerville, MA 02143

Dig-Safe 1-800-322-4844

The contractor shall have all utilities marked out along the course of this work by such means as the Engineer shall approve and shall preserve such marked locations until the work has progressed to the point where the encountered utility is fully exposed and protected as required. It shall be the contractor's responsibility to notify utilities at least 48 hours prior to the start of any excavation.

The contractor is responsible for contacting any other utilities that are not listed herein.

11. MINIMUM QUALIFICATION CRITERIA

- All bidders must have been conducting business, in this specified field, for a minimum of five (5) years.
- All bidders must have successfully constructed a minimum of three (3) municipal projects similar in magnitude within the last six (6) years.

All questions regarding the project and this Invitation to Bid should be in writing, submitted to Alex Nosnik, Asst. Purchasing Director, Purchasing Department, Somerville City Hall, First Floor, 93 Highland Avenue, Somerville, Massachusetts, 02143. Questions may be submitted either by mail or email to anosnik@somervillema.gov. Questions must be submitted in writing **by 12:30 pm, Thursday, June 17, 2015;** they will be answered in writing (via addendum) to all holders of the bid proposals. Bidders must submit e-mail address (preferred) or a fax number with their inquiries. If any bidders contact any other person or department outside of Purchasing with inquiries, they may be disqualified from the bidding process.

Key Dates

IFB Released		Wednesday, June 10, 2015
Deadline for Questions	12:30 PM	Wednesday, June 17, 2015
Bids Due and Opened	11:00 AM	Wednesday, July 1, 2015
Anticipated Contract Award		August 1, 2015
Anticipated Notice to Proceed		August 20, 2015
Commencement of Work		September 1, 2015
Substantial Completion Date		December 31, 2015
Final Completion Date		To Be Determined Post Award

12. BID SUBMISSION TIME AND PLACE OF BID OPENING

Sealed bids (clearly identified as a bid and endorsed with the name and address of the bidder) must be received at the Purchasing Department, First floor, City Hall, 93 Highland Avenue, Somerville, MA, 02143 on or before **11:00 AM, Wednesday, July 1, 2015**, at which time they will be publicly opened and read aloud. In the event City Hall is closed, the deadline shall be 11:00 a.m**.** on the next day City Hall is open for business.

ADDITIONAL REQUIREMENTS: PLEASE READ CAREFULLY, FAILURE TO MEET THESE REQUIREMENTS COULD RESULT IN REJECTION OF A BID.

13. BID SUBMISSION REQUIREMENTS

Bid Signature

A bid must be signed as follows: 1) if the bidder is an individual, by her/him personally; 2) if the bidder is a partnership, by the name of the partnership, followed by the signature of each general partner; and 3) if the bidder is a corporation, by the authorized officer, whose signature must be a person named on the Corporate Secretary's Certificate of Authority.

Changes and Addenda

If any changes are made to this IFB, an addendum will be issued. Addenda will be emailed to all bidders on record as having picked up the IFB. No changes may be made to the bid documents, except as authorized in an addendum from the Purchasing Department.

Modification or Withdrawal of Bids, Mistakes, and Minor Informalities

A bidder may correct, modify, or withdraw a bid by written notice received by the City of Somerville prior to the time and date set for the bid opening. Bid modifications must be submitted in a sealed envelope clearly labeled "Modification No.__" to the address listed in part one of this section. Each modification must be numbered in sequence, and must reference the original IFB.

After the bid opening, a bidder may not change any provision of the bid in a manner prejudicial to the interests of the City or fair competition. Minor informalities will be waived or the bidder will be allowed to correct them. If a mistake and the intended correct bid are clearly evident on the face of the bid document, the mistake will be corrected to reflect the intended correct bid, and the bidder will be notified in writing; the bidder may not withdraw the bid. A bidder may withdraw a bid if a mistake is clearly evident on the face of the bid document, but the intended correct bid is not similarly evident.

Right to Cancel/Reject Bids
The City of Somerville may cancel this IFB, or reject any and all bids, if the City determines that cancellation serves the best interests of the City; or that such rejection of bids is in the public interest.

Bid Prices to Remain Firm
All bid prices submitted in response to this IFB must remain firm for 60 days following the bid opening.

Unbalanced Bids
The City reserves the right to reject unbalanced, front loaded, and conditional bids.

Documents to be Submitted as part of Bid
The following documents must be submitted with the complete signed bid package:

Form for General Bid (Section 00300)

Unit Price Form (Section 00315)

Somerville Living Wage Form (Section 00320)

Acknowledgement of Notice to Bidders (Section 00330)

Quality Requirements Form (Section 00335)

Certificate of Non-Collusion and Tax Compliance (Section 00340)

Certificate of Signature Authority (Section 00350)

Signature Form (Section 00360)

Reference Form (Section 00370)

Bid bond (Section 00380)

Wage Compliance Form (Section 00385)

Schedule of Values. Bidders do NOT need to include a Schedule of Values with their bid package. The successful bidder will be required to submit a refined and detailed schedule of values for review and approval by the design professional prior to signing the construction contract.

5% Statutory Bid Guaranty. All bids shall be accompanied by a bid bond or bank certified check or bank treasurer's check in the amount of 5% of the bid price, which shall become the property of the City of Somerville if the bid is accepted and the bidder neglects or refuses to comply with the terms of the bid.

For successful bidder: Certificate of Good Standing: If the bidder is a corporation, a Certificate of Good Standing should accompany the signed contract. Certificate available online at: https://wfb.dor.state.ma.us/webfile/Certificate/Public/WebForms/Welcome.aspx or call Tel: (617) 727-9640 for more information.

14. PREVAILING WAGE RATE REQUIREMENTS

The contractor shall pay Mass. Prevailing Wage Rates. The applicable prevailing wage rates are attached as part of this bid package and will be included as Appendix J in the contract. A signed Compliance Form must be included with the bid package (form included).

(a) The Contractor shall pay Mass. Prevailing Wage Rates set forth in Appendix J. Notwithstanding anything to the contrary, the City may, in its sole discretion withhold payment unless the City has in its possession payroll records that are complete, accurate, and current as of the date of said application for payment.

(b) The Contractor shall:

(1) Pay wages at least once a week;

(2) Submit payroll information on a weekly basis in a format approved by the City, numbered in numerical sequence and signed by the Contractor (including forms for weeks when the Contractor is not on the Project Site, in which case there shall be a notation to the effect "no work this payroll period" and a date anticipated for resuming work).

(c) The Contractor shall submit to the City within the first week of construction:
(1) A list of apprenticeship programs with which the Contractor is affiliated;
(2) The number of apprentices that will be employed by the Contractor on the Project;
(3) A list of the Contractor's employee fringe benefits;
(4) A copy of each project schedule, including the anticipated commencement date for each Subcontractor; and
(5) A list of each Subcontractor's suppliers and material men.

(d) The Contractor shall include language similar to the above in all subcontracts.

15. SAMPLE CONSTRUCTION CONTRACT

The successful bidder shall execute with the City of Somerville a Public Works Contract ("Contract") in substantially the same form as the sample contract included in this bid package. In addition to the items submitted with the bid, the contract includes certain other documents which may be executed by the Bidder selected as contractor and which are included as Appendices to the Sample Construction Contract (see Part 2) include:

Appendix F: Certificate of Authority (for corporations if the contract is signed by anyone other than the President, there must be a current Certificate of Vote signed by the corporate clerk or secretary stating who is authorized to sign contracts on the Corporations behalf)

Appendix D: Insurance Certificates– evidencing minimum coverage as follows:
General Liability - $2,000,000 per occurrence, $2,000,000 aggregate
Automobile Liability: $1,000,000 per occurrence, $1,000,000 aggregate
Workman's Compensation: statutory coverage
Certificates must stipulate "City of Somerville" as a certificate holder and as an additional insured for general liability.

Appendix F: Certificate of Good Standing: Certificate available online at https://wfb.dor.state.ma.us/webfile/Certificate/Public/WebForms/Welcome.aspx or call Tel: (617) 727-9640 for more information.

Appendix H: Statement of Management (for contracts over $100,000.00)

Appendix I: Performance and Payment Bonds for 100% of the contract sum

All paperwork required for the contract shall be completed and delivered to the Purchasing Department no later than five (5) working days after the Award of the Contract.

ITEMS OF SPECIAL CONSIDERATION
The Contractor's attention is specifically drawn to the following items of special consideration relative to this project, most of which are also addressed in the Technical Specifications.

a. The Contractor must provide police details at the Contractor's expense.
b. All new Handicapped Accessible ramps must meet the most current state ADA and City of Somerville standards.
c. The Contractor must obtain all street and sidewalk permits as necessary.

19. RESERVATION OF RIGHTS

The City reserves the right to extend the deadline for submission of bids, to waive minor informalities, and to reject any and all bids, if in its sole judgment, the best interests of the City of Somerville would be served by doing so.

20. RULE FOR AWARD

A contract will be awarded to the lowest responsible and eligible bidder. All required bid documents must be provided to be deemed responsible and eligible.

21. MAINTENANCE MANUAL AND AS-BUILT DRAWING REQUIREMENTS

Upon Final Completion of all construction, the contractor shall submit: two complete copies of a maintenance manual, and two copies of an as-built drawing set, with two compact disc (CD) copies of the as-built drawings.

The City will not issue the final check for retainage until the submittal and approval of the maintenance manual and as-built drawings.

1) The Maintenance Manual shall be in the form of a three ring binder, organized and tabbed into appropriate sections, and shall include the following items:

- A letter from the contractor stating the period of warranty for all parts, materials, and workmanship, from the date of Final Completion;
- A letter from the contractor stating the period of warranty for the irrigation system;
- All product information, product directions, and warranties;
- Copies of City permits with signatures of inspectors;
- Contact information for all subcontractors including email addresses; and,
- A record of all submittals and dates of approvals.

2) As-Built drawing shall be a complete and accurate record that incorporate any and all changes to the construction plan set issued at the time of contract initiation. As-built drawings shall be clearly marked and annotated and shall include but not be limited to: all field changes, change orders, and supplemental drawing provided by the landscape architect.

3) The Compact Discs shall include an electronic copy of all as-built drawings.

PART 1 SECTION 3

Union Square Early Action Project
(IFB # 15-105)

BID SUBMISSION DOCUMENTS

BIDDERS NAME: _____

This Bid Submission includes the following:

_____ Form for General Bid

_____ Unit Price Form

_____ Somerville Living Wage Form

_____ Acknowledgement of Notice to Bidders

_____ Quality Requirements

_____ Certificate of Non-Collusion and Tax Compliance

_____Certificate of Signature Authority

_____Signature Form

_____Reference Form

_____5% Statutory Bid Bond or Guaranty

_____Wage Rate Compliance Forms

_____Vendor Certification

Part 1 Section 00300: FORM FOR GENERAL BID
FOR CONSTRUCTION CONTRACT

To the Awarding Authority:

A. The undersigned proposes to furnish all labor and materials required for:

Union Square Early Action Project

in accordance with the accompanying plans and specifications prepared by

Parsons Brinckerhoff, Inc. LLC
75 Arlington St.
Cambridge, MA 02141
614-426-7330

Contact: Rachel J. Burckardt
Burckardt@pbworld.com

specified below, subject to additions and deductions according to the terms of the specifications.

B. This bid includes addenda #1_____, #2 _____, #3 _____, #4 _____.

C. The proposed contract price is:

$_____.
(total bid in figures)

_____DOLLARS
(total bid in words)

D. The bidder understands that the project construction cost estimate provided by the city is inclusive of all the work described in this form.

E. The Undersigned Bidder agrees that, if it is selected as general contractor, it will within five working days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the Awarding Authority, execute a contract in accordance with the terms of this bid, including furnishing a 100% performance bond and a 100% labor and materials or payment bond, each of a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and satisfactory to the Awarding Authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included

in the contract price; and, in addition, furnishing a certificate of good standing and insurance certificates as required by the bid documents.

F. The Undersigned Bidder hereby certifies that it is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the Project and that it will comply fully with all laws and regulations applicable to this Award, including applicable provisions of MGL Chapter 30, ss. 39M et seq.

G. The Undersigned Bidder further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

H. The Undersigned Bidder certifies under the penalties of perjury that:

(1) Pursuant to M.G.L. c. 62C, §49A, to the best of the signatories knowledge and belief, that the Undersigned Bidder is in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support, as well as paid all contributions and payments in lieu of contributions pursuant to MGL 151A, §19A(b), and

(2) the Federal Employer Identification Number (EIN) of the Bidder is:

#_____, and that it is in compliance with all federal, state, and local laws regarding taxation.

I. The Undersigned Bidder certifies under penalties of perjury that the Bidder is not presently debarred from doing federal or state public construction work, that the Bidder has not had its low bid rejected by any municipality in the previous two years, except

_____

in which case the reasons for rejection were as follows:

_____

J. The Undersigned Bidder has submitted the information on the Reference Form:

- (00370-1), requesting three references for municipal projects completed during the previous six (6) years. The Undersigned Bidder understands that the contractor and subcontractors will be required to pay prevailing wages to laborers and mechanics, and that if the Undersigned's bid is significantly below the

average bid, the Awarding Authority may require the Bidder to substantiate that the bid is based on payment of wages at prevailing rates.

M. The Undersigned Bidder certifies that it can achieve substantial completion by:

_____ and achieve Final Completion by the date finalized by the City of Somerville Post Award.

N. Unit Price Form

1. Should certain additional work be required, or should the quantities of certain classes of work be increased or decreased from those required by the Contract Documents, by authorization of the City, unit prices listed on the attached "Unit Price Form" shall at the option of the City be the basis of payment to the Contractor or credit to the City, for such increase or decrease in the work. The unit prices shall represent the exact net amount per unit to be paid the Contractor (in the case of addition or increase) or to be refunded the City (in the case of decrease). Contractually noted adjustments will be allowed for overhead, profit, insurance or other direct or indirect expenses of the Contractor or Subcontractors.

2. The unit prices shall include cost of fuel, all labor, materials, equipment, overhead, profit, insurance, etc. to cover the finished work of the several kinds called for. Changes shall be processed in accordance with the provisions of the General Conditions governing changes in the work.

Executed this_____day of_____ , 2015.

On behalf of :

_____
(Undersigned Bidder Business Name)

_____

_____
(Business Address) and (Telephone)

By:

_____

(Name and Address of Person Signing Bid)

_____

(Title of Person Signing bid)

_____

(Signature)

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
100- 001	MOBILIZATION The sum of _____ _____ Lump Sum ($_____) Lump Sum	Lump Sum	1	
102- 051	INDIVIDUAL TREE PROTECTION The sum of _____ _____ Each ($_____) Each	Each	27	
103- 001	INDIVIDUAL TREE REMOVED - UNDER 24 INCHES The sum of _____ _____ Each ($_____) Each	Each	6	
104- 001	INDIVIDUAL TREE REMOVED - DIAMETER 24 INCHES AND OVER The sum of _____ _____ Each ($_____) Each	Each	1	
108- 501	STREET SWEEPING The sum of _____ _____ Hour ($_____) Hour	Hour	300	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
119- 001	RODENT CONTROL The sum of _____ _____ Lump Sum ($_____) Lump Sum	Lump Sum	1	
129- 001	ROADWAY EXCAVATION BY COLD PLANE The sum of _____ _____ SQUARE YARD ($_____) SQUARE YARD	SY	12,000	
129- 002	ROADWAY PAVEMENT REMOVAL The sum of _____ _____ SQUARE YARD ($_____) SQUARE YARD	SY	150	
129- 003	SIDEWALK REMOVAL The sum of _____ _____ SQUARE YARD ($_____) SQUARE YARD	SY	1,000	
141- 001	TEST PITS The sum of _____ _____ CUBIC YARD ($_____) CUBIC YARD	CY	200	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
144- 001	CLASS B ROCK EXCAVATION The sum of _____ _____ CUBIC YARD ($_____) CUBIC YARD	CY	50	
150- 001	ORDINARY BORROW The sum of _____ _____ CUBIC YARD ($_____) CUBIC YARD	CY	100	
151- 001	GRAVEL BORROW The sum of _____ _____ CUBIC YARD ($_____) CUBIC YARD	CY	500	
152- 001	DENSE-GRADED CRUSHED STONE The sum of _____ _____ CY` ($\_\_\_\_\_) CY`	CY`	175	
153- 001	FLOWABLE FILL (CDF) The sum of _____ _____ CUBIC YARD ($_____) CUBIC YARD	CY	50	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
156- 002	CRUSHED STONE (3/4-INCH) The sum of _____ _____ Ton ($_____) Ton	Ton	60	
170- 001	FINE GRADING AND COMPACTION - SUBGRADE AREAS The sum of _____ _____ SQUARE YARD ($_____) SQUARE YARD	SY	1,325	
200- 005	FRAMES AND GRATES OR COVERS The sum of _____ _____ Each ($_____) Each	Each	10	
201- 021	CATCH BASIN WITH DEEP SUMP AND TRAP The sum of _____ _____ Each ($_____) Each	Each	2	
202- 002	DRAIN MANHOLE The sum of _____ _____ Each ($_____) Each	Each	1	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
210- 001	SANITARY SEWER MANHOLE The sum of _____ _____ Each ($_____) Each	Each	2	
210- 998	CONNECTION TO EXISTING SANITARY SEWER The sum of _____ _____ Each ($_____) Each	Each	1	
220- 001	DRAINAGE & SANITARY STRUCTURES - ADJUSTED The sum of _____ _____ Each ($_____) Each	Each	8	
220- 510	DRAINAGE & SANITARY STRUCTURES - REMODELED The sum of _____ _____ Each ($_____) Each	Each	4	
220- 908	DRAINAGE STRUCTURES ABANDONED The sum of _____ _____ Each ($_____) Each	Each	1	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
220- 909	DRAINAGE STRUCTURES REMOVED The sum of _____ _____ Each ($_____) Each	Each	1	
223- 001	FRAME AND GRATE OR COVER REMOVE AND STACK The sum of _____ _____ Each ($_____) Each	Each	5	
226- 001	CATCH BASIN CLEANING The sum of _____ _____ Each ($_____) Each	Each	10	
238- 012	12-INCH DUCTILE IRON PIPE (DIP) The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	50	
250- 010	10-INCH PVC SEWER PIPE The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	50	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
250- 012	12-INCH PVC SEWER PIPE The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	250	
250- 015	15-INCH PVC SEWER PIPE The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	50	
252- 912	12 INCH HIGH DENSITY POLYETHYLENE (HDPE) PIPE FOR DRAIN The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	50	
303- 006	6 INCH DUCTILE IRON WATER PIPE The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	75	
303- 008	8 INCH DUCTILE IRON WATER PIPE The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	50	

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
303- 012	12 INCH DUCTILE IRON WATER PIPE The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	250	
303- 016	16 INCH DUCTILE IRON WATER PIPE The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	230	
309- 001	DUCTILE IRON FITTINGS FOR WATER PIPE The sum of _____ _____ LB ($_____) LB	LB	300	
347- 001	1-INCH COPPER TUBING TYPE K The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	80	
347- 002	1-1/2-INCH COPPER TUBING TYPE K The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	20	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
350- 006	6 INCH GATE AND GATE BOX The sum of _____ _____ Each ($_____) Each	Each	2	
350- 008	8 INCH GATE AND GATE BOX The sum of _____ _____ Each ($_____) Each	Each	1	
350- 012	12 INCH GATE AND GATE BOX The sum of _____ _____ Each ($_____) Each	Each	3	
356- 016	16 INCH BUTTERFLY VALVE AND BOX The sum of _____ _____ Each ($_____) Each	Each	3	
356- 020	20 INCH BUTTERFLY VALVE AND BOX The sum of _____ _____ Each ($_____) Each	Each	1	

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
358- 002	GATE BOX AND SERVICE BOX ADJUSTED The sum of _____ _____ Each ($_____) Each	Each	20	
371- 990	CONNECTION TO EXISTING 20 INCH WATER MAIN The sum of _____ _____ Lump Sum ($_____) Lump Sum	Lump Sum	1	
376- 001	HYDRANT The sum of _____ _____ Each ($_____) Each	Each	2	
376- 003	HYDRANT - REMOVED AND STACKED The sum of _____ _____ Each ($_____) Each	Each	1	
460- 001	HOT MIX ASPHALT PAVEMENT (ALL COURSES) The sum of _____ _____ Ton ($_____) Ton	Ton	1,600	

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
460- 002	HOT MIX ASPHALT FOR PATCHING The sum of _____ _____ Ton ($_____) Ton	Ton	150	
460- 003	LIQUID ASPHALT PRICE ADJUSTMENT The sum of _____ _____ Allowance ($_____) Allowance	Allowance	1	$ 20,000
464- 001	BITUMEN FOR TACK COAT The sum of _____ _____ Gallon ($_____) Gallon	Gallon	700	
504- 001	GRANITE CURB - TYPE VA-4 The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	700	
516- 001	GRANITE CURB CORNER The sum of _____ _____ Each ($_____) Each	Each	6	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
580- 001	GRANITE CURB - REMOVE & RESET The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	100	
594- 001	CURB - REMOVE & DISCARD The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	800	
635- 100	HIGHWAY GUARD REMOVED AND DISCARDED The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	50	
697- 001	SEDIMENTATION FENCE The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	300	
701- 001	CEMENT CONCRETE SIDEWALKS AND DRIVEWAYS (ALL THICKNESSES) The sum of _____ _____ SQUARE YARD ($_____) SQUARE YARD	SY	750	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
701- 020	CEMENT CONCRETE WHEELCHAIR RAMPS The sum of _____ _____ Each ($_____) Each	Each	27	
702- 001	HOT MIX ASPHALT WALKWAY The sum of _____ _____ SQUARE YARD ($_____) SQUARE YARD	SY	200	
703- 801	CONCRETE WHEEL STOP WITH DELINEATORS The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	50	
706- 880	HEAVY DUTY INTERLOCKING CONCRETE PAVERS The sum of _____ _____ SQUARE FOOT ($_____) SQUARE FOOT	SF	200	
740- 001	ENGINEER'S FIELD OFFICE AND RELATED EQUIPMENT FOR ENGINEER The sum of _____ _____ Month ($_____) Month	Month	5	

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
751- 009	STRUCTURAL LOAM The sum of _____ _____ CUBIC YARD ($_____) CUBIC YARD	CY	25	
801- 301	3 INCH NON-METALLIC CONDUIT The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	925	
801- 302	3 INCH NON-METALLIC CONDUIT UNDER ROADWAYS The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	1,620	
806- 301	3 INCH METALLIC (GALVANIZED STEEL) CONDUIT The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	50	
811- 310	PULL BOX 12 X 12 INCHES The sum of _____ _____ Each ($_____) Each	Each	32	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
815- 098	FOOTING COST ADJUSTMENT The sum of _____ _____ VLF ($_____) VLF	VLF	100	
815- 701	TRAFFIC CONTROL SIGNAL – PROSPECT STREET & SOMERVILLE AVENUE The sum of _____ _____ Lump Sum ($_____) Lump Sum	Lump Sum	1	
815- 702	TRAFFIC CONTROL SIGNAL – WASHINGTON STREET, WEBSTER, AVENUE, SOMERVILLE AVENUE & BOW STREET The sum of _____ _____ Lump Sum ($_____) Lump Sum	Lump Sum	1	
815- 703	TRAFFIC CONTROL SIGNAL – PROSPECT STREET & WEBSTER AVENUE The sum of _____ _____ Lump Sum ($_____) Lump Sum	Lump Sum	1	
815- 704	TRAFFIC CONTROL SIGNAL – BOW STREET & WARREN STREET The sum of _____ _____ Lump Sum ($_____) Lump Sum	Lump Sum	1	

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
820- 700	ROADWAY LIGHTING MODIFICATIONS The sum of _____ _____ Lump Sum ($_____) Lump Sum	Lump Sum	1	
824- 001	RECTANGULAR RAPIDLY FLASHING BEACON SYSTEM The sum of _____ _____ Lump Sum ($_____) Lump Sum	Lump Sum	1	
828- 001	PERMANENT TRAFFIC SIGNAGE The sum of _____ _____ SQUARE FOOT ($_____) SQUARE FOOT	SF	390	
850- 002	TRAFFIC MANAGEMENT DURING CONSTRUCTION The sum of _____ _____ Lump Sum ($_____) Lump Sum	Lump Sum	1	
850- 001	TRAFFIC CONTROL SERVICES The sum of __One Hundred Fifty Thousand Dollars and No Cents_____ _____ Allowance ($____150,000.00_____) Allowance	Allowance	1	$ 150,000

BID SCHEDULE

Union Square Transportation & Utility Improvements - Early Action

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total
(Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
852- 100	TEMPORARY CONSTRUCTION SIGNS The sum of _____ _____ SQUARE FOOT ($_____) SQUARE FOOT	SF	300	
854- 026	TEMPORARY PAVEMENT MARKINGS – 4-INCH PAINT The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	2,000	
854- 120	PAVEMENT MARKING REMOVAL The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	1,400	
856- 105	PORTABLE CHANGEABLE MESSAGE SIGN The sum of _____ _____ Day ($_____) Day	Day	200	
860- 001	4-INCH WHITE PAVEMENT MARKINGS The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	13,250	

Bidder must fill in Bid Schedule in Ink

Bidder shall fill in Computed Total (Subject to verification)

Item No.	Description	Units	Approximate Quantity	Computed Total
860- 002	4-INCH YELLOW PAVEMENT MARKINGS The sum of _____ _____ LINEAR FOOT ($_____) LINEAR FOOT	LF	5,500	
860- 004	12-INCH WHITE STOP LINES The sum of _____ _____ SQUARE FOOT ($_____) SQUARE FOOT	SF	375	
860- 005	CROSSWALK STRIPING The sum of _____ _____ SQUARE FOOT ($_____) SQUARE FOOT	SF	5,100	
860- 006	PAVEMENT ARROWS AND LEGENDS The sum of _____ _____ SQUARE FOOT ($_____) SQUARE FOOT	SF	4,250	
860- 900	GREEN BIKE LANE PAINT The sum of _____ _____ SQUARE FOOT ($_____) SQUARE FOOT	SF	8,500	

SOMERVILLE LIVING WAGE ORDINANCE CERTIFICATION FORM

CITY OF SOMERVILLE CODE OF ORDINANCES SECTION 2-397 et seq[1].

Instructions: This form shall be included in all Invitations for Bids and Requests for Proposals which involve the furnishing of labor, time or effort (with no end product other than reports) by vendors contracting or subcontracting with the City of Somerville, where the contract price meets or exceeds the following dollar threshold: $10,000. If the undersigned is selected, this form will be attached to the contract or subcontract and the certifications made herein shall be incorporated as part of such contract or subcontract. **Complete this form and sign and date where indicated below on page 2.**

Purpose: The purpose of this form is to ensure that such vendors pay a "Living Wage" (defined below) to all covered employees (i.e., all employees except individuals in a city, state or federally funded youth program). In the case of bids, the City will award the contract to the lowest responsive and responsible bidder paying a Living Wage. In the case of RFP's, the City will select the most advantageous proposal from a responsive and responsible offeror paying a Living Wage. In neither case, however, shall the City be under any obligation to select a bid or proposal that exceeds the funds available for the contract.

Definition of "Living Wage": For this contract or subcontract, as of **7/1/2015** "Living Wage" shall be deemed to be an hourly wage of no less than **$12.24** per hour. From time to time, the Living Wage may be upwardly adjusted and amendments, if any, to the contract or subcontract may require the payment of a higher hourly rate if a higher rate is then in effect.

CERTIFICATIONS

1. The undersigned shall pay no less than the Living Wage to all covered employees who directly expend their time on the contract or subcontract with the City of Somerville.

2. The undersigned shall post a notice, (copy enclosed), to be furnished by the contracting City Department, informing covered employees of the protections and obligations provided for in the Somerville Living Wage Ordinance, and that for assistance and information, including copies of the Ordinance, employees should contact the contracting City Department. Such notice shall be posted in each location where services are performed by covered employees, in a conspicuous place where notices to employees are customarily posted.

3. The undersigned shall maintain payrolls for all covered employees and basic records relating hereto and shall preserve them for a period of three years. The records shall contain the name and address of each employee, the number of hours worked, the gross wages, a copy of the social

[1]Copies of the Ordinance are available upon request to the Purchasing Department.

security returns, and evidence of payment thereof and such other data as may be required by the contracting City Department from time to time.

4. The undersigned shall submit payroll records to the City upon request and, if the City receives information of possible noncompliance with the provisions the Somerville Living Wage Ordinance, the undersigned shall permit City representatives to observe work being performed at the work site, to interview employees, and to examine the books and records relating to the payrolls being investigated to determine payment of wages.

5. The undersigned shall not fund wage increases required by the Somerville Living Wage Ordinance by reducing the health insurance benefits of any of its employees.

6. The undersigned agrees that the penalties and relief set forth in the Somerville Living Wage Ordinance shall be in addition to the rights and remedies set forth in the contract and/or subcontract.

CERTIFIED BY:

Signature: _____
(Duly Authorized Representative of Vendor)

Title: _____

Name of Vendor:_____

Date: _____

INSTRUCTIONS: PLEASE POST

NOTICE TO ALL EMPLOYEES
REGARDING PAYMENT OF LIVING WAGE

Under the Somerville, Massachusetts' Living Wage Ordinance (Ordinance No. 1999-1), any person or entity who has entered into a contract with the City of Somerville is required to pay its employees who are involved in providing services to the City of Somerville no less than a "Living Wage".

The Living Wage as of **7/1/2014** is **$12.05** per hour. The only employees who are not covered by the Living Wage Ordinance are individuals in a Youth Program. "Youth Program" as defined in the Ordinance, "means any city, state or federally funded program which employs youth, as defined by city, state or federal guidelines, during the summer, or as part of a school to work program, or in any other related seasonal or part-time program."

For assistance and information regarding the protections and obligations provided for in the Living Wage Ordinance and/or a copy of the Living Wage Ordinance, all employees should contact the City of Somerville's Purchasing Department directly.

NOTICE TO BIDDERS
BID #15-105

All bids must be in accordance with terms and conditions set forth herein as stated.

SECTION A. Sealed bids for: **Union Square Early Action Project**. The bids will be received at the office of the Purchasing Director, Somerville City Hall, 93 Highland Avenue, Somerville, MA. 02143 no later than **Wednesday, July 1, 2015 at 11:00 A.M.** at which time and place they will be publicly opened and read.

SECTION B. Forms of price bid, specifications and terms of contract can be obtained at the Purchasing Department office on or after **Wednesday, June 10, 2015.**

SECTION C. Bid envelopes shall be clearly marked as follows: **"Bid No: 15-105, Bid for Union Square Early Action Project."**

SECTION D. If **awarded** vendor is a Corporation, vendor must comply with request for "Certificate of Good Standing". See attached instructions.

SECTION E. **INSURANCE: Awarded Vendor** must comply with insurance requirements as stated in the bid package.

SECTION F. Living Wage - see Somerville Living Wage Form (00320)
Prevailing Wage Rates – and Compliance Form

SECTION G. The requirements in Section **E or F** will be waived if the words "Non-Applicable" **(N/A)** are inserted in the space designated.

SECTION H. The copy of the bid deposited with the City will be accompanied by a bid guarantee in the amount of 5% of the proposed bid amount. A Bid bond, Certified Check, Treasurer's Check, or Cashier's Check made payable to the City must be submitted with each bid. Said bid guarantee will become the property of the City of Somerville if the proposal is accepted and the bidder either neglects or refuses to comply with the terms of the proposal. Bid guarantee will be returned within 30 days to all unsuccessful bidders.

SECTION I. A Performance Bond and a Payment Bond in the amount of 100% of the total contract price will be required by the City.

SECTION J. The Purchasing Director reserves the right to accept or reject any or all bids, to waive any minor informalities, if in her sole judgment, the best interest of the City of Somerville would be served by so doing.

SECTION K. The City reserves the right to cancel a contract, if awarded bidder does not respond to all necessary documents and required signature forms within ten (10) working days of receipt of contract.

SECTION L. The Vendor must certify that all employees to be provided have successfully completed at least ten (10) hours of OSHA approved training in Construction Safety and Health.

Signature:_____

Company:_____

By: _____ Title:_____

Date:_____Tel. No: _____ Fax:_____

Applicable to Corporations:

I hereby attest that the signatory to this bid has the authority to sign and submit bids for the Corporation.

ATTEST: _____
Secretary

QUALITY REQUIREMENTS

Please respond to the following questions. A negative response to any of the first four questions will automatically disqualify the Bidder. A negative response to the fifth question about SOMWBA will not disqualify the Bidder.

	Yes	No
Has the contractor been established in this specified field for at least 5 years?		
Has the contractor successfully completed a minimum of three (3) similar Municipal projects within the past six (6) years?		
Has the Contractor included a Health and Safety Plan Form with their bid documents?		
Can the contractor certify that all employees to be provided, have successfully completed at least 10 hours of OSHA approved training in Construction Safety and Health?		
Optional: Vendor: Are you a State Office for Minority and Women Owned Business Assistance (SOMWBA) certified minority- or woman-owned business?		

Non-Collusion Form and Tax Compliance Certification

Instructions: Complete each part of this two-part form and sign and date where indicated below.

A. NON-COLLUSION FORM

I, the undersigned, hereby certify under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person.

As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

Signature: _____
(Individual Submitted Bid or Proposal)
Duly Authorized

Name of Business or Entity:_____

Date: _____

B. TAX COMPLIANCE CERTIFICATION

Pursuant to M.G.L. c. 62C, §49A, I certify under the penalties of perjury that, to the best of my knowledge and belief, I am in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support, as well as paid all contributions and payments in lieu of contributions pursuant to MGL 151A, §19A(b).

Signature: _____
(Duly Authorized Representative of Vendor)

Name of Business or Entity:_____

Social Security Number or Federal Tax ID#:_____

Date: _____

Print

Certificate of Authority
(Limited Liability Companies Only)

Instructions: Complete this form and sign and date where indicated below.

1. I, the undersigned, being a member or manager of

_____,
(Complete Name of Limited Liability Company)

a limited liability company (LLC) hereby certify as to the contents of this form for the purpose of contracting with the City of Somerville.

2. The LLC is organized under the laws of the state of: _____.

3. The LLC is managed by **(check one)** a ☐ Manager or by its ☐ Members.

4. I hereby certify that each of the following individual(s) is:
   - a member/manager of the LLC;
   - duly authorized to execute and deliver this contract, agreement, and/or other legally binding documents relating to any contract and/or agreement on behalf of the LLC;
   - duly authorized to do and perform all acts and things necessary or appropriate to carry out the terms of this contract or agreement on behalf of the LLC; and
   - that no resolution, vote, or other document or action is necessary to establish such authority.

Name	Title

5. **Signature**:_____

Printed Name: _____

Printed Title:_____

Date: _____ Print

Certificate of Authority
(Corporations Only)

Instructions: Complete this form and sign and date where indicated below.

1. I hereby certify that I, the undersigned, am the duly elected Clerk/Secretary of

_____.
(Insert Full Name of Corporation)

2. I hereby certify that the following individual _____
(Insert the Name of Officer who Signed the Contract and Bonds)

is the duly elected_____ of said Corporation.
(Insert the Title of the Officer in Line 2)

3. I hereby certify that on _____
(Insert Date: Must be *on or before* Date Officer Signed Contract/Bonds)

at a duly authorized meeting of the Board of Directors of said corporation, at which a quorum was present, it was voted that

_____ _____
(Insert Name of Officer from Line 2) (Insert Title of Officer from Line 2)

of this corporation be and hereby is authorized to make, enter into, execute, and deliver contracts and bonds in the name and on behalf of said corporation, and affix its Corporate Seal thereto, and such execution of any contract of obligation in this corporation's name and on its behalf, with or without the Corporate Seal, shall be valid and binding upon this corporation; and that the above vote has not been amended or rescinded and remains in full force and effect as of the date set forth below.

4. **ATTEST**:
Signature: _____ ***AFFIX CORPORATE SEAL HERE***
(**Clerk or Secretary)**
Printed Name: _____

Printed Title:_____

Date: _____
(Date Must Be *on or after* Date Officer Signed Contract/Bonds)

Print

CITY OF SOMERVILLE, MASSACHUSETTS

JOSEPH A. CURTATONE
MAYOR

Vendor Certification

The vendor certifies that it has provided the City of Somerville with an accurate tax identification number (TIN). In the event that the City is fined by the IRS for an incorrect TIN provided by the vendor, the vendor agrees to reimburse the City for the amount of the fine.

_____

TIN

_____

Signature

_____

Printed Name of Person signing

_____

Company

_____

Date

CITY OF SOMERVILLE

SIGNATURE FORM

NAME OF COMPANY: _____

ADDRESS: _____

TELEPHONE #:_____FAX #: _____

DATE: _____ EMAIL: _____

SIGNATURE OF AUTHORIZED CONTRACTING OFFICIAL:

_____

TITLE: _____

RESIDENCE: _____

IF COMPANY IS A PARTNERSHIP:

FULL NAME AND RESIDENCE OF EACH PARTNER:

_____

_____

IF COMPANY IS A CORPORATION:

THE CORPORATE NAME IS: _____

THE CORPORATION IS ORGANIZED UNDER THE LAWS OF: _____

THE PRESIDENT IS: _____

THE TREASURER IS: _____

THE CLERK/SECRETARY OR ASSISTANT CLERK/SECRETARY WHO WILL EXECUTE THE CONTRACT AND SIGN THE CERTIFICATE OF AUTHORITY IS:

_____

NAME OF CORPORATION THAT WILL APPEAR ON A POTENTIAL CONTRACTUAL AGREEMENT IF DIFFERENT FROM ABOVE:_____.

NAME AND TITLE OF PERSON WHO WILL BE THE PRINCIPAL SIGNATORY ON THE CONTRACT IF OTHER THAN THE PRESIDENT:

NAME:_____TITLE: _____

REFERENCE FORM

Bidder:_____

IFB Title: **IFB# 15-105 Union Square Early Action Project**
Bidder must provide references from three municipalities for similar municipal projects completed during the previous six (6) years.

Reference:_____ Contact:_____

Address:_____ Phone:_____

_____ Fax:_____

Description and date(s) of supplies or services provided:_____

_____

_____

Reference:_____ Contact:_____

Address:_____ Phone:_____

_____ Fax:_____

Description and date(s) of supplies or services provided:_____

_____

_____

Reference:_____ Contact:_____

Address:_____ Phone:_____

_____ Fax:_____

Description and date(s) of supplies or services provided:_____

_____

CERTIFICATE OF GOOD STANDING

TO: Vendor

FROM: Purchasing Department

RE: **CERTIFICATE OF GOOD STANDING**

The **Awarded Vendor** must comply with our request for a **CURRENT "Certificate of Good Standing".**

If you require information on how to obtain the "Certificate of Good Standing" or Certificate of Registration (Foreign Corporations) from the Commonwealth of Massachusetts, please call the Secretary of State's Office at (617) 727-2850 (Press #1) located at One (1) Ashburton Place, 17th Floor, Boston, MA 02133 or you may access their web site at: http://corp.sec.state.ma.us/CorpWeb/Certificates/CertificateOrderForm.aspx

If your company is incorporated outside of Massachusetts and therefore is a "foreign corporation", but is registered to do business in Massachusetts, please comply with our request for the Certificate of Registration from the Commonwealth of Massachusetts. If your company is a foreign corporation, but is not registered to do business in Massachusetts, please provide the Certificate of Good Standing from your state of incorporation.

Please note that without the above certificate (s), the City of Somerville cannot execute your contract.

IMPORTANT NOTICE

Requests for Certificates of Good Standing by mail may take a substantial amount of time. A certificate may be obtained immediately in person at the Secretary's Office at the address above. Also, at this time, the Secretary of State's Office may not have your current annual report recorded. If this is the case, and you are therefore unable to obtain the Certificate of Good Standing, please forward a copy of your annual report filing fee check with your signed contracts. Please forward your original Certificate of Good Standing to the Purchasing Department upon receipt.

Thank You,

Purchasing Director

WEEKLY PAYROLL RECORDS REPORT
& STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form has been printed on the reverse of this page and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

In addition, every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority. For every week in which an apprentice is employed, a photocopy of the apprentice's identification card must be attached to the payroll report. Once collected, the awarding authority is also required to preserve those records for three years.

In addition, each such contractor, subcontractor, or public body shall furnish to the awarding authority directly, within fifteen days after completion of its portion of the work a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

_____, 20_____

I,_____,_____
(Name of signatory party) (Title)

do hereby state:

That I pay or supervise the payment of the persons employed by

_____ on the _____
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____

Title _____

INSURANCE SPECIFICATIONS
INSURANCE REQUIREMENTS FOR AWARDED VENDOR ONLY:

Prior to commencing performance of any work or supplying materials or equipment covered by these specifications, the contractor shall furnish to the Office of the Purchasing Director a Certificate of Insurance evidencing the following:

A. GENERAL LIABILITY - Comprehensive Form

Bodily Injury Liability.....….....$ One Million

Property Damage Liability.....$ One Million

B. COVERAGE FOR PAYMENT OF WORKER'S COMPENSATION BENEFIT PURSUANT TO CHAPTER 152 OF THE MASSACHUSETTS GENERAL LAWS IN THE AMOUNT AS LISTED BELOW:

WORKER'S COMPENSATION.….....$Statutory

EMPLOYERS' LIABILITY..….....…….$ Statutory

C. AUTOMOBILE LIABILITY INSURANCE AS LISTED BELOW:

BODILY INJURY LIABILITY.....$ STATUTORY

l. A contract will not be executed unless a certificate (s) of insurance evidencing above-described coverage is attached.

2. Failure to have the above-described coverage in effect during the entire period of the contract shall be deemed to be a breach of the contract.

3. All applicable insurance policies shall read:
"CITY OF SOMERVILLE" as a certificate holder and as an additional insured for general liability only along with a description of operation in the space provided on the certificate.

Certificate Should Be Made Out To:
City Of Somerville
Purchasing Department
93 Highland Avenue
Somerville, Ma. 02143

Note: If your insurance expires during the life of this contract, you shall be responsible to submit a new certificate(s) covering the period of the contract. No payment will be made on a contract with an expired insurance certificate.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
INSURED	INSURER A :	
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
	☐ CLAIMS-MADE ☐ OCCUR						MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
							GENERAL AGGREGATE	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$
	☐ POLICY ☐ PRO-JECT ☐ LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB ☐ OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						☐ WC STATU-TORY LIMITS ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ **(Mandatory in NH)**	N / A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

ADD "X" HERETO CERTIFY THAT THE CITY OF SOMERVILLE IS AN ADDITIONAL INSURED

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

DESCRIPTION OF PROJECT, SOLICITATION NUMBER AND THAT THE CITY OF SOMERVILLE IS A CERTIFICATE HOLDER AND ADDITIONAL INSURED

CERTIFICATE HOLDER

CERTIFICATES SHOULD BE MADE OUT TO:

CITY OF SOMERVILLE
PURCHASING DEPARTMENT
93 HIGHLAND AVE
SOMERVILLE, MA 02143

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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BID BOND OR GUARANTY

BIDDER TO INSERT HERE

Prevailing Wage Rates
Payroll Submission Forms

WEEKLY PAYROLL RECORDS REPORT
& STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form has been printed on the reverse of this page and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

In addition, every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority. For every week in which an apprentice is employed, a photocopy of the apprentice's identification card must be attached to the payroll report. Once collected, the awarding authority is also required to preserve those records for three years.

In addition, each such contractor, subcontractor, or public body shall furnish to the awarding authority directly, within fifteen days after completion of its portion of the work a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

_____, 20_____

I,_____,_____
(Name of signatory party) (Title)

do hereby state:

That I pay or supervise the payment of the persons employed by

_____ on the _____
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____

Title _____

MASSACHUSETTS WEEKLY CERTIFIED PAYROLL REPORT FORM

Company's Name:	Address:	Phone No.:		Payroll No.:
Employer's Signature:	**Title:**	**Contract No:**	**Tax Payer ID No.**	**Work Week Ending:**
Awarding Authority's Name:	**Public Works Project Name:**	**Public Works Project Location:**		**Min. Wage Rate Sheet No.**
General / Prime Contractor's Name:	**Subcontractor's Name:**		**"Employer" Hourly Fringe Benefit Contributions**	

Employee Name & Complete Address	Employee is OSHA 10 Certified (?)	Work Classification:	Appr. Rate (%)	Hours Worked Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Project Hours (A) All Other Hours	Hourly Base Wage (B)	Health & Welfare Insurance (C')	ERISA Pension Plan (D)	Supp. Unemp. (E)	(B+C+D+E) Total Hourly Prev. Wage (F)	(A x F) Project Gross Wages (G) Total Gross Wages	Check No. (H)

NOTE: Pursuant to MGL Ch. 149 s.27B, every contractor and subcontractor is required to submit a "true and accurate" copy of their weekly payroll records directly to the awarding authority. Failure to comply may result in the commencement of a criminal action or the issuance of a civil citation.

Date recieved by awarding authority
/ /

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

RONALD L. WALKER, II
Secretary

WILLIAM D MCKINNEY
Director

Awarding Authority: City of Somerville

Contract Number: IFB 15-105 **City/Town:** SOMERVILLE

Description of Work: The Union Square Early Action Project is a streetscape and utility improvement project for segments of Prospect Street, Webster Avenue and Somerville Avenue in Somerville's Union Square.

Job Location: Somerville, MA: Webster and Somerville Ave.

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **If an apprentice rate is not listed on the prevailing wage schedule for the trade in which an apprentice is registered with the DAS, the apprentice must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at http://www.mass.gov/dols/pw.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.

Issue Date: 06/09/2015 **Wage Request Number:** 20150609-016

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2015	$32.75	$9.91	$9.33	$0.00	$51.99
	08/01/2015	$32.75	$10.41	$9.33	$0.00	$52.49
	12/01/2015	$32.75	$10.41	$10.08	$0.00	$53.24
	06/01/2016	$33.25	$10.41	$10.08	$0.00	$53.74
	08/01/2016	$33.25	$10.91	$10.08	$0.00	$54.24
	12/01/2016	$33.25	$10.91	$10.89	$0.00	$55.05
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2015	$32.82	$9.91	$9.33	$0.00	$52.06
	08/01/2015	$32.82	$10.41	$9.33	$0.00	$52.56
	12/01/2015	$32.82	$10.41	$10.08	$0.00	$53.31
	06/01/2016	$33.32	$10.41	$10.08	$0.00	$53.81
	08/01/2016	$33.32	$10.91	$10.08	$0.00	$54.31
	12/01/2016	$33.32	$10.91	$10.89	$0.00	$55.12
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2015	$32.94	$9.91	$9.33	$0.00	$52.18
	08/01/2015	$32.94	$10.41	$9.33	$0.00	$52.68
	12/01/2015	$32.94	$10.41	$10.08	$0.00	$53.43
	06/01/2016	$33.44	$10.41	$10.08	$0.00	$53.93
	08/01/2016	$33.44	$10.91	$10.08	$0.00	$54.43
	12/01/2016	$33.44	$10.91	$10.89	$0.00	$55.24
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2014	$87.36	$9.80	$18.17	$0.00	$115.33
	08/01/2015	$90.51	$9.80	$18.17	$0.00	$118.48
AIR TRACK OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	12/01/2015	$36.60	$7.30	$13.20	$0.00	$57.10
	06/01/2016	$37.35	$7.30	$13.20	$0.00	$57.85
	12/01/2016	$38.35	$7.30	$13.20	$0.00	$58.85
For apprentice rates see "Apprentice- LABORER"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	06/01/2015	$33.43	$10.40	$5.95	$0.00	$49.78
	12/01/2015	$34.38	$10.40	$5.95	$0.00	$50.73
ASPHALT RAKER *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 1*	06/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	12/01/2015	$36.60	$7.30	$13.20	$0.00	$57.10
	06/01/2016	$37.35	$7.30	$13.20	$0.00	$57.85
	12/01/2016	$38.35	$7.30	$13.20	$0.00	$58.85
For apprentice rates see "Apprentice- LABORER"						
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2010	$37.70	$6.97	$11.18	$0.00	$55.85

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2010

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$24.51	$6.97	$11.18	$0.00	$42.66
2	65	$24.51	$6.97	$11.18	$0.00	$42.66
3	70	$26.39	$6.97	$11.18	$0.00	$44.54
4	75	$28.28	$6.97	$11.18	$0.00	$46.43
5	80	$30.16	$6.97	$11.18	$0.00	$48.31
6	85	$32.05	$6.97	$11.18	$0.00	$50.20
7	90	$33.93	$6.97	$11.18	$0.00	$52.08
8	95	$35.82	$6.97	$11.18	$0.00	$53.97

Notes:

Apprentice to Journeyworker Ratio:1:5

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (BOSTON)*	02/01/2015	$48.96	$10.18	$18.50	$0.00	$77.64
	08/01/2015	$49.86	$10.18	$18.57	$0.00	$78.61
	02/01/2016	$50.43	$10.18	$18.57	$0.00	$79.18
	08/01/2016	$51.33	$10.18	$18.65	$0.00	$80.16
	02/01/2017	$51.90	$10.18	$18.65	$0.00	$80.73

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Boston*

Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.48	$10.18	$18.50	$0.00	$53.16
2	60	$29.38	$10.18	$18.50	$0.00	$58.06
3	70	$34.27	$10.18	$18.50	$0.00	$62.95
4	80	$39.17	$10.18	$18.50	$0.00	$67.85
5	90	$44.06	$10.18	$18.50	$0.00	$72.74

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.93	$10.18	$18.57	$0.00	$53.68
2	60	$29.92	$10.18	$18.57	$0.00	$58.67
3	70	$34.90	$10.18	$18.57	$0.00	$63.65
4	80	$39.89	$10.18	$18.57	$0.00	$68.64
5	90	$44.87	$10.18	$18.57	$0.00	$73.62

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2015	$36.20	$7.30	$13.40	$0.00	$56.90
	12/01/2015	$36.95	$7.30	$13.40	$0.00	$57.65
	06/01/2016	$37.70	$7.30	$13.40	$0.00	$58.40
	12/01/2016	$38.70	$7.30	$13.40	$0.00	$59.40
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2015	$35.05	$7.30	$13.40	$0.00	$55.75
	12/01/2015	$35.80	$7.30	$13.40	$0.00	$56.50
	06/01/2016	$36.55	$7.30	$13.40	$0.00	$57.25
	12/01/2016	$37.55	$7.30	$13.40	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2015	$35.05	$7.30	$13.40	$0.00	$55.75
	12/01/2015	$35.80	$7.30	$13.40	$0.00	$56.50
	06/01/2016	$36.55	$7.30	$13.40	$0.00	$57.25
	12/01/2016	$37.55	$7.30	$13.40	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
CARPENTER *CARPENTERS -ZONE 1 (Metro Boston)*	03/01/2015	$42.30	$9.80	$16.48	$0.00	$68.58

Apprentice - *CARPENTER - Zone 1 Metro Boston*

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.15	$9.80	$1.63	$0.00	$32.58
2	60	$25.38	$9.80	$1.63	$0.00	$36.81
3	70	$29.61	$9.80	$11.59	$0.00	$51.00
4	75	$31.73	$9.80	$11.59	$0.00	$53.12
5	80	$33.84	$9.80	$13.22	$0.00	$56.86
6	80	$33.84	$9.80	$13.22	$0.00	$56.86
7	90	$38.07	$9.80	$14.85	$0.00	$62.72
8	90	$38.07	$9.80	$14.85	$0.00	$62.72

Notes:

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (BOSTON)*	01/01/2015	$44.90	$10.90	$18.71	$1.30	$75.81
	07/01/2015	$45.82	$10.90	$18.71	$1.30	$76.73
	01/01/2016	$46.44	$10.90	$18.71	$1.30	$77.35

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CEMENT MASONRY/PLASTERING - Eastern Mass (Boston)*

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.45	$10.90	$12.21	$0.00	$45.56
2	60	$26.94	$10.90	$13.71	$1.30	$52.85
3	65	$29.19	$10.90	$14.71	$1.30	$56.10
4	70	$31.43	$10.90	$15.71	$1.30	$59.34
5	75	$33.68	$10.90	$16.71	$1.30	$62.59
6	80	$35.92	$10.90	$17.71	$1.30	$65.83
7	90	$40.41	$10.90	$18.71	$1.30	$71.32

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.91	$10.90	$12.21	$0.00	$46.02
2	60	$27.49	$10.90	$13.71	$1.30	$53.40
3	65	$29.78	$10.90	$14.71	$1.30	$56.69
4	70	$32.07	$10.90	$15.71	$1.30	$59.98
5	75	$34.37	$10.90	$16.71	$1.30	$63.28
6	80	$36.66	$10.90	$17.71	$1.30	$66.57
7	90	$41.24	$10.90	$18.71	$1.30	$72.15

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$43.83	$10.00	$14.55	$0.00	$68.38
	12/01/2015	$45.08	$10.00	$14.55	$0.00	$69.63
	06/01/2016	$45.83	$10.00	$14.55	$0.00	$70.38
	12/01/2016	$47.08	$10.00	$14.55	$0.00	$71.63
	06/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
	12/01/2017	$49.08	$10.00	$14.55	$0.00	$73.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$29.61	$10.00	$14.55	$0.00	$54.16
	12/01/2015	$30.48	$10.00	$14.55	$0.00	$55.03
	06/01/2016	$31.00	$10.00	$14.55	$0.00	$55.55
	12/01/2016	$31.87	$10.00	$14.55	$0.00	$56.42
	06/01/2017	$32.56	$10.00	$14.55	$0.00	$57.11
	12/01/2017	$33.25	$10.00	$14.55	$0.00	$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 1*	01/01/2015	$47.66	$7.85	$16.10	$0.00	$71.61
	07/01/2015	$48.56	$7.85	$16.10	$0.00	$72.51
	01/01/2016	$49.51	$7.85	$16.10	$0.00	$73.46
	07/01/2016	$50.46	$7.85	$16.10	$0.00	$74.41
	01/01/2017	$51.41	$7.85	$16.10	$0.00	$75.36

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.83	$7.85	$0.00	$0.00	$31.68
2	55	$26.21	$7.85	$3.66	$0.00	$37.72
3	60	$28.60	$7.85	$3.99	$0.00	$40.44
4	65	$30.98	$7.85	$4.32	$0.00	$43.15
5	70	$33.36	$7.85	$14.11	$0.00	$55.32
6	75	$35.75	$7.85	$14.44	$0.00	$58.04
7	80	$38.13	$7.85	$14.77	$0.00	$60.75
8	90	$42.89	$7.85	$15.44	$0.00	$66.18

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.28	$7.85	$0.00	$0.00	$32.13
2	55	$26.71	$7.85	$3.66	$0.00	$38.22
3	60	$29.14	$7.85	$3.99	$0.00	$40.98
4	65	$31.56	$7.85	$4.32	$0.00	$43.73
5	70	$33.99	$7.85	$14.11	$0.00	$55.95
6	75	$36.42	$7.85	$14.44	$0.00	$58.71
7	80	$38.85	$7.85	$14.77	$0.00	$61.47
8	90	$43.70	$7.85	$15.44	$0.00	$66.99

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 1*	06/01/2015	$35.25	$7.30	$13.20	$0.00	$55.75
	12/01/2015	$36.00	$7.30	$13.20	$0.00	$56.50
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 1*	06/01/2015	$36.25	$7.30	$13.20	$0.00	$56.75
	12/01/2015	$37.00	$7.30	$13.20	$0.00	$57.50
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS *LABORERS - ZONE 1*	06/01/2015	$36.00	$7.30	$13.20	$0.00	$56.50
	12/01/2015	$36.75	$7.30	$13.20	$0.00	$57.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 1*	06/01/2015	$36.25	$7.30	$13.20	$0.00	$56.75
	12/01/2015	$37.00	$7.30	$13.20	$0.00	$57.50
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 1*	06/01/2015	$36.00	$7.30	$13.20	$0.00	$56.50
	12/01/2015	$36.75	$7.30	$13.20	$0.00	$57.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER *LABORERS - ZONE 1*	06/01/2015	$35.25	$7.30	$13.20	$0.00	$55.75
	12/01/2015	$36.00	$7.30	$13.20	$0.00	$56.50
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2014	$58.24	$9.80	$18.17	$0.00	$86.21
	08/01/2015	$60.34	$9.80	$18.17	$0.00	$88.31
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2014	$41.60	$9.80	$18.17	$0.00	$69.57
	08/01/2015	$43.10	$9.80	$18.17	$0.00	$71.07
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2014	$62.40	$9.80	$18.17	$0.00	$90.37
	08/01/2015	$64.65	$9.80	$18.17	$0.00	$92.62
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2014	$87.36	$9.80	$18.17	$0.00	$115.33
	08/01/2015	$90.51	$9.80	$18.17	$0.00	$118.48
DRAWBRIDGE OPERATOR (Construction) *ELECTRICIANS LOCAL 103*	03/01/2015	$45.17	$13.00	$15.40	$0.00	$73.57
	09/01/2015	$46.13	$13.00	$15.43	$0.00	$74.56
	03/01/2016	$47.08	$13.00	$15.46	$0.00	$75.54
For apprentice rates see "Apprentice- ELECTRICIAN"						
ELECTRICIAN *ELECTRICIANS LOCAL 103*	03/01/2015	$45.17	$13.00	$15.40	$0.00	$73.57
	09/01/2015	$46.13	$13.00	$15.43	$0.00	$74.56
	03/01/2016	$47.08	$13.00	$15.46	$0.00	$75.54

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELECTRICIAN - Local 103*

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$18.07	$13.00	$0.54	$0.00	$31.61
2	40	$18.07	$13.00	$0.54	$0.00	$31.61
3	45	$20.33	$13.00	$11.64	$0.00	$44.97
4	45	$20.33	$13.00	$11.64	$0.00	$44.97
5	50	$22.59	$13.00	$11.98	$0.00	$47.57
6	55	$24.84	$13.00	$12.33	$0.00	$50.17
7	60	$27.10	$13.00	$12.66	$0.00	$52.76
8	65	$29.36	$13.00	$13.01	$0.00	$55.37
9	70	$31.62	$13.00	$13.35	$0.00	$57.97
10	75	$33.88	$13.00	$13.70	$0.00	$60.58

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$18.45	$13.00	$0.55	$0.00	$32.00
2	40	$18.45	$13.00	$0.55	$0.00	$32.00
3	45	$20.76	$13.00	$11.65	$0.00	$45.41
4	45	$20.76	$13.00	$11.65	$0.00	$45.41
5	50	$23.07	$13.00	$11.99	$0.00	$48.06
6	55	$25.37	$13.00	$12.34	$0.00	$50.71
7	60	$27.68	$13.00	$12.68	$0.00	$53.36
8	65	$29.98	$13.00	$13.03	$0.00	$56.01
9	70	$32.29	$13.00	$13.37	$0.00	$58.66
10	75	$34.60	$13.00	$13.72	$0.00	$61.32

Notes: :
App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2015	$53.30	$13.58	$14.21	$0.00	$81.09
	01/01/2016	$54.53	$14.43	$14.96	$0.00	$83.92
	01/01/2017	$55.86	$15.28	$15.71	$0.00	$86.85

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 4*

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.65	$13.58	$0.00	$0.00	$40.23
2	55	$29.32	$13.58	$14.21	$0.00	$57.11
3	65	$34.65	$13.58	$14.21	$0.00	$62.44
4	70	$37.31	$13.58	$14.21	$0.00	$65.10
5	80	$42.64	$13.58	$14.21	$0.00	$70.43

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.27	$14.43	$0.00	$0.00	$41.70
2	55	$29.99	$14.43	$14.96	$0.00	$59.38
3	65	$35.44	$14.43	$14.96	$0.00	$64.83
4	70	$38.17	$14.43	$14.96	$0.00	$67.56
5	80	$43.62	$14.43	$14.96	$0.00	$73.01

Notes:
Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2015	$37.31	$13.58	$14.21	$0.00	$65.10
	01/01/2016	$38.17	$14.43	$14.96	$0.00	$67.56
	01/01/2017	$39.10	$15.28	$15.71	$0.00	$70.09
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2015	$40.22	$10.00	$14.30	$0.00	$64.52
	11/01/2015	$40.80	$10.00	$14.30	$0.00	$65.10
	05/01/2016	$41.69	$10.00	$14.30	$0.00	$65.99
	11/01/2016	$42.28	$10.00	$14.30	$0.00	$66.58
	05/01/2017	$43.16	$10.00	$14.30	$0.00	$67.46
	11/01/2017	$43.89	$10.00	$14.30	$0.00	$68.19
	05/01/2018	$44.60	$10.00	$14.30	$0.00	$68.90
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2015	$41.65	$10.00	$14.30	$0.00	$65.95
	11/01/2015	$42.24	$10.00	$14.30	$0.00	$66.54
	05/01/2016	$43.13	$10.00	$14.30	$0.00	$67.43
	11/01/2016	$43.73	$10.00	$14.30	$0.00	$68.03
	05/01/2017	$44.62	$10.00	$14.30	$0.00	$68.92
	11/01/2017	$45.35	$10.00	$14.30	$0.00	$69.65
	05/01/2018	$46.07	$10.00	$14.30	$0.00	$70.37
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2015	$21.68	$10.00	$14.30	$0.00	$45.98
	11/01/2015	$22.02	$10.00	$14.30	$0.00	$46.32
	05/01/2016	$22.54	$10.00	$14.30	$0.00	$46.84
	11/01/2016	$22.89	$10.00	$14.30	$0.00	$47.19
	05/01/2017	$23.42	$10.00	$14.30	$0.00	$47.72
	11/01/2017	$23.84	$10.00	$14.30	$0.00	$48.14
	05/01/2018	$24.27	$10.00	$14.30	$0.00	$48.57
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 103*	03/01/2015	$45.17	$13.00	$15.40	$0.00	$73.57
	09/01/2015	$46.13	$13.00	$15.43	$0.00	$74.56
	03/01/2016	$47.08	$13.00	$15.46	$0.00	$75.54
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING *ELECTRICIANS LOCAL 103*	03/01/2015	$33.88	$13.00	$13.70	$0.00	$60.58
	09/01/2015	$34.60	$13.00	$13.72	$0.00	$61.32
	03/01/2016	$35.31	$13.00	$13.74	$0.00	$62.05
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$35.64	$10.00	$14.55	$0.00	$60.19
	12/01/2015	$36.69	$10.00	$14.55	$0.00	$61.24
	06/01/2016	$37.31	$10.00	$14.55	$0.00	$61.86
	12/01/2016	$38.35	$10.00	$14.55	$0.00	$62.90
	06/01/2017	$39.19	$10.00	$14.55	$0.00	$63.74
	12/01/2017	$40.02	$10.00	$14.55	$0.00	$64.57
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER *LABORERS - ZONE 1*	06/01/2015	$20.50	$7.30	$13.20	$0.00	$41.00
	12/01/2015	$20.50	$7.30	$13.20	$0.00	$41.00
	06/01/2016	$20.50	$7.30	$13.20	$0.00	$41.00
	12/01/2016	$20.50	$7.30	$13.20	$0.00	$41.00
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE 1*	09/01/2014	$40.40	$9.80	$17.21	$0.00	$67.41

Apprentice - *FLOORCOVERER - Local 2168 Zone 1*

Effective Date - 09/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.20	$9.80	$1.79	$0.00	$31.79
2	55	$22.22	$9.80	$1.79	$0.00	$33.81
3	60	$24.24	$9.80	$11.84	$0.00	$45.88
4	65	$26.26	$9.80	$11.84	$0.00	$47.90
5	70	$28.28	$9.80	$13.63	$0.00	$51.71
6	75	$30.30	$9.80	$13.63	$0.00	$53.73
7	80	$32.32	$9.80	$15.42	$0.00	$57.54
8	85	$34.34	$9.80	$15.42	$0.00	$59.56

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FORK LIFT/CHERRY PICKER *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$29.61	$10.00	$14.55	$0.00	$54.16
	12/01/2015	$30.48	$10.00	$14.55	$0.00	$55.03
	06/01/2016	$31.00	$10.00	$14.55	$0.00	$55.55
	12/01/2016	$31.87	$10.00	$14.55	$0.00	$56.42
	06/01/2017	$32.56	$10.00	$14.55	$0.00	$57.11
	12/01/2017	$33.25	$10.00	$14.55	$0.00	$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 35 (ZONE 1)*	01/01/2015	$42.95	$7.85	$16.10	$0.00	$66.90
	07/01/2015	$43.85	$7.85	$16.10	$0.00	$67.80
	01/01/2016	$44.80	$7.85	$16.10	$0.00	$68.75
	07/01/2016	$45.75	$7.85	$16.10	$0.00	$69.70
	01/01/2017	$46.70	$7.85	$16.10	$0.00	$70.65

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *GLAZIER - Local 35 Zone 1*

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.48	$7.85	$0.00	$0.00	$29.33
2	55	$23.62	$7.85	$3.66	$0.00	$35.13
3	60	$25.77	$7.85	$3.99	$0.00	$37.61
4	65	$27.92	$7.85	$4.32	$0.00	$40.09
5	70	$30.07	$7.85	$14.11	$0.00	$52.03
6	75	$32.21	$7.85	$14.44	$0.00	$54.50
7	80	$34.36	$7.85	$14.77	$0.00	$56.98
8	90	$38.66	$7.85	$15.44	$0.00	$61.95

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.93	$7.85	$0.00	$0.00	$29.78
2	55	$24.12	$7.85	$3.66	$0.00	$35.63
3	60	$26.31	$7.85	$3.99	$0.00	$38.15
4	65	$28.50	$7.85	$4.32	$0.00	$40.67
5	70	$30.70	$7.85	$14.11	$0.00	$52.66
6	75	$32.89	$7.85	$14.44	$0.00	$55.18
7	80	$35.08	$7.85	$14.77	$0.00	$57.70
8	90	$39.47	$7.85	$15.44	$0.00	$62.76

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

HOISTING ENGINEER/CRANES/GRADALLS *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *OPERATING ENGINEERS - Local 4*

Effective Date - 06/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$23.56	$10.00	$0.00	$0.00	$33.56
2	60	$25.70	$10.00	$14.55	$0.00	$50.25
3	65	$27.84	$10.00	$14.55	$0.00	$52.39
4	70	$29.98	$10.00	$14.55	$0.00	$54.53
5	75	$32.12	$10.00	$14.55	$0.00	$56.67
6	80	$34.26	$10.00	$14.55	$0.00	$58.81
7	85	$36.41	$10.00	$14.55	$0.00	$60.96
8	90	$38.55	$10.00	$14.55	$0.00	$63.10

Effective Date - 12/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$24.24	$10.00	$0.00	$0.00	$34.24
2	60	$26.45	$10.00	$14.55	$0.00	$51.00
3	65	$28.65	$10.00	$14.55	$0.00	$53.20
4	70	$30.86	$10.00	$14.55	$0.00	$55.41
5	75	$33.06	$10.00	$14.55	$0.00	$57.61
6	80	$35.26	$10.00	$14.55	$0.00	$59.81
7	85	$37.47	$10.00	$14.55	$0.00	$62.02
8	90	$39.67	$10.00	$14.55	$0.00	$64.22

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2015	$43.28	$10.20	$20.54	$2.22	$76.24
	08/01/2015	$44.28	$10.20	$20.54	$2.22	$77.24
	02/01/2016	$45.28	$10.20	$20.54	$2.22	$78.24
	08/01/2016	$46.43	$10.20	$20.54	$2.22	$79.39
	02/01/2017	$47.53	$10.20	$20.54	$2.22	$80.49
	08/01/2017	$48.63	$10.20	$20.54	$2.22	$81.59
	02/01/2018	$49.78	$10.20	$20.54	$2.22	$82.74
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 103*	03/01/2015	$45.17	$13.00	$15.40	$0.00	$73.57
	09/01/2015	$46.13	$13.00	$15.43	$0.00	$74.56
	03/01/2016	$47.08	$13.00	$15.46	$0.00	$75.54
For apprentice rates see "Apprentice- ELECTRICIAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2015	$43.28	$10.20	$20.54	$2.22	$76.24
	08/01/2015	$44.28	$10.20	$20.54	$2.22	$77.24
	02/01/2016	$45.28	$10.20	$20.54	$2.22	$78.24
	08/01/2016	$46.43	$10.20	$20.54	$2.22	$79.39
	02/01/2017	$47.53	$10.20	$20.54	$2.22	$80.49
	08/01/2017	$48.63	$10.20	$20.54	$2.22	$81.59
	02/01/2018	$49.78	$10.20	$20.54	$2.22	$82.74
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PIPEFITTERS LOCAL 537*	03/01/2015	$48.69	$9.70	$16.89	$0.00	$75.28
	09/01/2015	$49.69	$9.70	$16.89	$0.00	$76.28
	03/01/2016	$50.69	$9.70	$16.89	$0.00	$77.28
	09/01/2016	$51.69	$9.70	$16.89	$0.00	$78.28
	03/01/2017	$52.69	$9.70	$16.89	$0.00	$79.28
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PIPEFITTERS LOCAL 537*	03/01/2015	$48.69	$9.70	$16.89	$0.00	$75.28
	09/01/2015	$49.69	$9.70	$16.89	$0.00	$76.28
	03/01/2016	$50.69	$9.70	$16.89	$0.00	$77.28
	09/01/2016	$51.69	$9.70	$16.89	$0.00	$78.28
	03/01/2017	$52.69	$9.70	$16.89	$0.00	$79.28
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS *LABORERS - ZONE 1*	06/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	12/01/2015	$36.60	$7.30	$13.20	$0.00	$57.10
	06/01/2016	$37.35	$7.30	$13.20	$0.00	$57.85
	12/01/2016	$38.35	$7.30	$13.20	$0.00	$58.85
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	09/01/2014	$43.31	$11.25	$12.60	$0.00	$67.16

Apprentice - *ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston*

Effective Date - 09/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.66	$11.25	$9.35	$0.00	$42.26
2	60	$25.99	$11.25	$10.00	$0.00	$47.24
3	70	$30.32	$11.25	$10.65	$0.00	$52.22
4	80	$34.65	$11.25	$11.30	$0.00	$57.20

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (BOSTON AREA)*	03/16/2015	$42.11	$7.70	$20.25	$0.00	$70.06

Apprentice - *IRONWORKER - Local 7 Boston*

Effective Date - 03/16/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$25.27	$7.70	$20.25	$0.00	$53.22
2	70	$29.48	$7.70	$20.25	$0.00	$57.43
3	75	$31.58	$7.70	$20.25	$0.00	$59.53
4	80	$33.69	$7.70	$20.25	$0.00	$61.64
5	85	$35.79	$7.70	$20.25	$0.00	$63.74
6	90	$37.90	$7.70	$20.25	$0.00	$65.85

Notes:
** Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:**

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
LABORER *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10

Apprentice - *LABORER - Zone 1*

Effective Date - 06/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.06	$7.30	$13.20	$0.00	$41.56
2	70	$24.57	$7.30	$13.20	$0.00	$45.07
3	80	$28.08	$7.30	$13.20	$0.00	$48.58
4	90	$31.59	$7.30	$13.20	$0.00	$52.09

Effective Date - 12/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.51	$7.30	$13.20	$0.00	$42.01
2	70	$25.10	$7.30	$13.20	$0.00	$45.60
3	80	$28.68	$7.30	$13.20	$0.00	$49.18
4	90	$32.27	$7.30	$13.20	$0.00	$52.77

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: CARPENTER TENDER *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 1*	06/01/2015	$35.25	$7.30	$13.20	$0.00	$55.75
	12/01/2015	$36.00	$7.30	$13.20	$0.00	$56.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
This classification applies to all tree work associated with the removal of standing trees, and trimming and removal of branches and limbs when the work is not done for a utility company for the purpose of operation, maintenance or repair of utility company equipment. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2015	$37.37	$10.18	$17.18	$0.00	$64.73
	08/01/2015	$38.08	$10.18	$17.25	$0.00	$65.51
	02/01/2016	$38.53	$10.18	$17.25	$0.00	$65.96
	08/01/2016	$39.23	$10.18	$17.33	$0.00	$66.74
	02/01/2017	$39.69	$10.18	$17.33	$0.00	$67.20

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE & TILE FINISHER - Local 3 Marble & Tile*

Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$18.69	$10.18	$17.18	$0.00	$46.05
2	60	$22.42	$10.18	$17.18	$0.00	$49.78
3	70	$26.16	$10.18	$17.18	$0.00	$53.52
4	80	$29.90	$10.18	$17.18	$0.00	$57.26
5	90	$33.63	$10.18	$17.18	$0.00	$60.99

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.04	$10.18	$17.25	$0.00	$46.47
2	60	$22.85	$10.18	$17.25	$0.00	$50.28
3	70	$26.66	$10.18	$17.25	$0.00	$54.09
4	80	$30.46	$10.18	$17.25	$0.00	$57.89
5	90	$34.27	$10.18	$17.25	$0.00	$61.70

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS,TILELAYERS & TERRAZZO MECH *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2015	$49.00	$10.18	$18.50	$0.00	$77.68
	08/01/2015	$49.90	$10.18	$18.57	$0.00	$78.65
	02/01/2016	$50.47	$10.18	$18.57	$0.00	$79.22
	08/01/2016	$51.37	$10.18	$18.65	$0.00	$80.20
	02/01/2017	$51.94	$10.18	$18.65	$0.00	$80.77

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - *MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile*						
Effective Date - 02/01/2015						
Step percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate	
1 50	$24.50	$10.18	$18.50	$0.00	$53.18	
2 60	$29.40	$10.18	$18.50	$0.00	$58.08	
3 70	$34.30	$10.18	$18.50	$0.00	$62.98	
4 80	$39.20	$10.18	$18.50	$0.00	$67.88	
5 90	$44.10	$10.18	$18.50	$0.00	$72.78	
Effective Date - 08/01/2015						
Step percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate	
1 50	$24.95	$10.18	$18.57	$0.00	$53.70	
2 60	$29.94	$10.18	$18.57	$0.00	$58.69	
3 70	$34.93	$10.18	$18.57	$0.00	$63.68	
4 80	$39.92	$10.18	$18.57	$0.00	$68.67	
5 90	$44.91	$10.18	$18.57	$0.00	$73.66	
Notes:						
Apprentice to Journeyworker Ratio:1:5						
MECH. SWEEPER OPERATOR (ON CONST. SITES)	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
OPERATING ENGINEERS LOCAL 4	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
OPERATING ENGINEERS LOCAL 4	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 1)	04/01/2015	$37.64	$9.80	$16.21	$0.00	$63.65
MILLWRIGHTS LOCAL 1121 - Zone 1						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - *MILLWRIGHT - Local 1121 Zone 1*						
Effective Date - 04/01/2015						
Step percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate	
1 55	$20.70	$9.80	$4.48	$0.00	$34.98	
2 65	$24.47	$9.80	$13.36	$0.00	$47.63	
3 75	$28.23	$9.80	$14.18	$0.00	$52.21	
4 85	$31.99	$9.80	$14.99	$0.00	$56.78	
Notes: Steps are 2,000 hours						
Apprentice to Journeyworker Ratio:1:5						
MORTAR MIXER	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
LABORERS - ZONE 1	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS)	06/01/2015	$21.97	$10.00	$14.55	$0.00	$46.52
OPERATING ENGINEERS LOCAL 4	12/01/2015	$22.62	$10.00	$14.55	$0.00	$47.17
	06/01/2016	$23.01	$10.00	$14.55	$0.00	$47.56
	12/01/2016	$23.66	$10.00	$14.55	$0.00	$48.21
	06/01/2017	$24.17	$10.00	$14.55	$0.00	$48.72
	12/01/2017	$24.69	$10.00	$14.55	$0.00	$49.24
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS)	06/01/2015	$25.68	$10.00	$14.55	$0.00	$50.23
OPERATING ENGINEERS LOCAL 4	12/01/2015	$26.43	$10.00	$14.55	$0.00	$50.98
	06/01/2016	$26.89	$10.00	$14.55	$0.00	$51.44
	12/01/2016	$27.64	$10.00	$14.55	$0.00	$52.19
	06/01/2017	$28.24	$10.00	$14.55	$0.00	$52.79
	12/01/2017	$28.85	$10.00	$14.55	$0.00	$53.40
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
OPERATING ENGINEERS LOCAL 4	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS)	01/01/2015	$47.66	$7.85	$16.10	$0.00	$71.61
PAINTERS LOCAL 35 - ZONE 1	07/01/2015	$48.56	$7.85	$16.10	$0.00	$72.51
	01/01/2016	$49.51	$7.85	$16.10	$0.00	$73.46
	07/01/2016	$50.46	$7.85	$16.10	$0.00	$74.41
	01/01/2017	$51.41	$7.85	$16.10	$0.00	$75.36

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.83	$7.85	$0.00	$0.00	$31.68
2	55	$26.21	$7.85	$3.66	$0.00	$37.72
3	60	$28.60	$7.85	$3.99	$0.00	$40.44
4	65	$30.98	$7.85	$4.32	$0.00	$43.15
5	70	$33.36	$7.85	$14.11	$0.00	$55.32
6	75	$35.75	$7.85	$14.44	$0.00	$58.04
7	80	$38.13	$7.85	$14.77	$0.00	$60.75
8	90	$42.89	$7.85	$15.44	$0.00	$66.18

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.28	$7.85	$0.00	$0.00	$32.13
2	55	$26.71	$7.85	$3.66	$0.00	$38.22
3	60	$29.14	$7.85	$3.99	$0.00	$40.98
4	65	$31.56	$7.85	$4.32	$0.00	$43.73
5	70	$33.99	$7.85	$14.11	$0.00	$55.95
6	75	$36.42	$7.85	$14.44	$0.00	$58.71
7	80	$38.85	$7.85	$14.77	$0.00	$61.47
8	90	$43.70	$7.85	$15.44	$0.00	$66.99

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2015	$44.35	$7.85	$16.10	$0.00	$68.30
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. *PAINTERS LOCAL 35 - ZONE 1*	07/01/2015	$45.25	$7.85	$16.10	$0.00	$69.20
	01/01/2016	$46.20	$7.85	$16.10	$0.00	$70.15
	07/01/2016	$47.15	$7.85	$16.10	$0.00	$71.10
	01/01/2017	$48.10	$7.85	$16.10	$0.00	$72.05

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - Spray/Sandblast - New*

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.18	$7.85	$0.00	$0.00	$30.03
2	55	$24.39	$7.85	$3.66	$0.00	$35.90
3	60	$26.61	$7.85	$3.99	$0.00	$38.45
4	65	$28.83	$7.85	$4.32	$0.00	$41.00
5	70	$31.05	$7.85	$14.11	$0.00	$53.01
6	75	$33.26	$7.85	$14.44	$0.00	$55.55
7	80	$35.48	$7.85	$14.77	$0.00	$58.10
8	90	$39.92	$7.85	$15.44	$0.00	$63.21

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.63	$7.85	$0.00	$0.00	$30.48
2	55	$24.89	$7.85	$3.66	$0.00	$36.40
3	60	$27.15	$7.85	$3.99	$0.00	$38.99
4	65	$29.41	$7.85	$4.32	$0.00	$41.58
5	70	$31.68	$7.85	$14.11	$0.00	$53.64
6	75	$33.94	$7.85	$14.44	$0.00	$56.23
7	80	$36.20	$7.85	$14.77	$0.00	$58.82
8	90	$40.73	$7.85	$15.44	$0.00	$64.02

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT) *PAINTERS LOCAL 35 - ZONE 1*	01/01/2015	$42.41	$7.85	$16.10	$0.00	$66.36
	07/01/2015	$43.31	$7.85	$16.10	$0.00	$67.26
	01/01/2016	$44.26	$7.85	$16.10	$0.00	$68.21
	07/01/2016	$45.21	$7.85	$16.10	$0.00	$69.16
	01/01/2017	$46.16	$7.85	$16.10	$0.00	$70.11

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - Spray/Sandblast - Repaint*

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.21	$7.85	$0.00	$0.00	$29.06
2	55	$23.33	$7.85	$3.66	$0.00	$34.84
3	60	$25.45	$7.85	$3.99	$0.00	$37.29
4	65	$27.57	$7.85	$4.32	$0.00	$39.74
5	70	$29.69	$7.85	$14.11	$0.00	$51.65
6	75	$31.81	$7.85	$14.44	$0.00	$54.10
7	80	$33.93	$7.85	$14.77	$0.00	$56.55
8	90	$38.17	$7.85	$15.44	$0.00	$61.46

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.66	$7.85	$0.00	$0.00	$29.51
2	55	$23.82	$7.85	$3.66	$0.00	$35.33
3	60	$25.99	$7.85	$3.99	$0.00	$37.83
4	65	$28.15	$7.85	$4.32	$0.00	$40.32
5	70	$30.32	$7.85	$14.11	$0.00	$52.28
6	75	$32.48	$7.85	$14.44	$0.00	$54.77
7	80	$34.65	$7.85	$14.77	$0.00	$57.27
8	90	$38.98	$7.85	$15.44	$0.00	$62.27

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (TRAFFIC MARKINGS) *LABORERS - ZONE 1*	06/01/2015	$35.10	$7.30	$13.20	$0.00	$55.60
	12/01/2015	$35.85	$7.30	$13.20	$0.00	$56.35
	06/01/2016	$36.60	$7.30	$13.20	$0.00	$57.10
	12/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
For Apprentice rates see "Apprentice- LABORER"						
PAINTER / TAPER (BRUSH, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 1*	01/01/2015	$42.95	$7.85	$16.10	$0.00	$66.90
	07/01/2015	$43.85	$7.85	$16.10	$0.00	$67.80
	01/01/2016	$44.80	$7.85	$16.10	$0.00	$68.75
	07/01/2016	$45.75	$7.85	$16.10	$0.00	$69.70
	01/01/2017	$46.70	$7.85	$16.10	$0.00	$70.65

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER - Local 35 Zone 1 - BRUSH NEW*

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.48	$7.85	$0.00	$0.00	$29.33
2	55	$23.62	$7.85	$3.66	$0.00	$35.13
3	60	$25.77	$7.85	$3.99	$0.00	$37.61
4	65	$27.92	$7.85	$4.32	$0.00	$40.09
5	70	$30.07	$7.85	$14.11	$0.00	$52.03
6	75	$32.21	$7.85	$14.44	$0.00	$54.50
7	80	$34.36	$7.85	$14.77	$0.00	$56.98
8	90	$38.66	$7.85	$15.44	$0.00	$61.95

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.93	$7.85	$0.00	$0.00	$29.78
2	55	$24.12	$7.85	$3.66	$0.00	$35.63
3	60	$26.31	$7.85	$3.99	$0.00	$38.15
4	65	$28.50	$7.85	$4.32	$0.00	$40.67
5	70	$30.70	$7.85	$14.11	$0.00	$52.66
6	75	$32.89	$7.85	$14.44	$0.00	$55.18
7	80	$35.08	$7.85	$14.77	$0.00	$57.70
8	90	$39.47	$7.85	$15.44	$0.00	$62.76

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 1*	01/01/2015	$41.01	$7.85	$16.10	$0.00	$64.96
	07/01/2015	$41.91	$7.85	$16.10	$0.00	$65.86
	01/01/2016	$42.86	$7.85	$16.10	$0.00	$66.81
	07/01/2016	$43.81	$7.85	$16.10	$0.00	$67.76
	01/01/2017	$44.76	$7.85	$16.10	$0.00	$68.71

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - *PAINTER Local 35 Zone 1 - BRUSH REPAINT*						
Effective Date - 01/01/2015						
Step percent		Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1 50		$20.51	$7.85	$0.00	$0.00	$28.36
2 55		$22.56	$7.85	$3.66	$0.00	$34.07
3 60		$24.61	$7.85	$3.99	$0.00	$36.45
4 65		$26.66	$7.85	$4.32	$0.00	$38.83
5 70		$28.71	$7.85	$14.11	$0.00	$50.67
6 75		$30.76	$7.85	$14.44	$0.00	$53.05
7 80		$32.81	$7.85	$14.77	$0.00	$55.43
8 90		$36.91	$7.85	$15.44	$0.00	$60.20
Effective Date - 07/01/2015						
Step percent		Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1 50		$20.96	$7.85	$0.00	$0.00	$28.81
2 55		$23.05	$7.85	$3.66	$0.00	$34.56
3 60		$25.15	$7.85	$3.99	$0.00	$36.99
4 65		$27.24	$7.85	$4.32	$0.00	$39.41
5 70		$29.34	$7.85	$14.11	$0.00	$51.30
6 75		$31.43	$7.85	$14.44	$0.00	$53.72
7 80		$33.53	$7.85	$14.77	$0.00	$56.15
8 90		$37.72	$7.85	$15.44	$0.00	$61.01
Notes: Steps are 750 hrs.						
Apprentice to Journeyworker Ratio:1:1						
PANEL & PICKUP TRUCKS DRIVER	06/01/2015	$32.58	$9.91	$9.33	$0.00	$51.82
TEAMSTERS JOINT COUNCIL NO. 10 ZONE A	08/01/2015	$32.58	$10.41	$9.33	$0.00	$52.32
	12/01/2015	$32.58	$10.41	$10.08	$0.00	$53.07
	06/01/2016	$33.08	$10.41	$10.08	$0.00	$53.57
	08/01/2016	$33.08	$10.91	$10.08	$0.00	$54.07
	12/01/2016	$33.08	$10.91	$10.89	$0.00	$54.88
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)	08/01/2014	$41.60	$9.80	$18.17	$0.00	$69.57
PILE DRIVER LOCAL 56 (ZONE 1)	08/01/2015	$43.10	$9.80	$18.17	$0.00	$71.07
PILE DRIVER	08/01/2014	$41.60	$9.80	$18.17	$0.00	$69.57
PILE DRIVER LOCAL 56 (ZONE 1)	08/01/2015	$43.10	$9.80	$18.17	$0.00	$71.07

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - *PILE DRIVER - Local 56 Zone 1*						
Effective Date - 08/01/2014						
Step percent		Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1 50		$20.80	$9.80	$18.17	$0.00	$48.77
2 60		$24.96	$9.80	$18.17	$0.00	$52.93
3 70		$29.12	$9.80	$18.17	$0.00	$57.09
4 75		$31.20	$9.80	$18.17	$0.00	$59.17
5 80		$33.28	$9.80	$18.17	$0.00	$61.25
6 80		$33.28	$9.80	$18.17	$0.00	$61.25
7 90		$37.44	$9.80	$18.17	$0.00	$65.41
8 90		$37.44	$9.80	$18.17	$0.00	$65.41
Effective Date - 08/01/2015						
Step percent		Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1 50		$21.55	$9.80	$18.17	$0.00	$49.52
2 60		$25.86	$9.80	$18.17	$0.00	$53.83
3 70		$30.17	$9.80	$18.17	$0.00	$58.14
4 75		$32.33	$9.80	$18.17	$0.00	$60.30
5 80		$34.48	$9.80	$18.17	$0.00	$62.45
6 80		$34.48	$9.80	$18.17	$0.00	$62.45
7 90		$38.79	$9.80	$18.17	$0.00	$66.76
8 90		$38.79	$9.80	$18.17	$0.00	$66.76
Notes:						
Apprentice to Journeyworker Ratio:1:3						
PIPEFITTER & STEAMFITTER	03/01/2015	$48.69	$9.70	$16.89	$0.00	$75.28
PIPEFITTERS LOCAL 537	09/01/2015	$49.69	$9.70	$16.89	$0.00	$76.28
	03/01/2016	$50.69	$9.70	$16.89	$0.00	$77.28
	09/01/2016	$51.69	$9.70	$16.89	$0.00	$78.28
	03/01/2017	$52.69	$9.70	$16.89	$0.00	$79.28

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PIPEFITTER - Local 537*

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$19.48	$9.70	$7.50	$0.00	$36.68
2	45	$21.91	$9.70	$16.89	$0.00	$48.50
3	60	$29.21	$9.70	$16.89	$0.00	$55.80
4	70	$34.08	$9.70	$16.89	$0.00	$60.67
5	80	$38.95	$9.70	$16.89	$0.00	$65.54

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$19.88	$9.70	$7.50	$0.00	$37.08
2	45	$22.36	$9.70	$16.89	$0.00	$48.95
3	60	$29.81	$9.70	$16.89	$0.00	$56.40
4	70	$34.78	$9.70	$16.89	$0.00	$61.37
5	80	$39.75	$9.70	$16.89	$0.00	$66.34

Notes:

** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.
Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

PIPELAYER *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
PLUMBERS & GASFITTERS *PLUMBERS & GASFITTERS LOCAL 12*	03/01/2015	$50.21	$10.32	$14.89	$0.00	$75.42
	09/01/2015	$51.21	$10.32	$14.89	$0.00	$76.42
	03/01/2016	$52.36	$10.32	$14.89	$0.00	$77.57
	09/01/2016	$53.41	$10.32	$14.89	$0.00	$78.62
	03/01/2017	$54.41	$10.32	$14.89	$0.00	$79.62

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PLUMBER/GASFITTER - Local 12*

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$17.57	$10.32	$5.54	$0.00	$33.43
2	40	$20.08	$10.32	$6.27	$0.00	$36.67
3	55	$27.62	$10.32	$8.42	$0.00	$46.36
4	65	$32.64	$10.32	$9.87	$0.00	$52.83
5	75	$37.66	$10.32	$11.30	$0.00	$59.28

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$17.92	$10.32	$5.54	$0.00	$33.78
2	40	$20.48	$10.32	$6.27	$0.00	$37.07
3	55	$28.17	$10.32	$8.42	$0.00	$46.91
4	65	$33.29	$10.32	$9.87	$0.00	$53.48
5	75	$38.41	$10.32	$11.30	$0.00	$60.03

Notes:

** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr
Step4 with lic$56.05 Step5 with lic$62.48

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) *PIPEFITTERS LOCAL 537*	03/01/2015	$48.69	$9.70	$16.89	$0.00	$75.28
	09/01/2015	$49.69	$9.70	$16.89	$0.00	$76.28
	03/01/2016	$50.69	$9.70	$16.89	$0.00	$77.28
	09/01/2016	$51.69	$9.70	$16.89	$0.00	$78.28
	03/01/2017	$52.69	$9.70	$16.89	$0.00	$79.28
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER *LABORERS - ZONE 1*	06/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	12/01/2015	$36.85	$7.30	$13.20	$0.00	$57.35
	06/01/2016	$37.60	$7.30	$13.20	$0.00	$58.10
	12/01/2016	$38.60	$7.30	$13.20	$0.00	$59.10
For apprentice rates see "Apprentice- LABORER"						
POWER SHOVEL/DERRICK/TRENCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$29.61	$10.00	$14.55	$0.00	$54.16
	12/01/2015	$30.48	$10.00	$14.55	$0.00	$55.03
	06/01/2016	$31.00	$10.00	$14.55	$0.00	$55.55
	12/01/2016	$31.87	$10.00	$14.55	$0.00	$56.42
	06/01/2017	$32.56	$10.00	$14.55	$0.00	$57.11
	12/01/2017	$33.25	$10.00	$14.55	$0.00	$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY MIX CONCRETE DRIVERS after 4/30/10 (Drivers Hired After 4/30/2010)*TEAMSTERS LOCAL 25a*	05/01/2015	$27.88	$7.73	$8.92	$0.00	$44.53
	07/01/2015	$27.88	$7.98	$8.92	$0.00	$44.78
	05/01/2016	$28.03	$7.98	$9.31	$0.00	$45.32
	07/01/2016	$28.03	$8.23	$9.31	$0.00	$45.57
	05/01/2017	$28.18	$8.23	$9.72	$0.00	$46.13
	07/01/2017	$28.18	$8.48	$9.72	$0.00	$46.38
READY-MIX CONCRETE DRIVER *TEAMSTERS LOCAL 25a*	05/01/2015	$31.14	$7.73	$8.92	$0.00	$47.79
	07/01/2015	$31.14	$7.98	$8.92	$0.00	$48.04
	05/01/2016	$31.29	$7.98	$9.31	$0.00	$48.58
	07/01/2016	$31.29	$8.23	$9.31	$0.00	$48.83
	05/01/2017	$31.44	$8.23	$9.72	$0.00	$49.39
	07/01/2017	$31.44	$8.48	$9.72	$0.00	$49.64
RECLAIMERS *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RESIDENTIAL WOOD FRAME (All Other Work) *CARPENTERS -ZONE 1 (Residential Wood)*	04/01/2011	$37.25	$8.67	$15.51	$0.00	$61.43
RESIDENTIAL WOOD FRAME CARPENTER ** ** The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement.*CARPENTERS -ZONE 1 (Residential Wood)*	05/01/2011	$27.49	$6.34	$6.23	$0.00	$40.06

As of 9/1/09 Carpentry work on wood-frame residential WEATHERIZATION projects shall be paid the RESIDENTIAL WOOD FRAME CARPENTER rate.

Apprentice - *CARPENTER (Residential Wood Frame) - Zone 1*

Effective Date - 05/01/2011

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$16.49	$6.34	$0.00	$0.00	$22.83
2	60	$16.49	$6.34	$6.23	$0.00	$29.06
3	65	$17.87	$6.34	$6.23	$0.00	$30.44
4	70	$19.24	$6.34	$6.23	$0.00	$31.81
5	75	$20.62	$6.34	$6.23	$0.00	$33.19
6	80	$21.99	$6.34	$6.23	$0.00	$34.56
7	85	$23.37	$6.34	$6.23	$0.00	$35.94
8	90	$24.74	$6.34	$6.23	$0.00	$37.31

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 33*	02/01/2015	$40.11	$10.50	$11.60	$0.00	$62.21
	08/01/2015	$41.01	$10.50	$11.60	$0.00	$63.11
	02/01/2016	$41.91	$10.50	$11.60	$0.00	$64.01

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ROOFER - Local 33*

Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.06	$10.50	$3.38	$0.00	$33.94
2	60	$24.07	$10.50	$11.60	$0.00	$46.17
3	65	$26.07	$10.50	$11.60	$0.00	$48.17
4	75	$30.08	$10.50	$11.60	$0.00	$52.18
5	85	$34.09	$10.50	$11.60	$0.00	$56.19

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.51	$10.50	$3.38	$0.00	$34.39
2	60	$24.61	$10.50	$11.60	$0.00	$46.71
3	65	$26.66	$10.50	$11.60	$0.00	$48.76
4	75	$30.76	$10.50	$11.60	$0.00	$52.86
5	85	$34.86	$10.50	$11.60	$0.00	$56.96

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE *ROOFERS LOCAL 33*	02/01/2015	$40.36	$10.50	$11.60	$0.00	$62.46
	08/01/2015	$41.26	$10.50	$11.60	$0.00	$63.36
	02/01/2016	$42.16	$10.50	$11.60	$0.00	$64.26
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2015	$43.28	$10.20	$20.54	$2.22	$76.24
	08/01/2015	$44.28	$10.20	$20.54	$2.22	$77.24
	02/01/2016	$45.28	$10.20	$20.54	$2.22	$78.24
	08/01/2016	$46.43	$10.20	$20.54	$2.22	$79.39
	02/01/2017	$47.53	$10.20	$20.54	$2.22	$80.49
	08/01/2017	$48.63	$10.20	$20.54	$2.22	$81.59
	02/01/2018	$49.78	$10.20	$20.54	$2.22	$82.74

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SHEET METAL WORKER - Local 17-A*

Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.31	$10.20	$4.58	$0.00	$32.09
2	40	$17.31	$10.20	$4.58	$0.00	$32.09
3	45	$19.48	$10.20	$9.09	$1.16	$39.93
4	45	$19.48	$10.20	$9.09	$1.16	$39.93
5	50	$21.64	$10.20	$9.91	$1.25	$43.00
6	50	$21.64	$10.20	$10.16	$1.26	$43.26
7	60	$25.97	$10.20	$11.55	$1.43	$49.15
8	65	$28.13	$10.20	$12.38	$1.52	$52.23
9	75	$32.46	$10.20	$14.02	$1.70	$58.38
10	85	$36.79	$10.20	$15.16	$1.86	$64.01

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.71	$10.20	$4.58	$0.00	$32.49
2	40	$17.71	$10.20	$4.58	$0.00	$32.49
3	45	$19.93	$10.20	$9.09	$1.18	$40.40
4	45	$19.93	$10.20	$9.09	$1.18	$40.40
5	50	$22.14	$10.20	$9.91	$1.27	$43.52
6	50	$22.14	$10.20	$10.16	$1.28	$43.78
7	60	$26.57	$10.20	$11.55	$1.45	$49.77
8	65	$28.78	$10.20	$12.38	$1.54	$52.90
9	75	$33.21	$10.20	$14.02	$1.72	$59.15
10	85	$37.64	$10.20	$15.16	$1.89	$64.89

Notes:
Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SIGN ERECTOR *PAINTERS LOCAL 35 - ZONE 1*	06/01/2013	$25.81	$7.07	$7.05	$0.00	$39.93

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SIGN ERECTOR - Local 35 Zone 1*

Effective Date - 06/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$12.91	$7.07	$0.00	$0.00	$19.98
2	55	$14.20	$7.07	$2.45	$0.00	$23.72
3	60	$15.49	$7.07	$2.45	$0.00	$25.01
4	65	$16.78	$7.07	$2.45	$0.00	$26.30
5	70	$18.07	$7.07	$7.05	$0.00	$32.19
6	75	$19.36	$7.07	$7.05	$0.00	$33.48
7	80	$20.65	$7.07	$7.05	$0.00	$34.77
8	85	$21.94	$7.07	$7.05	$0.00	$36.06
9	90	$23.23	$7.07	$7.05	$0.00	$37.35

Notes:
Steps are 4 mos.

Apprentice to Journeyworker Ratio:1:1

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2015	$33.04	$9.91	$9.33	$0.00	$52.28
	08/01/2015	$33.04	$10.41	$9.33	$0.00	$52.78
	12/01/2015	$33.04	$10.41	$10.08	$0.00	$53.53
	06/01/2016	$33.54	$10.41	$10.08	$0.00	$54.03
	08/01/2016	$33.54	$10.91	$10.08	$0.00	$54.53
	12/01/2016	$33.54	$10.91	$10.89	$0.00	$55.34
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2015	$33.33	$9.91	$9.33	$0.00	$52.57
	08/01/2015	$33.33	$10.41	$9.33	$0.00	$53.07
	12/01/2015	$33.33	$10.41	$10.08	$0.00	$53.82
	06/01/2016	$33.83	$10.41	$10.08	$0.00	$54.32
	08/01/2016	$33.83	$10.91	$10.08	$0.00	$54.82
	12/01/2016	$33.83	$10.91	$10.89	$0.00	$55.63
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1*	03/01/2015	$54.43	$8.42	$14.90	$0.00	$77.75
	10/01/2015	$55.58	$8.42	$14.90	$0.00	$78.90
	01/01/2016	$55.58	$8.67	$15.05	$0.00	$79.30
	03/01/2016	$56.58	$8.67	$15.05	$0.00	$80.30
	10/01/2016	$57.73	$8.67	$15.05	$0.00	$81.45
	03/01/2017	$58.73	$8.67	$15.05	$0.00	$82.45

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SPRINKLER FITTER - Local 550 (Section A) Zone 1*

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$19.05	$8.42	$8.40	$0.00	$35.87
2	40	$21.77	$8.42	$8.40	$0.00	$38.59
3	45	$24.49	$8.42	$8.40	$0.00	$41.31
4	50	$27.22	$8.42	$8.40	$0.00	$44.04
5	55	$29.94	$8.42	$8.40	$0.00	$46.76
6	60	$32.66	$8.42	$8.40	$0.00	$49.48
7	65	$35.38	$8.42	$8.40	$0.00	$52.20
8	70	$38.10	$8.42	$8.40	$0.00	$54.92
9	75	$40.82	$8.42	$8.40	$0.00	$57.64
10	80	$43.54	$8.42	$8.40	$0.00	$60.36

Effective Date - 10/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$19.45	$8.42	$8.40	$0.00	$36.27
2	40	$22.23	$8.42	$8.40	$0.00	$39.05
3	45	$25.01	$8.42	$8.40	$0.00	$41.83
4	50	$27.79	$8.42	$8.40	$0.00	$44.61
5	55	$30.57	$8.42	$8.40	$0.00	$47.39
6	60	$33.35	$8.42	$8.40	$0.00	$50.17
7	65	$36.13	$8.42	$8.40	$0.00	$52.95
8	70	$38.91	$8.42	$8.40	$0.00	$55.73
9	75	$41.69	$8.42	$8.40	$0.00	$58.51
10	80	$44.46	$8.42	$8.40	$0.00	$61.28

Notes: Apprentice entered prior 9/30/10:
40/45/50/55/60/65/70/75/80/85
Steps are 850 hours

Apprentice to Journeyworker Ratio:1:3

STEAM BOILER OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TELECOMMUNICATION TECHNICIAN	03/01/2015	$33.88	$13.00	$13.70	$0.00	$60.58
ELECTRICIANS LOCAL 103	09/01/2015	$34.60	$13.00	$13.72	$0.00	$61.32
	03/01/2016	$35.31	$13.00	$13.74	$0.00	$62.05

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 103*

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$13.55	$13.00	$0.41	$0.00	$26.96
2	40	$13.55	$13.00	$0.41	$0.00	$26.96
3	45	$15.25	$13.00	$10.87	$0.00	$39.12
4	45	$15.25	$13.00	$10.87	$0.00	$39.12
5	50	$16.94	$13.00	$11.11	$0.00	$41.05
6	55	$18.63	$13.00	$11.38	$0.00	$43.01
7	60	$20.33	$13.00	$11.64	$0.00	$44.97
8	65	$22.02	$13.00	$11.89	$0.00	$46.91
9	70	$23.72	$13.00	$12.15	$0.00	$48.87
10	75	$25.41	$13.00	$12.41	$0.00	$50.82

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$13.84	$13.00	$0.42	$0.00	$27.26
2	40	$13.84	$13.00	$0.42	$0.00	$27.26
3	45	$15.57	$13.00	$10.88	$0.00	$39.45
4	45	$15.57	$13.00	$10.88	$0.00	$39.45
5	50	$17.30	$13.00	$11.14	$0.00	$41.44
6	55	$19.03	$13.00	$11.39	$0.00	$43.42
7	60	$20.76	$13.00	$11.65	$0.00	$45.41
8	65	$22.49	$13.00	$11.90	$0.00	$47.39
9	70	$24.22	$13.00	$12.17	$0.00	$49.39
10	75	$25.95	$13.00	$12.43	$0.00	$51.38

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS	02/01/2015	$47.90	$10.18	$18.50	$0.00	$76.58
BRICKLAYERS LOCAL 3 - MARBLE & TILE	08/01/2015	$48.80	$10.18	$18.57	$0.00	$77.55
	02/01/2016	$49.37	$10.18	$18.57	$0.00	$78.12
	08/01/2016	$50.27	$10.18	$18.65	$0.00	$79.10
	02/01/2017	$50.84	$10.18	$18.65	$0.00	$79.67

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TERRAZZO FINISHER - Local 3 Marble & Tile*

Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.95	$10.18	$18.50	$0.00	$52.63
2	60	$28.74	$10.18	$18.50	$0.00	$57.42
3	70	$33.53	$10.18	$18.50	$0.00	$62.21
4	80	$38.32	$10.18	$18.50	$0.00	$67.00
5	90	$43.11	$10.18	$18.50	$0.00	$71.79

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.40	$10.18	$18.57	$0.00	$53.15
2	60	$29.28	$10.18	$18.57	$0.00	$58.03
3	70	$34.16	$10.18	$18.57	$0.00	$62.91
4	80	$39.04	$10.18	$18.57	$0.00	$67.79
5	90	$43.92	$10.18	$18.57	$0.00	$72.67

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER	06/01/2015	$36.45	$7.30	$13.40	$0.00	$57.15
LABORERS - FOUNDATION AND MARINE	12/01/2015	$37.20	$7.30	$13.40	$0.00	$57.90
	06/01/2016	$37.95	$7.30	$13.40	$0.00	$58.65
	12/01/2016	$38.95	$7.30	$13.40	$0.00	$59.65
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER	06/01/2015	$35.17	$7.30	$13.40	$0.00	$55.87
LABORERS - FOUNDATION AND MARINE	12/01/2015	$35.92	$7.30	$13.40	$0.00	$56.62
	06/01/2016	$36.67	$7.30	$13.40	$0.00	$57.37
	12/01/2016	$37.67	$7.30	$13.40	$0.00	$58.37
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER	06/01/2015	$35.05	$7.30	$13.40	$0.00	$55.75
LABORERS - FOUNDATION AND MARINE	12/01/2015	$35.80	$7.30	$13.40	$0.00	$56.50
	06/01/2016	$36.55	$7.30	$13.40	$0.00	$57.25
	12/01/2016	$37.55	$7.30	$13.40	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS	06/01/2015	$42.42	$10.00	$14.55	$0.00	$66.97
OPERATING ENGINEERS LOCAL 4	12/01/2015	$43.66	$10.00	$14.55	$0.00	$68.21
	06/01/2016	$44.41	$10.00	$14.55	$0.00	$68.96
	12/01/2016	$45.64	$10.00	$14.55	$0.00	$70.19
	06/01/2017	$46.63	$10.00	$14.55	$0.00	$71.18
	12/01/2017	$47.62	$10.00	$14.55	$0.00	$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2015	$33.62	$9.91	$9.33	$0.00	$52.86
	08/01/2015	$33.62	$10.41	$9.33	$0.00	$53.36
	12/01/2015	$33.62	$10.41	$10.08	$0.00	$54.11
	06/01/2016	$34.12	$10.41	$10.08	$0.00	$54.61
	08/01/2016	$34.12	$10.91	$10.08	$0.00	$55.11
	12/01/2016	$34.12	$10.91	$10.89	$0.00	$55.92
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	06/01/2015	$47.33	$7.30	$13.80	$0.00	$68.43
	12/01/2015	$48.08	$7.30	$13.80	$0.00	$69.18
	06/01/2016	$48.83	$7.30	$13.80	$0.00	$69.93
	12/01/2016	$49.83	$7.30	$13.80	$0.00	$70.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	06/01/2015	$49.33	$7.30	$13.80	$0.00	$70.43
	12/01/2015	$50.08	$7.30	$13.80	$0.00	$71.18
	06/01/2016	$50.83	$7.30	$13.80	$0.00	$71.93
	12/01/2016	$51.83	$7.30	$13.80	$0.00	$72.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	06/01/2015	$39.40	$7.30	$13.80	$0.00	$60.50
	12/01/2015	$40.15	$7.30	$13.80	$0.00	$61.25
	06/01/2016	$40.90	$7.30	$13.80	$0.00	$62.00
	12/01/2016	$41.90	$7.30	$13.80	$0.00	$63.00
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	06/01/2015	$41.40	$7.30	$13.80	$0.00	$62.50
	12/01/2015	$42.15	$7.30	$13.80	$0.00	$63.25
	06/01/2016	$42.90	$7.30	$13.80	$0.00	$64.00
	12/01/2016	$43.90	$7.30	$13.80	$0.00	$65.00
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2015	$33.04	$9.91	$9.33	$0.00	$52.28
	08/01/2015	$33.04	$10.41	$9.33	$0.00	$52.78
	12/01/2015	$33.04	$10.41	$10.08	$0.00	$53.53
	06/01/2016	$33.54	$10.41	$10.08	$0.00	$54.03
	08/01/2016	$33.54	$10.91	$10.08	$0.00	$54.53
	12/01/2016	$33.54	$10.91	$10.89	$0.00	$55.34
WAGON DRILL OPERATOR *LABORERS - ZONE 1*	06/01/2015	$35.35	$7.30	$13.20	$0.00	$55.85
	12/01/2015	$36.10	$7.30	$13.20	$0.00	$56.60
	06/01/2016	$36.85	$7.30	$13.20	$0.00	$57.35
	12/01/2016	$37.85	$7.30	$13.20	$0.00	$58.35
For apprentice rates see "Apprentice- LABORER"						
WASTE WATER PUMP OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2015	$42.83	$10.00	$14.55	$0.00	$67.38
	12/01/2015	$44.08	$10.00	$14.55	$0.00	$68.63
	06/01/2016	$44.83	$10.00	$14.55	$0.00	$69.38
	12/01/2016	$46.08	$10.00	$14.55	$0.00	$70.63
	06/01/2017	$47.08	$10.00	$14.55	$0.00	$71.63
	12/01/2017	$48.08	$10.00	$14.55	$0.00	$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
WATER METER INSTALLER *PLUMBERS & GASFITTERS LOCAL 12*	03/01/2015	$50.21	$10.32	$14.89	$0.00	$75.42
	09/01/2015	$51.21	$10.32	$14.89	$0.00	$76.42
	03/01/2016	$52.36	$10.32	$14.89	$0.00	$77.57
	09/01/2016	$53.41	$10.32	$14.89	$0.00	$78.62
	03/01/2017	$54.41	$10.32	$14.89	$0.00	$79.62
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/01/2013	$25.66	$8.70	$4.48	$0.00	$38.84
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/01/2013	$36.55	$8.70	$6.58	$0.00	$51.83
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/01/2013	$29.94	$8.70	$6.05	$0.00	$44.69
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/01/2013	$23.52	$8.70	$5.24	$0.00	$37.46
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/01/2013	$36.35	$8.70	$9.43	$0.00	$54.48
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/01/2013	$32.08	$8.70	$6.59	$0.00	$47.37
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/01/2013	$23.52	$8.70	$3.72	$0.00	$35.94
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/01/2013	$19.25	$8.70	$2.85	$0.00	$30.80
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	09/01/2013	$42.77	$8.70	$11.78	$0.00	$63.25

Apprentice - *LINEMAN (Outside Electrical) - East Local 104*

Effective Date - 09/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$25.66	$8.70	$4.24	$0.00	$38.60
2	65	$27.80	$8.70	$4.71	$0.00	$41.21
3	70	$29.94	$8.70	$5.43	$0.00	$44.07
4	75	$32.08	$8.70	$6.16	$0.00	$46.94
5	80	$34.22	$8.70	$6.88	$0.00	$49.80
6	85	$36.35	$8.70	$7.62	$0.00	$52.67
7	90	$38.49	$8.70	$8.83	$0.00	$56.02

Notes:

Apprentice to Journeyworker Ratio:1:2

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TELEDATA CABLE SPLICER *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	01/01/2015	$28.12	$4.25	$3.09	$0.00	$35.46
	01/01/2016	$28.98	$4.25	$3.12	$0.00	$36.35
TELEDATA LINEMAN/EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	01/01/2015	$26.49	$4.25	$3.04	$0.00	$33.78
	01/01/2016	$27.31	$4.25	$3.07	$0.00	$34.63
TELEDATA WIREMAN/INSTALLER/TECHNICIAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	01/01/2015	$26.49	$4.25	$3.04	$0.00	$33.78
	01/01/2016	$27.31	$4.25	$3.07	$0.00	$34.63
TREE TRIMMER *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/01/2015	$18.05	$3.55	$0.00	$0.00	$21.60
	01/31/2016	$18.51	$3.55	$0.00	$0.00	$22.06
This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is not on the ground. This classification does not apply to wholesale tree removal.						
TREE TRIMMER GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/01/2015	$15.92	$3.55	$0.00	$0.00	$19.47
	01/31/2016	$16.32	$3.55	$0.00	$0.00	$19.87
This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is on the ground. This classification does not apply to wholesale tree removal.						

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)
Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.
*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.
**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

Division of Labor and Industries Statement of Compliance

GENERAL TERMS & CONDITIONS

General Conditions

GENERAL TERMS AND CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, RECONSTRUCTION, ALTERATION, REMODELING, OR REPAIR OF ANY PUBLIC BUILDING OR PUBLIC WORK IN THE CITY OF SOMERVILLE

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GENERAL TERMS AND CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, RECONSTRUCTION, INSTALLATION,

DEMOLITION, MAINTENANCE, OR REPAIR OF ANY PUBLIC BUILDING OR PUBLIC WORK IN THE CITY OF SOMERVILLE

ARTICLE 1: DEFINITIONS

1.1. In General.

1.1.1. Well-known meanings. When words or phrases that have a well-known technical, or construction industry, or trade meaning are used in the Contract Documents, such words or phrases shall be interpreted in accordance with that meaning, unless otherwise stated.

1.1.2. Capitalization. The words and terms defined in this Article are capitalized in these General Terms and Conditions of the Contract. Other capitalized words may refer to a specific document found in the Contract Documents.

1.1.3. Persons. Whenever the word person or persons is used, it includes, unless otherwise stated, entity or entities, respectively, including, but not limited to, corporations, partnerships, and joint venturers.

1.1.4. Singular and Plural. The following terms have the meanings indicated which are applicable to both the singular and the plural thereof.

1.2. Definitions.

1.2.1. Agreement. The Agreement is the written document between the **City** and the **Contractor** which is titled: Agreement between the City of Somerville and the Contractor, which is the executed portion of the Contract, and which forms a part of the Contract. The Agreement also includes all documents required to be attached thereto, including, but not limited to, the performance bond, the labor and materials or payment bonds, certificates of insurance, and all Modifications of the Agreement.

1.2.2. Change Order. A Change Order is a document which is signed by the **Contractor**, the **Design Professional**, and the **City;** which is directed to the **Contractor;** which authorizes the **Contractor** to make an addition to, a deletion from or a revision in the Work, or an adjustment in the Contract Sum or in the Contract Time; and which is issued on or after the date of the Agreement between the **Contractor** and the **City.**

1.2.3. City. The **City** refers to the City of Somerville, which is the owner of the Project and is the public awarding authority with whom the **Contractor** has entered into the Contract and for whom the Work is to be provided.

1.2.4. Claim. A Claim is a dispute, demand, or assertion by one of the parties arising out of or relating to the Contract for which such party is seeking relief.

1.2.5. Contract. The Contract consists of all the Contract Documents. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations**,** representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification to the Contract signed by both parties.

1.2.6. Contract Documents. The Contract Documents consist of the Agreement; the notice of award of the Contract; the Notice to Proceed; the entire Project Manual; Change Orders; Construction Change Directives; the **Contractor's** Bid and all accompanying documents; and the **Design Professional's** written interpretations and clarifications issued on or after the issuance of the Notice to Proceed. Shop Drawing submittals and reports or drawings utilized by the **Design Professional** in preparing the Contract Documents are not Contract Documents.

1.2.7. Contractor. The **Contractor** is the person who is awarded the Contract for the Project herein pursuant to M.G.L. c. 149, §44A or M.G.L. c. 39, §39M; and is identified in the Agreement as such. The term "**Contractor**" is intended to include the **Contractor** as well as its authorized representative(s).

1.2.8. Contract Sum. The Contract Sum is the total amount stated in the Agreement payable by the **City** to the **Contractor** for the completion of the Work in accordance with the Contract Documents.

1.2.9. Contract Time. Unless otherwise provided, the Contract Time is the number of days allotted in the Contract Documents or the dates stated in the Agreement, including authorized adjustments, for Substantial Completion. We usually put a contract end date that is beyond the date of substantial completion.

1.2.10. Coordination Drawings. Coordination Drawings are those drawings, which are prepared by the **Contractor** or a Subcontractor that show the exact alignment, physical locations, and configuration of the mechanical, electrical, and fire protection installations.

1.2.11. Day. The term "day" shall mean calendar day unless otherwise stated.

1.2.12. Design Professional. The **Design Professional** is the person lawfully licensed to practice architecture, engineering, or landscape architecture and has been selected by the **City** to administer the Contract. The term "**Design Professional**," while referred to in the singular, means the **Design Professional** and/or the **Design Professional's** representative. For the purposes of this project, **Design Professional** shall mean the firm of Weston Sampson Engineers and appropriate consultants.

1.2.13. Field Order. A Field Order is a written order issued by the **Design Professional** which orders minor changes in the Work, but which does not involve a change in the Contract Sum or the Contract Time.

1.2.14. Final Completion. Final Completion is the point in time when the Design Professional finds that the Work has been fully completed in accordance with the Contract Documents. Final Completion shall be no later than thirty (30) days after Substantial Completion.

1.2.15. General Requirements. General Requirements refer to Sections of Division 1 of the Specifications.

1.2.16. Modification. A Modification is a written instrument that amends the Contract after execution of the Agreement.

1.2.17. Notice to Proceed. A Notice to Proceed is a written notice given by the **City,** or the **Design Professional**, to the **Contractor** fixing the date on which the Contract Time will begin to run and on which the **Contractor** shall start to perform its obligations under the Contract Documents.

1.2.18. Plans. The Plans are the drawings which are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location, dimensions, scope, extent, and character of the Work to be furnished and performed by the **Contractor** and which have been prepared or approved by the **Design Professional**.

1.2.19. Product Data. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the **Contractor** to illustrate materials or equipment for some portion of the Work. Product Data are not considered part of the Contract Documents.

1.2.20. Project. The Project is the total Work to be provided under the Contract Documents and may be the whole or a part as indicated elsewhere in the Contract Documents and may include construction by the **City** or by separate contractors. The Project is the Work described in the invitation to bid (advertisement) and Specifications and illustrated by the Plans, including any Modifications.

1.2.21. Project Manual. The Project Manual is the entire set of bidding documents which includes, but is not limited to, the invitation to bid (advertisement), the instructions to bidders, all of the forms, the wage rates, all City and state requirements, the General Terms and Conditions of the Contract, any supplementary conditions thereto, the Plans, the Specifications, and all addenda.

1.2.22. Proposed Change Order. A Proposed Change Order is a Change Order that has been submitted by the **Contractor** to the **Design Professional,** is under review, and has not been approved by the **City**.

1.2.23. Samples. Samples are physical examples of materials, equipment, or

workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged. Samples are not considered part of the Contract Documents.

1.2.24. Shop Drawings. Shop Drawings are all drawings, diagrams, illustrations, schedules, and other information that are specifically prepared or assembled by or for the **Contractor** and submitted by the **Contractor** to illustrate some portion of the Work. Shop Drawings are not considered part of the Contract Documents.

1.2.25. Site. The Site is the location of the Project and of the Work.

1.2.26. Specifications. Specifications are those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

1.2.27. Subcontractor. A Subcontractor is a person who contracts directly with the **Contractor**, unless otherwise stated.

1.2.28. Submittals. Submittals are those Shop Drawings, Product Data, Samples, or any other required document that are provided to the Design Professional for review and approval.

1.2.29. Substantial Completion. Substantial Completion means that the Work has been completed and the Site or the facility is opened for full and intended public use, except for minor incomplete or unsatisfactory items that do not materially impair the usefulness of the Work. The **Design Professional** shall decide what constitutes “minor,” “incomplete,” “unsatisfactory,” and “materially” and the **Design Professional's** decision shall be final.

1.2.30. Sub-subcontractor. A Sub-subcontractor is a person who has contracted directly with a Subcontractor.

1.2.31. Supplier. A Supplier is a manufacturer, fabricator, distributor, material person, or vendor having a direct contract with the Contractor or with any Subcontractor to furnish materials or equipment to be incorporated into the Work by the Contractor or any Subcontractor.

1.2.32. Work. Work refers to the services and the entire completed construction or the various separately identifiable parts thereof required by the Contract Documents, including all labor, materials, and equipment furnished, furnished and incorporated into the Project, or to be provided by the **Contractor** to fulfill the **Contractor's** obligations. The Work may constitute the whole or a part of the Project.

1.2.33. Construction Change Directive. A **Construction Change** Directive is a written directive to the **Contractor** ordering an addition to, a deletion from, or a revision to the Work issued on or after the date of the Agreement, signed by the **City**, and recommended by the **Design Professional**.

ARTICLE 2: ABOUT THE CONTRACT DOCUMENTS

2.1. Priority/Conflict.

2.1.1. Priority Among Contract Documents. In the event of conflict among the Contract Documents, the Contract Documents shall be construed according to the following priorities:

Highest Priority:	Modifications
Second Priority:	Agreement
Third Priority:	Addenda-later date to take precedence
Fourth Priority:	Supplementary General Conditions
Fifth Priority:	General Conditions
Sixth Priority:	Plans and Specifications

2.1.1.1. If there is a conflict between the Plans and Specifications, the figured dimensions shall govern over the scaled dimensions. Detailed Plans shall govern over the general Plans. Larger scale Plans shall take precedence over smaller scale Plans. Plans shall govern over Shop Drawings. Whenever notes, specifications, dimensions, details, or schedules in the Specifications or in the Plans, or between the Specifications and the Plans, or in all other instances not specifically noted above, the **Contractor** shall provide, unless otherwise directed by a Modification of the Contract, the better quality or greater quantity of Work at no increase in the Contract Sum or in the Contract Time.

2.1.1.2. Compliance with these priority conditions shall not justify any changes in the Work or any increase in the Contract Sum or Contract Time, unless any such compliance results in Work that may not be reasonably inferred from the Contract Documents as being required to produce the intended result as determined by the **Design Professional**.

2.1.2. Review of the Contract Documents and Field Conditions and Discovery of Conflict, Error, Ambiguity, or Discrepancy. Before starting the Work, and during the progress thereof, the **Contractor** shall carefully study and compare the Contract Documents with each other and with the information furnished by the **City** pursuant to Article 3 and shall at once report to the **Design Professional** any error, inconsistency, or omission the **Contractor** may discover. Any necessary change shall be ordered as provided in Article 11, subject to the requirements of any other provisions of the Contract Documents. The **Contractor** shall not proceed with the Work affected thereby (except in an emergency) until

a Modification has been issued. If the **Contractor** proceeds with the Work having discovered such errors, inconsistencies, or omissions contrary to the provisions contained herein, or if by reasonable study of the Contract Documents the **Contractor** could have discovered such, the **Contractor** shall bear all costs arising therefrom. The **Contractor** shall be liable to the **City** for failure to report any conflict, error, ambiguity, or discrepancy of which it knew or should have known.

2.1.3. Field Measurements. The **Contractor** shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the **Contractor** with the Contract Documents before commencing activities. Errors, inconsistencies, or omissions discovered shall be reported to the **Design Professional** at once.

2.1.4. Statutory Provisions. The **City** and the **Contractor** recognize that other rights duties and obligations with respect to public construction contracts are provided for by statute, notwithstanding the fact that they may not be provided for in the Contract Documents. In case of conflict between the statutory provisions and other provisions of the Contract Documents and the provisions of any applicable statute, the statutory provisions shall govern.

2.1.5. Voided or Unlawful Provisions. In the event any provision in the Contract is voided or deemed unlawful, such provision shall be deleted without affecting the remainder of the Contract.

2.2. Execution.

2.2.1. Execution of the Agreement by the **Contractor** is a representation that the **Contractor** has visited the Site, become familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

2.3. Intent.

2.3.1. Entire Agreement. The Contract Documents comprise the entire agreement between the **City** and the **Contractor** concerning the Work**.** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the **Contractor**. The Contract Documents are complementary; what is required by one shall be as binding as if required by all. Performance by the **Contractor** shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results. All Work mentioned or indicated in the Contract Documents shall be performed by the **Contractor** as part of this Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others.

2.3.2. Statutory Provisions. Each and every provision of law, code, and regulation, required by law to be inserted in these Contract Documents shall be deemed to be inserted

herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be physically amended to make such insertion.

2.3.3. Functionally Complete Project. It is the intent of the Contract Documents to describe a functionally complete Project. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the **Contractor**. Any Work, materials, or equipment that may be reasonably inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed by the **Contractor** whether or not specifically called for in the Contract Documents.

2.3.4. Indications or Notations. All indications or notations which apply to one of a number of similar situations, materials, or processes shall be deemed to apply to all such situations, materials, or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the Contract Documents.

2.3.5. Standards or Quality of Materials or Workmanship. Where no explicit quality or standards for materials or workmanship are established for Work, such Work is to be of good quality for the intended use and consistent with the quality of the surrounding Work and of the construction of the Project generally.

2.3.6. Manufactured Products. All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer’s written or printed directions and instructions unless otherwise indicated in the Contract Documents.

2.3.7. Mechanical, Electrical, and Fire Protection Plans. The mechanical, electrical, and fire protection Plans are diagrammatic only and are not intended to show the alignment, physical locations, or configurations of such Work. Such Work shall be installed without additional cost to the **City** to clear all obstructions, permit proper clearances for the Work of other trades, and present an orderly appearance where exposed. Prior to beginning such Work, the **Contractor** shall prepare Coordination Drawings and demonstrate to the **Design Professional's** satisfaction that the installations will comply with the preceding sentence. The **Contractor** shall be solely liable and responsible for any costs and/or delays resulting from the **Contractor's** failure to prepare such Coordination Drawings.

2.3.8. Locations of Fixtures and Outlets. Exact locations of fixtures and outlets shall be obtained from the **Design Professional** as provided in Article 5 before the Work is roughed in. Work installed without such information from the **Design Professional** shall be relocated at the **Contractor's** expense.

2.3.9. Tests. When test boring or soil test information are included with the Contract

Documents or otherwise made available to the **Contractor** and such test boring or soil test information was obtained by the **City** for use by the **Design Professional** in the design of the Project or Work, the **City** does not hold out such information to the **Contractor** as an accurate or approximate indication of subsurface conditions, and no claim for extra cost of extension of time resulting from a reliance by the **Contractor** on such information shall be allowed except as otherwise provided herein. Any such reports are not part of the Contract Documents.

2.3.10. Joining Work. Where the Work is to fit with existing conditions or work to be performed by others, the **Contractor** shall fully and completely join the Work with such conditions or work, unless otherwise specified.

2.4. Organization.

2.4.1. Except as provided in M.G.L. c. 149, §44F, the organization of the Specifications into divisions, sections, and articles, and the arrangement of Plans shall not control the **Contractor** in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

2.5. References.

2.5.1. Where codes, manuals, specifications, standards, requirements and publications of public and private bodies are referred to in the Contract Documents whether specifically or by implication, references shall be understood to be to the latest revision prior to the date of receiving bids, except where otherwise indicated. Where statutes are referred to in the Contract Documents whether specifically or by implication, references shall be understood to be to the latest revision.

2.5.2. References herein to particular paragraphs or Articles are solely to facilitate finding additional information with regard to the specific matters and are not to be construed in any way as limiting the possible paragraphs and Articles in which such matters may be found elsewhere in this document.

2.6. Reuse of Design Professional's Written Instruments.

2.6.1. Neither the **Contractor** nor any Subcontractor or Supplier shall have or acquire any title to or ownership rights in any of the Plans, Specifications, or other documents prepared by the **Design Professional** and shall not reuse any of such Plans, Specifications, or other documents without prior written consent of the **City** and the **Design Professional**.

2.7. Written Material of the Contractor.

2.7.1. All written material prepared or collected by the **Contractor** in the course of completing the Work shall be the exclusive property of the **City** and shall not be used by the **Contractor** for any purpose other than the purpose of this Contract.

2.8. Modifying Words.

2.8.1. In the interest of simplicity, modifying words such as “all” and “any” may be omitted, but the fact that such words may be absent from one sentence and appear in another is not intended to affect the interpretation of either statement.

2.9. Use of Certain Words and Terms.

2.9.1. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the **City** or of the **Design Professional** as to the Work, it is intended that such requirement, direction, review, or judgment will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise).

2.9.2. The use of any such term or adjective shall not be effective to change the duties and responsibilities of the **City** or the **Design Professional** from those assigned in the Contract Documents or to assign any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of the Contract Documents.

2.9.3. When the words "Contractor," "Subcontractor," Sub-subcontractor," and "Supplier" are used, they are intended to include their employees and agents, unless otherwise specified.

2.10. Modification of the Contract Documents.

2.10.1. Major Modifications. Major Modifications may affect the Contract Sum or the Contract Time. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways, all of which must contain a written endorsement by the **City**:

2.10.1.1. a formal written amendment;

2.10.1.2. a Change Order;

2.10.1.3. a **Construction Change** Directive; or

2.10.1.4. the **Design Professional's** written interpretation, clarification, or decision.

2.10.2. Minor Modifications. Minor modifications do not affect the Contract Sum or the Contract Time. The requirements of the Contract Documents may be supplemented and minor variations and deviations of the Work may be authorized in one or more of the following ways:

2.10.2.1. a Field Order; or

2.10.2.2. the **Design Professional's** approval of a Shop Drawing or Sample.

ARTICLE 3: THE CITY

3.1. Signatory.

3.1.1. All documents which require a signature or an endorsement by the **City** must be signed by the Mayor in order to be deemed ratified by the **City**.

3.2. Requirements to Provide Documents.

3.2.1. To the extent they are available, the **City** shall furnish surveys describing physical characteristics, legal limitations, and utility locations for the site of the Project, and a legal description of the Site.

3.2.2. The **City** shall obtain and pay for necessary approvals, easements, assessments, and charges that are customarily secured prior to the execution of the Contract.

3.2.3. The **City** shall furnish information or services required of the **City** hereunder with reasonable promptness after receipt from the **Contractor** of a written request for such information or services.

3.2.4. The **City** shall provide the **Contractor**, at no charge, such copies of the Project Manual as are reasonably necessary for the execution of the Work.

3.3. Clerk of the Works.

3.3.1. The **City** may engage a Clerk of the Works for this Project, in which case the **City** shall, upon request of the **Contractor**, provide the **Contractor** with a written statement of the duties, responsibilities, and limitations of authority of such Clerk of the Works. Except as expressly set forth in such written statement, the Clerk of the Works shall have no authority to approve Work, to approve Change Orders, or to exercise any of the power and authority of the **City** or the **Design Professional**. The Clerk of the Works shall observe the **Contractor's** operations and construction activities for compliance with the Plans and Specifications. The Clerk of the Works shall have access to all areas of the Project at all times. The **Contractor** shall fully cooperate with the Clerk of the Works in the performance of the Clerk's duties.

3.4. City's Right to Perform Construction and to Award Separate Contracts.

3.4.1. The **City** reserves the right to perform construction or operations at the Site with its own forces or others. If the **Contractor** claims that a delay or additional cost is involved because of such action by the **City**, the **Contractor** shall make such Claim as provided elsewhere in the Contract Documents.

3.4.2. When the separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "**Contractor**" in the Contract Documents in each case shall mean the **Contractor** who executes each separate City-Contractor Agreement.

3.4.3. The **City** shall provide for coordination of the activities of the **City's** own forces and of each separate contractor with the Work of the **Contractor**, who shall cooperate with them. The **Contractor** shall afford each other person access to the Site and shall properly coordinate its Work with that of the persons performing other work. The **Contractor** shall participate with other separate contractors and the **City** in reviewing their construction schedules when directed to do so. The **Contractor** shall make any revisions to the construction schedules deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the **Contractor**, separate contractors, and the **City** until subsequently revised.

3.5. Limitations on the City's Responsibilities.

3.5.1. The **City** shall not supervise, direct, or have control or authority over, nor be responsible for the **Contractor's** means, methods, techniques, sequences, or procedures of construction or the safety precautions and programs incident thereto, or for any failure of the **Contractor** to comply with laws, codes and regulations applicable to the furnishing or performance of the Work. The **City** will not be responsible for the **Contractor's** failure to perform or furnish the Work in accordance with the Contract Documents. The **City** is not responsible for the acts or omissions of the **Contractor**, any Subcontractor, Supplier, or anyone for whose acts the **Contractor**, any Subcontractor or Suppliers may be liable.

3.5.2. The **City's** authority to review any of the **Contractor's** progress schedules, or its decision to raise or not to raise any objections about such schedules shall not impose on the **City** any responsibility for the timing, planning, scheduling, or execution of the Work, nor in any way give rise to any duty or responsibility on the part of the **City** to exercise this authority for the benefit of the **Contractor**, any Subcontractor or Supplier or any other party.

3.5.3. The **City's** decision to raise or not to raise objections with regard to any aspects of the **Contractor's** insurance shall in no way give rise to any duty or responsibility on the part of the **City** to or for the benefit of the **Contractor**, any Subcontractor, any Supplier, or any other party.

3.6. Reservation of Rights.

3.6.1. The **City** reserves the right to correct at any time any error in any progress payment that may have been made.

3.6.2. Should defective Work be discovered subsequent to final payment, the **City** reserves the right to make a claim and recover all costs and professional fees associated therewith, including the cost of removing and/or replacing the defective Work.

3.7. Waivers.

3.7.1. All waivers by the **City** are valid only to the extent that they are signed by the **City**. Any such waivers pertain only to the specific matter contained in the waiver and not to any similar, subsequent matters.

ARTICLE 4: THE DESIGN PROFESSIONAL

4.1. City's Representative.

4.1.1. The **Design Professional** is the **City's** representative (1) during construction, (2) until final payment is due, and (3) with the **City's** concurrence, from time to time during the correction period described in Article 10. The **Design Professional** will advise and consult with the **City**. The **Design Professional** will have authority to act on behalf of the **City** only to the extent provided in the Contract Documents, unless otherwise modified by a written instrument in accordance with other provisions of the Contract.

4.1.2. The duties, responsibilities, and the limitations of authority of the **Design Professional** as the **City's** representative during construction are set forth in the Contract Documents and shall not be extended without the written consent of the **City** and the **Design Professional**.

4.2. Administration of the Contract.

4.2.1. The **Design Professional** will provide administration of the Contract as described in the Contract Documents, unless the **City** has engaged a construction manager.

4.3. Visits to the Site.

4.3.1. The **Design Professional** will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. However, the **Design Professional** will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of on-site observations as an architect, engineer, or landscape architect, the **Design Professional** will keep the **City** informed of progress of the Work in writing and will endeavor to guard the **City** against defects and deficiencies in the Work.

4.4. Communications Facilitating Contract Administration.

4.4.1. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the **City** and the **Contractor** shall endeavor to communicate through the **Design Professional**. Communications by and with the **Design Professional's** consultants shall be through the **Design Professional**. Communications by and with Subcontractors and Suppliers shall be through the **Contractor**. Communications by and with **City** employees and separate contractors shall be through the **City**.

4.4.2. When it deems it necessary or expedient, the **City** may communicate directly with the **Contractor**, any Subcontractors, Suppliers, or consultants.

4.5. Certification of Applications for Payment.

4.5.1. Based on the **Design Professional's** observations and evaluations of the

Contractor's applications for payment, the **Design Professional** will review and certify the amounts due the **Contractor** and will issue certificates for payment in such amounts.

4.6. Rejection of Work.

4.6.1. The **Design Professional** will have authority to reject or disapprove Work (1) that does not conform to the Contract Documents; (2) that the **Design Professional** believes to be defective; and (3) that the **Design Professional** believes will not produce a completed Project conforming to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Whenever the **Design Professional** considers it necessary or advisable for implementation of the intent of the Contract Documents, the **Design Professional** will have authority to require additional inspection or testing of the Work in accordance with Article 9, whether or not such Work is fabricated, installed, or completed. However, neither this authority of the **Design Professional** nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the **Design Professional** to the **Contractor**, Subcontractors, Suppliers, or other persons performing portions of the Work.

4.7. Review of Submittals.

4.7.1. The **Design Professional** will review or take other appropriate action upon the **Contractor's** submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents and only to the extent that the **Design Professional** believes desirable to protect the **City's** interest. The **Design Professional's** action will be taken with reasonable promptness, while allowing sufficient time in the **Design Professional's** professional judgment to permit adequate review, taking into account the time periods set forth in the latest schedule prepared by the **Contractor** and approved by the **Design Professional**. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the **Contractor** as required by the Contract Documents. The **Design Professional's** review of the **Contractor's** submittals shall not relieve the **Contractor** of the obligations under Article 5. The **Design Professional's** review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The **Design Professional's** approval of a specific item shall not indicate approval of an assembly of which the item is a component. After the rejection of the second resubmittal of any one Submittal, the **Contractor** shall bear the cost of the review of each subsequent resubmittal.

4.8. Preparation of Change Orders and Construction Change Directives.

4.8.1. The **Design Professional** will prepare Change Orders and **Construction Change** Directives and may authorize minor Modifications in the Work as provided in Article 11.

4.9. Inspections.

4.9.1. The **Design Professional** will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; will receive and forward to the **City** for the **City's** review and records written warranties and related documents required by the Contract and assembled by the **Contractor**; and will issue a final certificate for payment upon

the **Contractor's** compliance with all of the requirements of the Contract Documents.

4.10. Interpretations, Clarifications, and Decisions.

4.10.1. The **Design Professional** will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of either the **City** or the **Contractor**. The **Design Professional's** response to such requests will be made with reasonable promptness and within the time set forth in the Agreement between the **City** and the **Design Professional**. Any such written interpretations, clarifications, and decisions shall be binding on the **Contractor**.

4.10.2. Interpretations, clarifications, and decisions of the **Design Professional** will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. The **Design Professional** will not be liable to the **Contractor**, any Subcontractor, or Supplier for results of interpretations, clarifications, or decisions so rendered in good faith.

4.10.3. The **Design Professional** may, as the **Design Professional** judges desirable, issue additional drawings or instructions indicating in greater detail the construction or design of the various parts of the Work; such drawings or instructions may be effected by a Field Order or other notice to the **Contractor**, and provided such drawings or instructions are reasonably consistent with the previously existing Contract Documents, the Work shall be executed in accordance with such additional drawings or instructions without any additional cost or an extension of the Contract Time.

4.10.4. The **Design Professional's** decisions on matters relating to aesthetic effect must be consistent with the **City's** and will be final.

4.11. Limitation on the Design Professional's Responsibilities.

4.11.1. Neither the **Design Professional's** authority to act under the provisions of the Contract Documents nor any decision made by the **Design Professional** in good faith to exercise or not to exercise such authority shall give rise to any duty or responsibility of the **Design Professional** to the **Contractor**, any Subcontractor, any Supplier, any surety for any of them or any other person.

4.11.2. The **Design Professional** will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, since these are solely the **Contractor's** responsibility as provided in Article 5. The **Design Professional** will not be responsible for the **Contractor's** failure to carry out the Work in accordance with the Contract Documents. The **Design Professional** will not have control over or charge of and will not be responsible for acts or omissions of the **Contractor**, Subcontractors, Suppliers, or of any other persons performing portions of the Work.

ARTICLE 5: THE CONTRACTOR

5.1. Relationship with the City.

5.1.1. The **Contractor** is an independent contractor and not an employee of the **City.** The **Contractor** is engaged by virtue of the Contract to perform only those services contained therein. The **Contractor** is not authorized to contract on behalf of the **City** or to incur any liability on the part of the **City**.

5.2. Code of Conduct.

5.2.1. M.G.L. c. 268A establishes standards of conduct for officials and employees of the **City**. The **Contractor** shall familiarize itself with the statute and act accordingly.

5.3. Quality Assurance.

5.3.1. The **Contractor** shall be responsible for ensuring that it, all Subcontractors, Suppliers, and all persons employed to do the Work under the Contract Documents perform in a professional manner, provide a high quality of service and Work, and perform in accordance with the Contract Documents.

5.4. Supervision.

5.4.1. Competence and Efficiency. The **Contractor** shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills, attention and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

5.4.2. Construction Means, Methods, Techniques, Etc. The **Contractor** shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under the Contract. Where the Contract Documents refer to particular construction means, methods, techniques, sequences, or procedures or indicate or imply that such are to be used in the Work, such mention is intended only to indicate that the operations of the **Contractor** shall be such as to produce at least the quality of Work implied by the operations described. The actual determination of whether or not the described operations may be safely and suitably employed on the Work shall be the responsibility of the **Contractor**, who shall notify the **Design Professional** in writing, prior to implementation, of the actual means, methods, techniques, sequences, or procedures which will be employed on the Work, if these differ from those mentioned in the Contract Documents. All loss, damage, liability or cost of correcting defective work arising from the employment of any construction means, methods, techniques, sequences, or procedures shall be borne by the **Contractor**, notwithstanding that such construction means, methods, techniques, sequences, or procedures are referred to, indicated or implied by the Contract Documents, unless the **Contractor** has given timely notice to the **City** and the **Design Professional** in writing that such means, methods, techniques, sequences, or procedures are not safe or suitable, and the **City** has then instructed the **Contractor** in writing to proceed at the **City's** risk.

5.4.3. Variance between the Contract Documents and Statutes, Ordinances, Codes, Rules, and Regulations. The **Contractor** shall promptly notify the **Design Professional** and the **City** in writing of any variances between the Contract Documents and statutes, ordinances, codes, rules, and regulations. If the **Contractor,** without written notice to the **Design Professional** and the **City,** performs Work knowing that it is contrary to statutes, ordinances, codes, rules, and regulations, the **Contractor** shall assume full responsibility for such Work and shall bear the costs associated therewith, i.e., replacement, repairs, removal, and fines.

5.4.4. Acts and Omissions. The **Contractor** shall be responsible to the **City** for the acts and omissions of all persons performing or supplying the Work.

5.4.5. Inspections. The **Contractor** shall be responsible for inspection of portions of Work already performed under this Contract to determine whether such portions are in proper condition to receive subsequent Work.

5.5. Personnel.

5.5.1. Suitability. The **Contractor** shall provide competent, properly licensed and/or certified, suitably qualified, and reliable personnel to perform the Work required by the Contract Documents. The **Contractor** shall enforce strict discipline and maintain good order at the site at all times. The **Contractor** shall not employ any Subcontractor, Supplier, or other person, whether initially or as a substitute, against whom the **City** may have reasonable objection. Acceptance of any Subcontractor or other person by the **City** shall not constitute a waiver of any right of the **City** to reject defective Work.

5.5.2. Sexual Harassment. Sexual harassment is an unlawful practice under M.G.L. c. 151B. The **Contractor**, Subcontractors, and all other persons responsible for any portion of the Work shall refrain from engaging in sexual harassment. The **Contractor** shall be responsible for any acts of sexual harassment committed by any persons responsible for any portion of the Work. The **Contractor** shall take appropriate action against any such individuals.

5.5.3. Weapons and Illegal Drugs. No weapons or illegal drugs are permitted on the Site. It is the responsibility of the **Contractor** to ensure that no weapons or illegal drugs are brought to the Site.

5.5.4. Maximum Work Day and Work Week. (*Reference:* M.G.L. c. 149, §§30 and 34;). No laborer, worker, mechanic, foreperson or inspector working within this Commonwealth in the employ of the **Contractor**, Subcontractor or other person doing or contracting to do the whole or part of the work contemplated by the Contract, shall be required or permitted to work more than eight (8) hours in any one day or more than forty-eight (48) hours in any one week, or more than six (6) days in any one week, except in cases of emergency.

5.5.5. Lodging. (*Reference:* M.G.L. c. 149, §25;). Every employee under this Contract

shall lodge, board and trade where and with whom he or she elects, and neither the **Contractor** nor its agents or employees shall, either directly or indirectly, require as a condition of the employment of any person that the employee shall lodge, board or trade at a particular place or with a particular person.

5.5.6. Wage Rates. (*Reference:* M.G.L. c. 149, §27). Mechanics and apprentices, teamsters, chauffeurs and laborers performing Work shall be paid no less than the minimum rate of wages included in the bid documents and the Project Manual and which are made part of the Contract. They shall continue to be the minimum rate of wages for said employees during the life of the Contract. The **Contractor** shall keep a legible copy of the wage rates posted in a conspicuous place at the site during the life of the Contract. These rates of wages shall include payments by employers to health and welfare plans, pension plans and supplementary unemployment benefit plans as provided in M.G.L. c. 149, §26;, and such payments shall be considered as payments to persons under M.G.L. c. 149, §27 performing work as therein provided. If the **Contractor** does not make payments to a health and welfare plan, a pension plan and a supplementary unemployment benefit plan, where such payments are included in the rates of wages, the **Contractor** shall pay the amount of said payments directly to each employee engaged in the Work. If the **Contractor** pays less than the rate of wages, including payments to health and welfare funds and pension funds, or the equivalent payments in wages to any person performing Work within the classifications as determined by the Commissioner of Labor and Industries, and if the **Contractor** takes or receives for its own use or the use of any other person, as a rebate, refund or gratuity, or in any other guise, any part or portion of the wages, including payments to health and welfare funds and pension funds, or the equivalent payment in wages, paid to such person for Work done or service rendered on the Project, the **Contractor** will be subject to the penalties set forth in M.G.L. c. 149, §27. Notwithstanding the foregoing and the requirements of 5.5.7.1 and 5.5.7.2 below, if the Contract is federally funded, federal labor standards apply, including Davis Bacon minimum wage rates and payroll reporting requirements. See the "Federal Requirements" section at the end of these contract documents.

5.5.7. Payroll Records of Employees. (*Reference:* M.G.L. c. 149, §27B;). The **Contractor** and all Subcontractors who are subject to M.G.L. c. 149, §§27 and 27A shall keep a true and accurate record of all mechanics and apprentices, teamsters, chauffeurs, and laborers performing Work showing the name, address and occupational classification of each such employee, the hours worked by and the wages paid to all such employees. The **Contractor** and the Subcontractors shall submit a copy of said record to the **City** on a weekly basis.

5.5.7.1. (*Reference:* M.G.L. c. 149, §27B;). The **Contractor** and all Subcontractors who are subject to M.G.L. c. 149, §§27 and 27A shall preserve their payroll records for a period of three (3) years from the date of completion of the Contract.

5.5.7.2. (*Reference:* M.G.L. c. 149, §27B). The **Contractor** and all Subcontractors who are subject to M.G.L. c. 149, §§27 and 27A shall furnish to the Commissioner of Labor and Industries and the **City** within fifteen (15) days after completion of their portion of the Work a statement executed by the **Contractor** or

Subcontractor or by any authorized officer or employee of the **Contractor** or Subcontractor who supervises the payment of wages in the form found in M.G.L. c.149, §27B.

5.6. Superintendence.

5.6.1. Employment of a Superintendent. The **Contractor** shall employ a competent, properly licensed superintendent, reasonably acceptable to the **City**, and necessary assistants who shall be in attendance at the Site full time during the progress of the Work until the date of Substantial Completion and for such additional time thereafter as the **Design Professional** or the **City** may determine to be necessary for the expeditious completion of the Work, including final completion. If continually in the employ of the Contractor, the same Superintendent shall be assigned to this project.

5.6.2. Removal/Replacement of a Superintendent. The **Contractor** shall remove the superintendent if requested to do so in writing by the **City** and shall promptly replace such superintendent with a competent person reasonably acceptable to the **City**. The superintendent shall represent the **Contractor**, and communications given to the superintendent shall be as binding as if given to the **Contractor**. The **Contractor** shall not replace the superintendent without written notice to the **City** and the **Design Professional**.

5.6.3. Registered Professional Engineer or Registered Land Surveyor. The **Contractor** shall retain a competent Registered Professional Engineer or Registered Land Surveyor, acceptable to the **Engineer**, who shall establish the exterior lines and required elevations of all buildings and structures to be erected on the site and shall establish sufficient lines and grades for the construction of associated Work such as, but not limited to, roads, utilities, and site grading. The Engineer or Land Surveyor shall certify as to the actual location of the constructed facilities in relation to property lines, building lines, easements, and other restrictive boundaries.

5.6.4. Building Grades, Lines, Etc.; The **Contractor** shall establish the building grades; lines; levels; and column, wall and partition lines required by the various Subcontractors in laying out their Work.

5.6.5. Coordination and Supervision. The **Contractor** shall coordinate and supervise the Work performed by Subcontractors to the end that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. The **Contractor** and all Subcontractors shall at all times afford each trade, any separate contractor, or the **City**, every reasonable opportunity for the installation of Work and the storage of materials.

5.6.6. Job Meetings. There shall be job meetings held on a weekly basis, or more often if required by the **City**. The **Contractor** shall arrange for and attend weekly job meetings with the **Design Professional** and such other persons as the **Design Professional** may from time to time wish to have present. The **Contractor** shall be represented by a principal, project manager, general superintendent or other authorized main office representative, as well as by the **Contractor's** own superintendent. An authorized representative of any Subcontractor or Sub-subcontractor shall attend such meetings if the representative's presence is requested by the

Design Professional. Such representatives shall be empowered to make binding commitments on all matters to be discussed at such meetings, including costs, payments, Change Orders, time schedules and workforce power. Any notices required under the Contract may be served on such representatives.

5.7. Materials, Labor, Equipment, Etc.

5.7.1. Provision of. Unless otherwise provided in the Contract Documents, the **Contractor** shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the Work.

5.7.2. Quality and Use of. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by the **Design Professional**, the **Contractor** shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

5.7.3. Discrepancies or Defects. If the **Contractor** is unable to perform its Work because of discrepancies or defects in the work of the **City's** own forces or of a separate contractor, the **Contractor** shall immediately notify the **Design Professional** and the **City** in writing of the conditions that render unable to so perform. Failure to notify the **Design Professional** constitutes an acknowledgment and acceptance of the other work as being fit and proper for integration with the **Contractor's** Work except for latent or non-apparent defects and deficiencies in the other work.

5.8. Contractor's Management and Financial Statement Requirements. (*Reference:* M.G.L. c. 30, §39R)

5.8.1. The words defined herein shall have the meaning stated below whenever they appear in this Paragraph:

5.8.1.1. "Contractor" means any person, corporation, partnership, joint venture, sole proprietorship, or other entity awarded a contract pursuant to M.G.L. c.149, §44A-H or M.G.L. c. 30, §39M, inclusive.

5.8.1.2. "Contract" means any contract awarded or executed pursuant to M.G.L. c. 149, §44A-H or M.G.L. c. 30, §39M, which is for an amount or estimate amount that exceed the dollar amount set forth in M.G.L. c. 30, §39R.

5.8.1.3. "Records" means books of original entry, accounts, checks, bank statements and all other banking documents, correspondence, memoranda, invoices, computer printouts, tapes, discs, papers and other documents or transcribed information

of any type, whether expressed in ordinary or machine language.

5.8.1.4. "Independent Certified Public Accountant" means a person duly registered in good standing and entitled to practice as a certified public accountant under the laws of the place of his/her residence or principal office and who is in fact independent. In determining whether an accountant is independent with respect to a particular person, appropriate consideration should be given to all relationships between the accountant and that person or any affiliate thereof. Determination of an accountant's independence shall not be confined to the relationships existing in connection with the filing of reports with the **City**.

5.8.1.5. "Audit," when used in regard to financial statement, means an examination of records by an independent certified public accountant in accordance with generally accepted accounting principles and auditing standards for the purpose of expressing a certified opinion thereon, or, in the alternative, a qualified opinion or a declination to express an opinion for stated reasons.

5.8.1.6. "Accountant's Report," when used in regard to financial statements, means a document in which an independent certified accountant indicates the scope of the audit which s/he has made and sets forth his/her opinion regarding the financial statements taken as a whole with listing of noted exceptions and qualifications, or an assertion to the effect that an overall opinion cannot be expressed. When an overall opinion cannot be expressed the reason therefore shall be stated. An accountant's report shall include as part thereof a signed statement by the responsible corporate officer attesting that management has fully disclosed all material facts to the independent certified public accountant, and that the audited financial statement is a true and complete statement of the financial condition of the contractor.

5.8.1.7. "Management," when used herein, means the chief executive officers, partners, principals or other person or persons primarily responsible for the financial and operational policies and practices of the Contractor.

5.8.1.8. Accounting terms, unless otherwise defined herein shall have a meaning in accordance with generally accepted accounting principles and auditing standards.

5.8.2. The Contractor shall make, and keep for at least six (6) years after final payment, books, Records, and accounts that in reasonable detail accurately and fairly reflect the transactions and dispositions of the Contractor.

5.8.3. Until the expiration of six (6) years after final payment, the Office of the Inspector General, and the Deputy Commissioner of the Division of Capital Asset Management shall have the right to examine any books, documents, papers or Records of the Contractor or of its Subcontractors that directly pertain to, and involve transactions relating to, the Contractor or

its Subcontractors.

5.8.4. The Contractor shall describe any change in the method of maintaining Records or recording transactions which materially affect any statements filed with the **City**, including in its description the date of the change and reasons therefore, and shall accompany said description with a letter from the Contractor's Independent Certified Public Accountant approving or otherwise commenting on the changes.

5.8.5. The Contractor shall file a Statement of Management on internal accounting controls as set forth below prior to the execution of the Contract.

5.8.6. The Contractor shall file prior to the execution of the contract and shall continue to file annually, an Audited Financial Statement for the most recent completed fiscal year as set forth below.

5.8.7. The Contractor shall file with the **City** a Statement of Management as to whether the system of internal accounting controls of the Contractor and its subsidiaries reasonably assures that:

5.8.7.1. transactions are executed in accordance with Management's general and specific authorization;

5.8.7.2. transactions are recorded as necessary to permit preparation of financial statements in conformity with generally accepted accounting principles, and to maintain accountability for assets;

5.8.7.3. access to assets is permitted only in accordance with Management's general or specific authorization; and

5.8.7.4. the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any difference.

5.8.7.5. The Contractor shall also file with the **City** a statement prepared and signed by an Independent Certified Public Accountant stating that s/he has examined the Statement of Management on internal accounting controls, and expressing an opinion as to:

5.8.7.5.1. whether the representation of Management in response to this paragraph and paragraphs 5.8.2. through 5.8.6 above are consistent with the result of Management's evaluation of the system of internal accounting controls; and

5.8.7.5.2. whether such representations of Management are, in

addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statements.

5.8.8. The Contractor shall annually file with the Commissioner of the Division of Capital Asset Management during the term of the contract a financial statement prepared by an Independent Certified Public Accountant on the basis of an Audit by such accountant. The final statement filed shall include the date of final payment. All statements shall be accompanied by an accountant's report. Such statements shall be made available to the **City** upon request.

5.9. Taxes.

5.9.1 The **Contractor** shall pay all sales, consumer, use, and other similar taxes for the Work or portions thereof which are provided by the **Contractor** which are legally enacted when bids are received, whether or not yet effective or merely scheduled to go into effect. However, the **Contractor** shall not pay, and the **City** shall not reimburse or pay the **Contractor** for, any sales taxes for building supplies or materials for which an exemption is provided in M.G.L. c. 64H, §6(f). The **City's** tax exemption number to be used by the **Contractor** in this regard is E04-600-1414.

5.10. Permits, Licenses, and Fees.

5.10.1 Unless otherwise provided, the **Contractor** shall obtain and pay the fees for all permits, licenses, and inspections that are necessary for the proper execution and completion of the Work and which are customarily secured after execution of the Contract and which are legally required. All fees for permits, and inspections required by any **City** department shall be waived. Fees for licenses (e.g. drainlayer's license) are not waived . In addition the contractor shall pay for water meters and water usage. The contractor is responsible for obtaining NSTAR work orders and paying all costs and fees associated with NSTAR work.

5.11. Notices Required By Statutes, Ordinances, Codes, Rules, Regulations, and Orders of the City.

5.11.1 The **Contractor** shall give notices required by statutes, ordinances, codes, rules, regulations, and orders of the **City** bearing on performance of the Work.

5.12. Additional Information from Design Professional.

5.12.1. The **Contractor** shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Article 4.

5.12.2. The **Contractor** shall give the **Design Professional** timely notice of any additional Plans, Specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work.

5.12.3. The **Contractor** shall not proceed with any Work not clearly and consistently defined in detail in the Contract Documents, but shall request additional drawings or instructions from the **Design Professional** as provided in the previous Paragraph. If the **Contractor** proceeds

with such Work without obtaining further drawings, Specifications, or instructions, the **Contractor** shall correct Work incorrectly done at the **Contractor's** own expense.

5.13. "Or equal."

5.13.1. Requirements for Substitutions. (*Reference:* M.G.L. c. 30, §39M(b).) Where products or materials are prescribed by manufacturer name, trade name, or catalog reference, the words "or approved equal" shall be understood to follow. An item shall be considered equal to the item so named or described if, in the opinion of the **Design Professional**:

5.13.1.1. it is at least equal in quality, durability, appearance, strength, and design;

5.13.1.2. it performs at least equally the function imposed by the general design for the Work;

5.13.1.3. it conforms substantially, even with deviations, to the detailed requirements for the items as indicated by the Specifications.

5.13.2. Net Savings. No proposed substitution will be permitted unless the **Contractor** certifies that the proposed substitution will yield a net savings to the **City** and will not extend the Contract Time.

5.13.3. Contractor's Expense. Any structural or mechanical changes made necessary to accommodate substituted equipment under this paragraph (including but not limited to engineering fees) shall be at the expense of the **Contractor** or **Subcontractor** responsible for the Work item.

5.13.3.1. Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the **Contractor**, notwithstanding approval or acceptance of such substitution by the **City** or the **Design Professional**, unless such substitution was made at the written request or direction of the **City** or the **Design Professional**.

5.13.3.2. All data to be provided by the **Contractor** in support of any proposed "or equal" or substitute item will be at the **Contractor's** expense.

5.13.4. Meeting Requirements. The **Contractor** shall be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. The **Design Professional** may require the **Contractor** to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of the **Design Professional,** would lead to a reasonable certainty that any material used, or proposed to be used, in the Work meets the requirements of the Contract Documents. All such data shall be furnished at the **Contractor's** expense. This provision shall not require the **Contractor** to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at the **Contractor's** expense.

5.13.5. Named Manufacturer's Product. In all cases in which a manufacturer's name, trade name, or other proprietary designation is used in connection with materials or articles to be furnished under this Contract, whether or not the phrase "or equal" is used after such name, the **Contractor** shall furnish the product of the name manufacturer(s) without substitution, unless a written request for a substitute has been submitted by the **Contractor** and approved in writing by the **Design Professional** as provided in the following paragraph.

5.13.6. Deviations. If the **Contractor** proposes to use a material which while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, the **Contractor** shall inform the **Design Professional** in writing of the nature of such deviations at the time the material is submitted for approval and shall request written approval of the deviation from the requirements of the Contract Documents.

5.13.7. Rejection of Deviations. In requesting approval of deviations or substitutions, the **Contractor** shall provide, upon request, evidence leading to a reasonable certainty that the proposed substitution or deviation will provide a quality of result at least equal to that otherwise attainable. If, in the opinion of the **Design Professional**, the evidence presented by the **Contractor** does not provide a sufficient basis for such reasonable certainty, the **Design Professional** may reject such substitution or deviation without further investigation.

5.13.8. Consistent Character and Quality of Design. The Contract Documents are intended to produce a building of consistent character and quality of design. All components of the building including visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance of the Project. The **Design Professional** shall judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The **Design Professional** will not approve as equal to materials specified proposed substitutes that, in the **Design Professional's** opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project. In order to permit coordinated design of color and finishes the **Contractor** shall, if required by the **Design Professional**, furnish the substituted material in any color, finish, texture, or pattern which would have been available from the manufacturer originally specified, at no additional cost to the **City**.

5.13.9. Warranty. The warranties provided herein shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise prescribed by law.

5.13.10. Design Professional's Approval. The **Design Professional** will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed, or utilized without the **Design Professional's** prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. The **City** may require the **Contractor** to furnish at the **Contractor's** expense a special performance guarantee or other surety with respect to any "or equal" or substitute. The **Design Professional** will record the time required by the **Design**

Professional and its consultants in evaluating substitutes proposed or submitted by the **Contractor** and in making changes in the Contract Documents (or in the provisions of any other direct contract with the **City** for work on the Project) occasioned thereby. Whether or not the **Design Professional** accepts a substitute item so proposed or submitted by the **Contractor**, the **Contractor** shall reimburse the **City** for the charges of the **Design Professional** and its consultants for evaluating each such proposed substitute item.

5.14. Substitute Construction Methods or Procedures.

5.14.1 If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, the **Contractor** may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to the **Design Professional**. The **Contractor** shall submit sufficient information to allow the **Design Professional**, in the **Design Professional's** sole discretion, to determine whether the substitute proposed is equivalent to that expressly called for by the Contract Documents.

5.15. Contractor's Progress Schedule.

5.15.1. Before Starting Construction. Within ten (10) days after the date of the Notice to Proceed, the **Contractor** shall submit to the **Design Professional** for review:

5.15.1.1. a preliminary progress schedule indicating the times (number of days or dates) for starting and completing the various stages of the Work;

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

5.15.1.3. a refined schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Sum and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

5.15.2. Review of Progress Schedule. At least ten (10) days prior to the commencement of construction, the **Design Professional**, the **Contractor,** and any other appropriate persons will meet to review and discuss the acceptability to the **Design Professional** of the progress schedule. The **Contractor** will have an additional ten (10) days to make corrections and adjustments and to complete and resubmit the schedule. No progress payment shall be made to the **Contractor** until the schedule is submitted to and found acceptable by the **Design Professional** as provided below.

5.15.3. Acceptability of Progress Schedule. The progress schedule will be acceptable to the **Design Professional** if, according to the **Design Professional**, it provides an orderly

progression of the Work to completion within any specified time frame, but such acceptance will neither impose on the **Design Professional** responsibility for the sequencing, scheduling, or progress of the Work nor interfere with or relieve the **Contractor** from the **Contractor's** full responsibility therefore. The **Contractor's** schedule of Submittals must be acceptable to the **Design Professional** in providing a workable arrangement for reviewing and processing the required Submittals. The **Contractor's** schedule of values must be acceptable to the **Design Professional** as to form and substance.

5.15.4. Sepia and Copies. After the **Design Professional** has approved the schedule, the **Contractor** shall submit to the **Design Professional** one (1) sepia and four (4) copies bearing the **Contractor's** stamp of approval as a representation to the **City** that the **Contractor** has determined or verified all data on that progress schedule and that the **Contractor**, the Subcontractors and Suppliers have reviewed and coordinated the sequences in that progress schedule with the requirements of the Work.

5.15.5. Adjustment of Schedule. The **Contractor** shall adhere to the established progress schedule which may be adjusted from time to time as follows: the **Contractor** shall submit to the **Design Professional** for acceptance proposed adjustments in the progress schedule that will not change the Contract Time. Such adjustments will conform generally to the progress schedule then in effect and will comply with any provisions of the requirements applicable thereto.

5.15.6. During Construction. The **Contractor** shall submit monthly progress schedules to the **Design Professional**. The schedules shall stay current with the **Contractor's** approach to the Work remaining.

5.15.7. Schedule of Submittals. The **Contractor** shall prepare and keep current, for the **Design Professional's** approval, a schedule of Submittals that is coordinated with the **Contractor's** construction schedule and allows the **Design Professional** reasonable time to review Submittals.

5.16. Project Coordination.

5.16.1. In General. The **Contractor** shall be responsible for the proper coordination of the Work of all of the trades.

5.16.2. Coordination with Subcontractors. The **Contractor** shall coordinate the work of each Subcontractor with the Work of every other Subcontractor whose Work affects the other.

5.16.3. Coordination with the City's Own Forces or Separate Contractors. The **Contractor** shall coordinate its operations with those of the **City's** own forces or separate contractors. The **Contractor** shall provide the **City's** own forces and separate contractors a reasonable opportunity for the handling, unloading and storage of their materials and equipment and execution of their work. The **Contractor** shall connect and coordinate its Work with theirs.

5.16.4. Coordination with Utility Companies. The **Contractor** shall coordinate its operations with all the appropriate utility companies to assure that the utilities required on the Project are available and functioning properly pursuant to the requirements of the Contract Documents.

5.17. Project Photographs.

5.17.1. In General. The **Contractor** shall take, at its own expense, interior and exterior photographs at the site, from different vantages as directed by the **Design Professional** or the **City**, before beginning any Work and thereafter, at a minimum, on the first work day of each month until final completion of the Work, including final Site photos. Photos shall be taken of any Work that will be buried or concealed while the Work is still exposed. The photographs shall be taken by a skilled commercial photographer. The number of photographs required shall be at the discretion of the **City** or the **Design Professional**. One aerial photo shall be required a) prior to commencement of the work and b) at the completion of the work. See Section 01320 – Construction Progress Documentation.

5.17.2. Prints and Digital Media. Within fourteen (14) days after the photographs have been taken, the **Contractor** shall cause prints to be made and delivered to the **City** and the **Design Professional**. All photographs shall be 8" x 10". Each print shall state the date of the photograph, the name of the Project, the description of the view and the name and address of the photographer. The **City** shall receive one glossy print of each photo as well as all prints in digital form on compact disc. The **Design Professional** shall receive one glossy print.

5.17.3. Failure to Comply. Should the **Contractor** fail to adhere to any requirement set forth in the previous two paragraphs, the **City** may have the photographs taken at the **Contractor's** expense or receive a set-off against the **Contractor's** next application for payment.

5.18. Record Documents and Samples at the Site.

5.18.1 The **Contractor** shall maintain in a safe place at the site one record copy of all Plans, Specifications, Modifications, Change Orders, **Construction Change** Directives, Field Orders and written interpretations and clarifications in good order and annotated to show all changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to the **Design Professional** for reference. Upon completion of the Work, these record documents, Samples and Shop Drawings will be delivered by the **Contractor** to the **Design Professional** for the **City**.

5.19. Submittals.

5.19.1. Purpose. The purpose of Submittals is to demonstrate for those portions of the Work for which Submittals are required the way the **Contractor** proposes to conform to the information given and the design concept expressed in the Contract Documents.

5.19.2. Submittal Procedure. Within ten (10) days from the Notice to Proceed, the **Contractor** shall submit to the **Design Professional** a completed Submittals schedule. The

Contractor shall review, approve, and submit to the **Design Professional** Submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the **City** or of separate contractors. Submittals made by the **Contractor** that are not required by the Contract Documents may be returned without action. The schedules shall be updated and resubmitted each month. All Submittals will be identified as the **Design Professional** may require and in the number specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show the **Design Professional** the materials and equipment that the **Contractor** proposes to provide and to enable the **Design Professional** to review the information for the limited purposes stated below.

5.19.3. Samples. The **Contractor** shall also submit Samples to the **Design Professional** for review and approval in accordance with said accepted schedule of Submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which it is intended and otherwise as the **Design Professional** may require to enable the **Design Professional** to review the Submittal for the limited purposed stated below. The numbers of each Sample to be submitted will be as specified in the Specifications. Unless otherwise specified in the Specifications, three (3) specimens of each Sample shall be submitted.

5.19.3.1. The Samples shall be of sufficient size to permit proper evaluation of material. Where variations in color or other characteristics are to be expected, samples showing the minimum range of variation shall be submitted. Materials exceeding the range of variation of the approved Samples will not be approved on the Work.

5.19.3.2. All costs associated with delivery of Samples will be paid by the **Contractor**.

5.19.4. Contractor's Verifications. Before submitting each Submittal, the **Contractor** shall have determined and verified:

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

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

5.19.4.3. all information relative to the **Contractor's** sole responsibilities in respect of means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto.

5.19.5. Contractor's Representations. By approving and providing Submittals, the **Contractor** thereby represents that the **Contractor** has determined and verified all dimensions,

quantities, field dimensions, relations to existing Work, coordination with Work to be installed later, coordination with information on previously accepted Submittals and verification of compliance with all the requirements of the Contract Documents. The accuracy of all such information is the responsibility of the **Contractor**. In reviewing Submittals, the **Design Professional** shall be entitled to rely upon the **Contractor's** representation that such information is correct and accurate.

5.19.6. Coordination. The **Contractor** shall also have reviewed and coordinated each Submittal with other Submittals and with the requirements of the Work and the Contract Documents.

5.19.7. Stamp or Specific Written Indication. Each Submittal will bear a stamp or specific written indication that the **Contractor** has satisfied the **Contractor's** obligations under the Contract Documents with respect to the **Contractor's** review and approval of that Submittal.

5.19.8. Written Notice of Variations. At the time of each Submittal, the **Contractor** shall give the **Design Professional** specific written notice of such variations, if any, that the Submittal may have from the requirements of the Contract Documents. Such notice is to be in a written communication separate from the Submittal. Moreover, the **Contractor** shall make a specific notation on each Submittal to the **Design Professional** for review and approval of each such variation.

5.19.9. Review and Approval by the Design Professional. The **Contractor** shall perform no portion of the Work requiring a Submittal until the respective Submittal has been approved by the **Design Professional**. Such Work shall be in accordance with approved Submittals.

5.19.9.1. The **Design Professional** will review and approve Submittals in accordance with the schedule of Submittals accepted by the **Design Professional** as required above. The **Design Professional's** review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated in the Contract Documents. The **Design Professional's** review and approval will not extend to means, method, technique, sequences, or procedures of construction (except where a particular means, method, technique, sequences or procedures of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

5.19.10. Deviations. The **Contractor** shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the **Design Professional's** approval of Submittals unless the **Contractor** has specifically informed the **Design Professional** in writing of such deviation at the time of Submittal and the **Design Professional** has given written approval to the specific deviation. The **Contractor** shall not be relieved of responsibility for

errors or omissions in Submittals by the **Design Professional's** approval thereof.

5.19.11. Revisions. The **Contractor** shall make corrections required by the **Design Professional** and shall return the required number of corrected copies of Submittals and submit as required new Submittals for review and approval. The **Contractor** shall direct specific attention, in writing or on resubmitted Submittals, to revisions other than those requested by the **Design Professional** on previous Submittals. Unless such written notice has been given, the **Design Professional's** approval of a resubmitted Submittal shall not constitute approval of any changes not requested on the prior Submittal.

5.19.12. Related Work. Where a Submittal is required by the Contract Documents or the schedule of Submittals accepted by the **Design Professional**, any related Work performed prior to the **Design Professional's** review and approval of the pertinent Submittal will be at the sole expense and responsibility of the **Contractor**.

5.19.13. Informational Submittals. Informational Submittals upon which the **Design Professional** is not expected to take responsive action may be so identified in the Contract Documents.

5.19.14. Certification. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the **City** shall be entitled to rely upon such certifications, and neither the **City** nor the **Design Professional** shall be expected to make any independent examination with respect thereto.

5.20. Continuing the Work.

5.20.1. The **Contractor** shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with the **City**. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as otherwise provided herein or as the **City** and the **Contractor** may agree in writing.

5.21. Use of Site; **Access to Work.**

5.21.1. The right of possession of the premises and the improvements made thereon by the **Contractor** shall remain at all times in the **City**. The **Contractor's** right to entry and use thereof arises solely from the permission granted by the **City** under the Contract Documents. The **Contractor** shall confine the **Contractor's** apparatus, the storage of materials, and the operations of the **Contractor's** workers to limits indicated by law, ordinance, the Contract Documents and permits and/or directions of the **Design Professional** and shall not unreasonably encumber the premises with the **Contractor's** materials. The **City** shall not be liable to the **Contractor**, the Subcontractors, Suppliers, or anyone else with respect to the conditions of the premises, except for a condition caused directly and solely by the negligence of the **City**.

5.21.2. At all times, the **City** and the **Design Professional** shall have access to the Work.

5.22. Protection of Persons and Property.

5.22.1. In General. The **Contractor** shall be responsible for initiating, maintaining, and supervising all health and safety precautions and programs in connection with the performance of the Contract. The **Contractor** is responsible for the implementation of all Federal, State, and local health and safety requirements.

5.22.2. The **Contractor** shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

5.22.2.1. employees on the site and other persons who may be affected thereby;

5.22.2.2. the Work, materials, and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the **Contractor**, Subcontractors, or Sub-subcontractors;

5.22.2.3. other property at the site or adjacent or in close proximity thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and

5.22.2.4. any other property of the **City**, whether or not forming part of the Work, located at the site or adjacent thereto in areas to which the **Contractor** has access.

5.22.3. Notices and Compliance. The **Contractor** shall give notices and comply in all other respects with applicable laws, ordinances, rules, regulations, codes, and lawful orders of public authorities bearing on the safety of persons or property or their protection from damage, injury, or loss. The **Contractor** shall notify owners of adjacent and nearby properties of underground facilities and utility owners when prosecution of the Work may affect them and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

5.22.4. Erection and Maintenance of Safeguards. The **Contractor** shall erect and maintain, as required by existing conditions and the terms of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent and nearby sites and utilities.

5.22.5. Hazardous Materials and Equipment. When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the **Contractor** shall exercise utmost care and carry on such activities under the supervision of properly qualified personnel.

5.22.6. Damage to Property. The **Contractor** shall promptly remedy damage and loss to

property referred to above. If the damage or loss is due in whole or in part to the **Contractor's** failure to take the precautions required herein, the **Contractor** shall bear the cost, subject to any reimbursement to which the **Contractor** is entitled under property insurance required by the Contract Documents. The **Contractor** shall be fully and solely responsible for all Work and other operations carried out on adjacent properties. The insurance required under Article 8 shall cover such Work or operations, and the **Contractor** shall indemnify and defend the **City**, the **Design Professional**, and the owners of such adjacent or nearby properties from and against all claims, suits, losses, or costs arising out of such Work or operations.

5.22.7. Fire Protection Equipment and Services. The **Contractor** shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services and shall comply with all reasonable recommendations regarding fire protection made by the representatives of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the site limits shall be kept orderly and clean and all combustible rubbish shall be promptly removed from the site.

5.22.8. Protection of Excavations, Trenches, etc. The **Contractor** shall at all times protect excavations, trenches, buildings and materials from rain water, ground water, backup or leakage of sewers, drains and other piping, and from water of any other origin and shall remove promptly any accumulation of water. The **Contractor** shall provide and operate all pumps, piping, and other equipment necessary to this end.

5.22.9. Snow and Ice Removal. The **Contractor** shall remove snow and ice that might result in damage or delay.

5.22.10. Safety Representative. The **Contractor** shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

5.22.11. Weather Protection. (*Reference:* M.G.L. c. 149, §44F(1).) The **Contractor** shall install weather protection and furnish adequate heat in the protected area from November 1 through March 31.

5.22.12. Security. The **Contractor** shall provide, within the Contract Sum, a sufficient number of security personnel at the Site at all times when the **Contractor's** personnel are not present, from commencement of the Work until Substantial Completion to assure that the Site, the facility, and the Work, and all materials and equipment stored at the Site are fully and completely protected against loss or damage due to vandalism, theft, or malicious mischief. If the **Contractor** elects, in addition, to use guard dogs for this purpose, each dog shall at all times be accompanied by an adult handler. If the **Contractor** fails to comply with the requirements of this paragraph, then the **City** may provide appropriate security and charge the cost thereof to the **Contractor**. The **City's** provision of such security, or failure to do so, shall not relieve the **Contractor** of its responsibility to pay for loss or damage due to vandalism, theft, or malicious mischief at the Site.

5.22.13. Hazard Communication Programs. The **Contractor** shall be responsible for coordinating any exchange of material safety data sheets or other hazard communications information required to be made available to or exchanged between or among employers at the site in accordance with laws, codes and regulations.

5.22.14. Noise Pollution Control. The **Contractor** shall comply with all applicable provisions of Somerville Municipal Code §9-109.

5.23. Cutting and Patching.

5.23.1. In General. Unless otherwise provided in the Contract Documents, the **Contractor** shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly, including the work of the City or of separate contractors.

5.23.2. Damage to Work of City or of Separate Contractor. The **Contractor** shall not damage or endanger a portion of the Work or fully or partially completed construction of the **City** or separate contractors by cutting, patching, or otherwise altering such construction, or by excavation. The **Contractor** shall not cut or otherwise alter such construction by the **City** or a separate contractor except with prior written consent of the **City** and of such separate contractor; such consent shall not be unreasonably withheld. The **Contractor** shall not unreasonably withhold from the **City** or a separate contractor the **Contractor's** consent to cutting or otherwise altering the Work.

5.23.3. Damage Caused by Contractor. Should the **Contractor** cause damage to the work or property of any separate contractor at the Site, or should any claim arising out of the **Contractor's** performance of Work at the Site be made by any separate contractor against the **Contractor**, the **City**, the **Design Professional**, or any of the **Design Professional's** consultants, the **Contractor** shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law. The **Contractor** shall, to the fullest extent permitted by laws and regulations, indemnify and hold harmless the **City**, the **Design Professional**, and the **Design Professional's** consultants from and against all claims, damages, losses and expenses (including, but not limited to, fees of the Design Professional, the Design Professional's consultants, attorneys, and other professionals, and court and arbitration or mediation costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any separate contractor against the **City**, the **Design Professional**, or any of the **Design Professional's** consultants, to the extent based on a claim arising out of the **Contractor's** performance of the Work. Should a separate contractor cause damage to the Work or property of the **Contractor** or should the performance of work by any separate contractor at the site give rise to any other claim, the **Contractor** shall not institute any action, legal or equitable, against the **City**, the **Design Professional**, or any of the **Design Professional's** consultants, or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from the **City**, the **Design Professional**, or any of the **Design Professional's** consultants, on account of any such damage or claim. If the **Contractor** delays at any time in performing or furnishing Work by any act or neglect of a separate contractor and the City and the Contractor are unable to agree as to the extent of any adjustment in the Contract Time attributable thereto, the **Contractor** may make a claim for an extension of time in accordance with Article 16. An extension of the Contract Time shall be the **Contractor's** exclusive remedy with respect to the **City**, the **Design Professional**, and the **Design Professional's** consultants, for any delay, disruption, interference, or hindrance caused by any separate contractor.

5.24. Cleaning Up.

5.24.1. During the progress of the Work, the **Contractor** shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract or other debris. At the completion of the Work, the **Contractor** shall remove from and about the Project all waste materials, rubbish, and debris, and the **Contractor's** tools, construction equipment, machinery, and surplus materials. Surplus materials to be provided to the **City** by specifications shall be stored in a clean, safe and secure area as directed by the **City**. The **Contractor** shall leave the site clean and ready for occupancy by the **City** at Substantial Completion of the Work. Immediately prior to the **Design Professional's** inspection for Substantial Completion, the **Contractor** shall completely clean the premises. Concrete and ceramic surfaces shall be cleaned and washed. Resilient coverings shall be cleaned, waxed and buffed. Woodwork shall be dusted and cleaned. Sash, fixtures and equipment shall be thoroughly cleaned. Stains, spots, dust, marks and smears shall be removed from all surfaces. Hardware and all metal surfaces shall be cleaned and polished. Glass and plastic surfaces shall be thoroughly cleaned by professional window cleaners. All damaged, broken or scratched glass or plastic shall be replaced by the **Contractor** at the **Contractor's** expense. The **Contractor** shall restore to original condition all property not designated for alteration by the Contract Documents.

5.24.2. If the **Contractor** fails to clean up as provided herein, the **City** may do so and charge the cost thereof to the **Contractor**.

5.25. Royalties and Patents.

5.25.1 The **Contractor** shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. To the fullest extent permitted by law, the **Contractor** shall indemnify and hold harmless the **City** and the **Design Professional** from and against all claims, costs, losses, and damages arising out of or resulting from any infringement of patent rights or copyrights incident to the use in the performance of the work or resulting from the incorporation in the work of any invention, design, process, product, or device not specified in the Contract Documents.

5.26. Contractor's Obligation to Perform.

5.26.1. The **Contractor's** obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of the **Contractor's** obligation to perform the Work in accordance with the Contract Documents:

5.26.1.1. observations by the **Design Professional**;

5.26.1.2. recommendation of any progress or final payment by the **Design Professional**;

5.26.1.3. the issuance of a certificate of Substantial Completion or any payment by the **City** to the **Contractor** under the Contract Documents;

5.26.1.4. use or occupancy of the Work, Project, or Site, or any part thereof, by the **City**;

5.26.1.5. any acceptance by the **City** or any failure to do so;

5.26.1.6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptance by the **Design Professional**;

5.26.1.7. any inspection, test, or approval by others; or

5.26.1.8. any correction of defective Work by the **City**.

5.27. Indemnification; **and Covenant Not To Sue.**

5.27.1. To the fullest extent permitted by law, the **Contractor** shall assume the defense of, indemnify and hold harmless the **City**, the **Design Professional**, the **Design Professional's** consultants, and agents and employees of any of them, from and against claims, damages, losses, and expenses, including, but not limited, to attorneys' fee, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting there from, caused in whole or in part by alleged negligent acts or omissions of the **Contractor**, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this paragraph.

5.27.2. In claims against any person or entity indemnified under the foregoing paragraph by an employee of the **Contractor**, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under the foregoing paragraph shall not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for the **Contractor** or a Subcontractor under Workers' Compensation laws, disability benefit acts or other employee benefit acts.

5.27.3. The obligations of the **Contractor** in this Article shall not extend to the liability of the **Design Professional**, the **Design Professional's** consultants, and agents or employees of any of them arising out of (1) the preparation of maps, Plans, opinions, reports, surveys, Change Orders, designs, or Specifications, or (2) directions or instructions given by the **Design Professional**, the **Design Professional's** consultants and agents or employees of any of them, provided such instructions or directions are the primary cause of the injury or damage.

5.27.4. The **Contractor**, or any successor, assign, or subrogee of the **Contractor** agrees

not to bring any civil suit, action, or other proceeding in law, equity or arbitration against the **Design Professional**, or the officers, employees, agents, or consultants of the **Design Professional**, for the enforcement of any action which the **Contractor** may have arising out of or in any manner connected with the Work. The **Contractor** shall assure that this covenant not to sue is contained in all subcontracts and sub-subcontracts of every tier and shall assure its enforcement. The **Design Professional**, its officers, employees, agents, and consultants are intended third-party beneficiaries of this covenant not to sue, and are entitled to enforce this covenant in law or equity.

5.28. Survival of Obligations.

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

ARTICLE 6: SUBCONTRACTORS

6.1 Use of Subcontractors.

6.1.1 The **Contractor** shall use the Subcontractors named in the **Contractor's** Bid.

6.2 Substitution of Subcontractors.

6.2.1 The **Contractor** shall not substitute another Subcontractor therefore without notice to the **City** and the **City's** prior written consent of such substitution.

6.3 Names of Subcontractors.

6.3.1 Upon execution of the Contract with the **City**, the **Contractor** shall provide in writing to the **City**, through the **Design Professional,** the names, addresses, telephone numbers, and fax numbers of all persons proposed for each principal portion of the Work.

6.4. Objections to Subcontractors.

6.4.1 The **Contractor** shall not use any Subcontractor against whom the **City** has a reasonable objection. The **Contractor** shall not be required to contract with any person or entity against whom it has a reasonable objection.

6.5. Form of the Subcontract.

6.5.1 All Work performed by a Subcontractor shall be through an appropriate subcontract. The form of subcontract shall be submitted to the **City's Law Department for its** approval, which shall not be unreasonably withheld or delayed.

6.6. Content of the Subcontract.

6.6.1. In addition to all statutorily mandated provisions and provisions required elsewhere in the Contract Documents, each subcontract shall expressly provide that:

6.6.1.1. Each subcontract agreement for a portion of the Work is assigned by the **Contractor** to the **City** provided that:

6.6.1.1.1. the assignment is effective only after termination of the Contract by the **City** or the **Contractor** and only for those subcontract agreements which the **City** accepts by notifying the Subcontractor in writing; and

6.6.1.1.2. the assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

6.6.1.2. Each Subcontractor is bound by the requirements of the Contract Documents for the express benefit of the **City.**

6.6.1.3. Each Subcontractor shall assume toward the **Contractor** all the obligations that the **Contractor** assumes toward the **City** and the **Design Professional**, unless otherwise provided by law.

ARTICLE 7: PERFORMANCE AND PAYMENT BONDS

7.1. Form of Bonds.

7.1.1 The performance and labor and material or payment bonds shall be in the form required by the **City**, copies of which are included in the Project Manual. The **City** reserves the right to reject any bond that does not conform to the **City's** requirements.

7.2. Furnished by the Contractor. (*Reference:* M.G.L. c. 30, §39M(c);, M.G.L. c. 149, §29).

7.2.1 The **Contractor** shall furnish a performance bond and a labor and materials or payment bond, each with a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the **City** and each in the sum of the Contract Sum, the premiums for which are to be paid by the **Contractor** and are included in the Contract Sum. The bonds shall remain in effect until final payment is made. The sum of the performance bond shall increase each time the Contract Sum is increased as a result of a Change Order.

7.3. Submission to the City.

7.3.1 The **Contractor** must submit the performance and a labor and materials or payment bonds to the **City** upon the **Contractor's** execution of the Agreement.

ARTICLE 8: INSURANCE REQUIREMENTS

8.1 Insurance Certificates.

8.1.1 Prior to starting work on this project, the contractor shall deposit with the **City**, certificates from insurers clearly stating that the required insurance policies have been issued to the **Contractor** and will remain in effect during the time period required to complete this contract. ACCORD forms will not be accepted. The certificates must be in a form satisfactory to the **City**. The insurance shall include all major divisions of coverage, and shall be on a comprehensive general basis including: Premises and Operations (including X-C-U), Owners and Contractors Protective, Products and Completed Operations, Owned, Non-owned or Hired

and/or Leased Motor Vehicles. Such insurance shall be written for not less than any limits of liability, required by law or the following limits, whichever are greater.

8.2 Minimum Coverages. The **Contractor** shall possess and maintain throughout the contract period/project, insurance in the kinds and amounts as provided in Appendix D. The **Contractor** may purchase and maintain excess liability insurance in the in the umbrella form in order to satisfy the limits of liability required for the insurance to be purchased and maintained in accordance with the required requirements set forth above (in addition to the umbrella limits required). Evidence of such excess liability shall be delivered to the **City** in the form of a certificate and the certificate indicating the policy numbers and limits of liability of all underlying insurance.

8.3 Additional Insured. The **City** shall be named as an additional insured on each certificate, and the certificate must have the endorsement of the insurance agency.

8.4 Notice. Each certificate shall contain a notation that the insurer will give 30 days notice to the **City** prior to cancellation, change or non-renewal of policy.

8.5 Carrier Rating. Insurance carriers MUST have an A.M. Best rating of "A" or better.

8.6 Material Breach. Failure of the contractor to provide and continue in force such insurance shall be deemed a material breech of contract and shall operate as immediate termination thereof.

ARTICLE 9: TESTS AND INSPECTIONS

9.1. Access.

9.1.1 The **City**, the **Design Professional**, and all other persons designated by the **City** shall have access to the Work at reasonable times for observing, inspecting, and testing. The **Contractor** shall provide them with proper and safe conditions for such access and advise them of the **Contractor's** site safety procedures and programs so that they may comply therewith as applicable.

9.2. Tests and Inspections.

9.2.1. The **Contractor** shall give the **Design Professional** timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

9.2.2. Unless otherwise provided, the **Contractor** shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the **City**, or with the appropriate public authority and shall bear all related costs of tests, inspections, and approvals. If the laws or regulations of any public body having jurisdiction require any Work or part thereof specifically to be inspected, tested, or approved by an employee or other representative of such public body, the **Contractor** shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection

therewith and furnish the **Design Professional** with the required certificates of inspection, testing, or approval.

9.2.3. The **Contractor** shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for the **Design Professional's** acceptance of materials or equipment to be incorporated into the Work, or of materials, mix designs, or equipment submitted for approval prior to the **Contractor's** purchase thereof for incorporation into the Work.

9.2.4. If any Work that is to be inspected, tested, or approved is covered by the **Contractor**, Subcontractor, or Sub-subcontractor without the prior written consent of the **Design Professional**, it must be uncovered for observation, inspection, testing, or approval, if requested by the **Design Professional**. The **Contractor** must recover the Work at its own expense.

9.2.5. The **Contractor** shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the **Design Professional** in the **Design Professional's** administration of the Contract or by tests, inspections, or approvals required or performed by persons other than the **Contractor**.

ARTICLE 10
UNCOVERING AND CORRECTING WORK

10.1. Uncovering Work.

10.1.1. If a portion of the Work is covered contrary to the **Design Professional's** request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the **Design Professional**, be uncovered for the **Design Professional's** observation and be replaced, both at the **Contractor's** expense and without change in the Contract Time.

10.1.2. If a portion of the Work has been covered which the **Design Professional** has not specifically requested to observe prior to its being covered, the **Design Professional** may request to see such Work, and it shall be uncovered by the **Contractor**. If it is found that such Work is in accordance with the Contract Documents, costs of uncovering and replacing shall, by appropriate Change Order, be charged to the **City**. If it is found that such Work is defective or not in accordance with the Contract Documents, the **Contractor** shall pay all claims, costs, losses, and damages caused by, arising out of or resulting from such uncovering, exposure, observation, inspection, and testing and of satisfactory replacement of reconstruction (including, but not limited to, all costs of repair or replacement of work of others); and the **City** shall be entitled to an appropriate decrease in the Contract Sum. The **City** may take such decrease by reducing the then current application for payment accordingly or subsequent applications, if necessary, until the decrease is paid in full.

10.2. Correcting Work.

10.2.1. The **Contractor** shall promptly correct Work rejected by the **Design Professional**

or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. The **Contractor** shall bear all costs of correcting such rejected Work including additional testing and inspections and compensation for the **Design Professional's** services and expenses made necessary thereby and any cost, loss, or damages to the **City** resulting from such failure or defect.

10.2.2. If, within one (1) year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established in Article 15, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the **City** to do so, unless the **City** has previously given the **Contractor** a written acceptance of such condition. This period of one (1) year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation to correct under this paragraph shall survive acceptance of the Work under the Contract and termination of the Contract. The **City** shall give such notice promptly after discovery of the condition.

10.2.3. The **Contractor** shall correct, remove, or replace portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the **Contractor** nor accepted by the **City**.

10.2.4. If the **Contractor** fails within a reasonable time to correct nonconforming Work, or to remove and replace rejected Work, or fails to perform the Work in accordance with the Contract Documents, the **City** may correct it in accordance with the provisions herein. If the **Contractor** does not proceed with correction, removal, or replacement of such nonconforming Work within seven (7) days from the date of written notice from the **Design Professional**, the **City** may correct it and store any salvageable materials or equipment at the **Contractor's** expense. If the **Contractor** does not pay costs of any such removal and storage within ten (10) days after written notice, the **City** may upon ten (10) additional days' written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the **Contractor**, including compensation for the **Design Professional's** services and expenses made necessary thereby. If such proceeds of sale do not cover all the costs that the **Contractor** should have born, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the **Contractor** are not sufficient to cover such amount, the **Contractor** shall pay the difference to the **City**.

10.2.5. The **Contractor** shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the **City** or separate contractors caused by the **Contractor's** correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

10.2.6. Nothing contained in this paragraph shall be construed to establish a period of limitation with respect to other obligations that the **Contractor** might have under the Contract Documents. Establishment of the time period of one (1) year as described in the above paragraph related only to the specific obligation of the **Contractor** to correct the Work and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced nor to the time within which proceedings may be commenced to establish the **Contractor's** liability with respect to the **Contractor's** obligations other than specifically to correct the Work.

10.3. Acceptance of Nonconforming Work.

10.3.1 If, instead of requiring correction or removal and replacement of defective or nonconforming Work, the **City** prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the **City** may do so instead of requiring its removal and correction, in which case the **Contractor** shall pay all claims, costs, losses, and damages attributable to the **City's** evaluation of and determination to accept such defective or non-conforming Work. The Contract Sum will be reduced as appropriate. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 11:CHANGES IN THE WORK

11.1. In General.

11.1.1. The Contract Sum constitutes the total compensation (subject to authorized adjustments) payable to the **Contractor** for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by the **Contractor** shall be at the **Contractor's** expense without any change in the Contract Sum.

11.1.2. Without invalidating the Contract and without notice to any surety, the **City** may, at any time or from time to time, order additions to, deletions from, or revisions in the Work. Such additions, deletions, or revisions will be authorized by a Change Order, a Modification or a **Construction Change** Directive. Upon receipt of any such document, the **Contractor** shall promptly proceed with the Work involved that will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

11.1.3. The **Contractor** shall not be entitled to an increase in the Contract Sum or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified, or supplemented, except as otherwise provided herein.

11.2. Change Orders.

11.2.1. (*Reference:* M.G.L. c. 30, §39I;). The **Contractor** shall perform all the Work required by this Contract in conformity with the Plans and Specifications contained herein. No willful and substantial deviation from said Plans and Specifications shall be made unless authorized in writing by the **City** and the **Design Professional** in charge of the Work who is duly authorized by the **City** to approve such deviations. In order to avoid delays in the prosecution of the Work required by such Contract, such deviation from the Plans or Specifications may be

authorized by a written order of the **City** or the **Design Professional** so authorized to approve such deviation. Within thirty (30) days thereafter, such written order shall be confirmed by a certificate of the **City** stating: (1) If such deviation involves any substitution or elimination of materials, fixtures or equipment, the reasons why such materials, fixtures, or equipment were included in the first instance and the reasons for substitution or elimination, and, if the deviation is of any other nature, the reasons for such deviation, giving justification therefore; (2) that the specified deviation does not materially injure the Project as a whole; (3) that either the work substituted for the Work specified is of the same cost and quality, or that an equitable adjustment has been agreed upon between the **City** and the **Contractor** and the amount in dollars of said adjustment; and (4) that the deviation is in the best interest of the **City**.

11.3. Construction Change Directive.

11.3.1. A **Construction Change** Directive shall be used in the absence of total agreement on the terms of a Change Order.

11.3.2. Upon request of the **City** or the **Design Professional**, the **Contractor** shall without cost to the **City** submit to the **Design Professional** in such form as the **Design Professional** may require, an accurate written estimate of the cost of any proposed extra work or change. The estimate shall indicate the quantity and unit cost of each item of materials, and the number of hours of work and hourly rate for each class of labor, as well as the description and amounts of all other costs chargeable under the terms of this Article. Unit labor costs for the installation of each item of materials shall be shown if required by the **Design Professional**. If required by the **Design Professional**, in order to establish the exact cost of new Work added or of previously required Work omitted, the **Contractor** shall obtain and furnish to the **Design Professional** bona fide proposals from recognized Suppliers for furnishing any material included in such Work. Such estimates shall be furnished promptly so as to occasion no delay in the Work, and shall be furnished at the **Contractor's** expense.

11.3.3. The **Contractor** shall state in the estimate any extension of time required for the completion of the Work if the change or extra Work is ordered. The **Contractor** shall document, through a critical path analysis, or some other clearly delineated explanation, how the proposed change affects other aspects of the Work, and why it would require an extension of time. The **Contractor** shall promptly revise and resubmit such estimate if the **Design Professional** determines that it is not in compliance with the requirements of this Article, or that it contains errors of fact or mathematical errors.

11.3.4. If the **Construction Change** Directive provides for an adjustment to the Contract Sum**,** the adjustment shall be based on one of the following methods, as selected by the **City**, selection of which does not require the consent of the **Contractor**:

11.3.4.1. by unit prices stated in the Contract Documents or otherwise mutually agreed upon; or

11.3.4.2. by Cost and Percentages estimated by the **Contractor** as provided

herein and accepted by the **City**, whereupon the **Contractor's** estimate shall become a fixed price which shall not be changed by any variation in the actual cost of executing the Work covered by the change; or

11.3.4.3. by actual Cost determined after the Work covered by the change is completed, plus Percentage; or

11.3.4.4. by submission to arbitration or a court, which shall determine the fair value of the Work covered by the change.

11.3.5. "Cost" shall mean the estimated or actual net increase or decrease in cost to the **Contractor**, Subcontractor, or Sub-subcontractor for performing the Work covered by the change, including actual payments for materials, equipment rentals, expendable items, wages, and associated benefits to the workers and to supervisors employed full time at the Site, insurance, bonds, and other provable direct costs, but not including any administrative, accounting or expediting costs, or other indirect or overhead costs, or any wages or benefits of supervisory personnel not assigned full time to the Site, or any amount for profit or fee to the **Contractor**, Subcontractor, or Sub-subcontractor.

11.3.6. "Percentage" shall mean an allowance to be added to or subtracted from the Cost in lieu of overhead and profit and of any other expense that is not included in the Cost of the Work covered by the change, as defined above. Percentage for a Sub-subcontractor shall be 8% of any net increase or decrease of Cost of any Work performed by the Sub-subcontractor's own forces plus 4% of any net increase or decrease in Cost of any Work performed for the Sub-subcontractor by lower tier Sub-subcontractors. Percentage for a Subcontractor shall be 12% of any net increase or decrease of Cost of any Work performed by the Subcontractor's own forces plus 4% of the Cost of Work performed by Sub-subcontractors. Percentage for the **Contractor** shall be 15% of any net increase or decrease of Cost of any Work performed by the **Contractor's** own forces plus 5% of any net increase or decrease in the Cost for all other Work covered by the change. When the **Contractor** is also performing Work as a Subcontractor or Sub-subcontractor, the **Contractor** shall only be entitled to a total of no more than 15% of any net increase or decrease of Cost of any Work.

11.3.7. When in the reasonable judgment of the **Design Professional** a series of **Construction Change** Directives or Change Orders effect a single change, Percentage shall be calculated on the cumulative net increase or decrease in Cost, if any.

11.3.8. If unit prices are stated in the Contract Documents or are subsequently agreed upon, and if quantities originally contemplated are so changed in a Proposed Change Order or **Construction Change** Directive that the application of such unit prices to quantities of Work proposed will cause substantial inequity to the **City** or the **Contractor**, the applicable unit prices shall be equitably adjusted.

11.3.9. If the **City** elects to determine the Cost of the Work as provided in method

(11.3.4.1) using unit prices stated in the Contract Documents or subsequently agreed upon, the unit prices shall be subject to the prior paragraph. Notwithstanding the inclusion of unit prices in the Contract Documents, it shall be the **City's** option to require the Cost of any given change to be determined by one of the other methods stated in 11.3.4. If the **City** elected to determine the Cost of the change by unit prices and the nature of the work is such that its extent cannot readily be measured after the completion of such work or any subsequent Work, the **Contractor** shall keep daily records, available at all times to the **Design Professional** for inspection, of the actual quantities of such Work put in place, and delivery receipts or other adequate evidence, acceptable to the **Design Professional**, indicating the quantities of materials delivered to the Site for use in such unit price Work, and distinguishing such from other similar material delivered for use in Work include in the base Contract Sum. If so required by the **Design Professional**, materials for use in unit price Work shall be stored apart from all other materials on the Project.

11.3.10. If the **City** elects to determine the Cost of the Work as provided in methods 11.3.4.3. or 11.3.4.4. or if the method of determining the Cost has not been established before the Work is begun, the **Contractor** shall keep detailed daily records of labor and material costs applicable to the Work.

11.3.11. Upon receipt of a **Construction Change** Directive, the **Contractor** shall promptly proceed with the change in the Work involved and advise the **Design Professional** in writing of the **Contractor's** agreement or disagreement with the method, if any, provided in the **Construction Change** Directive for determining the proposed adjustment in the Contract Time.

11.3.12. A **Construction Change** Directive signed by the **Contractor** indicates the agreement of the **Contractor** therewith, including adjustment in the Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

11.3.13. If the **Design Professional** and the **Contractor** do not agree with the adjustment in the Contract Time or the method for determining it, the adjustment or the method shall be referred to the **Design Professional** for determination.

11.4. Minor Changes in the Work.

11.4.1. The **Design Professional** has the authority to order minor changes in the Work. "Minor changes" as used in this paragraph mean changes which are so insignificant as to not affect the Contract Sum or the Contract Time and which are not inconsistent with the intent of the Contract Documents. Any minor change shall be committed to a written order which shall be binding on both the **City** and the **Contractor** and which shall be promptly carried out by the **Contractor**.

11.5. Certificate of Appropriations. (*Reference:* M.G.L. c. 44, §31C;). This Contract shall not be deemed to have been made until the **City's** auditor has certified thereon that an appropriation in the amount of this Contract is available therefor and that an officer or agent of the **City** has

been authorized to execute said Contract and approve all requisitions and change orders. No order to the **Contractor** for a change in or addition to the Work, whether in the form of a drawing, plan, detail or any other written instruction, unless it is an order which the **Contractor** is willing to perform without any increase to the Contract price, shall be deemed to be given until the auditor has certified thereon that an appropriation in the amount of such order is available therefore; but such certificate shall not be construed as an admission by the **City** of its liability to pay for such work. The certificate of the auditor that an appropriation in the amount of this Contract or in the amount of such order is available shall bar any defense by the **City** on the grounds of insufficient appropriation.

ARTICLE 12: CHANGE IN THE CONTRACT TIME

12.1. Date of Commencement.

12.1.1 The date of commencement of the Work is the date established in the Notice to Proceed. The date shall not be postponed by the failure to act of the **Contractor** or persons or entities for whom the **Contractor** is responsible.

12.2. Progress and Completion.

12.2.1. Time is of the essence; all time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the **Contractor** confirms that the Contract Time is a reasonable period for performing the Work.

12.2.2. The **Contractor** shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

12.2.3. Within five (5) working days of award of contract, the **Contractor** shall submit to the **Design Professional** a progress schedule showing for each class of Work included in the schedule of values, the percentage of completion to be obtained and the total dollar value of Work to be completed as of the first of each month until Substantial Completion. All calculations shall be on the basis of Work in place, but may include, at the **Design Professional's** discretion, the value of materials delivered but not in place.

12.2.4. The progress schedule shall be based on an orderly progression of the Work, allowing adequate time for each operation (including adequate time for submission and review of submittals), and leading to a reasonable certainty of Substantial Completion by the date established in the Agreement. The progress schedule will be reviewed by the **Design Professional** for compliance with the requirements of this Article and will be accepted by the **Design Professional** or returned to the **Contractor** for revision and resubmittal. Unless specifically required by law, no payment under this Contract shall be due until the progress schedule has been approved by the **Design Professional**. The **Design Professional's** review of the progress schedule shall not impose any duty on the **Design Professional** or the **City** with respect to the timing, planning, scheduling, or execution of the Work. In particular, if the **Contractor** proposes a progress schedule indicating a date of Substantial Completion which is earlier than the Contract Time, the **Contractor** shall not be entitled to additional payment or compensation of any kind if, for any reason, the full Contract Time is required to achieve

Substantial Completion of the Work.

12.2.5. If in any Application for Payment, the total value of the completed Work in place, as certified by the **Design Professional**, is less than 90% of the total value of the Work in place estimated in the progress schedule, the **City** may, at the **City's** option, require the **Contractor** to accelerate the progress of the Work without cost to the **City** by increasing the workforce or hours or Work or by other reasonable means approved by the **Design Professional**.

12.2.6. If each of three successive applications, as certified by the **Design Professional**, indicate that the actual Work completed is less than 90% of the values estimated in the progress schedule to be completed by the respective dates, the **City** may at the **City's** option, treat the **Contractor's** delinquency as a default justifying the action permitted under Article 18.

12.2.7. If the **Design Professional** has determined that the **Contractor** should be permitted to extend the time for completion as provided below, the calendar dates in the progress schedule shall be adjusted accordingly to retain their same relationship to the adjusted date of Substantial Completion, and the dollar value of the Work to be completed as of the first of each month shall be adjusted pro rata.

12.2.8. If the **Contractor** fails to submit any application for payment in any month, the **Design Professional** shall, for the purpose of this evaluation of progress, certify separately to the actual value of the Work in place completed as of the first of the month to the best of the **Design Professional's** knowledge.

12.2.9. Nothing herein shall limit the **City's** right to liquidated or other damages for delays by the **Contractor** or to any other remedy which the **City** may be entitled or may possess under other provisions of the Contract Documents or by law.

12.3. Delays and Extensions of Time.

12.3.1. If the **Contractor** is delayed at any time in the progress of the Work by an act or neglect of the **City** or the **Design Professional**, or of an employee of either, or of a separate contractor employed by the **City**, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, or other causes (except weather) beyond the **Contractor's** control, or by delay authorized by the **City**, or by other causes which the **Design Professional** determines may justify delay, then the Contract Time shall be extended by Change Order or **Construction Change** Directive for such reasonable time as the **Design Professional** may determine.

12.3.2. Claims relating to time shall be made in accordance with applicable provisions of Article 16.

12.3.3. No claim for extension of time shall be allowed on account of failure of the **Design Professional** to furnish Plans, Specifications or instructions or to return Shop Drawings or Samples until fifteen (15) days after receipt by the **Design Professional** by registered or

certified mail of written demand for such instructions, Plans, Specifications, or Samples, and then not unless such claim is reasonable.

12.3.4. No extensions of time shall be granted because of seasonal or abnormal variations in temperature, humidity or precipitation, which conditions shall be wholly at the risk of the **Contractor**, whether occurring within the time originally scheduled for completion or within the period of any extension granted. There shall be no increase in the Contract Sum on account of any additional costs of operations or conditions resulting therefrom.

12.3.5. The **Contractor** hereby agrees that the **Contractor** shall have no claim for damages of any kind against the **City** or the **Design Professional** on account of any delay in the commencement of the Work and/or any hindrance, delay, or suspension of any portion of the Work, whether such delay is caused by the **City**, the **Design Professional**, or otherwise, except as and to the extent expressly provided under M.G.L. c. 30, §39O, in the case of written orders by the **City**. The **Contractor** acknowledges that the **Contractor's** sole remedy for any such delay and/or suspension will be an extension of time as provided in this Article.

12.3.6. (*Reference:* M.G.L. c. 30, §39O;). (a) The **City** may order the **Contractor** in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as it may determine to be appropriate for the convenience of the **City**, provided however that if there is a suspension, delay, or interruption for fifteen (15) days or more due to a failure of the **City** to act within the time specified in this Contract, the **City** shall make an adjustment in the Contract prices for any increase in the cost of performance of this Contract under this provision for any suspension, delay, interruption, or failure to act to the extent that such is due to any cause for which this Contract provides for an equitable adjustment of the Contract price under any other Contract provisions.

(b) The **Contractor** must submit the amount of a claim under provision (a) to the **City** in writing as soon as practicable after the end of the suspension, delay, interruption, or failure to act and, in any event, not later than the date of final payment under this Contract and, except for costs due to a suspension order, the **City** shall not approve any costs in the claim incurred more than twenty (20) days before the **Contractor** notified the **City** in writing of the act or a failure to act involved in the Claim.

In the event a suspension, delay, interruption, or failure to act of the **City** increases the cost of performance to any Subcontractor, that Subcontractor shall have the same rights against the **Contractor** for payment for an increase in the cost of its performance as provisions (a) and (b) give the **Contractor** against the **City**, but nothing in provisions (a) and (b) shall in any way change, modify, or alter any other rights which the **Contractor** or the Subcontractor may have against each other.

12.4. Liquidated Damages.

12.4.1. If the **Contractor** shall fail to achieve Substantial Completion within the Contract

Time, it shall be liable to pay the **City** the daily amount specified in the Agreement, not as a penalty, but as a fixed and agreed upon damages for breach of contract. The said amount is fixed and agreed upon because of the difficulty of ascertaining the **City's** actual damages. It is mutually understood that the said amount is a reasonable approximation or estimate thereof as of the date of the Agreement. The **City** may elect to withhold said amount from periodic or final payments due to the **Contractor**, in addition to retainage and other back charges.

12.5. Changes in the Contract Time.

12.5.1. In Writing. The Contract Time may only be changed by a Change Order or a Modification. Any claim for an adjustment of the Contract Time shall be based on a written notice delivered to the party making the claim to the other party and to the **Design Professional** promptly (but in no event later that seven (7) days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within thirty (30) days after such occurrence and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by the **Design Professional** in accordance with Article 16. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this paragraph.

12.5.2. Early Completion. The Contract Time shall not be changed due to a delay in the **Contractor's** early completion date.

ARTICLE 13: PAYMENTS

13.1. Schedule of Values.

13.1.1. The **Contractor** shall submit to the **Design Professional** a schedule of values which shall subdivide the Work into its component parts and shall include quantities, direct craft labor worker hours, labor cost and material/equipment cost. Labor cost shall include an appropriate amount of construction equipment costs, supplemental costs, administrative expenses, contingencies, and profit. The **Contractor** shall prepare the schedule of values in such form and supported by such data to substantiate its accuracy as the **Design Professional** may require and shall be revised if later found by the **Design Professional** to be inaccurate. This schedule, unless objected to by the **Design Professional**, shall be used as a basis for reviewing the **Contractor's** applications for payment.

13.2. Content and Submission of Applications for Payment.

13.2.1. At least ten (10) days before the date established for each progress payment, the **Contractor** shall submit to the **Design Professional** six (6) copies of an itemized application for payment for Work completed in accordance with the schedule of values. Such application shall be in a form or format established or approved by the **Design Professional** and shall be supported by documentation substantiating the **Contractor's** right to payment.

13.2.2. When **Construction Change** Directives have set forth an adjustment to the

Contract Sum but have not yet been included in Change Orders, the value established by the **City** may be included in the application.

13.2.3. Applications covering Work of Subcontractors or Suppliers shall not include requests for payments of amounts the **Contractor** does not intend to pay to a Subcontractor or Supplier because of a dispute or other reason. The **Contractor** shall not be paid for any Work performed by a Subcontractor unless and until the **City** receives for that Subcontractor a certificate of insurance that conforms to the requirements of the Contract Documents .

13.2.4. Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the Site for subsequent incorporation in the Work. If approved in advance by the **City**, payment may similarly be made for materials and equipment suitably stored off the Site at a location agreed upon in writing. Payment for materials and equipment stored on or off the Site shall be conditioned upon the application for payment being accompanied by a bill of sale, an invoice, or other documentation warranting that the **City** has received the materials and equipment free and clear of all liens, claims, security interests, or encumbrances, hereinafter collectively referred to as "liens," and evidence that the materials and equipment are covered by appropriate insurance and other arrangements to protect the **City's** interest therein.

13.2.5. Each application for payment or periodic estimate requesting payment shall be accompanied by, at the **City's** option, a certificate from each Subcontractor stating that the Subcontractor has been paid all amounts due the Subcontractor on the basis of the previous periodic payment to the **Contractor**, or else stating the amount not so paid and the reason for the discrepancy. In the event of any such discrepancy, the **Contractor** shall furnish the **Contractor's** own written explanation to the **City** through the **Design Professional**. Such waiver or certificate shall be in a form acceptable to the **City**.

13.3. False Applications for Payment.

13.3.1. (*Reference:* M.G.L. c. 266, §§67B). Any person who makes or presents to any claim upon or against any employee or department of the **City**, knowing such claim to be false, fictitious, or fraudulent shall be punished by a fine or not ore than ten thousand dollars ($10,000) or by imprisonment in the state prison for not more than five (5) years, or in the house of correction for not more than two and one-half years, or both.

13.4. Review of Applications for Payment.

13.4.1. The **Design Professional** shall review each application for payment and will reject any application that (1) is not accompanied by the required documentation or (2) contains errors, mathematical or otherwise.

13.4.2. Within five (5) business days after receipt of an application for payment, the **Design Professional** will either (1) return the application to the **Contractor** with a written explanation as to why it was rejected or (2) issue to the **City** a certificate for payment, with a copy to the **Contractor**, for such amount as the **Design Professional** determines is properly due.

In the event an application is returned to the **Contractor**, the date of receipt of the application shall be the date of receipt of the corrected application.

13.4.3. The **Design Professional** or the **City** may make changes to any application submitted by the **Contractor**.

13.4.4. By recommending any payment, the **Design Professional** will not thereby be deemed to have represented that: (1) exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to the **Design Professional** in the Contract Documents or (2) that there may not be other matters or issues between the parties that might entitle the **Contractor** to be paid additionally by the **City** or entitle the **City** to withhold payment to the **Contractor**. The **Design Professional's** approval of the application for payment and the accompanying documentation shall indicate that to the best of the **Design Professional's** knowledge, information, and belief, the Work has progressed to the point indicated by the **Contractor**, and that the quality of the Work is in accordance with the Contract Documents, subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests specified in the Contract Documents, final determination of quantities and classifications for unit price work and any other qualifications so stated.

13.4.5. The **Design Professional's** recommendation of any payment shall not mean that the **Design Professional** is responsible for the **Contractor's** means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the **Contractor** to comply with laws and regulations applicable to the furnishing or performance of Work, of for any failure of the **Contractor** to perform or furnish Work in accordance with the Contract Documents.

13.4.6. No certificate given or payment made shall be evidence of the performance of this Contract, either wholly or in part and no payment, whether made upon the final certificate or otherwise, shall be construed as an acceptance of defective work or materials.

13.5. Decisions to Withhold Certification.

13.5.1. The **Design Professional** may refuse to recommend the whole or any part of any payment if, in the **Design Professional's** opinion, it would be incorrect to make the representations to the **City** referred to above.

13.5.2. If the **Contractor** and the **Design Professional** cannot agree on a revised amount, the **Design Professional** will promptly approve a certificate for payment for the amount for which the **Design Professional** is able to make such representations to the **City**. The **Design Professional** may also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a certificate for payment previously issued, to such extent as may be necessary in the **Design Professional's** opinion to protect the **City** from loss because of:

13.5.2.1. defective Work not remedied;

13.5.2.2. third party claims filed or reasonable evidence indicating probable filing of such claims;

13.5.2.3. failure of the **Contractor** to make payments properly to Subcontractors or for labor, materials or equipment;

13.5.2.4. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

13.5.2.5. damage to the **City** or another contractor;

13.5.2.6. reasonable evidence that the Work will not be completed within the Contract Time, and that retainage currently held by the **City** would not be adequate to cover actual or liquidated damage for the anticipated delay;

13.5.2.7. persistent failure to carry out the Work in accordance with the Contract Documents; or

13.5.2.8. failure of mechanical trade or electrical trade subcontractors to comply with mandatory requirements for maintaining record drawings. The **Contractor** shall check record drawings each month. Written confirmation that the record drawings are current will be required by the **Design Professional** before approval of the **Contractor's** monthly payment requisition.

13.5.3. When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

13.6. Progress Payments.

13.6.1. After the **Design Professional** has issued a certificate for payment, the **City** shall make payment in the manner and within the time provided in the Contract Documents.

13.6.2. (*Reference:* M.G.L. c. 30, §39G;). The **City** shall pay the amount due pursuant to any periodic, Substantial Completion or final estimate within thirty-five (35) days after receipt of written acceptance for such estimate from the **Contractor**. In the case of periodic payments, the **City** may deduct from its payment a retention based on its estimate of the fair value of its claims against the **Contractor**, a retention for direct payments to Subcontractors based on demands for same in accordance with M.G.L. c. 30, §39F; and a retention to secure satisfactory performance of the contractual work, not exceeding five percent (5%) of the approved amount of any periodic payment, and the same right to retention shall apply to bonded Subcontractors entitled to direct

payment under M.G.L. c. 30, §39F; provided, that a five percent (5%) value of all items that are planted in the ground shall be deducted from the periodic payments until final acceptance.

13.6.3. No periodic, Substantial Completion or final estimate or acceptance or payment thereof shall bar the **Contractor** from reserving all rights to dispute the quantity and amount of, or the failure of the **City** to approve a quantity and amount of, all or part of any Work item or extra Work item.

13.7. Final Payment.

13.7.1. After final inspection and after the **Contractor** has completed all the required corrections to the satisfaction of the **Design Professional** and the **City** and delivered in accordance with the Contract Documents all maintenance and operating instructions, schedules, guarantees, bonds, certificates, or other evidence of insurance, certificates of inspection, marked-up record documents, and all other documents called for in the Contract Documents, as well as any surplus materials requested by the **City,** the **Contractor** may make an application for final payment as provided below.

13.7.2. (*Reference:* M.G.L. c. 30, §39G;). Within thirty (30) days after receipt by the **City** of a notice from the **Contractor** stating that all of the Work required by the Contract has been completed, the **City** shall prepare and forthwith send to the **Contractor** for acceptance a final estimate for the quantity and price of the Work done and all retainage on the Work less all payments made to date, unless the **City's** inspection shows that Work required by the Contract remains incomplete or unsatisfactory, or that documentation required by the Contract has not been completed.

13.7.3. The making and acceptance of final payment will constitute a waiver of all claims by the **Contractor** against the **City** other than those previously made in writing and still unsettled.

13.8. Payments to Subcontractors.

13.8.1. Neither the **City** nor the **Design Professional** shall have an obligation to pay or see to the payment of money to a Subcontractor, Sub-subcontractor, or Supplier except as may otherwise be required by law.

13.8.2. (*Reference:* M.G.L. c. 30, §39F;) (1)(a) Forthwith after the **Contractor** receives payment on account of a periodic estimate, the **Contractor** shall pay to each Subcontractor the amount paid for the labor performed and the materials furnished by that Subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the **Contractor**.

(b) Not later than the sixty-fifth day after each Subcontractor substantially completes its Work in accordance with the Plans and Specifications, the entire balance

due under the subcontract, less amounts retained by the **City** as the estimated cost of completing the incomplete and unsatisfactory items of Work, shall be due the Subcontractor; and the **City** shall pay that amount to the **Contractor**. The **Contractor** shall forthwith pay to the Subcontractor the full amount received from the **City** less any amount specified in any court proceeding barring such payment and also less any amount claimed due from the Subcontractor by the **Contractor**.

(c) Each payment made by the **City** to the **Contractor** pursuant to paragraphs (a) and (b) of M.G.L. c. 30, §39F(1);, for the labor performed and the materials furnished by a Subcontractor shall be made to the **Contractor** for the account of that Subcontractor; and the **City** shall take reasonable steps to compel the **Contractor** to make each such payment to each such Subcontractor. If the **City** has received a demand for direct payment from a Subcontractor for any amount which has already been included in a payment to the **Contractor** or which is to be include in a payment to the **Contractor** for payment to the Subcontractor as provided in paragraphs (a) and (b) of M.G.L. c. 30, §39F(1), the **City** shall act upon the demand as provided in M.G.L. c. 30, §39F.

(d) If, within seventy (70) days after the Subcontractor has substantially completed the subcontract Work, the Subcontractor has not received from the **Contractor** the balance due under the subcontract including any amount due for extra labor and materials furnished to the **Contractor**, less any amount retained by the **City** as the estimated cost of completing the incomplete and unsatisfactory items of Work, the Subcontractor may demand direct payment of that balance from the **City**. The demand shall be by a sworn statement delivered to or sent by certified mail to the **City**, and a copy shall be delivered to or sent by certified mail to the **Contractor** at the same time. The demand shall contain a detailed breakdown of the balance due under the subcontract and also a statement of the status of completion of the subcontract Work. [The demand letter shall indicate the certified mail number assigned by the postal service or the date of delivery to the **Contractor**.] Any demand made after substantial completion of the subcontract Work shall be valid even if delivered or mailed prior to the seventieth day after the Subcontractor has substantially completed the subcontract Work. Within ten (10) days after the Subcontractor has delivered or so mailed the demand to the **City** and delivered or so mailed a copy to the **Contractor**, the **Contractor** may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the **City**, and a copy shall be delivered to or sent by certified mail to the Subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontract, including any amount due for extra labor and materials furnished to the **Contractor** and of the amount due for each claim made by the **Contractor** against the Subcontractor.

(e) Within fifteen (15) days after receipt of the demand by the **City**, but in no event prior to the seventieth day after substantial completion of the subcontract Work, the **City** shall make direct payment to the Subcontractor of the balance due under the

subcontract, including any amount due for extra labor and materials furnished to the **Contractor**, less any amount (i) retained by the **City** as the estimated cost of completing the incomplete or unsatisfactory items of Work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the **Contractor** in the sworn reply; provided that the **City** shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to or for which the sworn reply does not contain the detailed breakdown required by the previous paragraph. The **City** shall make further direct payments to the Subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this paragraph.

(f) The **City** shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of the previous paragraph in an interest-bearing joint account in the names of the **Contractor** and the Subcontractor in a bank in Massachusetts selected by the **City** or agreed upon by the **Contractor** and the Subcontractor and shall notify the **Contractor** and the Subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the **Contractor** and the Subcontractor or as determined by decree of a court of competent jurisdiction.

(g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to the previous paragraph shall be made out of amounts payable to the **Contractor** at the time of receipt of a demand for direct payment from a Subcontractor and out of amounts which later become payable to the **Contractor** and in the order of receipt of such demands from Subcontractors. All direct payments shall discharge the obligation of the **City** to the **Contractor** to the extent of such payment.

(h) The **City** shall deduct from payments to a **Contractor** amounts that, together with the deposits in interest-bearing accounts pursuant to paragraph (f), are sufficient to satisfy all unpaid balances of demands for direct payment received from Subcontractors. All such amounts shall be earmarked for such direct payments, and the Subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the **Contractor**.

(i) If the Subcontractor does not receive payment as provided in paragraph (a) or if the **Contractor** does not submit a periodic estimate for the value of the labor or materials performed or furnished by the Subcontractor and the Subcontractor does not receive payment for same when due less the deductions provided for in paragraph (a), the Subcontractor may demand direct payment by following the procedure in paragraph (d) and the **Contractor** may file a sworn reply as provided in that same paragraph. A demand made after the first day of the month following that for which the Subcontractor performed or furnished the labor and materials for which the Subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic estimate from the **Contractor**. Thereafter the **City** shall proceed as provided in

paragraphs (e), (f), (g), and (h). "Subcontractor" as used in this paragraph (1)(i) shall mean a person approved by the **City** in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the **Contractor**.

(2) Any assignment by a Subcontractor of the rights under this section to a surety company furnishing a bond under the provisions of M.G.L. c. 149, §29; shall be invalid. The assignment and subrogation rights of the surety to amounts included in a demand for direct payment which are in the possession of the **City** or which are on deposit pursuant to paragraph (g) shall be subordinate to the rights of all Subcontractors who are entitled to be paid under this section and who have not been paid in full.

(3) A **Contractor** or a Subcontractor shall enforce a claim to any portion of the amount of a demand for direct payment deposited as provided in herein by a petition in equity in the superior court against the other and the bank shall not be a necessary party. A Subcontractor shall enforce a claim for direct payment or a right to require a deposit as provided in paragraph (f) by a petition in equity in the superior court against the **City** and the **Contractor** shall not be a necessary party. Upon motion of any party the court shall advance for speedy trial any petition filed as provided in this paragraph. M.G.L. c. 231, §§59 and 59B shall apply to such petitions. The court shall enter an interlocutory decree upon which execution shall issue for any part of a claim found due pursuant to §§59 and 59B and, upon motion of any party, shall advance for speedy trial the petition to collect the remainder of the claim. Any party aggrieved by such interlocutory decree shall have the right to appeal therefrom as from a final decree. The court shall not consolidate for trial the petition of any Subcontractor with the petition of one or more Subcontractors or the same general contract unless the court finds that a substantial portion of the evidence of the same events during the course of construction (other that the fact that the claims sought to be consolidated arise under the same general contract) is applicable to the petitions sought to be consolidated and that such consolidation will present unnecessary duplication of evidence. A decree in any such proceeding shall not include interest on the disputed amount deposited in excess of the interest earned for the period of any such deposit. No person except a Subcontractor filing a demand for direct payment for which no funds due the **Contractor** are available for direct payment shall have a right to file a petition in court of equity against the **City** claiming a demand for direct payment is premature, and such Subcontractor must file the petition before the **City** has made a direct payment to the Subcontractor and has made a deposit of the disputed portion as provided in part (iii) of paragraph (e) and in paragraph (f).

(4) In any petition to collect any claim for which a Subcontractor has filed a demand for direct payment the court shall, upon motion of the **Contractor**, reduce by the amount of any deposit of a disputed amount by the **City** as provided in part (iii) of paragraph (e) and in paragraph (f) any amount held under a trustee writ or pursuant to a restraining order or injunction.

ARTICLE 14: SUBSTANTIAL COMPLETION

14.1. Substantial Completion.

14.1.1. Upon Substantial Completion of the Work, the **Contractor** shall present in writing to the **City** its certification that the Work has been substantially completed and include in its certification (1) a list of items to be completed or corrected, (2) all special warranties required by the Contract Documents, endorsed by the **Contractor** and in a form reasonably acceptable to the **Design Professional** and (3) the permits and certificates referred to in 13.7.1., or elsewhere. The failure to include any item on the list mentioned in the preceding sentence does not alter the responsibility of the **Contractor** to complete all Work in accordance with the Contract Documents. When the **Design Professional** on the basis of an inspection determines that the Work or designed portion thereof is substantially complete and the other conditions have been met, the **Design Professional** will then prepare a certificate of Substantial Completion which shall establish the date of Substantial Completion, shall state the responsibilities of the **City** and the **Contractor** for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the **Contractor** shall complete the items listed therein. The certificate of Substantial Completion shall be submitted to the **City** and the **Contractor** for their written acceptance of the responsibilities assigned to them in such certificate.

14.1.2. Within twenty-one (21) days after receipt of the certification from the **Contractor**, the **City** shall present to the **Contractor** either a written declaration that the Work has been substantially completed or an itemized list of incomplete or unsatisfactory work items required by the Contract sufficient to demonstrate that the Work has not been substantially completed. The **City** may include with such list a notice setting forth a reasonable time within which the **Contractor** must achieve Substantial Completion of the Work. If the **City** fails to respond, by presentation of a written declaration or itemized list as aforesaid, to the **Contractor's** certification within the twenty-one (21) day period, the **Contractor's** certification shall take effect as the **City's** declaration that the Work has been substantially completed.

14.2. Partial Use or Occupancy of the Premises.

14.2.1. The **City** may occupy or use any completed or partially completed portion of the Work at any stage. Such partial occupancy or use may begin whether or not the portion is substantially complete, provided that the respective responsibilities of the **City** and the **Contractor** with respect to payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work, insurance, correction of the Work, and warranties shall be established by agreement of the **City** and the **Contractor** or, absent such agreement, shall be determined by the **Design Professional** subject to the right of either party to contest such determination as provided in Article 16.

14.2.2. Immediately prior to such partial occupancy or use, the **City**, the **Contractor** and the **Design Professional** shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

14.2.3. Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the

Contract Documents.

14.2.4. (*Reference:* M.G.L. c. 30, §39G;). Within sixty-five (65) days after the effective date of a declaration of Substantial Completion, the **City** shall prepare and send to the **Contractor** for acceptance a Substantial Completion estimate for the quantity and price of the Work done and all but one percent (1%) retainage on that Work, including the quantity, price and all but one percent (1%) retainage for the undisputed part of each item and extra work item in dispute, but excluding the disputed part thereof, less the estimated cost of completing all incomplete and unsatisfactory items and less the total periodic payments made to date for the Work. The **City** shall also deduct from the Substantial Completion estimate an amount equal to the sum of all demands for direct payment filed by Subcontractors and not yet paid to Subcontractors or deposited in joint accounts pursuant to M.G.L. c. 30, §39F.

14.2.5. (*Reference:* M.G.L. c. 30, §39G). If the **City** fails to prepare and send to the **Contractor** any Substantial Completion estimate required by the provisions herein on or before the date specified, the **City** shall pay to the **Contractor** interest on the amount which would have been due to the **Contractor** pursuant to such Substantial Completion estimate at the rate of three (3) percentage points above the rediscount rate then charged by the Federal Reserve Bank of Boston from such date to the date on which the **City** sends that Substantial Completion estimate to the **Contractor** for acceptance or to the date of payment therefor, whichever occurs first. The **City** shall include the amount of such interest in the Substantial Completion estimate.

14.2.6. (*Reference:* M.G.L. c. 30, §39G). Within fifteen (15) days after the effective date of the declaration of Substantial Completion, the **City** shall send to the **Contractor** by certified mail, return receipt requested, a complete list of all incomplete or unsatisfactory items, and unless delayed by causes beyond its control, the **Contractor** shall complete all such items within forty-five (45) days after the receipt of such list or before the date for final payment and acceptance, whichever is later. If the **Contractor** fails to complete such Work within such time, the **City** may, subsequent to seven (7) days' written notice to the **Contractor** by certified mail, return receipt requested, terminate the Contract and complete the incomplete or unsatisfactory items and charge the cost of same to the **Contractor**.

14.3. Final Inspection.

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

ARTICLE 15: GUARANTEES AND WARRANTIES

15.1. In General.

15.1.1. All guarantees and warranties specifically called for by the Specifications shall expressly run to the benefit of the **City**.

15.2. Warranties.

15.2.1. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof, unless otherwise provided in the certificate of Substantial Completion.

15.2.2. The **Contractor** warrants that the materials and equipment furnished under the Contract will be new and of recent manufacture unless otherwise specified, and that all Work will be of good quality, free from faults and defects, and in conformance with the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The **Contractor's** warranty excludes remedy for damage or defect caused by abuse, Modifications not executed by the **Contractor**, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the **Design Professional**, the **Contractor** shall furnish satisfactory evidence as to the kind and quality of material and equipment.

15.2.3. The **Contractor** warrants that title to all Work covered by an application for payment will pass to the **City** either by incorporation in the construction or upon the receipt of payment by the **Contractor**, whichever occurs first, free and clear of all liens. The **Contractor** further agrees that the submission of any application for payment shall conclusively be deemed to waive all liens with respect to said Work to which the **Contractor** may then be entitled, provided that such waiver of the lien rights shall not waive the **Contractor's** right to payment for such Work.

15.2.4. The **Contractor** warrants and guarantees that title to all Work, materials, and equipment covered by any application for payment, whether incorporated in the Project or not, will pass to the **City** no later than the time of payment free and clear of all liens.

15.2.5. No materials or supplies for the Work shall be purchased by the **Contractor** or Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. The **Contractor** warrants that it has good title to all materials and supplies used by it in the Work, free from all liens.

15.2.6. The **Contractor** shall indemnify and hold the **City** harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workers, mechanics, material persons, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. The **Contractor** shall at the **City's** request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If the **Contractor** fails to do so, then the **City** may, after having served written notice on the **Contractor** either pay unpaid bills, of which the **City** has written notice, direct, or withhold from the **Contractor's** unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the **Contractor** shall be resumed, in accordance with the terms of this

Contract, but in no event shall the provisions of this sentence be construed to impose any obligations on the **City** to either the **Contractor** or its surety. In paying any unpaid bills of the **Contractor**, the **City** shall be deemed the agent of the **Contractor** and any payment so made by the **City** shall be considered as payment made under the Contract by the **City** to the **Contractor** and the **City** shall not be liable to the **Contractor** for any such payment made in good faith.

15.3. Extended Warranties and Guarantees.

15.3.1. Any defective Work that is either corrected or replaced will be warranted and guaranteed for a period of three (3) years from the date of such correction or replacement.

ARTICLE 16: CLAIMS

16.1. In General.

16.1.1. Written Notice. A Claim must be made by written notice to the other party.

16.1.2. Content of Notice. The notice must include all written supporting data.

16.1.3. Burden of Proof. The party making the Claim must substantiate the Claim.

16.2. Time Limits on Claims.

16.2.1. Unless otherwise provided, all Claims must be made within twenty-one (21) days after the occurrence of the event giving rise to such Claim or within twenty-one (21) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Any change or addition to a previously made Claim shall be made by a written notice within the twenty-one-day period in order to be valid.

16.3. Continuing Contract Performance.

16.3.1. Pending final resolution of a Claim including arbitration, unless otherwise agreed in writing, the **Contractor** shall proceed diligently with performance of the Contract and the **City** shall continue to make payments in accordance with the Contract Documents.

16.4. Types of Claims.

16.4.1. Claims for Differing Subsurface or Latent Physical Conditions. (*Reference:* M.G.L. c. 30, §39N;). If, during the progress of the Work, the **Contractor** or the **City** discovers that the actual subsurface or latent physical conditions encountered at the Site differ substantially or materially from those shown on the Plans or indicated in the Contract Documents, either the **Contractor** or the **City** may request an equitable adjustment in the Contract Sum of the Contract applying to Work affected by the differing Site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a **Contractor**, or upon its own initiative, the **City** shall make an investigation of such physical conditions, and if they differ substantially or materially from those shown on the Plans or indicated in the Contract Documents or from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Plans and Contract

Documents and are of such a nature as to cause an increase or decrease in the cost of performance of the Work or a change in the construction methods required for the performance of the Work which results in an increase or decrease in the cost of the Work, the **City** shall make an equitable adjustment in the Contract Sum and the Contract shall be modified in writing accordingly.

16.4.2. Claims for Additional Cost. If the **Contractor** claims that any acts or omissions of the **City** or the **Design Professional**, including any instructions or orders, whether oral, written, by drawings, or otherwise, involve extra cost or time, and the **Contractor** has not received a written acknowledgment by the **City** or the **Design Professional** that extra payment will be made or time extended on account thereof, the **Contractor** shall promptly so notify the **Design Professional** in writing of such Claim and shall proceed with the Work relating to such Claim and all rights of both parties with respect to such Claim shall be deemed to have been reserved. No Claim by the **Contractor** on account of such acts, omissions, instructions, or orders shall be valid unless the **Contractor** has so notified the **Design Professional** before proceeding.

16.4.2.1. Under no circumstances shall a Claim be made for additional cost where adverse weather conditions are the basis for the Claim.

16.4.3. Claims for Additional Time. If the **Contractor** wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The **Contractor** shall have the burden of demonstrating the effect of the claimed delay on the Contract Time and shall furnish the **Design Professional** with such documentation relating thereto as the **Design Professional** may reasonably require. Under no circumstances shall the **Contractor** make a Claim for an increase in the Contract Time due to a change in the **Contractor's** early completion date. If the increase in the Contract Time extends beyond the Contract Time established by the **City**, only the time that so extends beyond the Contract Time shall be reviewed and considered. In the case of a continuing delay, only one Claim is necessary.

16.4.3.1. Under no circumstances shall a Claim be made for additional time where adverse weather conditions are the basis for the Claim.

16.4.4. Claims for Injury to Person or Damage to Property. Should either party to the Contract suffer injury to person or damage to property because of any error, omission, or act of the other party or of any of the other party’s employees or agents or others for whose acts the other party is legally liable, a Claim will be made in writing to the other party within twenty-one (21) days of the occurrence of the act giving rise to the injury or damage.

16.5. Review of Claims.

16.5.1. Initial Referral. All Claims, the bases of which arise prior to final payment or the earlier termination of the Contract, shall be referred initially to the **Design Professional** for action as provided herein.

16.5.2. Time Period and Action. The **Design Professional** shall review Claims and shall

do one of the following within fourteen (14) days of receipt of the Claim:

16.5.2.1. defer any action with respect to all or any part of a Claim for the purpose of requesting and receiving additional information from either party;

16.5.2.2. decline in writing to render a decision for any reason which it deems appropriate (including, but not limited to, the fact that the Claim involves allegations of fault on the part of the **Design Professional**); or

16.5.2.3. render a decision on all or a part of the Claim.

16.5.3. If the **Design Professional** requests additional information, the **Design Professional** shall take action with respect to the Claim no later than fourteen (14) days after receipt of the additional information. The **Design Professional** shall notify the parties in writing of its disposition of such Claim. If the **Design Professional** renders a decision or declines to render a decision, either party may proceed in accordance with paragraph 16.7.

16.6. Decisions.

16.6.1. Decisions by the City or the Design Professional. (*Reference:* M.G.L. c. 30, §39P;). In every case in which this Contract requires the **City**, any official, or its **Design Professional** to make a decision on interpretation of the Specifications, approval of equipment, material or any other approval, or progress of the Work, the decision shall be made promptly and, in any event, no later than fourteen (14) days after the written submission for decision; but if such decision requires extended investigation and study, the **City**, the official, or the **Design Professional** shall, within fourteen (14) days after the receipt of the submission, give the party making the submission written notice of the reasons why the decision cannot be made within the thirty-day period and the date by which the decision will be made.

16.6.2. When Decision of the Design Professional is Final and Binding. The decision of the **Design Professional** shall be final and binding on the parties, unless a party files suit or a demand for arbitration within thirty (30) days after the date of the decision.

16.6.3. When Decision of the Design Professional is Not Final and Binding. (*Reference:* M.G.L. c. 30, §39J). Notwithstanding any contrary provision of this Contract, no decision by the **City** or by the **Design Professional** on a dispute, whether of fact or of law, arising under said Contract shall be final or conclusive if such decision is made in bad faith, fraudulently, capriciously, arbitrarily, is unsupported by substantial evidence, or is based upon error of law.

16.6.4. Resolved Claims. If a Claim is resolved, the **Design Professional** shall obtain or prepare the appropriate documentation and provide the **City** and the **Contractor** with a copy of same.

16.7. Arbitration.

16.7.1. Controversies and Claims Subject to Arbitration. Any controversy or Claim arising out of or related to the Contract, or the breach thereof, shall be settled by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator or arbitrators may be entered in any court having jurisdiction thereof, except controversies or Claims relating to aesthetic effect, subject to the provisions of paragraph 16.7.7. In any such arbitration in which the amount stated in the demand is $100,000 or less, the American Arbitration Association shall appoint a single arbitrator in accordance with such Rules, who shall be a lawyer. In any such arbitration in which the amount stated in the demand is in excess of $100,000, the demand shall include the name of an arbitrator appointed by the claimant. The respondent shall appoint a second arbitrator and shall notify the claimant in writing of such appointment within thirty (30) days of receipt of the demand, failing which the matter shall be decided by the arbitrator named in the claimant's demand. Within thirty (30) days after the claimant's receipt of notice of the appointment of the second arbitrator, the two arbitrators shall appoint a neutral arbitrator and shall notify the parties in writing of such appointment, failing which either party may apply to the American Arbitration Association to appoint such neutral arbitrator. If such neutral arbitrator is appointed by the American Arbitration Association, he or she shall be a lawyer.

16.7.2. Rules for Arbitration. If the neutral arbitrator is appointed by the American Arbitration Association, the said Association shall administer the arbitration and its Construction Industry Arbitration Rules shall govern all aspects of the proceeding including the enforcement of any award. If the neutral arbitrator is not appointed by the American Arbitration Association, then the panel of arbitrators shall act as the administrator of the arbitration but the Construction Industry Arbitration Rules of the Association shall nonetheless govern all aspects of the proceeding, including the enforcement of any award, provided however that the arbitration panel shall have all of the powers and duties conferred on the Association pursuant to said rules. In addition, the following rules shall govern the selection of arbitrators and the proceedings:

16.7.2.1. Neither party may appoint as arbitrator an employee or an owner of that party, nor the parent, spouse, or child of an employee or owner of that party.

16.7.2.2. After the neutral arbitrator has been appointed, neither party may engage in *ex parte* communication with any arbitrator.

16.7.3. When Arbitration May Be Demanded. Demand for arbitration of any Claim, the basis of which arises prior to final payment or the earlier termination of the Contract may not be made before the earlier of (1) the date on which the **Design Professional** has rendered a written decision on the Claim or has notified the parties in writing that such decision will not be rendered or (2) forty-five (45) days following receipt by the **Design Professional** of a written request for a decision sent by registered or certified mail to both the **Design Professional** and the other party to this Contract.

16.7.3.1. In no event shall a demand for arbitration be made after the date

when the institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations.

16.7.4. Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract Documents shall include, by consolidation or joinder or in any other manner, the **Design Professional**, the **Design Professional's** employees or consultants, except by written consent containing specific reference to the Contract and signed by the **Design Professional**, the **City**, the **Contractor,** and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the **City**, the **Contractor**, a separate contractor, and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the **City**, the **Contractor,** or a separate contractor shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a dispute not described therein or with a person or entity so named or described herein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Contract shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

16.7.5. Claims and Timely Assertion of Claims. A party who files a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded. When a party fails to include a Claim through oversight, inadvertence, or excusable neglect, or when a Claim has matured or been acquired subsequently, the arbitrator or arbitrators may permit amendment.

16.7.6. Award Final. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

16.7.7. The City's Reservation of Rights. Notwithstanding any provision contained in this Article 16 or elsewhere in the Contract Documents, the **City** reserves the following rights in connection with Claims between the **City** and the **Contractor**, which rights may be exercised by the **City** unilaterally, in the **City's** sole discretion, and without the consent of the **Contractor**:

16.7.7.1. the right to institute legal action against the **Contractor** in any court of competent jurisdiction in lieu of demanding arbitration, in which case the dispute or disputes which are the subject of such action shall be decided by such court, and not by arbitration;

16.7.7.2. the right to obtain from any court of competent jurisdiction a stay of any arbitration instituted by the **Contractor**, provided that the application for such stay is made before the appointment of the neutral arbitrator in such arbitration, in which case the dispute or disputes which are the subject of such arbitration shall be decided by such court and not by arbitration;

16.7.7.3. the right to require the **Contractor** to join as a party in any arbitration between the **City** and the **Design Professional** relating to the Project, in which case the **Contractor** agrees to be bound by the decision of the arbitrator or arbitrators in such arbitration.

16.7.8. In case the **City** elects to proceed in accordance with 16.7.7.1. or 16.7.7.2. above, the word "litigation" shall be deemed to replace the word "arbitration" wherever the latter word appears in the Contract Documents.

ARTICLE 17: EMERGENCIES

17.1. In an emergency affecting the health and safety of persons or property, the **Contractor** shall act to prevent threatened damage, injury, or loss.

17.2. In emergencies affecting the health, safety, or protection of persons, the Work or property at the Site or adjacent thereto, the **Contractor**, without special instruction or authorization from the **City** or the **Design Professional**, is obligated to act to prevent threatened damage, injury, or loss. The **Contractor** shall give the **Design Professional** prompt written notice if the **Contractor** believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the **Design Professional** determines that a change in the Contract Documents is required because of the action taken by the **Contractor** in response to such an emergency, a **Construction Change** Directive or Change Order will be issued to document the consequences of such action.

ARTICLE 18: TERMINATION OR SUSPENSION OF THE CONTRACT

18.1. Suspension by the City.

18.1.1. At any time and without cause, the **City** may suspend the Work or any portion thereof for a period of not more than ninety (90) days by notice in writing to the **Contractor** and the **Design Professional** that will fix the date on which Work will be resumed. The **Contractor** shall resume Work on the date so fixed. The **Contractor** shall be allowed an adjustment in the Contract Sum or an extension of the Contract Time, or both, directly attributable to any such suspension if the **Contractor** makes an approved Claim therefor.

18.1.2. If the Work is defective, if the **Contractor** fails to provide a sufficient number of skilled workers or suitable materials or equipment, or if the **Contractor** defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the **City** to begin and prosecute correction of such default or neglect with diligence and promptness, the **City** may correct such deficiencies, without prejudice to other remedies the **City** may have. In such case, an appropriate **Construction Change** Directive shall be issued deducting from payments then or thereafter due to the **Contractor** the cost of correcting such deficiencies including compensation for the **Design Professional's** additional services and expenses made necessary by such default, neglect, or failure and any and all direct, indirect, or consequential costs associated with the order to stop the

Work. If such payments then or thereafter due the **Contractor** are not sufficient to cover such amounts, the **Contractor** shall immediately pay the difference to the **City**. The **Contractor** shall remain responsible for maintaining progress and shall not be entitled to any increase in the Contract Time or the Contract Sum.

18.2. Termination by the Contractor.

18.2.1. If, through no act or fault of the **Contractor**, a Subcontractor, or a Sub-subcontractor, the Work is suspended for a period of more than ninety (90) days by the **City**, or under an order of court or other public authority, or the **Design Professional** fails to act on any application for payment within thirty (30) days after it is submitted in proper form and content or the **City** fails for thirty (30) days to pay the **Contractor** any sum finally determined to be due, then the **Contractor** may terminate the Contract upon seven (7) days' written notice to the **City**, provided that the **City** does not remedy such suspension or failure within that time.

18.3. Termination by the City.

18.3.1. If the **Contractor** is adjudged a bankrupt, or if the **Contractor** makes a general assignment for the benefit of the **Contractor's** creditors, or if a receiver is appointed on account of the **Contractor's** insolvency, or if the **Contractor** persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if the **Contractor** fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction or disregards an instruction, order, or decision of the **Design Professional**, or otherwise is guilty of substantial violation of any provision of the Contract, then the **Contractor** shall be in default, and the **City** may, without prejudice to any other right or remedy and upon written notice to the **Contractor**, take possession of all materials, tools, appliances, equipment, construction equipment and machinery and vehicles, offices and other facilities on the Project Site, and all materials intended for the Work, wherever stored, and, seven (7) days after such notice, may terminate the employment of the **Contractor**, accept assignment of any or all subcontracts pursuant to Paragraph __, and finish the Work by whatever method the **City** may deem expedient. The **City** shall be entitled to collect from the **Contractor** all direct, indirect, and consequential damages suffered by the **City** on account of the **Contractor's** default, including without limitation additional services and expenses of the **Design Professional** made necessary thereby. The **City** shall be entitled to hold all amounts due to the **Contractor** at the date of termination until all of the **City's** damages have been established, and to apply such amounts to such damages.

18.3.2. (*Reference:* Somerville Municipal Code Chapter 2.117, Section 2.117.110C). In the event the **Contractor** or any of its agents or employees violates any provision of Somerville Municipal Code Chapter 2.117 that is applicable to **City** contractors in connection with the awarding, administration, or performance of the Contract, the **City** may terminate the Contract.

ARTICLE 19: AMERICANS WITH DISABILITIES ACT; (42 U.S. 12131)

19.1. On July 26, 1994, the Americans with Disabilities Act ("the Act") became effective for

employers of fifteen or more employees.

19.2. The Act protects against discrimination of the basis of "disability," which is defined as a physical or mental impairment that substantially limits at least one "major life activity;" or discrimination against an individual who has a record of such impairment; or discrimination against an individual being regarded - even if inaccurately - as having such impairment. The Act also expressly prohibits job discrimination that is based on any individual's relationship or association with a disabled person.

19.3. If the **Contractor** is subject to the Act, it must comply with its provisions.

ARTICLE 20: WRITTEN NOTICE TO THE PARTIES

20.1. In General.

20.1.1. All written communications from the **Design Professional** to the **Contractor** shall be copied to the **City**. All written communications from the **Contractor** to the **Design Professional** shall be copied to the **City**. All written communications from the **Contractor** to the **City** shall be copied to the **Design Professional**.

20.2. Addresses.

20.2.1. To the City. Written notice to the **City** shall be sent or hand-delivered to:

Purchasing Director
City of Somerville
93 Highland Avenue
Somerville, MA 02143

City Solicitor
Law Department
93 Highland Avenue
Somerville, MA 02143

Executive Director
Office of Strategic Planning & Community Development 93
Highland Avenue
Somerville, MA 02143

20.2.2. To the Contractor. Both the address given on the bid form upon which the Agreement is founded and the **Contractor's** office at or near the Site of the Work are hereby designated as places to either of which notices, letters, and other communications to the **Contractor** shall be certified, mailed, or delivered. Delivery of any notice, letter, or other communication to the **Contractor** at or depositing same in a postpaid wrapper directed to either place shall be deemed sufficient service thereof upon the **Contractor**. Written notice shall be deemed to have been duly served on the **Contractor** if it is sent or hand-delivered to any member or officer of the **Contractor**. The date of said service shall be the date of such delivery

or mailing. The address may be changed at any time by an instrument in writing, executed and acknowledged by the **Contractor** and delivered to the **City** and to the **Design Professional**. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter. or other communication upon the **Contractor** personally. Moreover, any notice, letter, or other communication required under the Contract may be served on the **Contractor's** representative at job meetings. The **Contractor** shall provide the **City** with its change of address seven (7) days prior to its effective date.

20.2.3. To the Design Professional. Written notice to the **Design Professional** shall be sent or hand-delivered to the address appearing on the Project Manual. Written notice shall be deemed to have been duly served on the **Design Professional** if it is sent or hand-delivered to any member or officer of the **Design Professional**.

ARTICLE 21: MISCELLANEOUS PROVISIONS

21.1. Governing Law.

21.1.1. This Contract shall be governed by the laws of the Commonwealth of Massachusetts.

21.2. Venue.

21.2.1. Venue for any court action or proceeding shall be Middlesex County in the Commonwealth of Massachusetts only. The **Contractor**, all Subcontractors, and Suppliers waive any and all jurisdictional and venue defenses.

21.3. Successors and Assigns.

21.3.1. The **Contractor** shall not assign, in whole or in part, its rights and obligations under the Contract Documents without prior written consent of the **City**. An assignment without the prior written consent of the **City** shall not relieve the **Contractor** of its obligations thereunder.

21.3.2. The **City** and the **Contractor** respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents.

21.4. Statutory Limitation Period.

21.4.1. It is expressly agreed that the obligations of the **Contractor** hereunder arise out of contractual duties, and that the failure of the **Contractor** to comply with the requirements of the Contract Documents shall constitute a breach of contract, not a tort, for the purpose of applicable statutes of limitations and repose. Any cause of action which the **City** may have on account of such failure shall be deemed to accrue only when the **City** has obtained actual knowledge of such failure, not before.

21.5. Rights and Remedies.

21.5.1. Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

21.5.2. No action or failure to act by the **City**, the **Design Professional,** or the **Contractor** shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

PART 2 - SAMPLE CONSTRUCTION CONTRACT

IMPORTANT INFORMATION REGARDING CERTIFICATE OF GOOD STANDING

- Sample Contract
- Certificate of Authority
- Appendix A – Scope of Work (including Technical Specifications)
- Appendix B – Contractor's Bid Price; Form for General Bid (From Bid Book)
- Appendix C – General Terms and Conditions
- Appendix D – Insurance Requirements
- Appendix E – Wage Rates and Living Wage (From Bid Book)
- Appendix F – Certificate of Good Standing (for corporations; from Bid Book)
- Appendix G – Procurement documentation (Advertisements and Notice to Bidders)
- Appendix H – Statement of Management
- Appendix I – Performance Bond and Payment Bond, if contract over $2000

S A M P L E C O N T R A C T

CONTRACT NUMBER

A-
PURCHASE ORDER # AND AMOUNT

BID NUMBER

OSPCD
ISSUING DEPARTMENT

FUNDING DEPARTMENT (Division)

CONTRACT PERIOD

CITY OF SOMERVILLE
MAYOR'S OFFICE OF STRATEGIC PLANNING AND COMMUNITY DEVELOPMENT

PUBLIC CONSTRUCTION CONTRACT

FOR: Union Square Early Action Project

CONTRACTOR: Vendor
Address
Townname, Ma

ACCORDING TO SPECIFICATIONS CONTAINED HEREIN

CITY OF SOMERVILLE
OWNER-CONTRACTOR PUBLIC CONSTRUCTION AGREEMENT

AGREEMENT made this --- day of _____, by and between the City of Somerville, a Massachusetts municipal corporation, acting by and through its Purchasing Department, with a usual address of 93 Highland Ave., Somerville, MA 02143 ("City", "Owner" or "Awarding Authority") and the following General Contractor ("Contractor" or "General Contractor"):

GENERAL CONTRACTOR:
Name:
Address:
Telephone: Fax:
E-Mail:

PROJECT: ADA Ramps (12) at Four Locations

The work consists of the construction of twelve (12) Wheelchair Ramps to Massachusetts Architectural Access Board (AAB) standards (521 MR 21.00, effective January 27, 2006); hiring a design professional to verify that all AAB requirements have been fulfilled; and resetting crosswalk signs. Substantial completion of work shall be by September 1, 2009.

PROJECT MANAGER:
Name: Brad Rawson
Address: City Hall, 3rd floor, 93 Highland Avenue, Somerville, MA 02143
Telephone: 617-625-6600, x.2545 Fax: 617-625-0722
E-Mail**:** afranzen@somervillema.gov

DESIGN PROFESSIONAL:
Name: **Parsons Brinckerhoff, Inc. LLC**
Address: **75 Arlington St.**
Cambridge, MA 02141

Contact: Rachel J. Burckardt
Phone: 614-426-7330
Burckardt@pbworld.com
Profession: Architect [ ] Landscape Architect [X] Engineeer [ ]

FUNDING SOURCE: Federal [ ] State [ ] City [X]

THIS CONTRACT IS A:

X Public Works Contract estimated to cost more than $10,000 subject to the bidding requirements of G.L. c. 30, § 39M

_ Public Building Contract estimated to cost under $10,000, subject to the price quote requirements of G.L. c. 149 §44A (2)(A)

_ Public Building Contract estimated to cost more than $10,000 but less than $25,000, subject to the written response requirements of G.L. c. 149, §44A(2)(B) of the General Laws

_ Public Building Contract estimated to cost more than $25,000 but less than $100,000, subject to the bidding requirements of G.L. c. 149, §44A(2)(C) and G.L. c. 30, § 39M

_ Public Building Contract estimated to cost more than $100,000, subject to the bidding requirements of G.L. c. 149, §44A(D).

Section 1: CONTRACT DOCUMENTS/APPENDICES

The Contract Documents consist of this Agreement; the notice of award of the Contract; the Notice to Proceed; the entire Project Manual; Change Orders; Construction Change Directives; the Contractor's Bid and all accompanying documents; and the Design Professional's written interpretations and clarifications issued on or after the issuance of the Notice to Proceed. Shop Drawing submittals and reports or drawings utilized by the Design Professional in preparing the Contract Documents are not Contract Documents.

The following Appendices are hereby incorporated by reference as part of this Agreement.

X Certificate of Authority

* Appendix A - Scope of Services - Misc. Bid Documents: includes a brief description of the Project, the Plans and Technical Specifications (Plans on File) and Addenda issued during the bid process

X Appendix B - Contractor's Bid Price; Form for General Bid

X** Appendix C - General Conditions

X** Appendix D - Insurance Requirements with Contractor's Insurance Certificate(s)

X Appendix E - Wage Rates; Living Wage

X Appendix F - Certificate of Good Standing (for corporations)

X Appendix G - Procurement Documentation (includes Advertisement; Notice to Bidders)

X Appendix H - Statement of Management (over $100,000)

X Appendix I - Performance Bond and Payment Bond, if contract is over $2,000

X Appendix J - Section 3 Requirements

X Appendix K – Laws Applicable to Federally Funded Contracts

X = Attached
* = Included in the Project Manual and incorporated herein by reference
** = Attached and also duplicated in the Project Manual

Section 2: THE CONTRACTOR'S WORK.

The Contractor's "Work" refers to the services and the entire completed construction or the various separately identifiable parts thereof required by the Contract Documents, including all labor, materials, and equipment furnished, furnished and incorporated into the Project, or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

Section 3: PROJECT DATES.

(a) Contract Period: The Contract shall begin on September 1, 2014 and end on June 1, 2015.

(b) Date of Commencement of Work: The Date of Commencement of the Work shall be stipulated by a written Notice to Proceed given by the City to the Contractor.

(c) Date of Substantial Completion: The Contractor shall achieve Substantial Completion of the Work on or before _____ or --- calendar days after the Date of Commencement of the Work, time being of the essence. Substantial Completion means that the Work has been completed and the Site or the facility is opened for full and intended public use, except for minor incomplete or unsatisfactory items that do not materially impair the usefulness of the Work. The Design Professional shall decide what constitutes "minor," "incomplete," "unsatisfactory," and "materially" and the Design Professional's decision shall be final.

(d) Date of Final Completion:
The Date of Final Completion shall be _____.

Section 4. CONTRACT SUM/LIQUIDATED DAMAGES

(a) Contract Sum: The Contract Sum shall be $_____ .

(b) Liquidated Damages: The Contractor and the City agree to a Liquidated Damages sum of $250.00 per calendar day.

SIGNATURE PAGE FOLLOWS

IN WITNESS WHEREOF, the City and the Contractor have executed this Contract as a sealed instrument as of the date first written above.

CITY OF SOMERVILLE

I hereby certify that an unencumbered balance of $_____ is available for this Contract and I further certify that the sum of $_____ is hereby encumbered against the appropriate account for the purposes of this contract.

_____
Edward Bean, City Auditor

_____
Joseph A. Curtatone
Mayor

_____
Michael F. Glavin, OSPCD
Executive Director

_____
Angela M. Allen, Purchasing Director

Approved as to form:

_____
Francis X. Wright, Jr., City Solicitor

VENDOR:

_____
Signature of Authorized Agent of Vendor

Printed Name: _____
Title: _____

Vendor Address:_____
_____

Federal Tax ID: #_____

FOR CORPORATIONS ONLY:

_____
Clerk's Signature

_____
Clerk's Name

SAMPLE CERTIFICATE OF AUTHORITY

__, 2014.
(Contract Date)

At a meeting of the directors of _____ duly
(Name of Corporation)
called and held at ____on _, 2010.
(Address) (Date)

which a quorum was present and acting, it was voted that _____
(Name)

the __ of this corporation is hereby authorized and empowered to
(Office)

make, enter into, sign, seal and deliver on behalf of this corporation a contract for

_____with the City of Somerville, Mayor's (Describe Service)

Office of Strategic Planning and Community Development. I do hereby certify that the above

is a true and correct copy of the record that said vote has not been amended or repealed and is in

full force and in effect at of this date, and that __ is duly elected
(Name)

___of this corporation.
(Office)

_____
(Clerk) (Secretary) of the Corporation

Attest:

(Affix Corporation Seal Here)

APPENDIX A
Scope of Services – Miscellaneous Bid Documents

Includes a brief description of the project
The Plans and Technical Specifications (Plans on File)
And all addenda issued during the bid process.

APPENDIX B
Contractor's Bid Price - Form for General Bid
(From Bid Book)

APPENDIX C
General Conditions
(From Bid Book)

APPENDIX D
INSURANCE REQUIREMENTS

APPENDIX D - INSURANCE REQUIREMENTS
INSURANCE SPECIFICATIONS

INSURANCE REQUIREMENTS FOR AWARDED VENDOR ONLY:

Prior to commencing performance of any work or supplying materials or equipment covered by these specifications, the contractor shall furnish to the Office of the Purchasing Director a Certificate of Insurance evidencing the following:

A. GENERAL LIABILITY - Comprehensive Form

Bodily Injury Liability.....….....$ Two Million
Property Damage Liability.....$ Two Million

B. COVERAGE FOR PAYMENT OF WORKER'S COMPENSATION BENEFIT PURSUANT TO CHAPTER 152 OF THE MASSACHUSETTS GENERAL LAWS IN THE AMOUNT AS LISTED BELOW:

WORKER'S COMPENSATION.….....$Statutory
EMPLOYERS' LIABILITY..…....…….$ Statutory

C. AUTOMOBILE LIABILITY INSURANCE AS LISTED BELOW:

AGGREGATE…….....$ One Million

l. A contract will not be executed unless a certificate (s) of insurance evidencing above-described coverage is attached.
2. Failure to have the above-described coverage in effect during the entire period of the contract shall be deemed to be a breach of the contract.
3. All applicable insurance policies shall read:
"CITY OF SOMERVILLE" as a certificate holder and as an additional insured for general liability only along with a description of operation in the space provided on the certificate.

Certificate Should Be Made Out To:
City Of Somerville
Purchasing Department
93 Highland Avenue
Somerville, Ma. 02143

Note: If your insurance expires during the life of this contract, you shall be responsible to submit a new certificate(s) covering the period of the contract. No payment will be made on a contract with an expired insurance certificate.

APPENDIX E
PREVAILING WAGE RATES AND LIVING WAGE FORM

Part 1, Section 4: OTHER BID DOCUMENTS

DAVIS BACON AND PREVAILING WAGE RATES

INSERT MANUALLY

Sample Contract

SOMERVILLE LIVING WAGE ORDINANCE CERTIFICATION FORM

CITY OF SOMERVILLE CODE OF ORDINANCES SECTION 2-397 et seq[2].

Instructions: This form shall be included in all Invitations for Bids and Requests for Proposals which involve the furnishing of labor, time or effort (with no end product other than reports) by vendors contracting or subcontracting with the City of Somerville, where the contract price meets or exceeds the following dollar threshold: $10,000. If the undersigned is selected, this form will be attached to the contract or subcontract and the certifications made herein shall be incorporated as part of such contract or subcontract. **Complete this form and sign and date where indicated below on page 2.**

Purpose: The purpose of this form is to ensure that such vendors pay a "Living Wage" (defined below) to all covered employees (i.e., all employees except individuals in a city, state or federally funded youth program). In the case of bids, the City will award the contract to the lowest responsive and responsible bidder paying a Living Wage. In the case of RFP's, the City will select the most advantageous proposal from a responsive and responsible offeror paying a Living Wage. In neither case, however, shall the City be under any obligation to select a bid or proposal that exceeds the funds available for the contract.

Definition of "Living Wage": For this contract or subcontract, as of **7/1/2013** "Living Wage" shall be deemed to be an hourly wage of no less than **$11.89** per hour. From time to time, the Living Wage may be upwardly adjusted and amendments, if any, to the contract or subcontract may require the payment of a higher hourly rate if a higher rate is then in effect.

CERTIFICATIONS

1. The undersigned shall pay no less than the Living Wage to all covered employees who directly expend their time on the contract or subcontract with the City of Somerville.

2. The undersigned shall post a notice, (copy enclosed), to be furnished by the contracting City Department, informing covered employees of the protections and obligations provided for in the Somerville Living Wage Ordinance, and that for assistance and information, including copies of the Ordinance, employees should contact the contracting City Department. Such notice shall be posted in each location where services are performed by covered employees, in a conspicuous place where notices to employees are customarily posted.

3. The undersigned shall maintain payrolls for all covered employees and basic records relating hereto and shall preserve them for a period of three years. The records shall contain the name and

[2]Copies of the Ordinance are available upon request to the Purchasing Department.

address of each employee, the number of hours worked, the gross wages, a copy of the social security returns, and evidence of payment thereof and such other data as may be required by the contracting City Department from time to time.

4. The undersigned shall submit payroll records to the City upon request and, if the City receives information of possible noncompliance with the provisions the Somerville Living Wage Ordinance, the undersigned shall permit City representatives to observe work being performed at the work site, to interview employees, and to examine the books and records relating to the payrolls being investigated to determine payment of wages.

5. The undersigned shall not fund wage increases required by the Somerville Living Wage Ordinance by reducing the health insurance benefits of any of its employees.

6. The undersigned agrees that the penalties and relief set forth in the Somerville Living Wage Ordinance shall be in addition to the rights and remedies set forth in the contract and/or subcontract.

CERTIFIED BY:

Signature: _____
(Duly Authorized Representative of Vendor)

Title: _____

Name of Vendor:_____

Date: _____

INSTRUCTIONS: PLEASE POST

NOTICE TO ALL EMPLOYEES
REGARDING PAYMENT OF LIVING WAGE

Under the Somerville, Massachusetts' Living Wage Ordinance (Ordinance No. 1999-1), any person or entity who has entered into a contract with the City of Somerville is required to pay its employees who are involved in providing services to the City of Somerville no less than a "Living Wage".

The Living Wage as of **7/1/2013** is **$11.89** per hour. The only employees who are not covered by the Living Wage Ordinance are individuals in a Youth Program. "Youth Program" as defined in the Ordinance, "means any city, state or federally funded program which employs youth, as defined by city, state or federal guidelines, during the summer, or as part of a school to work program, or in any other related seasonal or part-time program."

For assistance and information regarding the protections and obligations provided for in the Living Wage Ordinance and/or a copy of the Living Wage Ordinance, all employees should contact the City of Somerville's Purchasing Department directly.

APPENDIX F
CERTIFICATE OF GOOD STANDING
(FOR CORPORATIONS)

INSERT DOCUMENT FROM BID BOOK HERE

Certificate of Good Standing: If the bidder is a corporation, a Certificate of Good Standing should accompany the bid. Certificate of Good Standing available online at:
http://corp.sec.state.ma.us/corp/Certificates/Certificate_Request.asp
or call Tel: (617) 727-9640 for more information.

CERTIFICATE OF GOOD STANDING

TO: Vendor

FROM: Purchasing Department

RE: **CERTIFICATE OF GOOD STANDING**

The **Awarded Vendor** must comply with our request for a **CURRENT "Certificate of Good Standing".**

If you require information on how to obtain the "Certificate of Good Standing" or Certificate of Registration (Foreign Corporations) from the Commonwealth of Massachusetts, please call the Secretary of State's Office at (617) 727-2850 (Press #1) located at One (1) Ashburton Place, 17th Floor, Boston, MA 02133 or you may access their web site at: www.MA.GOV/SEC/COR

If your company is incorporated outside of Massachusetts and therefore is a "foreign corporation", but is registered to do business in Massachusetts, please comply with our request for the Certificate of Registration from the Commonwealth of Massachusetts. If your company is a foreign corporation, but is not registered to do business in Massachusetts, please provide the Certificate of Good Standing from your state of incorporation.

Please note that without the above certificate (s), the City of Somerville cannot execute your contract.

IMPORTANT NOTICE

Requests for Certificates of Good Standing by mail may take a substantial amount of time. A certificate may be obtained immediately in person at the Secretary's Office at the address above. Also, at this time, the Secretary of State's Office may not have your current annual report recorded. If this is the case, and you are therefore unable to obtain the Certificate of Good Standing, please forward a copy of your annual report filing fee check with your signed contracts. Please forward your original Certificate of Good Standing to the Purchasing Department upon receipt.

Thank You,

Purchasing Director

Part 1, Section 4: OTHER BID DOCUMENTS

APPENDIX G
PROCUREMENT DOCUMENTATION

ADVERTISEMENTS, NOTICE TO BIDDERS, ETC.

Sample Contract

APPENDIX H
STATEMENT OF MANAGEMENT
FOR CONTRACTS OVER $100,000

STATEMENT OF MANAGEMENT

In accordance with M.G.L. Chapter 30, Section 39R, the undersigned successful bidder states that its system of internal accounting controls and that of its subsidiaries reasonably assure (1) that transactions are executed in accordance with management's general and specific authorization; (2) that transactions are recorded as necessary to permit preparation of financial statements in conformity with generally accepted accounting principles, and to maintain accountability for assets; (3) that access to assets is permitted only in accordance with management's general or specific authorization, and (4) that the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.

Executed this _____day of _____2014__

On behalf of _____
(Successful bidder name)

_____
(Address and telephone of successful bidder)

_____
(Name and title of person signing statement)

By:_____
(Signature)

CERTIFIED PUBLIC ACCOUNTANT STATEMENT

In accordance with M.G.L. 30, Section 39R I, _____ a certified public accountant, state that I have examined the above Statement of Management on internal accounting controls, and that in my opinion (1) the representations of management are consistent with the result of management's evaluation of the system of internal accounting controls; and (2) that such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the above referenced successful bidder's financial statements.

_____
(Signature)

_____
(Business name, address and telephone number)

APPENDIX I
PERFORMANCE BOND AND PAYMENT BOND

FOR CONTRACTS OVER $2000

PERFORMANCE BOND

We, the undersigned,

_____,
(Name of Contractor)

_____,
(Address of Contractor)

___, hereinafter called Principal, and
(Corporation, Partnership, or Individual)

_____,
(Name of Surety)

_____, (Address of Surety)

hereinafter called Surety, are held and firmly bound unto CITY OF SOMERVILLE, 93 Highland Avenue Avenue, Somerville, MA 02139, hereinafter called Owner, in the penal sum of __ Dollars

($__) in lawful money of the United States, for the payment of which sum well and truly to be made. We hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

The condition of this obligation is such that the Principal entered into a certain contract with the Owner, dated the _day of _, 20_, a copy of which is attached hereto and made a part hereof, for the project known as Union Square Early Action Projectand the Principal and Surety bind themselves to the Owner for the performance of the contract.

Now, therefore, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with

or without notice to the Surety and during the guaranty period set forth in the contract, and if it shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by a reason of failure to do so, and shall reimburse and repay the Owner all outlay and expenses which the Owner may incur in making good any default, then this obligation shall be void; otherwise, this bond shall remain in full force and effect; provided, further, that the said Surety for value received hereby agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder of the specifications accompanying the same shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications. Provided, further, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed on this day of _,2014.

CONTRACTOR AS PRINCIPAL	SURETY
_____	_____
(Signature)	(Signature)
Name and Title:	Name and Title:
SEAL	SEAL

Payment Bond

We, the undersigned,

_____,
(Name of Contractor)

_____,
(Address of Contractor)

___, hereinafter called Principal, and
(Corporation, Partnership, or Individual)

_____,
(Name of Surety)

_____, (Address of Surety)

hereinafter called Surety, are held and firmly bound unto CITY OF SOMERVILLE, 93 Highland Avenue, Somerville, MA 02139, hereinafter called Owner, in the penal sum of Dollars

($__) in lawful money of the United States, for the payment of which sum well and truly to be made. We hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

The condition of this obligation is such that the Principal entered into a certain contract with the Owner, dated the _day of _, 20_, a copy of which is attached hereto and made a part hereof, for the project known as Union Square Early Action Project.

Now, therefore, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials used in connection with the

work, and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void; otherwise this bond is remain in full force and effect. Provided, further, that the said Surety for value received hereby agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder of the Specifications accompanying the same shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

Provided, further, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed on this day of _, 2014.

CONTRACTOR AS PRINCIPAL	SURETY
----------	----------
(Signature)	(Signature)
Name and Title:	Name and Title:
SEAL	SEAL

MEETING OF THE BOARD OF DIRECTORS

CERTIFICATE OF AUTHORITY

_20

At a meeting of the Directors of the

____duly called and held at __on the day of _20_, at which a quorum was present and acting, it was

VOTED THAT

the __of this corporation is hereby authorized and empowered to make, enter into, sign, seal and deliver, in behalf of this corporation, a Contract for Union Square Early Action Projectwith the City of Somerville, and performance and payment bonds (each in the full amount of the Contract) in connection with such Contract.

I DO HEREBY CERTIFY that the above is a true and correct copy of the record, that said vote has not been amended or repealed and is in full force and effect on this date, and that __is duly elected of this corporation.

ATTEST:

_____

Clerk or Secretary of the Corporation

(Affix Corporate Seal Here)

Part 1, Section 4: OTHER BID DOCUMENTS

Sample Contract

UNION SQUARE EARLY ACTION PROJECT
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01001 GENERAL NOTE FOR THE TECHNICAL SPECIFICATIONS:

The Massachusetts Department of Transportation (MassDOT), Highway Division Standard Specifications for Highways and Bridges (herein titled "Standard Specifications" and "MHD Standard Specifications") shall be considered part of these Technical Specification where referenced herein. The term "MHD" shall mean MassDOT Highway Division.

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01002 GENERAL EARTHWORK REQUIREMENTS

DESCRIPTION

The work specified below consists of excavation, backfill, compaction, support of excavation, and groundwater control for the purposes of roadway and sidewalk construction, utility construction, and other incidental work.

The Contractor shall perform all excavations of whatever materials encountered, except rock, in a manner as required to allow for placing of temporary earth support, concrete plug, forms, installation of pipe and or structure and other work, and to permit access for the purpose of observing the work.

Soil testing shall be carried out to verify proper soil bearing capacities for foundations. The Engineer shall be notified immediately if unstable or unsuitable soil is found at the bottom of the foundation excavations.

All unsuitable material shall be removed within the limits of the foundations, as directed by the Engineer, and replaced with a well graded Gravel Borrow as specified under Item 151-001.

Excavations shall be to such widths as will give suitable space for the required work and stability of the sidewalls. Bottoms of trenches and excavations shall be protected from frost and shall be firm, dry and in an acceptable condition to receive the work. Work shall not be placed on frozen surfaces nor shall work be placed on wet or unstable surfaces.

All excavations made in open cut will be controlled by the conditions existing at that location. In no case shall earth be excavated or disturbed by machinery so near to the finished subgrade of structures and pipelines as to result in the disturbance of the supporting earth without proper support or protection. All excavations should be accomplished with a smooth faced bucket or by hand.

EXCAVATION CLASSIFICATIONS

Refer to description of classifications of excavation in Items 120-021 and 120-031.

GENERAL REQUIREMENTS

BLASTING

Blasting is not permitted.

PERMITS, CODES, AND SAFETY REQUIREMENTS

Comply with all rules, regulations, laws and ordinances of the municipality, the Commonwealth of Massachusetts, and other authorities having jurisdiction over the project site or work. All labor, materials, equipment and services necessary to make the work comply with these requirements shall be provided by the Contractor without additional cost to the City.

Comply with the provisions of the Manual for Accident Prevention in Construction of the Associated General Contractors of America, Inc., and the requirements of the Occupational Safety and Health Administration, United States Department of Labor.

The Contractor shall obtain and pay for all permits and licenses required to the complete work.

For Traffic Management requirements, refer to the Section 01015 and Item 850-002.

The Contractor shall notify "Dig Safe" at 1-888-DIG-SAFE and all utility companies at least 72 hours (excluding Saturdays, Sundays and Massachusetts legal holidays) prior to commencing any excavation work.

The Contractor shall provide police details when working in roadways as required by local jurisdictional authorities. Refer to Item 850-001.

PROTECTION OF EXISTING CONDITIONS

All work shall be executed in such a manner as to prevent any damage to existing buildings, streets, curbs, paving, service utility lines, structures and adjoining property.

Locate and mark underground utilities to remain in service before beginning the work. Protect all existing utilities to remain in service during operations. Do not interrupt existing utilities except when authorized in writing by authorities have jurisdiction unless otherwise indicated on the Contract Drawings.

When an active utility line is exposed during construction its location and elevation shall be recorded on the Record Drawings by the Contractor and both the Engineer and the Utility Owner shall be notified in writing. Active utilities existing on the site shall be carefully protected from damage or relocated as required by the work.

Inactive or abandoned utilities encountered during construction operations shall be removed, plugged, capped or filled. The location of such utilities shall be recorded on the Record Drawings.

Provide barricades, fences, lights, signs, and all other safety devices required to protect the public against injury. Refer to Item No. 850-002.

In case of any damage or injury caused in the performance of the work the Contractor shall, at his own expense make good such damage or injury to the satisfaction of, and without cost to the City.

Existing streets, sidewalks and curbs adjacent to the project site damaged during the project work shall be repaired or replaced in kind.

Acceptance of any of the Contractor's plans, design calculations and methods of construction by the Engineer shall not relieve the Contractor of the responsibility for the adequacy of the excavation lateral support system; preventing damage to existing or new structures, utilities and streets adjacent to excavations; the safety of persons working within excavated areas and the public at large; and excavation dewatering.

MATERIALS

Backfill materials shall conform to the following material descriptions and gradation requirements.

1. Ordinary Borrow: Ordinary Borrow is specified under Item 150-001.

2. Gravel Borrow: Gravel Borrow shall be as specified under Item 151-001.

3. Crushed Stone: Crushed Stone shall be as specified under Item 156-002.

SAMPLING

The backfill materials shall be obtained from a source with no known contamination. The supporting certification shall be submitted for the initial material source for each additional source the Contractor proposes. The source information shall be current – no greater than one month old.

Representative 50-pound samples of the proposed material shall be collected at the source in the presence of the Engineer. This activity shall be coordinated with the City. The Contractor shall deliver fifty-pound samples for each sample of source material to the project site, and fifty-pound samples to the City's testing laboratory at 164 Pond Street, Stoneham, MA 02180. The Contractor shall also take photographs of material piles at the source, and provide these to the City. All submittals shall be identified by Contractor's name, project name, and source information. Source information shall include the name, address, and location of the borrow area; the ownership of the source; the location of the samples from within the borrow area; and the date and method of sampling. Each sample shall be accompanied by particle size results, including gradation curves (based on screening and visual methods), and computational sheets. Approval of the gradation of the sample submitted will be based on the City's evaluation and testing. Approval of the sample submitted does not imply blanket approval of the source.

CONSTRUCTION METHODS

GENERAL

The Contract Drawings indicate the proposed finish alignment, elevation, and grade of the work. Establish the line and grade in close conformity with the Contract Drawings. The Engineer, however, may make minor adjustments in the field as necessary due to conditions encountered.

The Contractor is responsible for establishing construction phasing, means, and methods and interim grading and temporary conditions required to attain the finish product required by the Contract Documents. The Contractor is responsible for all construction, protection, movement, and maintenance of stockpiles. Establish and maintain suitable benchmarks and grade control to accurately perform the work.

All excavation shall be performed in the dry. Excavation and dewatering shall be accomplished by methods, which preserve the undisturbed state of the subgrade soils.

No excavation will be permitted below a line drawn downwards at 2 horizontal to 1 vertical from the underside of the closest edge of any in-place footing or utility at a higher elevation without providing adequate sheeting and bracing to prevent movement of the in-place footing or utility.

When excavations have reached the prescribed depths, the condition of the bottom of the trench or hole shall be inspected by the Engineer. After inspection the Contractor will receive approval to proceed if conditions meet project requirements.

No excavation shall be deposited or stockpiled at any time to endanger the traveling public or portions of new or existing structures, either by direct pressure or indirectly by overloading banks contiguous to the operation. Material, if stockpiled, shall be stored so as not to interfere with the established sequence of the construction. If there is not sufficient area available for stockpiling within the limits of the project, the Contractor will be required to furnish his own area for stockpiling.

When the Contract Drawings require excavation in areas in close proximity to existing buildings, roads, structures and utilities it shall be the responsibility of the Contractor at its expense to use satisfactory

means and methods to protect and maintain the stability of such roads, and structures located immediately adjacent to but outside the limits of excavations.

Old foundations and/or structures and other obstructions may be encountered during excavation, and shall be brought to the attention of the Engineer for resolution. Unless directed otherwise, such obstructions shall be removed to a minimum of 1 foot below base of proposed structure, or as directed by the Engineer.

Provide shoring, sheeting, and/or bracing at excavations, as required, to assure complete safety against collapse of earth at the side of excavations. Provide shoring of public utility lines where exposed in the excavations in accordance with rules and regulations of the local authorities.

TRENCH EXCAVATION
Trench excavation shall be carried out to the lines and grades as specified herein and shown on the Drawings.

Trenches may be excavated to their full depth by machinery provided that the material remaining at the bottom of the trench is no more than slightly disturbed.

The Contractor should anticipate that due to existing utility lines, some hand excavation will be required.

Trench excavation shall result in a flat or shaped trench bottom, true to grade so that the pipe will have uniform and continuous bearing on a firm support. Trenches shall be made as narrow as practicable, and every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling and compaction is completed.

UNATTENDED TRENCHES

A. The Contractor shall secure all unattended trenches in accordance with the provisions of the Summary of 520 CMR 14.00 et. seq. attached hereto.

B. A Permit for Trench Excavation, issued in accordance with G.L. c. 82A, §§1-5 and 520 CMR 14.00 et. seq, shall be obtained before performing any trench excavation. There will be no fee for this application.

TEMPORARY EARTH SUPPORT
The Contractor shall furnish, place and maintain such sheeting, shoring, and bracing at locations necessary to support the sides of excavations to prevent danger to persons or damage to adjacent pavements, facilities, utilities, or structures; to prevent injurious caving or erosion or the loss of ground; and to maintain pedestrian and vehicular traffic as required by the Contract Documents, the Contractor's sequence of construction, and as directed by the Engineer.

In all sheeting, shoring and bracing operations, care shall be taken to prevent collapse of excavations, injury to persons or damage to adjacent structures, facilities, utilities and services. Any injuries to persons shall be the responsibility of the Contractor; and any damage to the work occurring as a result of settlement, water or earth pressure, or other causes due to inadequate bracing or other construction operations of the Contractor shall be satisfactorily repaired and made good by the Contractor, at no additional expense to the City.

Where sheeting is to be used, it shall be driven ahead of excavation operations to the extent practicable so as to avoid the loss of material from behind the sheeting; where voids occur outside of the sheeting, they shall be filled immediately with Ordinary Borrow, thoroughly compacted.

Earth support system shall be installed with adequate clearance to avoid any interference with the permanent structure.

The earth support system shall be capable of providing a watertight excavation under non-flood conditions.

All sheeting and bracing shall be removed.

The Contractor shall comply with all federal, state, and local safety regulations, and requirements.

GROUNDWATER CONTROL

The Contractor shall provide, at its own expense, adequate pumping and drainage facilities to maintain the excavated area sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures nor cause excessive disturbance of underlying natural ground. The flows of all water resulting from pumping shall be managed so as not to cause erosion, siltation of drainage systems, or damage to adjacent property. Prior to discharge, all groundwater shall be filtered by temporary settling basins or filter media.

Any damage resulting from the failure of the dewatering operations of the Contractor, and any damage resulting from the failure of the Contractor to maintain all the areas of work in a suitable dry condition, shall be repaired by the Contractor, as directed by the Engineer, at no additional expense to the City. The Contractor's pumping and dewatering operations shall be carried out in such a manner as to prevent damage to the Contract work and so that no loss of ground will result from these operations. Precautions shall be taken to protect new work from flooding during storms or from other causes. Pumping shall be continuous to protect the work and/or to maintain satisfactory progress.

All pipelines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected. Water from the trenches, excavations, and storm drain and utility construction operations shall be disposed of in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.

The Contractor shall control the grading in the areas surrounding all excavations so that the surface of the ground will be properly sloped to prevent water from running into the excavated area. Upon completion of the work and when directed, all areas shall be restored by the Contractor in a satisfactory manner and as directed.

FILLING AND BACKFILLING

The subgrade shall be shaped to line, grade, and cross-section, and be thoroughly compacted in accordance with the requirements herein. This operation shall include any required reshaping and wetting to obtain proper compaction. All soft or otherwise unsuitable material shall be removed and replaced with suitable material from excavation or borrow. The resulting area, and all other low sections, holes, or depressions shall be brought to the required grade with accepted material and the entire subgrade shaped to line, grade and cross-section and thoroughly compacted.

All fills shall be placed in horizontal layers. Fill shall not be placed following the natural contours of the ground. Fill shall be placed starting in the lowest areas working up to finish grades in horizontal layers in

the manner specified herein. Each layer of fill shall be benched into the existing slope in order to avoid the formation of a shear plane.

Unless otherwise specified or directed by the Engineer, material used for filling and backfilling shall meet the material requirements specified herein. In general, the material used for backfilling storm drain and utility trench excavations shall be material removed from the excavations provided that the reuse of these materials result in the required trench compaction and meets the requirements specified for Ordinary Borrow. All backfill placed for structure and pipe bedding shall be Gravel Borrow unless otherwise specified. In areas where the bottom of the excavation is in fine sand and silt, and is below the groundwater table, the first lift of backfill may be 12 inches of compacted crushed stone to provide a working mat and drainage layer. Place backfill to a maximum loose lift thickness of 12 inches. Maintain backfill material with uniform moisture content, with no visible wet or dry streaking, between plus two percent and minus three percent of optimum moisture content. The final filled soil mass shall be as uniform as possible in lift thickness, moisture content, and effort required to compact soil mass.

TRENCH BACKFILL

After the storm drain or utility pipe or conduit installation has been inspected and approved, trenches shall be backfilled as soon as practicable with specified material. All trench backfilling shall be done with special care.

Backfill material for pipe bedding shall be deposited in the trench, uniformly on both sides of the pipe or conduit, for the entire width of the trench to the springline of the pipe or conduit. The backfill material shall be placed by hand shovels, in layers not more than 8 inches thick in loose depth, and each layer shall be thoroughly and evenly compacted by tamping on each side of the pipe to provide uniform support around the pipe or conduit, free from voids.

The balance of backfill shall be spread in layers not exceeding 12 inches in loose depth. Each layer shall be thoroughly compacted by mechanical methods and shall contain no rock, stones or boulders larger than **4 inches** in their greatest dimension.

All trench backfilling shall be done with special care and must be carefully placed so as not to disturb the work at any time; if necessary, a timber grillage or other suitable method shall be used to break the fall of the material. The moisture content of the backfill material shall be such that proper compaction will be obtained. Puddling of backfill with water will not be permitted. Backfill within areas to receive topsoil or pavement construction shall be made to grades required to establish the proper subgrade for the placement of topsoil or pavement base courses.

In backfilling trenches, each layer of backfill material shall be moistened and compacted to a density at least equal to that of the surrounding undisturbed earth, and in such a manner as to permit the rolling and compaction of the filled trench or excavation with the adjoining earth to provide the required bearing value, so that paving of the excavated and disturbed areas, where required, can proceed immediately after backfilling is completed.

Any trenches or excavations improperly backfilled or where settlement occurs shall be reopened, to the depth required to achieve proper compaction, then refilled and compacted with the surface restored to the required grade and condition, at no additional expense to the City.

During filling and backfilling operations, pipelines will be checked by the Engineer to determine whether any displacement of the pipe has occurred. If the observation of the pipelines shows poor alignment, displaced pipe or any other defects they shall be remedied in a manner satisfactory to the Engineer, at no additional cost to the City.

BACKFILLING AGAINST STRUCTURES

Backfilling against masonry or concrete shall not be done until permitted by the City. The Contractor shall not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected, without distortion, cracking or other damage. As soon as practicable after the structures are structurally adequate and other necessary work has been satisfactorily completed and approved, special leakage tests of the structures shall be made by the Contractor, as specified elsewhere in the Specifications. After the satisfactory completion of leakage tests and the satisfactory completion of any other required work in connection with the structures, the backfilling around the drainage structures shall proceed using suitable and approved excavation material. The best of the backfill material meeting requirements of Ordinary Borrow shall be used for backfilling against structures. Just prior to placing backfill, the areas shall be cleaned of all excess construction material and debris and the bottom of excavations shall be in a thoroughly compacted condition.

Symmetrical backfill loading shall be maintained. Special care shall be taken to prevent any wedging action or eccentric loading upon or against the structures. During backfilling operations, care shall be exercised that the equipment used will not overload the structures in passing over and compacting these fills. Except as otherwise specified or directed, backfill shall be placed in layers not more than 12 inches in loose depth and each layer of backfill shall be compacted thoroughly and evenly using approved types of mechanical equipment. Each pass of the equipment shall cover the entire area of each layer of backfill.

In compacting and other operations, the Contractor shall conduct his operations in a manner to prevent damage to structures due to passage of heavy equipment over, or adjacent to, structures, and any damage thereto shall be made good by the Contractor at no additional expense to the City.

After backfilling trenches and excavations, the Contractor shall maintain the surfaces of backfill areas in good condition so as to present a smooth surface at all times level with adjacent surfaces. Any subsequent settling over backfilled areas shall be repaired by the Contractor immediately, and such maintenance shall be provided by the Contractor for the life of this Contract, at no additional cost to the City.

COMPACTION

Compaction Requirements: The degree of compaction is expressed as a percentage of the maximum dry density of the material at optimum moisture content as determined by ASTM Test D1557, Method C. The compaction requirements are as follows:

Area	ASTM Density Degree of Compaction
Below structures	95%
Pavement base course	95%
Pavement and walkway subgrade	95%
General fill below pavement subbase	95%
Trench backfill - below pavements	95%
- below landscaped areas	92%
- below structures	95%
Placement of Item 125-481 material	
- below walkway	95%
- below landscaped areas	(Note 1)
All other areas	90%

Note 1. Shape and compact by passing of bulldozer.

Moisture Control:
Fill that is too wet for proper compaction shall be disced, harrowed, or otherwise dried to a proper moisture content to allow compaction to the required density. If fill cannot be dried within 24 hours of placement, it shall be removed and replaced with drier fill.

Fill that is too dry for proper compaction shall receive water uniformly applied over the surface of the loose layer. Sufficient water shall be added to allow compaction to the required density.

Unfavorable Conditions:
In no case shall fill be placed over material that is frozen. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by heavy rains, fill operations shall not be resumed until the moisture content and the density of the previously placed fill are as specified.

In freezing weather, a layer of fill shall not be left in an uncompacted state at the close of the day's operations. Prior to terminating work for the day, the final layer of compacted fill shall be rolled with a smooth wheeled roller to eliminate ridges of soil left by compaction equipment.

Compaction Control:
In-place density tests shall be made in accordance with ASTM D1556, D2922, or D2167 as the work progresses, to determine the degree of compaction being attained by the Contractor. Any corrective work required as a result of such tests, such as additional compaction, or a decrease in the thickness of layers, shall be performed by the Contractor at no additional expense to the City. In-place density testing shall be made at the Contractor's expense by the geotechnical testing laboratory.

In-place density tests shall be performed at a minimum of one per trench and one test per lift for roadway and sidewalk subgrade and pavement courses.

DISPOSAL
All excess and unsuitable excavated soil shall be removed from the site and legally disposed off-site by the Contractor.

BASIS OF PAYMENT

Trench Excavation for Sewer, Storm Drainage, Water, Lighting, Traffic Conduit, and Other Utilities:
The payment of excavation, backfill, backfill materials, dewatering, and temporary earth support, unless otherwise noted, are included under the items of work that it pertains to.

Support of Excavation and Groundwater:
The cost of Support of Excavation and Groundwater Control will be considered incidental to the Items of work to which they pertain.

Other Earthwork:
Refer to the various Items of work for measurement and payment.

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Attachment to 01002 General Earthwork Requirements

Summary of 520 CMR 14.00, et. seq.

All Unattended Trenches in public ways and at fixed work sites other than on a public way shall be secured with covers or barriers to prevent unauthorized entry and provide protection for the General Public in accordance with the provisions specified herein. The Issuing Authority may require any additional, site-specific provisions it deems necessary to protect the General Public as a condition to any permit issued.

Trenches on Public Ways:

A. Covers: 3/4 inch thick steel metal plates, placed over the Trench, level and physically secured

1. Trench covers subject to vehicle traffic shall be suitable for H20 loading.

B. Barriers shall be:

1. continuous and surround the entire Trench perimeter

a. barriers with multiple sections shall have no more than four inches between each section
b. adjacent sections shall be securely fastened to each other

2. not less than six feet in height

a. openings between the ground and barrier shall not exceed four inches

3. strong with stable support

a. barriers adjacent to high speed traffic may include traffic control barrels ballasted by sandbags or temporary pre-cast concrete barriers as components

4. easily visible to motorists

5. a sufficient distance from the Trench to be unaffected by changing conditions of the Trench site

Trenches at Fixed Work Sites Other than on a Public Way:

A. Covers: 3/4 inch thick steel metal plates, placed over the Trench, level and physically secured

1. Trench covers subject to vehicle traffic shall be suitable for H20 loading.

Attachment to 01002 General Earthwork Requirements

B. Barriers and Gates:

1. Barriers shall be:

   a. continuous and surround the entire Trench perimeter

      i. barriers with multiple sections shall have no more than four inches between each section
      ii. adjacent sections shall be securely fastened to each other

   b. not less than six feet in height

      i. openings between the ground and barrier shall not exceed four inches

   c. clearly marked on all sides with signs indicating "Danger-Do Not Enter", "Authorized Personnel Only" or equivalent warning

   d. a sufficient distance from the Trench to be unaffected by changing conditions of the Trench site

2. Fence-type barriers shall be secured by vertical support members not more than ten feet apart

   a. fencing spaces shall not exceed four inches when measured as mesh size or between slats
   b. all horizontal support members shall be located on the Trench side of the barrier

3. Solid barriers shall not contain holes or indentations larger than four inches

   a. the wall of a dwelling or other permanent structure of a height of not less than six feet may serve as part of the barrier provided it complies with all of the provisions specified herein

4. Gates and other means of egress shall:

   a. comply with the size and strength provisions of specified above
   b. be securely fastened to adjacent barrier components
   c. allow not more than four inches between gates and barrier components
   d. be securely locked with a padlock, combination lock, or other suitable locking device

Alternative Provisions

Continuous personal monitoring of the Unattended Trench by the Permit Holder or by person(s) under the control and direction of the Permit Holder may be substituted for the provisions specified herein.

End of Attachment to 01002 General Earthwork Requirements

01012 PROJECT COORDINATION

COORDINATION WITH ONGOING CONSTRUCTION

A. Webster Avenue Water Main Rehabilitation

1. Work includes cleaning and lining of existing water main in Webster Avenue from Union Square to Cambridge Line.

2. Contractor is scheduled to be completed within the limits of this Project by the end of July 2015.

B. Green Line Extension (GLX)

1. Work includes construction of an extension of the Green Line from Lechmere with a branch ending at a new station at Prospect Street, adjacent to the bridge over the Fitchburg Line.

2. Construction will be ongoing concurrent with this Project.

3. Provide access for the GLX contractor from the GLX construction site to Prospect Street at Bennett Street and other designated access points.

C. Residential Construction on Washington Street

1. Work includes construction of new residential structure along the north side of Washington Street. Work also includes construction of a sidewalk extension adjacent to the construction site.

2. Construction will be ongoing concurrent with this Project.

3. Provide access for the site construction contractor to Washington Street.

4. Coordination the exact layout of traffic signing and striping in the vicinity of this site.

D. Eversource (formerly NSTAR) Construction on Prospect Street

1. Construction will be ongoing concurrent with this Project.

2. Provide access for the utility's contractor to Prospect Street.

COORDINATION WITH MBTA BUS OPERATIONS

A. MBTA operates six bus routes within the Project area.

B. The Contractor shall allow the MBTA to operate these bus routes without construction-related delays.

C. The Contractor shall maintain access for the MBTA buses to stop at all signed bus stops at times.

1. If the Contractor determines that in order to perform the Work of this Contract, it is necessary to restrict access to a bus stop, the Contractor must first obtain permission from the MBTA to temporarily relocate the bus stop.

D. The Contractor shall meet with the City, the Engineer and the MBTA to coordinate the scheduling for the change in Route 91 and the changes to the bus stop signs accordingly.

COORDINATION WITH MWRA

A. MWRA owns the Spot Pond East Supply Main in Webster Avenue.

B. The Contractor shall not interfere with the operation of the supply main and shall provide 24/7 access for the MWRA to the various valves within the Project Area.

C. Prior to the start of construction, the Contractor shall obtain an MWRA 8(m) permit.

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01015 SEQUENCE OF WORK

GENERAL

A. This section includes:

1. Contractor work hours

2. Constraints:
   a. Maintenance to traffic patterns
   b. Maintenance of utility service

3. Switchover to two-way operations

4. Milestones

CONTRACTOR WORK HOURS

The normal work hours shall be 7 am to 7 pm, 7 days per week.

No work shall be performed at other hours without prior written approval from the City.

CONSTRAINTS

A. Maintenance of traffic patterns

1. Maintain the existing one-way traffic pattern on Webster Avenue and Prospect Street until the designated weekend switchover to two-way operations.

2. Prior to the switchover to two-way operation, maintain all traffic signage and traffic control signal systems in the current configuration to support one-way operations.

3. Prior to the switchover to two-way operation, new traffic control equipment may be installed, but shall be covered and not placed in operation.

4. Prior to the switchover to two-way operation, new traffic signage may be installed, but shall be covered until the switchover.

5. Prior to the switchover to two-way operations, maintain:

   a. At least one southbound traffic lane on Webster Avenue

   b. At least one northbound traffic lane on Prospect Street

   c. At least one eastbound and one westbound traffic lane on Somerville Avenue.

6. At all times, maintain access to Everett and Emerson Streets via Newton Street.

   a. Newton Street between Everett and Prospect Streets may be closed for sewer, water, and speed table construction.

B. Utility service:

1. Water service: Maintain water service at all time, except:

a. Connection to 20-inch water main on Newton Street: one 8-hour shutdown will be allowed.

2. Sewer and storm drain: Maintain flow in existing lines at all times.

SWITCHOVER TO TWO-WAY OPERATIONS

A. The switchover from one-way to two-way operations on Webster Avenue and Prospect Street shall occur on a designated weekend switchover approved by the City.

B. Prior to the switchover:

1. Install and test (but do not activate) all new traffic signal control equipment.

2. Remove traffic islands as indicated on the Drawings (except island on the Washington Street approach to the Somerville Avenue/Prospect Street intersection).

3. Install new curb extensions

4. Install new wheelchair ramps.

5. At least 8 calendar days prior, complete cold and overlay Webster Avenue and Prospect Street. Install temporary tape pavement markings.

6. Install new traffic signage and cover it until the switchover.

7. Do not remove any traffic signage or traffic control system elements that support the current one-way traffic operations. If necessary, the Contractor may temporarily relocate signal heads as approved by the Engineer.

8. Meet with the City, the Engineer and MBTA Bus Operations to coordinate the timing of the switchover with regard to the rerouting of Route 91 outbound and the relocation of bus stops.

B. Switchover – General Sequence:

1. Step 1(Phase A and B): Webster Avenue

a. Ban all parking on Webster Avenue

b. Restrict traffic to a single 12-ft. southbound lane on the west side of Webster Avenue.

c. Stripe DYCL for two-way operations and channelizing island at southbound approach to Prospect Street

d. Shift traffic to a single 12-ft southbound lane on the east side of Webster Avenue.

e. Stripe southbound left turn lane at Prospect Street and bicycle lanes on Webster Avenue

f. Unwrap traffic and parking signage for two-way operations.

g. Provide traffic officers at signalized intersections.

h. Initiate two-way operations

i. Activate new signal system at Webster/Washington/Somerville Av. Intersection and Webster Street/Prospect Ave (note Prospect SB will remain covered).

h. MBTA will reroute Route 91 prior to Step 2.

2. Step 2 (Phase A and B): Prospect Street

a. Close Prospect Street to all traffic (Webster to Somerville Avenue) and detour via Webster Avenue.

b. Stripe DYCL for two-way operations, bicycle lane, and northbound left turn lane at Somerville Avenue intersection.

c. Unwrap traffic and parking signage for two-way operations.

d. Provide traffic officers at signalized intersections.

e. Remove existing island and mast arm on Washington Street SB at Prospect Street/Somerville Avenue intersection.

e. Initiate two-way operations. Remove detour signage.

f. Activate new signal system at Webster/Prospect and Prospect/Somerville Av. intersections.

2. Step 3: Miscellaneous pavement markings

a. Complete any pavement markings not installed in Steps 1 and 2.

b. Remove traffic and parking signage in support of one-way operations.

MILESTONES

A. Milestone 1: Completion of cold planing and overlay work.

1. **November 3, 2015**.

B. Milestone 2: Completion of permanent striping and switchover to two-way operations on Webster Avenue and Prospect Street.

1. **November 16, 2015**.

01025 MEASUREMENT & PAYMENT

DESCRIPTION:

A. Measurement and payment for all items of the Work shall be as specified in this section.

B. Lump sum and unit price items referenced in this section are the prices bid in the Bid Schedule contained in Section 00300.

C. All portions of the Work are either included in a lump sum bid item or a unit price bid item listed in the Bid Schedule.

D. Payment for all Work shall be in compliance with the Contract Documents, and shall be in accordance with the unit prices bid and the accepted Schedule of Values.

1. Work for which there is not a separate item will be considered incidental to the Contract and no additional compensation will be allowed.

LUMP SUM BID ITEMS:

A. Payment of each lump sum shall be full compensation for all labor, materials, and equipment required to furnish, install and test the Work covered under the lump sum items.

B. Payment of the lump sum shall fully compensate the Contractor for any other work which is not specified or shown, but is necessary to complete the Work.

C. Payment of the lump sum will be based on physical progress for each activity in accordance with the approved Schedule of Values.

UNIT PRICE BID ITEMS:

A. Payment of a unit price shall be full compensation for all labor, materials, and equipment required to furnish, install, and test each unit of Work covered under the applicable item.

B. Payment of unit price bid items will only be made for the actual quantity of Work performed in accordance with the Contract Documents.

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01045 CUTTING & PATCHING

GENERAL:

A. Provide protective devices to safeguard all Work and existing facilities during cutting and patching operations.

B. Saw cut HOT MIX ASPHALT pavement at limits of paving.

C. Saw cut sidewalks at limit of new concrete sidewalks or new concrete wheelchair ramps.

1. Saw cut concrete sidewalks only at existing score lines. Do not saw cut between score lines.

D. Remove and dispose of materials in a manner to prevent damage to adjacent facilities or materials.

1. Remove and dispose of materials which are not salvageable from site.

E. Restore all Work and existing facilities affected by cutting operations with new materials, or with salvaged materials acceptable to the City.

1. Obtain a finished installation with strength, appearance, and functional capacity equal to original or better.

2. Patch and refinish entire surfaces if necessary.

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01050 FIELD ENGINEERING

SUMMARY:

A. Section Includes:

1. Examination of site and conditions of construction.
2. Confirmation of construction easements.
3. Record Project Documents.

SUBMITTALS:

A. Submit in accordance with Section 01300 and the following:

1. Qualifications of Contractor's Professional Land Surveyor.

B. Record Drawings:

1. Submit monthly with payment request:

a. Submit each month with project invoices: copies of survey notes and Record Drawings indicating the as-built information of completed Work.

b. **Payment will not be made for any Work that is completed but is not correctly indicated in the monthly submittal of as-built information on the Record Drawings.**

2. Submit at Contract Close-out:

a. As a condition of final acceptance and payment, submit a full set of Record Drawings indicating all as-built locations and dimensions of work prepared by a Professional Land Surveyor from the ground survey. The Contractor shall include a statement on the cover sheet indicating that the Record Drawings contain all as-built information and that the Contractor has verified the information shown on the Record Drawings.

QUALITY ASSURANCE:

The layout of the Work and the establishment of line and grade shall be performed by a Registered Land Surveyor licensed in the Commonwealth of Massachusetts. The surveyor shall have at least five years experience in the layout of construction work with at least three years experience in the layout of pipeline work.

FIELD ENGINEERING REQUIREMENTS:

A. Verification of Conditions:

1. Before starting operations, examine the site to become acquainted with conditions to be encountered.

2. Notify DIG SAFE, utilities, and Somerville DPW prior to excavation.

3. Obtain MWRA 8(m) Permit prior to excavation

4. Verify exact locations of sewers, drains, local water mains, gas mains, above or below ground electrical wires, other utilities and conduits and structures that may interfere with Work.

5. Verify locations and dimensions of utilities at all tie-in locations before ordering piping, fittings, structures and other materials.

    a. Take test pits to confirm the existing conditions at each tie-in location.

B. Environmental Requirements:

1. Unfavorable Construction Conditions:

    a. During unfavorable weather, wet ground, or other unsuitable construction conditions, confine operations to work which will not be affected adversely by such conditions.

    b. No portion of Work shall be constructed under conditions which adversely affect quality or efficiency.

C. Field Measurements:

1. Lines and Grades:

    a. All Work shall be performed to lines, grades, and elevations indicated on Drawings.

    b. The Contractor is responsible for the layout of the Work and the establishment of line and grade.

    c. Establish basic horizontal and vertical control points.

    d. Perform all additional survey, layout, and measurement Work.

        1) Furnish survey crew under charge of a Professional Land Surveyor registered in the Commonwealth of Massachusetts, and such instruments, tools, stakes, and other materials required to complete survey, layout, and measurement Work, inclusive of:

            a) Establishing or designating horizontal and vertical control points.

            b) Establishing construction work area boundaries.

            c) Checking survey, layout, and measurement of the Work.

            d) For utility lines, provide horizontal and vertical control points every 50 feet.

    e. Remove and reconstruct Work which is improperly located at no additional cost to the City.

D. Connections to Existing Facilities:

1. Make all necessary connections to existing facilities as indicated on Drawings.

2. Contractor shall notify the Engineer at least ten (10) days prior to undertaking connections that impact private or public utilities.

    a. Protect facilities against deleterious substances and damage.

3. Thoroughly plan in advance all connections to existing facilities that are in service.

    a. All required equipment, materials, and labor shall be on hand at time of undertaking connections to existing facilities in service.

E. Protection of Utilities and Underground Facilities:

1. Protect, shore, brace, support, and maintain all underground pipes, conduits, drains, and other underground construction uncovered or otherwise affected by construction operations.

PROJECT MONUMENTATION:

A. Establish control points (known coordinates) and bench marks along the alignment of the Project.

1. Existing horizontal control points and benchmarks will be provided by the Engineer.

B. Protect all existing monumentation within the project area. **See detail as indicated on the Drawings for protection of existing monumentation during active construction.**

C. Restore all existing survey monuments, property line markers, street and roadway layout monumentation, and other monumentation that is disturbed by the Work of the Contract.

PROJECT RECORD DOCUMENTS:

A. The Contractor shall maintain one set of the Project Record Documents at the site. The Project Record Documents shall be stored apart from other documents used for construction. The Project Record Documents shall be maintained in a clean, dry and legible conditions and shall not be used for construction purposes.

B. The Contractor shall maintain two sets of Record Drawings that indicated redline "as-built locations and dimensions of work".

1. The Record Drawings with as-built information shall be submitted monthly to the Engineer for verification and for payment.

2. The as-built locations shall include the survey notes and marked-up plans prepared by a Professional Land Surveyor (PLS) registered in the Commonwealth of Massachusetts. The format of this information shall be such that it can eventually be used for the final as-built plans.

3. The as-built information on the Record Drawings shall include the following:

    a. For storm drain and sewer lines: the rims, inverts, pipe sizes and pipe material, at all structures; horizontal and vertical locations of any bend between structures; bottom of sump elevation for catch basins; inverts, pipe sizes, and pipe material. Also provide the

coordinates of the center of the structure itself and coordinates of the cover or grate. See paragraph g. below for headwalls.

b. For water lines: horizontal and vertical locations every 50 feet on pipes, at all changes in grade or direction, at all fittings, at all valves, and at hydrants. Provide coordinates of hydrant, valve, and fittings.

c. Include the location of any existing utility that differs from the location indicated on the Plans.

d. Include the location of any uncharted utility encountered.

e. The location of new or existing underground utilities shall be obtained prior to backfilling the trench.

4. All deficiencies or errors noted by the Engineer shall be promptly corrected.

5. Field data shall be updated each month.

6. The Record Drawings shall be available for inspection by the Engineer at all times.

C. Indicate the following on the Final Record Drawings:

1. All as-built information surveyed by a Professional Land Surveyor based on the ground survey and completed in accordance with the standards established in CMR 250.6.02.

2. Rim elevations at all surface structures (catch basins, manholes, gate valves).

3. Invert elevations on all sewer pipes at sewer manholes.

4. Location of traffic signs, traffic signal posts, handholes, street light poles, crosswalks, wheel chair ramps, and other features collected as part of a topo survey.

5. The Final Record Drawings with as-built information shall be submitted in paper copy (1 set) plus electronic copies in two formats:

a. AutoCAD.

b. PDF format files.

6. Survey shall reference Massachusetts State Plane (NAD ’83) and NAVD 1988.

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01060 PERMITS

APPLICABLE REGULATIONS:

Comply with all Federal, State, and Local laws, and regulations concerning environmental pollution control and abatement, navigable waters, noise, air pollution, damage to archaeological resources and any other governing agencies. The Contractor shall comply with all laws, rules, regulations and ordinances promulgated by any authority having jurisdiction over the Work.

PERMITS OBTAINED BY THE CITY

None

PERMITS TO BE OBTAINED BY THE CONTRACTOR:

A. The Contractor is responsible for obtaining and paying for all permits, licenses, certifications or approvals that are not listed above, but that are required for the Work. These include, but are not limited to, building, electrical and other permits required of its equipment, work force, and of particular operations (such as transportation of equipment, materials, chemicals, fuel, hazardous or contaminated materials, items removed from the sites; use and storage of chemicals, and other materials; fuel storage; air emission; discharge of dewatering and/or storm drainage, whether to water bodies or to storm drainage systems; and the like) in the performance of the Work or the construction and removal of temporary construction facilities (such as temporary utilities including the provision of backwater preventers on temporary water services, above or below ground tanks, piping installation, piping removal, and chemical handling. Proper equipment shall be installed, tested and maintained in accordance with local, state, and federal requirements.

B. The Contractor is responsible for scheduling and coordinating inspections and receipt of local or state permits/approvals/certifications for any tanks, piping, and associated appurtenances which are constructed, tested or removed as part of this Contract. Receipt of approvals for storage and use of test chemicals/gasses is the responsibility of the Contractor.

C. In addition to the permits required to be obtained by the Contractor specified elsewhere in this section, the Contractor shall also obtain the following permits prior to the start of construction:

1. NPDES Notice of Intent & Stormwater Pollution Prevention Plan (SWPPP): Prior to the start of construction, the Contractor shall prepare and submit to the Environmental Protection Agency (US EPA) a Notice of Intent for Storm Water Discharge Associated with Construction Activity under an NPDES General Permit.

    a. This submittal shall include a site-specific Stormwater Management Plan prepared by a professional engineer registered in Massachusetts.

    b. All work in this Contract shall be performed in compliance with the SWPPP.

    c. The Contractor shall maintain one copy of the SWPPP on site at all times.

    d. Upon completion and acceptance of all Work by the City, the Contractor shall submit a Notice of Termination to US EPA.

2. NPDES General Permit for Construction Dewatering Activities: The Contractor shall apply for a NPDES General Permit for Construction Dewatering Activities from the US EPA and the MA DEP.

3. MWRA 8(m) Permit: The Contractor shall apply for and obtain an MWRA 8(m) Permit for work in the vicinity of the MWRA East Spot Pond Supply Main that is located in and adjacent to Webster Avenue.

SITE VISITS BY PERMITTING AGENCIES AND NOTIFICATION:

Certain permits require that a representative of the permitting agency be present at the site during the construction of certain items of work. The Contractor shall allow representatives of permitting or other regulatory agencies to have access to the work site.

Where such items of work will be backfilled or otherwise buried in the course of subsequent work, the requirement may be that the item of work is viewed by the representative of the permitting agency prior to backfilling or burying. The Contractor shall not backfill or bury the work to be viewed until the representative of the permitting agency has viewed the work.

In situations where site visits by the permitting agency are required, the Contractor shall be responsible for notifying the permitting agency in writing in compliance with requirements of such permit.

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01120 HEALTH AND SAFETY

HEALTH & SAFETY - GENERAL

A. The Contractor shall take all necessary precautions and provide all necessary safeguards to prevent personal injury and property damage. The Contractor shall provide protection for all persons, including, but not limited to his/her employees and employees of other contractors or subcontractors, members of the public, employees, representatives and agents of the City, members of regulatory agencies who may be on-site during this work or other work on-site.

B. The Contractor shall provide protection for all public and private property, including, but not limited to structures, pipes and utilities, above and below ground.

C. The Contractor shall provide and maintain all necessary safety equipment such as fences, barriers, signs, lights, walkways, guards and fire prevention and firefighting equipment and shall take such other action as is required to fulfill their obligations under this Section. All work under this contract shall be conducted in accordance with all applicable Federal, State and local municipal laws, regulations and ordinances pertaining to health and safety, and industry guidelines, including but not limited to the following.

1. National Institute for Occupational Safety and Health (NIOSH) applicable sections.

2. Occupation Safety and Health Administration (OSHA), Regulations 29 CFR applicable sections.

D. The Contractor shall designate a Health and Safety Coordinator with knowledge of all applicable safety and health codes, statutes and ordinances as well as best safety practices recognized by the construction industry. The Safety and Health Coordinator shall be able to demonstrate knowledge by verbal or written test and have the ability to ensure compliance with same. The Contractor shall notify the Engineer orally and in writing immediately should any unforeseen safety hazard or condition become evident during the performance of the Work. The Contractor shall take action to establish and maintain safe working conditions to safeguard employees, the public, and the environment.

HEALTH AND SAFETY PLAN (HASP):

A. The Contractor shall prepare a Health and Safety Plan (HASP) for all workers, including Subcontractors, onsite personnel, visitors and potential offsite receptors from potential chemical and physical hazards. The Contractor shall furnish all labor, materials and equipment necessary to implement health and safety procedures designed to protect health, safety, public welfare and the environment during the performance of all Work.

B. The Health and Safety Plan shall be in compliance with the health and safety standards set forth by Occupational Safety and Health Administration (OSHA) as described in 29 CFR1910.120 – Occupational Safety and Health Standards and 29 CFR 1926 – Safety and Health Regulations for Construction.

C. The HASP shall include the following:

1. Identification of Key Personnel: Identify field and office contacts, describing general function, lines and levels of Engineer, responsibility and communication. The names, addresses and telephone numbers shall also be provided in the plan.

2. Understanding of Project Work: Describe work activities to be performed by Contractor, including identification and understanding of field testing and any required permits (i.e., property access, street opening, environmental) to be obtained. Site controls to be utilized, including regulated areas (zone delineation) within work zone, security, communication and entry control procedures.

3. Identification of Chemical and Physical Hazards and Risks: Identify potential known chemical hazards and occupational exposure to contaminated soils and/or groundwater and physical hazards involved with such activities associated with trenching and excavation, use of electrical equipment and/or electrical installations, use of hand and power tools, heavy equipment, which may result in physical injury to a worker. This assessment shall also identify allowable exposure limits, potential routes of exposure, preventative and control measures and symptoms associated with the potential hazard.

4. Excavation Entry: Indicate how the Contractor will comply with the inspection, training, competent person and other relevant requirements of OSHA 29 CFR 1926-Subpart P-Excavations.

5. Personal Protective Equipment (PPE): Provide list, description and procedures for use of clothing, equipment and/or instrumentation to conduct work in Level D and Upgraded Level D protection, including procedures for self-decontamination and handling of clothing. Modified Level D protection shall be the minimum requirement for all on-sire personnel.

6. Respiratory Protection Equipment (RPE): Provide list, description and procedures for donning respirators. Information regarding the availability of RPE shall be clearly stated in the plan as well as indicators (i.e., change in work task or scope, weather conditions, new contaminants.)

7. Standard Operating Procedures: Provide Contractor's standard work practices during construction. Worker safety requirements for entering excavations shall be included and comply with 29 CFR 1926-Subpart P - Excavations.

8. Worker Training and Medical Requirements: All workers who will potentially come in contact with contaminated media shall have 40-hour OSHA HAZWOPER training, and possess a current annual refresher course/certificate and meet the annual medical monitoring surveillance requirements set forth by OSHA in 29 CFR 1910. Any workers required to use respirators shall be certified in use of said equipment. Copies of all training certificates shall be provided to the Engineer and/or documented in the plan.

9. Emergency Response Plans and Procedures: Describe procedures for handling workers injured by identified physical and/or chemical hazards, including availability and locations of first aid kits, eye wash equipment, and fire extinguishers. Plans and procedures shall describe means of communication for contacting emergency responders (i.e., fire, police, ambulance, hospital) and directions to the nearest medical facility or hospital.

10. Personnel Monitoring Program: The Personnel Monitoring Program shall identify and describe symptoms and treatment of conditions including but not limited to noise, sunburn, heat stress, frostbite and/or hypothermia associated with working outdoors.

11. Environmental Monitoring Program: An Environmental Monitoring Program, including but not limited to ambient air monitoring, will be required during trench excavation activities and while working in confined space. The Environmental Monitoring Program shall be designed to continuously monitor for total volatile organic compounds (TVOCs), oxygen. Methane and hydrogen sulfide and shall describe the type pf monitoring equipment, calibration and maintenance procedures and appropriate action levels in the event unsafe conditions are encountered. Results of Environmental Monitoring shall be used to assess the need and/or to upgrade the level of dermal and/or respiratory protection. The Engineer may conduct duplicate air monitoring for quality control purposes.

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01200 PROGRESS MEETINGS

A. Preconstruction Conference:

1. Prior to commencement of the Work, a preconstruction conference shall be held at a time and place designated by the Engineer.

2. The purpose of the conference is to designate responsible personnel and establish working relationship.

   a. Matters requiring coordination shall be discussed and procedures for handling such matters established.

   b. Agenda shall include:

      1). Initial Contractor schedule.

      2) Transmittal, review, and distribution of submittals.

      3) Processing applications for payment.

      4) Maintaining record documents.

      5) Critical work sequencing.

      6) Field Orders and Change Orders.

      7) Staging areas and use of City streets.

B. Progress Meetings:

1. Attend regular biweekly or weekly progress meetings.

2. Purpose of progress meetings:

   a. Review progress of Work and upcoming Work.

   b. Maintain coordination of efforts.

   c. Discuss changes in scheduling.

   d. Resolve other problems which may develop.

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01300 SUBMITTALS

The Contractor shall submit product data, shop drawings, samples, quality control submittals, working drawings, for review and approval as required by the Contract Documents.

DEFINITIONS:

A. **Approved**: No correction or marks.

B. **Approved as Noted**: Few minor corrections. All items may be fabricated as marked up without further resubmission. Resubmit corrected copy.

C. **Revise and Resubmit:** Minor corrections. Items not noted to be revised and corrected may be fabricated at the Contractor's option. Resubmit shop drawings per original submission with corrections noted. Thirty (30) days will be allowed for checking and appropriate action by the Engineer.

D. **Rejected-See Remarks:** Major corrections or not in accordance with Contract Documents. No items shall be fabricated. Correct and resubmit shop drawings per original submission. Twenty-one (21) days will be allowed for checking and appropriate action by the Engineer.

E. **Reviewed for Informational Purposes Only**: Items not reviewed or items for which submittals are not required.

F. "Equal:" For approval of an "equal" product that is not specified, "equal" shall mean as it is defined in MGL Chapter 30, Section 39M(b).

SUBMITTAL PROCESS:

A. Requirements:

1. General Submission Requirements:

a. Make submittals promptly in accordance with the approved construction schedule and in such sequence as to cause no delay in the work.

b. Submittal electronically as PDFs to:

Parsons Brinckerhoff, Inc.
75 Arlington Street, 9th floor
Boston, MA 02116
Attn: Rachel J. Burckardt
Burckardt@pbworld.com

c. Include:

1) Date of submission and the dates of any previous submissions.

2) Contract title ("Union Square Utility and Roadway Early Action Project") and IJB No. 15-105.

3) Submittal Identification Number consisting of the Specification Number, submittal number, and versions identification:

XXXXX-YYY-Z

where XXXXX = Specification Section or Bid Item No.
YYY = submittal number (start with 001 within each Section
Z = letter indicating a resubmittal (initial submittal is blank, first resubmittal is "A", 2nd is "B", etc.

4) The names of the following

(a) Contractor
(b) Supplier
(c) Manufacturer

5) Identification of the product or process, with the specification section or item number and paragraph number.

6) Field dimensions, clearly identified as such.

7) Relation to adjacent or critical features of the work or materials.

8) Applicable standards, such as ACI, ASTM, AASHTO, ANSI, ASME or FS numbers.

9) Identification of deviations from the Contract Documents.

10) Identification of revisions on resubmittals.

11) An 8-inch by 3-inch blank space for the Contractor's and Engineer's stamps.

a) Contractor's stamp, shall be initialed or signed, certifying to the review of the submittal, verification of products, field measurements and field construction criteria, proposed construction methods, and coordination of the information within the submittal with requirements of the work and of the Contract Documents.

d. For approval of an "equal" product that is not one of the products specified, submit evidence to Engineer that the "equal" product meets the requirements stated in MGL Chapter 30, Section 39M(b)

2. Shop Drawings:

a. Drawings shall be presented in a clear and thorough manner.

1) Details shall be identified by reference to applicable sheet and detail or schedule as shown on the Contract Drawings.

2) Drawings shall have sufficient detail to show the kind, size, arrangement and function of component materials and devices.

3. Product Data:

    a. Preparation:

        1) Clearly mark each copy to identify pertinent products or models.

        2) Show performance characteristics and capacities.

        3) Show dimensions and clearances required**.**

        4) Show wiring or piping diagrams and controls.

        5) Show external connections, anchorages and supports required.

    b. Manufacturer's standard schematic drawings and diagrams.

        1) Modify drawings and diagrams to delete information which is not applicable to the Work.

        2) Supplement standard information to provide information specifically applicable to the Work.

4. Samples:

    a. Office samples shall be of sufficient size and quantity to clearly illustrate;

        1) Functional characteristics of the product, with integrally related part and attachment devices.

        2) Full range of color, texture and pattern.

5. Quality Control Submittals:

    a. A Certificate of Compliance shall be submitted which clearly states that the materials being supplied comply with the materials specified.

6. Contractor's Responsibilities:

    a. Review Shop Drawings and Product Data prior to submission.

    b. Determine and verify:

        1) Field measurements.

        2) Field construction criteria.

        3) Catalog numbers and similar data.

        4) Conformance with Contract Documents.

    c. Coordinate each submittal with requirements of the Work.

d. **Notify the Engineer in writing, at time of submission, of any deviations in the submittals from requirements of the Contract Documents.**

C. Resubmission Requirements:

1. Make any corrections or changes in the submittals required by the Engineer and resubmit until accepted by the Engineer.

2. Shop Drawings, Working Drawings and Product Data.

   a. Revise initial drawings or data, and resubmit as specified for the initial submittal.

   b. Indicate any changes which have been made other than those requested by Engineer.

3. Samples:

   a. Submit new samples as required for initial submittal.

4. Affix stamp, and indicate requirements for resubmittal, or acceptance of submittal.

SUBMITTAL LOG:

A. Maintain an accurate updated submittal log and bring this log to each scheduled progress meeting. This log shall include the following items:

1. Submittal-description and number assigned.

2. Date submitted to the Engineer.

3. Date returned to the Contractor.

4. Status of submittal (Approved, Approved as Noted, Revise and Resubmit, Rejected-See Remarks, Reviewed For Informational Purposes Only).

5. Date of resubmittal and return (as applicable).

6. Date material released for fabrication.

7. Projected date of fabrication.

8. Projected date of delivery to site.

9. Status of O&M manuals submittal.

10. Specification Section or Item No.

11. Contract Drawing number.

12. Certificate of Compliance: Submitted and anticipated.

B. Submit initial log listing all submittals within 30 days of NTP.

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01470 INDEPENDENT TESTING LABORATORY

GENERAL

A. Conduct tests where specifically required in Contract Documents. Quality control verification testing will be performed by Engineer.

1. Conduct required tests in accordance with the Engineer's accepted test instructions, procedures and plans.

B. The Contractor shall provide and pay for the services of an Independent Testing Laboratory to perform services as specified herein.

SUBMITTALS

A. Submit qualifications of Contractor's independent Testing Laboratory indicting that the lab meets the requirements and certification specified in Paragraph 1.07.

REQUIREMENTS

A. Testing Laboratory Services Furnished by Contractor:

1. Qualifications of Testing Laboratory:

a. Employ services of an independent Testing Laboratory to perform material qualification and job control testing. The laboratory shall meet requirements of ASTM E329 for the type of work performed. Non-destructive examination, including visual inspection of metallurgy welds, is included in this requirement.

b. Laboratories performing cement, concrete and aggregate testing shall possess a current Certificate of Accreditation to the latest edition of AASHTO R18, (or ASTM C1077), and a Certificate of Accreditation for each cement, concrete and aggregate test method to be used.

c. Laboratories performing soils testing shall possess a current Certificate of Accreditation to the latest edition of AASHTO R18, (or ASTM D3740), and a Certificate of Accreditation for each soils test method to be used.

d. Accreditation may be performed by AASHTO Accreditation Program (AAP), National Voluntary Laboratory Accreditation Program (NVLAP), American Association for Laboratory Accreditation (A2LA) or the Concrete Materials Engineering Council.

e. Field sampling and testing shall be performed by the laboratory and personnel that are licensed by the Commonwealth of Massachusetts State Board of Building Regulations and Standards in the manner indicated in Specifications, with minimum interference to the construction operations.

f. Ensure that laboratory is:

1) Certified by the Massachusetts Department of Environmental Protection for the analyses to be performed.

2) Has been in business for a minimum of five years while providing applicable testing services.

2. Furnish all testing services required for the Engineer's review of materials and equipment proposed to be used in the Work and quality control tests made in field, including:

   a. HOT MIX ASPHALT materials and mix designs.

   b. Cement concrete materials and mix designs.

   c. Moisture-density (Proctor) and relative density tests on:

      1) Embankment materials

      2) Backfill materials

      3) Subgrade materials

   d. Gradation tests for backfills.

   e. In-place field density tests on:

      1) Embankment materials

      2) Backfill materials

      3) Subgrade materials

   f. Disinfection of water pipes.

   g. All other tests and engineering data as specified herein for the Engineer's review of materials and equipment proposed to be used in the Work.

3. Obtain Engineer's acceptance of testing laboratory before having services performed.

4. Arrangements for delivery of samples and test specimens to testing laboratory.

5. Do not replace the Testing Laboratory without prior written approval by the Engineer.

6. Field Testing:

   a. The Contractor shall provide and schedule all field and laboratory testing and furnish written reports of each test within 48 hours of completion of testing to avoid delays.

   b. The Contractor shall furnish all sample materials and field testing activities.

   c. Contractor shall retest due to failure of original Work to meet the requirements of the Contract Documents.

7. Notification:

a. Provide the Engineer with not less than two workdays prior written notice of occurrence of an identified inspection. Inspections/approvals required by outside agencies require a seven day prior notification.

8. Document results of tests in report format and submit for review. Include the following:

a. Contract or Project Identification.

b. Identification of items tested.

c. Quantity.

d. Date test conducted.

e. Location of items tested.

f. Test procedure used.

g. Name of technician.

h. Acceptance Criteria.

i. Results - Acceptance or rejection.

j. Authorized signature.

9. Contractor Performed Tests - Witnessed by the Engineer. Do not proceed with Work without Engineer acceptance of test results.

B. Testing Laboratory Services Furnished by the Owner:

1. The Contractor shall provide for all testing laboratory services, however, the Owner reserves the right to hire its own testing laboratories for quality control tests made in field or laboratory on materials and equipment during and after their incorporation in the Work.

C. Inspection and tests, conducted by persons or agencies other than Contractor do not relieve Contractor of responsibility to meet Contract Document requirements.

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01565 NOISE CONTROL

The Contractor shall use every effort and every means possible to minimize noise caused by its operations, which the applicable towns may consider as objectionable or so regulated by ordinance. The Contractor and each Subcontractor shall provide working machinery and equipment designed to operate with the least possible noise, and when gearing is used, such gearing shall be of a type designed to reduce noise to a minimum. **Back-up alarms on all equipment shall be modified to reduce noise impacts**. Compressors and air-powered equipment shall be equipped with pneumatic exhaust silencers. All gas or oil operated equipment shall be equipped with silencers or mufflers on intake and exhaust lines. Wherever practicable, electricity shall be used for power to reduce noise. Dumping bins, hoppers and trucks used for disposal of excavated materials shall be lined with wood or other sound-deadening material. Where required by agencies having jurisdiction, certain noise-producing work may have to be performed during specified periods only. The Contractor shall use mufflers on trucks and equipment to reduce noise.

The Contractor shall comply with the noise ordinance of the City of Somerville.

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01570 ENVIRONMENTAL CONTROLS

PROTECTION OF LAND RESOURCES:

A. General:

1. Land resources within the project boundaries and outside the limits of the work as may be affected under the work of this contract shall be preserved in their present condition, or be restored to a condition, after completion of construction, that will appear to be natural. The Contractor shall confine its construction activities to areas defined by the Drawings or Specifications.

B. Restoration of Landscape Damage:

1. Any trees or other landscape features scarred or damaged by equipment or operations shall be restored or replaced in kind with a tree or shrub of equivalent or superior quality and size to the satisfaction of the Engineer. All scars made on trees by equipment, construction operations or by the removal of limbs larger than 1 inch in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Trimming with axes will not be permitted.

C. Post-Construction Clean-up or Obliteration:

1. The Contractor, on or before the completion of the work, except as otherwise expressly directed or permitted in writing by the Engineer, shall tear down and remove all temporary structures built or used by it, shall remove all rubbish and debris of all kinds from all contract structures and from any grounds which the Contractor shall have occupied; shall leave the site of the work in a satisfactory neat and clean condition; shall remove all abandoned materials and plants; and shall leave the spoiled areas and the property which may have been affected by his operations, in a neat and satisfactory condition. All materials salvaged shall be the property of the Contractor, and shall be disposed of legally off City property.

PROTECTION OF CULTURAL RESOURCES:

A. General:

1. The Contractor's attention is directed to the National Historic Preservation Act of 1966 (16 U.S.C. 470) and 36 CFR 800, which provides for the preservation of potential historical, architectural, archaeological, or cultural resources (hereinafter called "cultural resources").

2. The Contractor shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources.

3. All cultural resources including articles of historical or scientific value, including coins, fossils, and articles of antiquity, which may be uncovered or otherwise brought to attention during course of the Work, shall remain the property of the owner of the property on which articles reside. Such findings shall be immediately reported to the Engineer.

4. In the event potential cultural resources are discovered during excavation, the following procedures shall be instituted:

a. The Contractor shall stop work immediately and immediately notify the Engineer of such potential cultural resources find.

b. The Contractor shall cease operations until such time as a Registered Archaeologist (provided by the City) can be called to assess the value of these potential cultural resources and make recommendations to the Massachusetts Historical Commission.

c. If the archaeologist determines that the potential find is a bona fide cultural resource, at the direction of the Massachusetts Historical Commission, the Contractor shall suspend Work at the location of the find.

PROTECTION OF WATER RESOURCES:

A. General:

1. DO NOT pollute any storm drains or sewers with fuels, oils, bitumen, calcium chloride, acids or harmful materials. It is the responsibility of the Contractor to investigate and comply with all applicable Federal, State, County, and Municipal laws concerning pollution of surface waters. All work under this contract shall be performed in such a manner that objectionable materials will not be allowed to enter through or adjacent to the project areas.

2. During and after construction, there shall be no discharge or spillage of chemicals, fuel, oil, lubricants, bitumen, raw sewage, or any other pollutant from the Project into any storm drain.

3. No debris, litter or sanitary waste shall be allowed to fall or remain on site. All practical precautions shall be undertaken to collect and remove debris within the immediate vicinity of the project and any materials which escape from the vicinity but are the result of the Contractor's activity.

SPILL MANAGEMENT PLAN:

A. The Contractor shall develop a spill management plan for any hazardous materials that may be employed during work. Specifically, the Contractor shall prepare to effectively deal with spillage of fuel or hydraulic fluids from equipment. A quick absorbent material, such as "Speedy Dry" or equivalent shall be stored in a dry readily available area at the work site for use in the event petroleum-based fluids are spilled or leaked. The spent material is then to be containerized and disposed of properly. Absorbent-floating material shall be stored in a readily available area for use in case of a spill into a catch basin or storm drain.

B. The Contractor shall submit the Spill Prevention Plan to the Engineer for approval.

C. Do not store overnight petroleum products or hydraulic fluids within the project area.

STORAGE OF EQUIPMENT AND MATERIAL:

A. Equipment shall be stored in a manner and location that will minimize potential environmental impacts. There shall be no stockpiling of material or storage of equipment or vehicles beyond the paved area of the site. Best management practices shall be employed during construction to prevent any adverse impacts on adjacent properties, which practices shall include, but not be

limited to, covering of all stockpiled materials, and handling of all excavate in accordance with the Massachusetts Contingency Plan requirements.

MAINTENANCE OF DRAINAGE:

A. The Contractor shall be responsible for providing for the flow of stormwater into catch basisn.

B. The Contactor shall also be responsible for providing for the flow of stormwater in storm drains interrupted during the progress of the Work, and immediately removing and disposing of obstructions.

C. The entire procedure of maintaining existing flow must be fully discussed with the Engineer at least 5 working days prior to the interruption of any flow.

EROSION CONTROL:

A. Such materials as may be necessary shall be utilized to effectively prevent erosion and sediment from entering storm drains.

B. Do not place excavated soil material in a manner that will cause it to wash away by stormwater runoff.

C. All unconsolidated, project-related materials shall be contained to prevent erosion into resource areas by implementing all practical precautions, including but not limited to placement of sand bags.

D. Stockpiles shall be completely covered when no activity occurs at the site for periods of time greater than 24 hours.

E. Catch basins shall be protected with silt sacks (Gutter Buddies ®, SiltSacks™, SiltSocks™, SpillSmart Drain Filters, or approved equal) until construction is completed.

1. Protect all catch basins within project limits.

F. Transport all soils, excavated materials, aggregates, debris, or spoils in covered trucks. Trucks entering and leaving the Project work areas shall have their loads completely covered in compliance with M.G.L. Chapter 85 § 36.

DIRT, DEBRIS AND DUST CONTROL:

A. Maintain all work areas within or without the project boundaries free from dirt, debris and dust which would cause the standards for air pollution to be exceeded or cause a hazard or nuisance to others. Where applicable, approved temporary methods of stabilization consisting of sprinkling or use of calcium chloride, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dirt and dust control must be performed whenever a dust nuisance or hazard occurs, or as directed by the Engineer.

B. The Project site shall be maintained in a clean and orderly condition. Refuse, debris and waste materials shall not be placed within any resource area under any circumstances and shall be disposed of promptly and properly and in accordance with applicable local, state and federal laws.

All construction refuse, debris and waste materials shall be removed from the site upon completion of the construction activities as directed by the Engineer. The Contractor shall clean the work area at the end of each workday to prevent wind deposition of fugitive dust and accumulation of debris in the Project Area and on adjacent land.

C. The Contractor shall implement dust control measures during roadway and utility construction, and at all material stockpiles, so as to prevent the wind deposition of fugitive dust. All stockpiles shall be covered during non-working hours and when the stockpile is not being actively used.

D. Street Sweeping:

1, Provide street sweeping in accordance with Items 108-501.

2. At Substantial Completion, after the removal of all materials, equipment and temporary traffic control devices, the Contractor shall provide street sweeping services to clean all pavements within the limits of work.

AIR POLLUTION:

1. Use construction equipment which is in compliance with the most restrictive regulation of the EPA, state and local authorities.

2. Comply with Massachusetts air quality regulations (310 CMR 7.09).

3. Comply with restriction on vehicle idling (maximum 5 minutes of idling).

4. Burning of trees, brush, and other combustible materials will not be permitted. Such materials will be legally disposed of off-site in accordance with all federal, state and local regulations.

5. Participate in DEP's Clean Air Construction Initiative (CACI) to retrofit all on-site diesel-powered equipment with after-engine emission controls and use of Low Sulfur Diesel Fuel.

MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION:

A. During the life of this contract the Contractor shall maintain all facilities constructed for pollution control under this contract as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

DISPOSAL OF SURPLUS EXCAVATION MATERIAL

A. All surplus excavation material shall be removed from the project area by the Contractor. The Contractor shall dispose of the material in compliance with all federal, state, and local laws and regulations.

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01580 PROJECT SIGNS

The Contractor shall supply, install and maintain for the duration of the project two (2) signs at locations determined by the Engineer in the field.

The Contractor shall submit the design of the sign to the Engineer for approval. The exact location of the sign shall be determined by the Engineer.

The sign shall be constructed of either of the following:

1. 3/4-inch MDO Ext. Plywood, 4-foot by 8-foot with a mitered edge border of 2 inches by 3 inches fir.
2. 0.080 inch aluminum

Sign shall include the following:

1. City of Somerville and City logo(s).
2. Project title: "Union Square Utility and Roadway Early Action Project"
3. "IFB#15-105
4. Names of design team firms:
    a. Parsons Brinckerhoff, Inc.
    b. Toole Design Group, Inc.
    c. Bryant Associates, Inc.
5. Name of Contractor
6. No other information will be allowed on the project sign.

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ITEM NO. 100-001 MOBILIZATION LUMP SUM
ITEM NO. 999-999 DEMOBILIZATION LUMP SUM

DESCRIPTION

Item No. 100-001 Mobilization

A. **Work Tasks**: This Item includes Contractor mobilization tasks including the following:

1. Transport to Project area and assemble all construction plant, equipment, safety equipment, operational materials and supplies.

2. Submit the following:

   a. Spill Prevention Plan (as specified in the Special Conditions)

   b. The list of items to be submitted at the Pre-Construction Conference (as specified in the Special Conditions).

   c. Initial project schedule.

   d. Schedule of values for lump sum bid items.

   e. Health and Safety Plan (as specified in the Special Conditions).

   f. Dust Control Mitigation Plan.

   g. The names and 24/7 phone numbers of the Contractor's project manager, superintendent and at least two other supervisors.

   h. Project signs

3. Submit and obtain approval of the Engineer for the following:

   a. Contractor's Traffic Management/Construction Access Plan (as described in the Special Conditions) indicating staging areas, accessible pedestrian detours around the staging areas, and traffic control devices to protect staging areas by barriers and traffic signage for both motorists and pedestrians.

   d. Independent Testing Laboratory.

4. Attend Pre-Construction Conference and Coordination Meetings.

5. Furnish, and install on-site sanitary facilities .

6. Have all OSHA required notices and establish a safety program. Notices shall be posted at the site.

7. Furnish, install and operate initial temporary controls, in accordance with Special Conditions.

8. Obtain permits that are the responsibility of the Contractor. Submit copy of all permits to the Engineer.

9. Implement and execute a Rodent Control Program as specified herein under Item 119-001.
   a. Submit the initial submittals as specified herein, implement the pre-construction baiting program and submit the report on the pre-construction baiting program.
   b. Submit the weekly and final reports on the maintenance-baiting program that lasts throughout the construction period.

10. Erect project sign signs.

11. Remove tall sign post on foundation in the middle of the sidewalk on Propsect Street at Newton Street. Payment for the removal of the tall post and sign shall be under Item 100-001. Payment for removal of the foundation shall be under Item 144-001.

Item No. 999-999 Demobilization
Item No. 999-999 includes Contractor demobilization tasks including the removal of all equipment, temporary fencing, and temporary controls at the site and site clean-up.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 100-001**
ITEM NO. 999-999

MEASUREMENT
These Bid Items will be measured as lump sums.

PAYMENT

General:
The total price for mobilization and demobilization shall not exceed five percent (3%) and three percent (2%) of the Contract Price, respectively. **The figure of five percent (3%) for mobilization shall apply to Item No. 100-001**.

Partial Payment for Item No. 100-001:
Partial payments for mobilization will be made according to the following payment schedule:

a. Upon completion of tasks A.1 through A.7 plus tasks A.9 and A.10 as listed above under "Work Tasks," 60 percent of the lump sum for Item 100-001 will be paid.

b. Upon the approval by the Engineer of the Contractor's Detailed Construction Schedule, approval of the Schedule of Values, approval of the Health and Safety Plan, and completion of task A.8 as listed above under "Work Tasks," the remaining 40 percent of the lump sum for Item 100-001 will be paid.

Item No. 999-999 Demobilization:
Demobilization will be paid in a single lump sum upon the completion of the demobilization effort, as determined by the Engineer.

Pay Item		Pay Unit
ITEM NO. 100-001	**MOBILIZATION**	**LUMP SUM**
ITEM NO. 999-999	**DEMOBILIZATION**	**LUMP SUM**

ITEM NO. 102-501 INDIVIDUAL TREE PROTECTION EACH

GENERAL

Protect trees to remain as indicated on the Drawings and protect all trees adjacent to the limits of work.

SUBMITTALS

Shop Drawings, Samples, and Product Literature: At least thirty (30) days prior to intended use, Contractor shall provide the following samples and submittals for approval. Do not order materials until Engineer's approval of samples, certifications and test results has been obtained. Delivered materials shall closely match the approved samples. Samples and approvals which are not obtained prior to the ordering of materials or the completion of work shall result in possible disapproval of obtained materials or completed work.

1. Tree wrapping protection with lumber enclosure.

Request for deviations from Specifications: If any deviations from specifications are proposed, include written description and reasons for proposed deviations. Do not proceed until written approval by the Engineer of any deviations.

STANDARDS

Where references are made in these Specifications to Standard Specifications, codes, etc., of the U.S. Government, State or local authorities, or professional and industrial societies and associations, the applicable portions thereof shall govern as fully as if they were recited at length herein, and shall include all revisions thereto issued as of the date of the Notice to Contractors pertaining hereto.

1. **Standard Specifications**: "Standard Specifications for Highway and Bridges", Massachusetts Department of Transportation, Highway Division (MHD), latest edition and all supplements.
2. **AASHTO:** American Association of State Highway and Transportation Officials, Standard Specifications, latest edition.
3. **ASTM:** American Society of Testing and Materials "Annual Book of ASTM Standards", latest edition.
4. **OSHA:** Occupational Safety Hazard Administration, latest requirements.
5. **ISA:** International Society of Arboriculture Guide for Plant Appraisal, latest requirements.
6. **MAA:** Massachusetts Arborists Association, Wellesley, MA. 02181-7913; telephone (617) 431-1625.
7. **ASNI:** American National Standards Institute Standard A300-latest edition; "Standard_Practices for Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance".
8. **ANSI:** American National Standards Institute Standard Z-133.1. latest edition; "Safety Requirements for Tree Care Operations – Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and cutting Brush".

MATERIALS

Tree protection lumber for wrapping of the trunks of individual trees, shall consist of 2-inch by 4-inch lumber wired together in close spacing with sixteen (16) gauge galvanized steel wire to form a protective enclosure around individual tree trunks. This method shall only be used after prior approval of Engineer of individual trees to be protected in this manner.

EXECUTION

Protect all existing trees within limits of work, unless the Drawings indicate the tree for removal.

Place tree protection additionally at all other locations where trees may be jeopardized by construction activities. Trees to be saved within the Contract Limit Line and elsewhere as designated shall be protected with protection as specified, herein.

Individual trees shall be protected by wiring 2-inch by 4-inch lumber closely spaced in vertical alignment around the trunk of each tree. No spikes or nails are to be driven into trees.

Damage no trees to remain by burning, by pumping of water, by cutting live roots or branches, or by any other means. No trees to remain shall be used for crane stay, guys or other fastenings. Construction materials shall not, be stored beneath the leaf canopy of trees to be saved.

Protection of trees shall remain in place and shall be maintained in working condition by the Contractor. All protection devices shall be removed from the site by the Contractor just prior to preparing areas for seeding as specified, herein, or as directed in the field by the Engineer.

Existing trees to be saved within or outside the Limit of Work, which have, in the opinion of the Engineer, become damaged due to the Contractor's action, shall be assessed at $1000 per caliper inch and deducted from the Contract amount. The Contractor shall pay all expenses incurred without additional cost to the City. These trees shall be removed, according to the Specification requirements for removals, the stumps grubbed out and removed, and the ground surface repaired. Costs for this removal shall be borne by the Contractor and shall not be included as part of the above schedule.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 102-501**

METHOD OF MEASUREMENT

Item 102-501 will be measured per each for all tree protection indicated on the Drawings and specified herein. It shall include all labor and materials required to complete the work of tree protection complete and accepted, which will include the cost of furnishing and installing all materials complete in place in accordance with approved product literature, samples, and Shop Drawings.

BASIS OF PAYMENT

Item 102-501 will be paid for at the contract price each for tree protection in accordance with approved product literature, samples, and Shop Drawings. Such price and payment shall be full compensation for all the labor and materials required to complete the work under these Items.

Item No.	Pay Item	Pay Unit
ITEM NO. 102-511	INDIVIDUAL TREE PROTECTION AVENUE	EACH

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ITEM NO. 103-001 INDIVIDUAL TREE REMOVED - DIAMETER UNDER 24 INCHES EACH

ITEM NO. 104-001 INDIVIDUAL TREE REMOVED - DIAMETER 24 INCHES AND OVER EACH

GENERAL

Removal of individual trees shall be as indicated on the Drawings and as directed in the field by the Engineer. During removals protect all adjacent vegetation within and outside the site limits.

MATERIALS

Gravel Borrow shall be as specified under Item 151-001 GRAVEL BORROW, herein.

EXECUTION

Timing:

Before beginning tree removal work, the Contractor shall meet jointly with the City and the Engineer in order to discuss the procedures to be utilized. The Contractor shall be held responsible for any damage to vegetation designated to remain.

Contractor shall give the City adequate advance notice of his readiness to start tree removal work in order that the City can review and approve the Contractor's plans for access to the tree removal site.

Contractor shall be responsible for acquiring any and all permits required to complete the work of this Contract.

Plant Removal:

The Contractor shall accept the site as he finds it and shall remove all vegetation designated for removal and all debris, organic matter, and objectionable material, which are not suitable for, use as fill or for support of structural loads or slabs.

The Contractor shall remove all stumps and roots to a depth not less than three feet below original ground level. Unless further excavation is required, depressions made by stump removal and grubbing shall be filled Gravel Borrow and compacted to 95% as specified under Item 151-001, in preparation for installation of pavement or concrete sidewalk.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 103-001**
ITEM NO. 104-001

METHOD OF MEASUREMENT

Items 103-001 INDIVIDUAL TREE REMOVED - UNDER 24 INCHES and 104-001 INDIVIDUAL TREE REMOVED - DIAMETER 24 INCHES AND OVER will be measured per each complete and approved.

BASIS OF PAYMENT

Items 103-001 and 104-001 will be paid for at the contract price per each for tree removal. Such price and payment shall be full compensation for all the labor and materials required to complete the work under this Item.

Item No.	Pay Item	Pay Unit
ITEM NO. 103-001	**INDIVIDUAL TREE REMOVAL - DIAMETER UNDER 24 INCHES**	**EACH**
ITEM NO. 104-001	**INDIVIDUAL TREE REMOVED - DIAMETER 24 INCHES AND OVER**	**EACH**

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ITEM NO. 108-501 STREET SWEEPING HOUR

DESCRIPTION

This Item consists of supplying street sweeping services weekly and additionally as directed by the Engineer. The Contractor shall provide street sweeping equipment approved by the Engineer and designed for urban street sweeping.

EXECUTION

The street sweeping equipment shall operate within the limits as follows:

1. Somerville Avenue: Webster Avenue to Prospect Street
2. Webster Avenue: Somerville Avenue to 500 feet south of Prospect Street
3. Prospect Street: Somerville Avenue to 500 feet south of Webster Avenue

If directed by the Engineer, the Contractor shall provide street sweeping in a greater area.

Street sweeping shall be performed weekly, unless more frequent sweeping is ordered by the Engineer. Street sweeping shall conform to the requirements of the Special Conditions. The street sweeping equipment shall pass in both directions on the indicated streets. The equipment shall make at least one pass in each direction to sweep the travel lanes and an additional pass in each direction to sweep the curb lines. If there is no parking ban, the sweeper shall operating around the park cars and sweep as much of the curbline as possible where cars are not parked.

Parking Ban for Street Sweeping – Item 108-501:

Once a month, on a day determined by the City, there will be a parking ban for street sweeping within the limits specified in the Special Conditions. The Contractor shall assist the City by erecting no parking signs. The City will arrange for the City Police to enforce the parking ban by tagging and towing. Street sweeping shall be performed along the curbline within the area of the parking ban. The Contractor should assume the parking ban will typically be for 4 hours and be prepared to perform the street sweeping upon completion of towing operations.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 108-501

MEASUREMENT

Measurement shall be based on the actual number of hours that street sweeping equipment is on site and in operation. Measurement will be to the nearest one-half hour. The Engineer will determine the days when street sweeping is to be performed. Measurement will only be made on those days that the Engineer has directed that street sweeping is to be performed. The street sweeper operator shall log in with the Engineer before and after street sweeping operations.

PAYMENT

Payment shall be at the contract unit price per hour and is inclusive of materials, labor, equipment, tools, supplies and all other necessary items needed for satisfactory completion of the work approved by the Engineer. Erection and removal of no parking signs will be considered incidental to this Item and will not be paid for separately.

Pay Item		Pay Unit
ITEM NO. 108-501	STREET SWEEPING	HOUR

ITEM NO. 119-001 RODENT CONTROL LUMP SUM

DESCRIPTION

The work under these Items shall include all work necessary to provide rodent control in the areas of proposed construction. Such rodent control shall include a pre-construction survey of surface rodent activity and sanitation deficiencies in and bordering the proposed work area.

The Contractor is required to make all efforts to reduce the activity of rodents within the proposed work area prior, during and after construction has ceased, on a street by street basis for the duration of this project to the satisfaction of the Engineer.

A. Rodent Control Program shall include the following areas:

1. Item 119-001 shall include all streets within the Limits of Work indicated on the Drawings.

CONSTRUCTION METHODS & SUBMITTALS

A. Baiting will include a pre-construction baiting program followed by a maintenance-baiting program that lasts throughout the construction period. All baiting will be done according to the rodenticide labeling as approved by the U.S. EPA and the Massachusetts Department of Food and Agriculture. All bait applications will be made by licensed pest control operators and based upon activity levels and distribution of rodent control populations.

B. Records shall be maintained on baiting and survey results. A summary of determinable results of the control program must be submitted to the Engineer on a weekly basis. The summary must include the types of bait used, baiting locations, a description of rodent activity and sanitation conditions, and recommendations. Control shall include baiting of active rat burrows and the use of tamper-resistant bait stations, as appropriate. Control shall also be applied at all manholes and/or catch basins within the immediate contract area and to all catch basins and sewer manholes on adjoining streets within 300 feet of the Project Limits as defined above.

C. The pest control operator must provide adequate liability insurance and be prepared to respond to changes in rodent populations and any rodent related complaints associated with construction activities.

D. Initial submittals (at the Pre-Construction Conference):

1. Name and qualifications of the pest control operator that will implement the Rodent Control Program.
2. Description of the Rodent Control Program.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 119-001

MEASUREMENT

The Bid Item will be measured as a lump sum.

PAYMENT

Payment for these Items shall be made on a lump sum basis. The lump sum unit price paid for under these Items shall constitute full compensation for all activities required to accomplish the control of rodent populations during construction of this project within the limits specified. A payment in the

amount of 50% of the price bid for each Item shall be made after the pre-construction survey has been completed and the necessary steps for the duration of the project have been initiated. The remaining 50% of each Item will be paid for at the conclusion of the work as specified above or at a prior date as directed by the Engineer.

The lump sum unit price paid for under this Item shall also include full compensation for furnishing all materials, labor, tools, equipment and all other incidentals necessary to complete the work under this Item to the satisfaction of the Engineer.

Pay Item		**Pay Unit**
ITEM NO. 119-001	**RODENT CONTROL**	**LUMP SUM**

(Remainder of page is intentionally blank)

ITEM NO. 129-001 ROADWAY EXCAVATION BY COLD PLANE SQUARE YARDS

GENERAL

Remove pavement by cold planer where indicated on the Drawings.

EXECUTION

MILLING

1. Equipment:

    a. The cold planer shall be equipped with an elevating device capable offloading planed material directly into dump trucks while operative.

    b. It shall have safety devices such as reflectors, headlights, taillights, flashing lights, and back up signals so as to operate safely in traffic both day and night.

    c. The cold planer shall be designed and built for planing flexible pavements and possess the ability to plane cement concrete patches when encountered in bituminous pavement.

    d. It shall be self-propelled and shall have the means for planing without tearing or gouging the underlying surface,

    e. Variable lacing patterns shall be provide to permit a rough grooved or smooth surface as directed.

    f. The machine shall be adjustable to the crown and depth. It shall meet the standards set by the Air Quality Act for noise and air pollution.

2. Cold planing to a depth of 2 inches across the full width of the street, curb to curb.

3. The minimum width of pavement planed in each pass shall be 6 feet, expect in areas to be trimmed and edged.

4. The milled or planed surface shall conform generally to the grade and cross slope required. If not otherwise indicated, the surface shall be milled to the existing cross slopes.

5. The surface shall not be torn gouged, shoved, broken or excessively grooved. It shall be free from imperfections in workmanship that prevent resurfacing after this operation. Surface texture shall be as specified by the Engineer and excess material shall be removed so that the surface is suitable for traffic.

6. Immediately after milling, all castings shall be **painted bright red or orange** to warn motorists of the hazard of raised castings.

    a. Where castings are out of the travel lanes, place a reflectorized drum with flasher on each raised casting.

7. At the limits of the overlaying, the Contractor shall cold mill the existing pavement to provide a 20 foot long smooth transition between the overlay and the existing pavement. At the limits of overlay at side streets, saw cut the existing pavement.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 129-001**

Roadway Excavation by Cold Plane will be measured and paid for by the square yard of area as indicated on the plans or as directed.

Pay Item		Pay Unit
ITEM NO. 129-001	**ROADWAY EXCAVATION BY COLD PLANE**	**SQUARE YARD**

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ITEM NO. 129-002 ROADWAY PAVEMENT REMOVAL SQUARE YARD
ITEM NO. 129-003 SIDEWALK REMOVAL SQUARE YARD

GENERAL

The work of these Items includes the removal of bituminous pavement and the removal of sidewalks of any material (HOT MIX ASPHALT, brick, concrete paver and cement concrete).

EXECUTION

BITUMINOUS PAVEMENT REMOVAL

Saw cut along neat lines at limits of bituminous pavement removal. Remove along the saw cut lines to prevent forming irregular pavement edges. Completely remove full depth of existing pavement. Existing bituminous pavement depth is anticipated to be 5 to 7 inches thick.

Pavement removed shall be removed from the project site. Pavement removed may be recycled for reuse on this or other projects. Otherwise the Contractor shall dispose of the removed pavement in accordance with all federal, state and local laws and regulations.

SIDEWALK REMOVAL

Brick, concrete paver, cement concrete and HOT MIX ASPHALT sidewalks, and sidewalks of cement concrete with HOT MIX ASPHALT overlays shall be removed to the full depth of the existing pavement, including all wire mesh and other reinforcing. The materials shall be removed from the site and disposed of off-site in accordance with all federal, state and local laws and regulations.

Saw cut along neat lines along existing score lines at limits of sidewalk removal. Remove along the saw cut lines to prevent forming irregular edges.

METHOD OF MEASUREMENT AND PAYMENT — ITEM NO. 129-002 ITEM NO. 129-003

Roadway Pavement Removal and Sidewalk Removal will be measured by the square yard based on the limits indicated on the Drawings or as otherwise directed by the Engineer.

Roadway Pavement Removal and Sidewalk Removal will be paid for at the respective contract unit prices and shall include all supervision, labor, materials and equipment necessary for the removals as specified including the legal off-site disposal of all removed material.

Where the finish grade is lower than the existing grade and it is necessary to remove the existing gravel base below the pavement or sidewalk, such removal will be paid for under Item 120-021.

Pay Item		Pay Unit
ITEM NO. 129-002	ROADWAY PAVEMENT REMOVAL	SQUARE YARD
ITEM NO. 129-003	SIDEWALK REMOVAL	SQUARE YARD

ITEM NO. 141-001 TEST PITS CUBIC YARD

GENERAL

Excavate test pits at locations as directed by the Engineer. The purpose of test pits shall include the verification of location of existing underground utilities and other subsurface conditions.

EXECUTION

A. Removal of pavement and sidewalks: Saw cut existing pavement. In the case of existing concrete sidewalks, saw cut along existing score lines.

B. Exercise care not to damage existing utilities. The Contractor shall cooperate with representatives of the respective utility owners by notifying them, allowing them to be present during the test pit operations, and allowing them to inspect and repair, if necessary, their underground facilities.

C. Material shall be carefully excavated so that the underground utility or structure being searched for, or any other utility or structure, will not be damaged or destroyed. Excavation shall be with a hand shovel if conditions so warrant.

D. Provision of barriers, signage, traffic maintenance, traffic officers, steel plates and other temporary controls shall be in accordance with the provision of Items No. 850-001 and 850-.002.

E. Restore surface with temporary HOT MIX ASPHALT patch as specified under Item 460-002.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 141-001

METHOD OF MEASUREMENT

TEST PITS shall be measured by the cubic yard to the limits as directed by the Engineer.

BASIS OF PAYMENT

TEST PITS will be paid for at the Contract Unit Price per cubic yard. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary to excavate one cubic yard of Test Pit. Include the following costs: preparing site; excavating; furnishing temporary excavation support systems; removing and disposing of pavement and debris; handling, storing, transporting and disposing of all excess excavated material; preparing subgrades; pumping and dewatering, including sedimentation control; collection of information; furnishing and installing steel covers at grade, if required; backfilling; compacting; including miscellaneous concrete; utility support; temporary paving and other appurtenant work.

Pay Item		Pay Unit
ITEM NO. 141-001	TEST PITS	CUBIC YARD

ITEM NO. 144-001 CLASS B ROCK EXCAVATION CUBIC YARD

GENERAL

The work under this Item consists of the excavation, removal and off-site disposal of boulders, masonry and concrete measuring one cubic yard or more and solid rock that requires power equipment to remove, when encountered during excavation to install the stormwater system, street lighting system, landscaping, or other utilities.

This Item also includes the complete removal of the concrete foundation for the sign in the middle of the sidewalk on Prospect Street at Newton Street.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 144-001

MEASUREMENT

Class B Rock Excavation will be measured by the actual volume in cubic yard, to the payment limits as specified below. When rock is encountered, it shall be uncovered but not excavated until measurements have been made by the Engineer.

The Contractor shall not perform rock excavation work until material to be excavated has been cross-sectioned and classified by the Engineer. Visual observation of the completed excavation may be made by the Engineer to modify the excavation classifications. Removal of rock prior to classification by the Engineer shall be considered as earth excavation unless accepted by the Engineer in writing. Authorized excavation will be paid on the basis of Contract unit prices for the appropriate classification.

Payment limits:

1. Upper limit: as measured in the field by the Engineer.
2. Horizontal limits: 6 inches beyond the outside of the proposed pipe or structure.
3. Bottom limit: 6 inches below the outside of the proposed pipe or structure.

Rock excavated beyond the payment limits will not be measured for payment.

PAYMENT

Class B Rock Excavation will be paid for at the Contract unit price per cubic yard. The price shall include all supervision, labor, material, and equipment for excavation and disposal of legally in an off-site location.

Pay Item		Pay Unit
ITEM NO. 144-001	**CLASS B ROCK EXCAVATION**	**CUBIC YARD**

ITEM NO. 150-001 ORDINARY BORROW CUBIC YARD

DESCRIPTION

The work under this Item consists of furnishing, placing, and compacting Ordinary Borrow for use as fill in landscaped and lawn areas.

For fill under sidewalks, roadways or paved parking areas, use Gravel Borrow, Item 151-001.

MATERIAL

Ordinary Borrow: Ordinary borrow shall be well-graded, natural inorganic soil containing no stone greater than 6 inches maximum dimension. The materials shall be free of trash, ice, snow, tree stumps, roots and other organic and deleterious materials. It shall be free of highly plastic clays, of all materials subject to decay or other materials that will corrode piping or metals. Ordinary borrow shall have a maximum dry density of not less than 110 pounds per cubic foot. It shall be of such a nature and character that it can be compacted to the specified densities. Topsoil shall not be considered Ordinary Borrow. Existing available fill materials from on-site excavations may be reused as Ordinary Borrow if it meets the above requirements.

EXECUTION

Grade and compact subgrade as specified in General Earthwork Requirements. Do not place on frozen subgrade.

Place Ordinary Borrow in 12-inch lifts and compacted as specified in General Earthwork Requirements. Do not place frozen material.

Use only in lawn and landscaped areas. For fill under roadways and sidewalks, use Gravel Borrow.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 150-001

MEASUREMENT

Ordinary Borrow furnished by the Contractor will be measured by the cubic yard placed and compacted for the purposes of fill in landscaped or lawn areas.

Payment Limits:

Lower payment limits shall be the grade existing before the placement of Ordinary Borrow as determined by a survey performed by the Contractor.

Upper payment limits in areas of seeded lawn shall be 6 inches below the finished grade. The Contractor shall survey the finish grade no sooner than 30 days after the installation of the loam.

Horizontal payment limits shall be as directed by the Engineer.

PAYMENT

Ordinary Borrow will be paid for at the Contract unit price per cubic yard. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary to furnish, place and compact one cubic yard of Ordinary Borrow. Include the following costs: Furnishing, placing, compacting, and testing of borrow; temporary stockpiling; erosion control measures; and dust control measures.

No payment will be made for the reuse of existing material meeting the requirements of Ordinary Borrow.

No payment will be made for Ordinary Borrow used as specified in Drainage Items and as specified for use in the General Earthwork Requirements section of these Specifications.

Pay Item	Pay Unit
ITEM NO. 150-001 ORDINARY BORROW	**CUBIC YARD**

(Remainder of page is intentionally blank)

ITEM NO. 151-001 GRAVEL BORROW CUBIC YARD

GENERAL

The gravel base shall consist of approved gravel placed on the subgrade and in close conformity with the lines and grades shown on the plans or established by the Engineer.

MATERIAL

Gravel Borrow shall consist of imported material that is inert, hard, durable stone and coarse sand, free from loam and clay, surface coatings, and deleterious materials.

Gradation requirements are as follows:

U.S. Standard Sieve Size	Percent Passing by Weight
3 inch	100
1/2 inch	50 - 85
No. 4	40 - 75
No. 50	8 - 28
No. 200	0 - 10

SAMPLING

The gravel borrow shall be obtained from a source with no known contamination. The supporting certification shall be submitted for the initial material source and for each additional source the Contractor proposes.

EXECUTION

GRAVEL BASE COURSE FOR ROADWAYS:

The gravel shall be spread and compacted in layers not exceeding 8 inches in depth, compacted measurement, except the last layer of gravel base course shall be 4 inches in depth compacted measurement and all layers shall be compacted to not less than 95 percent of the maximum dry density of the material as determined by the Standard AASHTO Test Designation T99 compaction test Method C at optimum moisture content as determined by the Engineer. If the material retained on the #4 sieves is 50% or more of the total sample this test shall not apply and the material shall be compacted to the satisfaction of the Engineer. The specific density of the Gravel Base shall be maintained by determining the number of passes of a roller required to produce a constant and uniform density, after conducting a series of tests using the nuclear device.

Any stone with a dimension greater than that permitted for the type of gravel specified shall be removed from the sub-base before the gravel is compacted. Compaction shall continue until the surface is even and true to the proposed lines and grades within a tolerance of 3/8 inch above or below the required cross sectional elevations and to a maximum irregularly not exceeding 3/8 inch under a 10 foot line longitudinally. In locations when the 8 inches of gravel is used as roadway base this tolerance shall be

3/4 inches under a 10 foot line. Any specific area of gravel sub-base which, after being rolled, does not form a satisfactory, solid, stable foundation shall be removed, replaced and recompacted by the Contractor at no additional cost to the City.

GRAVEL BASE COURSE FOR SIDEWALKS:

The gravel for sidewalks, ramps and driveways shall be shaped parallel to the finish surface of the sidewalks, ramps and driveways. The gravel shall be spread and compacted in layers not exceeding 6 inches in depth, compacted measurement. All depressions shall be filled with gravel borrow and again compacted until the surface is smooth and hard.

REUSE OF EXISTING GRAVEL FOR SIDEWALK REPLACEMENT:

Where a proposed sidewalk is replacing the existing sidewalk, the Contractor shall take samples of the existing base material at a frequency of one per 2,000 square feet. The samples shall indicate the depth of the existing gravel and shall be tested for grain size distribution to determine if the material meets the specification for gravel borrow or processed gravel. If these samples indicate that there is at least 8 inches of existing gravel, the existing material may be left in place where directed by the Engineer.

Where the existing gravel is left in place, the Contractor shall compact the existing material to not less than 95 percent of the maximum dry density of the material as determined by the Standard AASHTO Test Designation T99 compaction test Method C at optimum moisture content as determined by the Engineer. All depressions shall be filled with gravel borrow and again compacted until the surface is smooth and hard.

If the proposed sidewalk grade is higher than existing, the Contractor shall raise the grade of the gravel base by spreading and compacting gravel borrow Type b.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 151-001**

METHOD OF MEASUREMENT
Gravel Borrow will be measured by the cubic yard placed and compacted to the limits indicated on the Drawings.

Where existing gravel is reused, the Contractor shall survey the grade of the existing gravel remaining in place after compaction but before additional new gravel borrow is placed. The Contractor shall also survey the grade of the completed compacted gravel base and use the end area method to compute the volume of gravel borrow installed.

BASIS OF PAYMENT
Gravel Borrow will be paid for at the Contract Unit Price per cubic yard. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary to furnish, place and compact one cubic yard of Gravel Borrow. Include the following costs: Furnishing, placing, compacting, and testing of borrow; temporary stockpiling; erosion control measures; and dust control measures.

Pay Item	Pay Unit
ITEM NO. 151-001 GRAVEL BORROW	**CUBIC YARD**

ITEM NO. 152-001 DENSE-GRADED CRUSHED STONE TONS

GENERAL

Furnish and install dense-graded crushed stone for as a substitute for Gravel Borrow for sidewalk and roadway subbase when directed by the Engineer.

MATERIAL

CRUSHED STONE MATERIAL SPECIFICATION

Dense Graded Crushed Stone shall consist of crusher-run course aggregates of crushed stone or grave and fine aggregates of natural stand or stone screenings uniformly pre-mixed and placed on the subgrade in close conformity with the lines and grades as indicated on the Drawings.

Dense-Graded Crushed Stone for Sub-base shall conform to MHD Standard Specifications material specifications M2.01.7 and shall meet the following gradation requirements:

U.S. Standard Sieve Size	Percent Passing by Weight
2 inch	100
1-1/2 inch	70 - 100
3/4 inch	50 - 85
No. 4	30 - 55
No. 50	8 - 24
No. 200	3 - 10

EXECUTION

SPREADING AND COMPACTING:

1. Spread the dense-graded crushed stone in layers from self-spreading vehicles or other equipment approved by the Engineer.

2. Place and compact in 6-inch lifts.

3. Watering devices shall be available at the source of the supply and on the project site for use as directed by the Engineer to prevent segregation in transit and during spreading and to obtain proper density and stability of the mixture.

4. Compact to 95% maximum density as determined by ASTM D2992. Perform test at the frequency of at least 1 tests per 250 square feet of finish paving area.

5. Compact the top of the dense-graded crushed stone to a depth of 3 inches below the indicated finished grade within tolerances specified in MHD Section 4.01.60, 3/8 in. tolerance.

6. Use water for dust control until the bituminous pavement is placed.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 152-001**

Measurement shall be based on the actual number of tons of material placed to the limits shown on the Drawings and as directed by the Engineer. Weight slips shall be countersigned by the Engineer, and no weight slips not so constitute full compensation for complete compliance with requirements of this item, including all incidental work, and construction methods. Payment per ton is inclusive of mobilization, demobilization, materials, labor, equipment, tools, supplies and all other necessary items needed for satisfactory completion of the work approved by the Engineer.

Pay Item		Pay Unit
ITEM NO. 152-001	**DENSE GRADED CRUSHED STONE**	**TONS**

(Remainder of page is intentionally blank)

ITEM NO. 153-001 FLOWABLE FILL (CDF) CUBIC YARD

GENERAL

With the prior approval of the Engineer, Flowable Fill (Controlled-Density Fill or CDF, conforming to MHD Type 2E "Flowable/Excavatable") can be used as a backfill material in paved areas, following trenching and utility (pipe, etc.) installations.

The Contractor shall be responsible for proper placement of CDF, including allowing adequate time for complete curing of the CDF, before paving is installed. In areas of high water table, the CDF needs additional curing time, and that time needs to be taken into account when scheduling paving operations.

MATERIAL

A. Provide Flowable Fill (CDF) MHD Type 2E with ingredients complying with the following:

Portland cement	AASHTO M85
Fly Ash	AASHTO M295 Class F
Sand	MHD M4.02.02
Water	MHD M4.02.04
Air entraining admixtures	MHD M4.02.05

Note 1: In lieu of the slump test, a 6-inch long, 3-inch diameter tube may be filled to the top and then slowly raised. The diameter of the resulting "pancake" may be measured and the range of the diameter shall be 9 to 14 inches.

Note 2: the maximum strength for structural flowable fills may be expressed in increments of 500 psi and will depend on the Engineer's requirements.

Note 3: High air (25% plus) may be sued instead of fly ash with an adjustment in sand content.

B. CDF properties shall be as follows:

	28 days	90 days
Compressive Strength	30 - 80 psi	100 psi

Slump	10 - 12 inches
Air	20 - 30 %

C. A typical CDF mix design is as follows:

Portland cement	50 pounds
Fly Ash	250 pounds
Sand	2700 pounds
Water	60 gallons

EXECUTION

If directed by the Engineer, install Flowable Fill for backfill. Ensure that all voids are filled with Flowable Fill.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 153-001

METHOD OF MEASUREMENT

Measurement shall be based on the actual number of cubic yards of flowable fill placed as directed by the Engineer.

BASIS OF PAYMENT

Payment per cubic yard is inclusive of mobilization, demobilization, materials, labor, equipment, tools, supplies and all other necessary items needed for satisfactory completion of the work approved by the Engineer.

No payment will be made under Item No. 153-001 where street lighting conduit in roadways is backfilled with CDF. CDF for this purpose is considered incidental to Item No. 820-315.

Pay Item		Pay Unit
ITEM NO. 153-001	**FLOWABLE FILL (CDF)**	**CUBIC YARD**

(Remainder of page is intentionally blank)

ITEM NO. 156-002 CRUSHED STONE (3/4-INCH) TON

GENERAL

Furnish and install crushed stone for backfill of unsuitable material in wet conditions, and bedding for pipe and structures in wet soil conditions, where shown on the Drawings, and where directed by the Engineer.

MATERIAL

Crushed Stone – 3/4 Inch:

Durable crushed rock free from dust, clay or trash. Crushed stone shall be free from a detrimental quantity of thin, flat, elongated or other objectionable pieces. A detrimental quantity will be considered as any amount in excess of 15% of the total weight.

Gradation:

U.S. Standard Sieve Size	Percent Passing by Weight
1 inch	100
3/4 inch	90 - 100
1/2 inch	10 - 50
3/8 inch	0 - 20
No. 4	0 - 5
No. 200	0 – 0.5

SAMPLING

The crushed stone shall be obtained from a source with no known contamination. The supporting certification shall be submitted for the initial material source and for each additional source the Contractor proposes.

Representative samples of the proposed material shall be collected at the source in the presence of the Engineer. This activity shall be coordinated with the City. The Contractor shall deliver fifty-pound samples from each source material to the project site, and fifty-pound samples to the City's testing laboratory at 148 Newton Street, Waltham, MA 02453-8643. The Contractor shall also take photographs of material piles at the source, and provide these to the City. All submittals shall be identified with the Contractor's name, project name, and source information. Source information shall include the name, address, and location of the borrow area; the ownership of the source; the location of the samples from within the borrow area; and the date and method of sampling. Each sample shall be accompanied by particle size distribution results performed in accordance with ASTM D422, including gradation curves (based on screening and visual methods), and computational sheets. Approval of the gradation of the sample submitted will be based on City evaluation and testing. Approval of the sample submitted does not imply blanket approval of the source.

CONSTRUCTION METHODS

Backfill of Unsuitable Material:
Where unsuitable material is removed as directed by the Engineer, and conditions are wet, the Engineer may direct that Crushed Stone (3/4") be placed in lieu of gravel borrow. The crushed stone shall be

placed to completely fill the volume of the overexcavation in accordance with the requirements specified in General Earthwork Requirements.

Bedding Material in Wet Conditions:
Where wet or saturated soils conditions are encountered at the elevation of the proposed pipe or structure bedding, Engineer may direct that Crushed Stone (3/4") be placed. The crushed stone shall be placed to dimensions as directed by the Engineer. Placement shall be in accordance with the requirements specified in General Earthwork Requirements.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 156-002**

Where Crushed Stone (3/4 Inch) is used in lieu of gravel for subbase at drainage or utility structures or for piping, no separate measurement nor payment will be made; rather the cost of the Crushed Stone shall be considered incidental to the respective item for the drainage or utility structure or pipe.

Where Crushed Stone (3/4-Inch) is used to backfill "Additional Excavation" where directed or is otherwise used as directed by the Engineer (where its use is not covered by another payment item), payment will be made as follows. The crushed stone shall be measured and paid for by the weight in tons in place. Payment will be at the Contract unit price which shall constitute full compensation for complete compliance with this Item, including all labor, material, equipment, tools, incidental work and construction methods.

Pay Item		Pay Unit
ITEM NO. 156-002	**CRUSHED STONE (3/4-INCH)**	**TON**

(Remainder of page is intentionally blank)

ITEM NO. 170-001 FINE GRADING AND COMPACTION - SUBGRADE AREAS SQUARE YARD

GENERAL

Fine grade and compact the subgrade under roadways, sidewalks, curbing, and landscaped areas.

EXECUTION

Fine grade subgrade in accordance with Section 170 of the MHD Standard Specifications.

Subgrade under roadways and sidewalks shall be compacted to 95% of the maximum dry density of the material at optimum moisture content as determined by ASTM Test D1557, Method C.

Compaction of subgrade below landscaped areas shall be between 88% and 92% of the maximum dry density of the material at optimum moisture content as determined by ASTM Test D1557, Method C.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 170-001

Fine Grading and Compaction – Subgrade Areas will be measured per square yard on the plane of the subgrade.

Fine Grading and Compaction – Subgrade Areas will be paid for at the Contract Unit Price per square yard. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary to perform one square yard of Fine Grading and Compacting – Subgrade Areas. Include the following costs: Grading and compacting of subgrade areas, material and compaction testing as specified, erosion control measures, and dust control measures.

Pay Item		Pay Unit
ITEM NO. 170-001	FINE GRADING AND COMPACTION - SUBGRADE AREAS	SQUARE YARD

(Remainder of page is intentionally blank)

ITEM NO. 200-005 FRAMES AND GRATES OR COVERS EACH

DESCRIPTION

The work under this Item shall include the furnishing and installing of new frames, grates and covers to complete the construction of various drainage and sanitary structures installed under this Contract. This item will also apply to the Engineer-ordered replacement of existing damaged frames, grates and covers on existing structures. The frames, grates, and covers shall be iron castings and shall be installed as shown on the Contract Drawings, and as directed by the Engineer.

MATERIALS

New iron castings (frames, grates and covers) shall conform to the requirements of AASHTO Designation M105, Class No. 30, Gray Iron Castings. Catch basins grates shall be rated as "bicycle safe" by the manufacturer. Grate patterns shall be two-directional. The use of one-directional grate patterns is prohibited. Do not use MHD "Cascade" style grates. All castings shall be rated "heavy duty" and capable of meeting AASHTO H-20 and HS-20 loading requirements.

Catch Basin Frames and Grates: The catch basin grates shall have a two-directional or "grid-pattern" type. Where grates are to be installed adjacent to granite curbing, they shall 3-flange type grates. Provide as specified in the table below: 24-inch square grate with 36 openings, similar to Model No. LF 248-2-000, as manufactured by E. L. LeBaron Foundry Co., or approved equal. *Do not use Cascade grates at these locations.*

"D-Frame" Style Frames and Grates: "D-Frame" Styles grates shall be a two-directional or "grid-pattern" type. Test bars required shall be Test Bar B 1.20 inches in diameter. For catch basins with curb inlets, the frame and grate shall conform to "M.D.C. Standard Design" Model 14, Old Style Grate-Drop inlets for three flanges, as manufactured by:

1. Neenah Foundry (Representative Melville Grant Assoc.), Box 175, 83 Chapel Street, Needham, MA 02192 (Drop Inlet Model No. R3405B)
2. Mechanics Iron Foundry Co., 56 Kemble Street, Roxbury, MA 02119 (Model No. F5051)
3. E.L. LeBaron Foundry Co., Box 746, 14E Union Street, Brockton, MA 02403 (Model No. LD 268-1)
4. C.M. White Iron Works, Inc., 62 Concord Street, North Reading, MA (Model No. S421)
5. approved equal.

Manhole castings shall conform to Model No. R-1720 as manufactured by, Neenah Foundry, Model No. B-3030 as Manufactured by Mechanics Iron Foundry Co., 56 Kemble Street, Roxbury, MA 02119, Model No. LB 268-2-000 as Manufactured by E.L. LeBaron, Model No. Mass. Standard D.C.R. No. 5 as Manufactured by C.M. White Iron Works, Inc., 62 Concord Street, North Reading, MA, or an approved equal.

Manhole covers shall be labeled as indicated on the Drawings. Where manholes include a hydrodynamic separator, the cover shall indicate the type of separator unit and supplier.

Where catch basins include a hydrodynamic separator, provide a sign indicting the type of unit and supplier. The sign shall be set next to the "Don't Dump" sign in the adjacent sidewalk or a concrete slab.

CONSTRUCTION METHODS

Frame castings for catch basins and manholes shall be set in full beds of mortar, true to lines and grade and structure opening, and as directed by the Engineer. The Contractor shall take adequate elevation readings of the pavement surfaces on all sides of the structure to insure that the frame and grate or cover is set to create a flush wearing surface. Catch basin grates shall be set at temporary grades as needed to insure that stormwater runoff does not puddle on the roadway during the phasing of the work.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 200-005

BASIS OF PAYMENT

Furnishing and installing of new frames, grates and covers will be paid for at the Contract unit price each. Payment shall include full compensation for all materials, transporting, protecting and installing the frame, grate and/or cover, and for all equipment, tools and labor incidental thereto.

For double grate catch basins (Item 203-413), each frame and grate will be measured separately. Therefore, the measurement under Item 200-005 for a double grate catch basin shall be 2 each.

The temporary setting of frames and grates to conform to the surface grade prior to the placing of the finish surface will not be separately measured for payment.

Pay Item		Pay Unit
ITEM NO. 200-005	**FRAMES AND GRATES OR COVERS**	**EACH**

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ITEM NO. 201-021 CATCH BASIN WITH DEEP SUMP AND TRAP EACH

DESCRIPTION

The work under this Item shall include the furnishing and installing of catch basins at the locations and the line and grade as shown on the Contract Drawings.

MATERIALS

Precast Concrete, Joints, Pipe Connections, Brick, Sumps, Subbase and Sealant:
As specified under Item 202-002.

Catch Basin Hoods:
All catch basins shall have hoods installed over the outlet pipe. Hoods shall be cast iron hinged traps that fit over the catch basin outlet pipe. Traps shall be approximately 15-inches wide by 15-inches high and extend 8 to 10-inches from the wall of the structure. Catch basin hoods shall be LeBaron L202 with high strength hangers

Catch Basin Signs:
Provide cast iron catch basin signs as indicated on the Drawings.

Screened Gravel for Subbase:
Screened Gravel shall be uniformly graded with the maximum size of a particle between 3/8 inch and 3/4 inch. Screened Gravel shall consist of clean, hard and durable particles free from an excess of soft, elongated and disintegrated pieces or other objectionable material.

In wet conditions, crushed stone, meeting the requirements of Item 156-002, may be used in place of Screened Gravel at the option of the Engineer.

CONSTRUCTION METHODS

Excavation and backfilling for the installation of the catch basins shall be in accordance with General Earthwork Requirements. Excavate hole to the proper depth as shown on the Drawings allowing for 6 inches of subbase. The bases shall be supported on a compacted level foundation of screened gravel a minimum 6 inches thick. If the subgrade material is wet, use 3/4-inch crushed stone in lieu of screened gravel.

Crushed Stone (3/4" – See Item 156-002) may be substituted for Screened Borrow if field conditions at the bottom of the excavation are wet.

The precast base shall be placed level at the specified grade. The entire base shall be in contact with the underlying compacted level foundation. Check elevation and verify that the structure is level. The structure sections shall be installed using the approved gasket for sealing the joints; jointing shall be performed in accordance with the manufacturer's recommendations. Adjustment of the structure can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets shall be repaired or replaced as necessary, at no additional cost to the City.

Plug and grout the lifting holes if present. Backfill the structure to the outlet pipe using compacted gravel borrow. Compaction density and lift height shall be in accordance with General Earthwork

Requirements. Install outlet pipes at invert elevations indicated on the Drawings. Pipe openings shall be provided in the precast concrete structure risers to receive entering pipes and these openings shall be made at the place of manufacture. Connection of drain pipes to the structure shall be by means of a flexible connection, tighten the connector over the pipe to the manufacturer's recommended torque.

Install additional riser section(s) if necessary. Install and set grade adjustment rings in a full bed of mortar (as required). Install frame and grate at the finished grade elevation in a full bed of mortar as specified under Item 200-005. Backfill unit up to finished grade using compacted gravel borrow. Compactions density and lift height shall be in accordance with the General Earthwork Requirements.

Cutting or tampering in the field, for purpose of creating new sidewall openings or altering existing openings, will not be permitted without approval of the Engineer.

The interior sidewalls of the Catch Basin sumps shall be carefully painted with a florescent orange line at 12-inch increments from the bottom up to the underside of the insert. The distance from the bottom shall be neatly stenciled above the line.

Clean all sediment, debris, mortar, and soil from the bottom of all structures prior to final acceptance of the project.

METHOD OF MEASUREMENT AND PAYMENT — ITEM NO. 201-021

Furnishing and installing of catch basins of any type will be paid for at the contract unit price each. Payment shall include full compensation for excavation, placing and compacting backfill material, placing and compacting screened gravel or crushed stone subbase, all materials, transporting, protecting and installing the precast concrete catch basins complete as shown on the Contract Drawings and specified, and for all equipment, tools and labor incidental thereto.

Pay Item		Pay Unit
ITEM NO. 201-021	**CATCH BASIN WITH DEEP SUMP AND TRAP**	**EACH**

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ITEM NO. 202-002 DRAIN MANHOLE EACH
ITEM NO. 210-001 SANITARY SEWER MANHOLE EACH

DESCRIPTION

The work under this Item shall include the furnishing and installing of pre-cast concrete drain manholes and manhole access structures as shown on the Drawings and as directed by the Engineer.

Submittals

A. Submit the following for all precast concrete structures:

1. Detailed shop drawings showing all dimensions of the structure and all reinforcing, stamped by a Registered Professional Structural Engineer licensed in the Commonwealth of Massachusetts. Include erection drawings showing connections, cast-in items, waterproofing details, lifting hooks. Include production drawings showing elevations, sections, and details indicating sizes and quantities of reinforcement.

2. Structural calculations prepared by and stamped by a professional structural engineer licensed in the Commonwealth of Massachusetts. Calculations shall be prepared in accordance with the applicable sections of the following references:

   a. Commonwealth of Massachusetts State Building Code.

   b. American Concrete Institute, ACI 318 "Building Code Requirements for Reinforced Concrete."

   c. AASHTO, "Standard Specifications for Highway Bridges."

B. Submit product data on manhole waterproofing. Also submit the written application instructions of the manufacturer.

C. Submit product data and manufacturer's written application and placement instructions for non-shrink mortar.

D. Submit product data and manufacturer's written instruction for installing pipe connector.

E. Submit test reports from the testing of sanitary sewer manholes.

F. Submit Certificates of Compliance for precast risers and tops

MATERIALS

Precast Concrete

Provide precast reinforced concrete structures as indicated on the Drawings and complying with ASTM C 478. The precast concrete manhole tops shall be a flat slab top type, as indicated in the Drawings. Manholes shall be designed to support AASHTO H20 loadings. The precast concrete base section shall be cast with and integral floor. Diameter, base and riser thicknesses shall be as indicated on the Contract Drawings. Concrete shall have a minimum 28 day compressive strength of 4,000 psi using Type II Portland cement.

Joints
Horizontal joints between sections of concrete structures shall be sealed with a self-sealing butyl rubber based flexible joint sealant gasket complying with ASTM C443. Sealant shall be installed in accordance with the manufacturer's written instructions.

Manhole Steps
Manhole steps shall be 1/2-inch grade 60 steel reinforcing rod conforming to ASTM A615 encapsulated with molded copolymer polypropylene. Rungs shall have a 14-inch-wide stepping surface and protrude no less than 6 inches from the wall equal to M.A. Industries type PS-2-PR-SL. Copolymer polypropylene shall be type II, grade 16906, meeting ASTM specifications D 4101. The portion of the legs to be embedded in the precast section shall have fins and be tapered to ensure a secure bond. Steps shall start a foot above the shelf of the manhole floor and continue twelve inches on center spacing up through the complete height of the unit. The steps shall finish no lower than 24 inches below the rim elevation.

Pipe Connections
Drainage structures shall have plain beveled openings to accept the pipe specified and to be sealed with non-shrink grout.

Sewer manhole pipe openings shall have integral flexible rubber sleeves capable of accepting the pipe connection and providing a positive seal.

Brick
Bricks for raising manhole frames to finished grade shall conform to ASTM C62. Bricks shall be sound, hard, uniformly burned, regular, and uniform in shape and size. Underburned or salmon brick shall not be acceptable. Only whole brick shall be used. Mortar shall be composed of one part Portland cement, two parts sand, and hydrated lime not to exceed 10 lbs. to each bag of cement. Portland cement shall be ASTM C150, Type II; hydrated lime shall conform to ASTM C207. Sand shall be washed, cleaned, screened, well-graded with all particles passing a No. 4 sieve, and conform to ASTM C33.

Inverts
The invert channel within the structure shall be shaped from cement concrete and shall be sloped to drain from the inlets to the outlet. Inverts in drain manholes shall conform accurately to size of the adjoining pipe. Side inverts and main inverts where the direction changes shall be laid out in smooth curves of the longest possible radius which is tangent, within the manhole, to the centerline of the adjoining pipe lines.

Subbase
Screened Gravel shall be uniformly graded with the maximum size of a particle between 3/8 inch and 3/4 inch. Screened Gravel shall consist of clean, hard and durable particles free from an excess of soft, elongated and disintegrated pieces or other objectionable material.

In wet conditions, crushed stone, meeting the requirements of Item 156-002, may be used in place of Screened Gravel at the option of the Engineer.

Sealant
The precast concrete manholes shall be coated with a liquid penetrant/sealant for Portland cement concrete surfaces used to protect concrete surfaces from chloride intrusion. Sealant shall be Weather Worker J29A manufactured by Dayton Superior, Enviroseal 40 or Weathergurard P40 Sealer manufactured by Harris Specialty Chemicals, SXL100 manufactured by Prosoco Inc., or Chem-Trete BSM 40 VOC manufactured by Silvento Inc., or approved equal.

Sanitary Sewer Manhole Waterproofing:

A. The exterior surfaces of precast sanitary sewer manholes shall be given two heavy coats of bituminous waterproofing material.

1. The material shall be No. 35-J-10 Hi Build Bituminous Coating made by Mobil Chemical Company, Edison, NJ; Bitumastic Super Service Black made by Koppers Company, Inc., Pittsburgh, PA; or equal.

2. The waterproofing material shall be applied by brush or spray and in accordance with the instructions of the manufacturer. Time shall be allowed between coats to permit sufficient drying so that the application of the second coat has no effect on the first coat.

CONSTRUCTION METHODS

Excavation and backfilling for the installation of manholes shall be in accordance with the General Excavation and Backfill Requirements. The bases shall be supported on a compacted level foundation of screened gravel a minimum 6 inches thick. Crushed Stone (3/4" – See Item 156-002) may be substituted for screened gravel if field conditions at the bottom of the excavation are wet.

Manhole risers and tops shall be installed using approved butyl-rubber type gasket for sealing joints of manhole risers and tops; jointing shall be performed in accordance with the manufacturer's recommendations. Manhole risers and tops shall be installed level and plumb. Water shall not be permitted to rise over newly made joints, nor until after inspection as to their acceptability. All jointing shall be done in a manner to ensure watertight joints. Openings shall be provided in the precast concrete manhole risers to receive entering pipes and these openings shall be made at the place of manufacture. Connection of drain pipes to manholes shall be by means of a non-shrink grout joint.

Care shall be taken to ensure the openings are made to permit setting of the entering pipe at its correct elevation as indicated or directed. Manhole risers and tops shall be installed so the manhole steps shall be in alignment.

All holes used for handling shall be thoroughly plugged with non-shrink grout.

Cutting or tampering in the field, for purpose of creating new sidewall openings or altering existing openings, will not be permitted without approval of the Engineer.

Remove and dispose all sediment, debris, mortar, and soil from the bottom of all structures prior to final acceptance of the project.

The vacuum test of sewer manholes shall be conducted in accordance with ASTM C1244. Test results will be judged by the length of time it takes for the applied vacuum to drop from 10 inches of mercury to 9 inches. If the time is less that that listed in the table below, the manhole will have failed the test.

Minimum Test Times for Various Manhole Diameters

Depth (Feet)	48	60	72
	Time in Seconds		
0-12	30	39	49
12-16	40	52	67
16-20	50	65	81

If the manhole fails the initial test, the Contractor shall locate the leak and make proper repairs. Leaks may be filled with a wet slurry of accepted quick setting material. If the manhole should again fail the vacuum test, additional repairs shall be made until it passes the test or the manhole shall be replaced and the new manhole tested. All repairs shall be made at no additional cost to the City.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 202-002**
ITEM NO. 210-001

Furnishing and installing manholes will be paid for at the contract unit price each. Payment shall include full compensation for excavation, placing and compacting backfill material, placing and compacting gravel borrow or crushed stone subbase, all materials, transporting, waterproofing, testing, protecting and installing the precast concrete structures complete as shown on the Contract Drawings and specified, and for all equipment, tools and labor incidental thereto.

Pay Item		Pay Unit
ITEM NO. 202-002	**DRAIN MANHOLE**	**EACH**
ITEM NO. 210-001	**SANITARY SEWER MANHOLE**	**EACH**

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ITEM NO. 210-998 CONNECTION TO EXISTING SANITARY SEWER LUMP SUM

DESCRIPTION

The work under this Item shall include connecting the sewer constructed under this contract to the existing brick sewer, as indicated on the Drawings and as specified herein.

CONSTRUCTION METHODS

Neatly cut opening in existing brick sewer to accept new PVC sewer pipe. Install pipe connection with the new pipe cut flush to the inside of the existing brick sewer. Seal around opening with a non-shrink grout.

Excavation and backfill shall conform to the General Earthwork Requirements.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 210-998

CONNECTION TO EXISTING SANITARY SEWER will be paid for at the contract lump sum price. Payment shall include full compensation for excavation, placing and compacting backfill material, placing and compacting gravel borrow or crushed stone subbase, all materials, transporting, protecting and installing the precast concrete structures complete as shown on the Contract Drawings and specified, and for all equipment, tools and labor incidental thereto.

Pay Item		Pay Unit
ITEM NO. 210-998	CONNECTION TO EXISTING SANITARY SEWER	LUMP SUM

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ITEM NO. 220-001 DRAINAGE & SANITARY STRUCTURES –ADJUSTED EACH
ITEM NO. 220-510 DRAINAGE & SANITARY STRUCTURES –REMODELED EACH

DESCRIPTION

The work of Item 220-001 consists of adjusting existing castings of drainage and sanitary structures to the finish grade of the roadway. This will be used in areas of cold planning and overlaying where existing castings are misaligned or depressed with respect to the existing pavement grade,

The work of Item 220-510 consists of removing the remodeling of drainage and sanitary structures in areas of cold planning and overlaying where existing structures have settled or have structural damage within the upper 4 feet of the existing structure.

MATERIALS

Refer to Items 201-021, 202-002, and 210-001.

CONSTRUCTION METHODS

Adjusting to Grade (ITEM NO. 220-001)
Remove existing castings and protect from damage.

Remove or build up masonry at the top of the structure so that the casting will be flush with finish grade. Construction methods shall conform to the applicable provisions of Item 202-002.

The maximum height of brick and mortar or grading rings shall not exceed 11 inches.

Reset the existing casting shall be set in full beds of mortar as specified in Item 200-005.

Remodeling (ITEM NO. 220-510)
Remove existing castings and protect from damage.

Remove up damaged masonry to a depth of 4 feet below the rim elevation.

(If damaged masonry extends below 4 feet below the rim elevation, the removal work will be performed under Item 220-909 and a new structure [Item 201-021, 202-002 or 210-001) will be installed as directed by the Engineer.)

Reconstruct structure as specified in Items 201-021, 202-002 or 210-001, as appropriate. Build up masonry at the top of the structure so that the casting will be flush with finish grade.

Reset the existing casting shall be set in full beds of mortar as specified in Item 200-005.

METHOD OF MEASUREMENT AND PAYMENT

ITEM NO. 220-001
ITEM NO. 220-510

METHOD OF MEASUREMENT

The work of Items No. 220-001 and 220-510 will be measured per each structure.

BASIS OF PAYMENT

Adjusting or remodeling of existing drainage and sanitary structures will be paid for at the Contract unit price each. Payment shall include full compensation for all materials; transporting; removing, protecting and reinstalling the frame, grate and/or cover; and for all equipment, tools and labor incidental thereto.

The temporary setting of frames and grates to conform to the surface grade prior to the placing of the finish surface will not be separately measured for payment.

Pay Item		Pay Unit
ITEM NO. 220-001	**DRAINAGE & SANITARY STRUCTURES – ADJUSTED**	**EACH**
ITEM NO. 220-510	**DRAINAGE & SANITARY STRUCTURES – REMODELED**	**EACH**

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ITEM NO. 220-908 DRAINAGE STRUCTURES ABANDONED EACH
ITEM NO. 220-909 DRAINAGE STRUCTURES REMOVED EACH
ITEM NO. 223-001 FRAME AND GRATE OR COVER REMOVE AND STACK EACH

DESCRIPTION

The work under these Items shall consist of the abandonment or removal of existing drainage structures. The work includes the removal and stacking of castings, the plugging of inlets and outlet pipes, and the filling of all drainage structures designated to be abandoned and the removal of all masonry and filling the cavity of the drainage structures designated to be removed.

MATERIALS

Backfill used to fill the cavity of the removed or abandoned structure shall conform to Gravel Borrow specified in Item 151-001.

CONSTRUCTION METHODS

The existing castings shall be carefully removed and cleaned of cement concrete and or asphalt. They shall be satisfactorily stored and protected until the castings are required for reuse or until the casting are delivered by the Contractor to a Somerville DPW yard at Franey Road.

Pipe inlets and outlets of structures to be abandoned shall be plugged with brick masonry (as specified under Item 202-002) not less than 8 inches in thickness. Upper portions of the abandoned structures masonry shall be removed to a depth of 3-feet below the finished grade, the bottom of the structures shall be broken, and the structures shall be completely filled with Gravel Borrow, as specified under Item number 151-001, placed in 6 inch layers and thoroughly compacted.

Pipe inlets and outlets of structures to be removed shall be plugged with brick masonry (as specified under Item 202-002) not less than 8 inches in thickness. The existing masonry of the structures to be removed shall be completely removed. The cavity shall be completely filled and with Gravel Borrow, as specified in Item 151-001, placed in 6 inch layers and thoroughly compacted as specified. Crushed Stone may be substituted for Ordinary Borrow if field conditions at the bottom of the excavation are wet as directed by the Engineer.

METHOD OF MEASUREMENT AND PAYMENT

ITEM NO. 220-908
ITEM NO. 220-909
ITEM NO. 223-001

Drainage structures abandoned or removed including the plugging of inlets and outlet pipes will be measured and paid for at the Contract unit price each under the appropriate Item. Castings removed and stacked will be measured and paid for at the Contract unit price each.

Pay Item		Pay Unit
ITEM NO. 220-908	DRAINAGE STRUCTURES ABANDONED	EACH
ITEM NO. 220-909	DRAINAGE STRUCTURES REMOVED	EACH
ITEM NO. 223-001	FRAME AND GRATE OR COVER REMOVE AND STACK	EACH

ITEM NO. 226-001 CATCH BASIN CLEANING EACH

GENERAL
Clean and flush existing catch basins as directed by the Engineer.

EXECUTION

A. Cleaning Catch Basins and Pipe:

1. Remove grating and clean catch basin sump. Flush basin and outlet pipe.

2. Grit removed from catch basins, manholes, and pipes shall be considered "special wastes" and shall be disposed of at a licensed lined landfill.

3. Submit the following documentation regarding the Disposal of Special Wastes:

   a. Name and location of licensed disposal facility.

   b. Documentation that all material was disposed of at the designated disposal facility. This shall include tipping slips and written documentation for each truckload received at the disposal facility.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 226-001

MEASUREMENT
Catch Basin cleaning will be measured by each catch basin cleaned, including the existing outlet pipe.

PAYMENT
Catch Basin cleaning will be paid for by each catch basin cleaned, including the existing outlet pipe.

Pay Item		Pay Unit
ITEM NO. 226-001	**CATCH BASIN CLEANING**	**EACH**

(Remainder of page is intentionally blank)

ITEM NO. 238-012 12-INCH DUCTILE IRON PIPE (DIP) LINEAR FOOT

DESCRIPTION

The work under this Item shall include the furnishing and installing of ductile iron pipe (DIP) of the size indicated and at the locations indicated on the Drawings. This item will be used when ordered by the Engineer if it is necessary to install shallow drain pipes with less than 3 feet of cover.

MATERIALS

Ductile Iron Pipe:

1. Ductile iron pipe shall conform to AWWA C150 and C151, and shall be Class 52.
2. Joints shall be the push-on rubber gasket type meeting the requirements of AWWA C111.
3. Fittings: Fittings shall be ductile iron and shall conform to AWWA C110.
4. Linings: Ductile iron pipe shall be cement lined meeting the requirements of AWWA C104.

CONSTRUCTION METHODS

Install piping in accordance with ASTM D2321, the manufacturer's instructions, and the Drawings.

Acceptance of pipe will be on the basis of tests specified hereinbefore. The quality of all materials used in the pipe, the process of manufacture, and the finished pipe shall be subject to review by the Engineer. Inspection may be made at the place of manufacture, or on the work site after delivery or at both places and the pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though sample pipe units may have been accepted as satisfactory at the place of manufacture. All pipe that is rejected shall be immediately removed from the project site by the Contractor at no additional cost to the City.

Pipe sections shall not be stored on areas over the newly laid pipe or other pipelines which might be damaged by the superimposed load, and storage sections shall be restricted to approved areas.

Except where a concrete cradle or envelope is required, the pipe shall be laid in a gravel cradle. In trenches, no blocking or supporting of the piping by concrete, stones, bricks, wooden wedges, or method other than bedding the pipe on gravel or crushed stone will be permitted. Each length of pipe shall be shoved home against the pipe previously laid and held securely in position. Joints shall not be "pulled" or "cramped" without approval of the Engineer.

After the pipes are aligned in the trench and are ready to be jointed, all joint surfaces shall be cleaned. All pipes shall be laid with extreme care as to grade and alignment. Each pipe shall be so laid as to form a close joint with the next adjoining pipe and bring the inverts continuously to the required grade.

Stakeout of drain work and setting of line and grade is the responsibility of the Contractor. The Contractor shall establish centerline and offset stakes at each manhole, plus intermediate centerline and offset stakes as needed to ensure proper alignment and grade.

Care shall be taken to prevent earth, water and other materials from entering the pipeline. As soon as possible after the pipe and manholes are completed, the Contractor shall clean out the pipeline and manholes being careful to prevent soil, water, and debris from entering any existing drain. Place plugs in end of uncompleted conduit at the end of the work day, or whenever work stops. Flush lines between manholes to remove any collected debris.

If the visual observation of the completed drain or any part thereof shows any pipe, manhole, or joint to be of defective work or material the defect shall be replaced or repaired as directed by the Engineer at no cost to the City. The visual observation shall be conducted by the Engineer and any defects shall be as identified by such. The Contractor shall coordinate and provide site access for the City.

Storage, Handling and Placing Ductile Iron Pipe

Ductile iron pipe shall be laid at the lines and grades as shown on the plans and specified herein. Whenever encountered within the trench existing sewer/drain shall be removed unless otherwise noted. All existing sewer/drain lines, which are to be abandoned in place, shall be plugged at all open ends.

Pipes and fittings shall be subjected to a careful inspection and a hammer (ringing) test just before installation.

Any fitting showing a crack or any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, or any fittings or pipe discovered to be defective, shall be marked as rejected and removed at once from the work. Pipe showing a crack may be cut off before the pipe is laid at a point at least 12 inches from the visible limit of the crack provided the remaining portions perfectly sound as determined by the Engineer. Cut ends used with push-on joints shall be chamfered to prevent cutting the gasket when the pipe is laid.

Each pipe shall be cleared of all excess tar, debris, dirt, etc., before laying.

Care shall be taken in loading, transporting, and unloading to prevent injury to the pipes or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying, and no piece shall be installed which is found to be defective. Any damage to the pipe coatings shall be repaired as directed by the Engineer.

If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in satisfactory manner by the Contractor at no additional expense to the City. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until used in the work, and when laid shall conform to the lines and grades required.

When laying is not in progress, including lunchtime; the open ends of the pipe shall be closed by watertight plug or other approved means. The Contractor shall keep the trench free from water while the pipe is being installed. Fittings, in addition to those shown on the plans, shall be provided, if required, in crossing utilities, which may be encountered when opening the trench.

When cutting pipe is required, the cutting shall be done by machine leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe shall be beveled to conform to the manufactured spigot end. Cement lining shall be undamaged.

Fittings and plugs shall be restrained against hydraulic thrust with a block of Class B concrete conforming to the size and shape required by the Boston Water and Sewer Commission specifications. Yokes and tie rods, retainer glands or any combination thereof shall also be used as directed by the Engineer based on actual field conditions encountered. Unless otherwise approved by the Engineer, all pipe up to and including 12 inch pipe shall have at least two (2) 3/4 inch tie rods, 16-inch pipe at least four (4) 3/4 inch tie rods, and 48-inch pipe at least six (6) 1-1/2 inch tie rods. All yokes and tie rods shall be coated with an approved bituminous paint after assembly.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 238-012**

Measurement per linear foot for various types and sizes of pipe will be horizontally along the centerline of the pipe. Where increasers are used, measurement will be included with the larger size of pipe.

Furnishing and installing of Ductile Iron Pipe of various sizes will be paid for at the Contract unit price per linear foot of actual pipe installed under the respective Item. Payment shall include full compensation for trench excavation to the depths required to provide for laying the pipe at the grades shown on the Drawings, furnishing all materials, transporting, protecting and installing (including joining) all pipe and fittings, flared end sections, placing and compacting bedding and backfill material (specified under General Earthwork Requirements), and all else in connection with the laying of the drain pipe for which there is no separate pay Item. All piping shall be left in a clean manner with no sediment accumulation.

Pay Item		Pay Unit
ITEM NO. 238-012	**12-INCH DUCTILE IRON PIPE (DIP)**	**LINEAR FEET**

(Remainder of page is intentionally blank)

ITEM NO. 250-010	**10-INCH PVC SEWER PIPE**	**LINEAR FOOT**
ITEM NO. 250-012	**12-INCH PVC SEWER PIPE**	**LINEAR FOOT**
ITEM NO. 250-015	**15-INCH PVC SEWER PIPE**	**LINEAR FOOT**

DESCRIPTION

The work under this Item shall include the furnishing and installing of PVC sewer pipe and fittings of the size indicated and at the locations indicated on the Drawings.

MATERIALS

Polyvinyl Chloride Pipe:

1. The polyvinyl chloride pipe and fittings, including also those required for stubs, shall conform to ASTM D3034.

2. The pipe shall have pipe diameter to wall thickness ratio (SDR) of a maximum of 35.

3. Joints shall conform to ASTM D3212. Provide push-on bell and spigot joints with elastomeric ring gaskets.

4. Provide gaskets conforming to ASTM F477; resistant to common ingredients of sewage and industrial wastes, including oils and groundwater; and capable of enduring permanently under conditions of proposed use. Fix gaskets into place in bell to avoid dislodging during joint assembly.

Flexible Pipe-to-Manhole Connector with Flexible Annular Space Filler:

1. Conform to ASTM C923.

2. Band and clamp non-magnetic Series 304 stainless steel.

3. Nitrile and PVC cavity O-ring.

4. Do no furnish connectors using castings and bolts with non-resilient bearings.

CONSTRUCTION METHODS

PVC pipe shall be installed in accordance the applicable provisions of Item 238-012 above and the following:

Install PVC pipe on bedding of screened gravel. Solidly bed pipe in pipe bedding material with full bearing for the entire length of the pipe. Excavate depressions for bell and spigot, hubbed, and flared ends to provide full bedding. Initial backfill to a point at least 6 inches over the pipe shall be screened gravel.

Installation of PVC Pipe:

A. Install in accordance with paragraph 3.02 of this section and the following:

B. Do not install non-straight pipe sections that deviate more than 1/2 inch over a 20-foot length of pipe.

1. Handle and place carefully into position to avoid damage.

2. Do not allow pipe centerline to deviate from straight line drawn between ends, by more than 1/16 inch per foot of length.

C. Follow directions of joint material and pipe manufacturers when installing gaskets and joints to render them watertight and flexible.

D. After bedding pipe, place and compact bedding material between pipe and sides of trench. Use extra care to compact bedding material under lower half of pipe. Fill bell holes with bedding material and compact. Place compact bedding material as indicated on the Drawings.

E. Allowable Pipe Deflection:

1. Pipe provided under this specification shall be so installed as to not exceed a maximum deflection of 5 percent. Such deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.

2. Upon completion of a section of sewer, including placement and compaction of backfill, the Contractor shall measure the amount of deflection by pulling a specially designed gage assembly through the completed section. The gage assembly shall be in accordance with the recommendations of the pipe manufacturer.

Jointing Pipe:
After the pipe are aligned in the trench and are ready to be jointed, all joint surfaces shall be cleaned.

Alignment and Placement:
All pipe shall be laid with extreme care as to grade and alignment. Each pipe shall be so laid as to form a close joint with the next adjoining pipe and bring the inverts continuously to the required grade.

Stakeout of drain work and setting of line and grade is the responsibility of the Contractor.

The Contractor shall establish centerline and offset stakes at each manhole, plus one intermediate centerline and offset stake as a check point between manholes. Laser aligning shall not be used to establish a continuous line in excess of 400-feet.

Cleaning:
Care shall be taken to prevent earth, water and other materials from entering the pipeline. As soon as possible after the pipe and manholes are completed, the Contractor shall clean out the pipeline and manholes being careful to prevent soil, water and debris from entering any existing pipe.

1. Place plugs in end of uncompleted conduit at end of day or whenever work stops.

2. Flush lines between manholes if required to remove collected debris.

Testing of Completed Gravity Sanitary Sewer System:

Testing of sanitary sewers shall be by low-pressure air test after installation of service fittings and leads, and after completing backfill of the gravity sewer trench. The Engineer will be present during all testing.

The low-pressure air test shall be conducted in compliance with the following:

1. After completing backfill of the wastewater line, the Contractor shall, at his expense, conduct a Line Acceptance Test using low-pressure air.

2. The test shall be performed under the supervision of a representative of the Somerville DPW.

4. Equipment used shall meet the following minimum requirements:

    a. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.

    b. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.

    c. All air used shall pass through a single control panel.

    d. Three individual hoses shall be used for the following connections:

        i. From control panel to pneumatic plugs for inflation.

        ii. From control panel to sealed line for introducing the low pressure air.

        iii. From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

        iv. Procedures: All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psi. The sealed pipe shall be pressurized to 5 psi. The plugs shall hold against the pressure without bracing and with movement of the plugs out of the pipe.

        v. After a reach of pipe has been backfilled and cleaned, and the pneumatic plugs are checked as specified, the plugs shall be placed in the line and inflated to 25 psi. Low pressure reaches 4 psi greater than the average back pressure of ground water that may be over the pipe. Two minutes minimum shall be allowed for the air pressure to stabilize.

        vi. After the stabilization period (3.5 psi minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed "acceptable" if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psi (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time shown for the given diameters in the following table:

Pipe Diameter (in inches)	Minutes
8	4.0
10	5.0
12	5.5
15	7.5

In areas where ground water is known to exist, the Contractor shall install a 1/2 inch diameter capped pipe nipple, approximately 10 inches long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the Line Acceptance Test, the ground water shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The hose shall be held vertically and a measurement of the height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11 feet, then the added pressure will be 5 psi, and the 2.5 psi increased to 7.5 psi. The allowable drop of one pound and the timing remain the same.)

vii. If installation fails to meet the above requirements for the air test, the Contractor shall correct the pipeline until an acceptable test is achieved.

viii. The Contractor shall provide as required the proper plugs, weirs, and other equipment required to perform all tests.

ix. The tests shall be conducted at all times in the presence of the Engineer and the Devens Utility Department. Should a line that has previously been tested indicate any water infiltration, or otherwise appear suspect to the Engineer, the Contractor shall conduct confirmation air tests on the line, at no additional cost to the Authority.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 250-010**
ITEM NO. 250-012
ITEM NO. 250-015

Measurement per linear foot for various types and sizes of pipe will be horizontally along the centerline of the pipe.

No separate measurements will be made for fittings including bends, wyes, tees and the like. These items shall be considered incidental to the length of pipe measured.

Furnishing and installing of PVC Pipe will be paid for at the Contract unit price per linear foot of actual pipe installed. Payment shall include full compensation for trench excavation to the depths required to provide for laying the pipe at the grades shown on the Contract Drawings, furnishing all materials, transporting, protecting and installing (including joining) all pipe and fittings, placing and compacting bedding and backfill material (specified under General Earthwork Requirements), testing, connection to existing manhole, connection to drinking fountain, and all else in connection with the laying of the sewer pipe for which there is no separate pay Item. All piping shall be left in a clean manner with no sediment accumulation.

Pay Item		Pay Unit
ITEM NO. 250-010	**10-INCH PVC SEWER PIPE**	**LINEAR FEET**
ITEM NO. 250-012	**12-INCH PVC SEWER PIPE**	**LINEAR FEET**
ITEM NO. 250-015	**15-INCH PVC SEWER PIPE**	**LINEAR FEET**

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ITEM NO. 252-912 12 INCH HIGH DENSITY POLYETHYLENE (HDPE) PIPE FOR DRAIN LINEAR FOOT

GENERAL

Furnish and install new HDPE drainage pipe as indicated.

SAMPLE AND SHOP DRAWINGS

A. Catalog cuts and product data for perforated HDPE pipe.

MATERIAL

A. HDPE Pipe:

1. All High Density Polyethylene (HDPE) pipe and pipe cap shall be rated to withstanding a AASHTO HS20-44 loading. Pipe shall be ADS N-12 pipe or approved equal.

2. HDPE: N-12 ST IB pipe shall have a smooth interior and annular exterior corrugations.

3 Fittings shall conform to AASHTO M294 or ASTM F2306. Fabricated fittings shall be welded at all accessible interior and exterior junctions.

4. Pipe and fittings shall be made of virgin polyethylene compounds that comply with cell classification 435400C as defined and described in ASTM D3350, except that carbon black content should not exceed 4%. The virgin pipe material shall comply with the notched constant ligament-stress (NClS) test as specified in Section 6.1.1 and 5.1 of AASHTO M294 and ASTM F2306 respectfully.

EXECUTION

A. Trench Excavation:

1. Trenches may be excavated to their full depth by machinery provided that the material remaining at the bottom of the trench is no more than slightly disturbed.

2. Trench excavation shall result in a flat or shaped trench bottom, true to grade so that the pipe will have uniform and continuous bearing on a firm support. Trenches shall be made as narrow as practicable, and every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling and compaction is completed.

3. Temporary Earth Support:

a. The Contractor shall furnish, place and maintain temporary earth support at locations necessary to support the sides of excavations to prevent danger to persons or damage to adjacent pavements, facilities, utilities, or structures; to prevent injurious caving or erosion or the loss of ground.

b. In all temporary earth support operations, care shall be taken to prevent collapse of excavations, injury to persons or damage to adjacent structures. Any injuries to persons shall be the responsibility of the Contractor; and any damage to the work occurring as a result of settlement, water or earth pressure, or other causes due to inadequate bracing or

other construction operations of the Contractor shall be satisfactorily repaired and made good by the Contractor, at no additional expense to the City.

c. The Contractor shall comply with all federal, state, and local safety regulations, and requirements.

4. Groundwater Control:

a. The Contractor shall provide, at its own expense, adequate pumping and drainage facilities to maintain the excavated area sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures nor cause excessive disturbance of underlying natural ground. The flows of all water resulting from pumping shall be managed so as not to cause erosion, siltation of drainage systems, or damage to adjacent property. Prior to discharge, all groundwater shall be filtered by temporary settling basins or filter media.

b. Any damage resulting from the failure of the dewatering operations of the Contractor, and any damage resulting from the failure of the Contractor to maintain all the areas of work in a suitable dry condition, shall be repaired by the Contractor, as directed by the Engineer, at no additional cost to the City. The Contractor's pumping and dewatering operations shall be carried out in such a manner as to prevent damage to the Contract work and so that no loss of ground will result from these operations. Precautions shall be taken to protect new work from flooding during storms or from other causes. Pumping shall be continuous to protect the work and/or to maintain satisfactory progress.

B. Installation of HDPE Pipe:

1. Acceptance of Pipe: Acceptance will be on the basis of tests specified herein before. The quality of all materials used in the pipe, the process of manufacture, and the finished pipe shall be subject to review by the Engineer. Inspection will be on the work site after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements. All pipe that is rejected shall be immediately removed from the project site by the Contractor and replaced with new pipe conforming to the Specifications, all at no additional cost to the City.

2. Pipe Storage: Pipe sections shall not be stored on areas over the newly laid pipe that might be damaged by the superimposed load, and storage sections shall be restricted to approved areas.

3. Handling Pipe: Each pipe unit shall be handled into its position in the trench only in such manner and by such means, as the Engineer accepts as satisfactory. The Contractor will be required to furnish suitable devices to permit satisfactory support of all parts of the pipe unit when it is lifted.

4. Slope the pipe down at the grade indicated on the Drawings.

5. Cleaning: Care shall be taken to prevent earth, water and other materials from entering the pipeline. As soon as possible after the pipe and manholes are completed, the Contractor shall clean out the pipeline and manholes being careful to prevent soil, water and debris from entering any existing drain.

a. Place plugs in end of uncompleted conduit at end of day or whenever work stops.
b. Flush lines between manholes if required to remove collected debris.

C. Trench Backfill:

1. Backfill trench with suitable backfill material, defined as conforming with the requirements of Item 150-001 ORDINARY BORROW, 151-001 GRAVEL BORROW, 152-001 DENSE-GRADED CRUSHED STONE, 153-001 FLOWABLE FILL (CDF) or 156-002 CRUSHED STONE (3/4-INCH).

2. Compact in 12-inch lifts.

3. Take care in backfilling and compacting so as not to damage or crush the pipe.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 252-912**

MEASUREMENT
Pipe will be measured in place by the linear foot of pipe installed complete in place.

PAYMENT
Pipe will be paid for at the contract unit price per linear foot of pipe, installed and complete in place. Trench excavation, backfilling, and compaction will be considered incidental to this Item.

Pay Item		Pay Unit
ITEM NO. 252-912	**12 INCH HIGH DENSITY POLYETHYLENE (HDPE) PIPE FOR DRAIN**	**LINEAR FOOT**

ITEM NO. 303-006	**6 INCH DUCTILE IRON WATER PIPE**	**LINEAR FOOT**
ITEM NO. 303-008	**8 INCH DUCTILE IRON WATER PIPE**	**LINEAR FOOT**
ITEM NO. 303-012	**12 INCH DUCTILE IRON WATER PIPE**	**LINEAR FOOT**
ITEM NO. 303-016	**16 INCH DUCTILE IRON WATER PIPE**	**LINEAR FOOT**
ITEM NO. 309-001	**DUCTILE IRON FITTINGS FOR WATER PIPE**	**POUND**
ITEM NO. 371-990	**CONNECTION TO EXISTING 20 INCH WATER MAIN**	**LUMP SUM**

DESCRIPTION:

Furnish, install, test and disinfect water system piping, as indicated and specified.

QUALITY ASSURANCE:

A. All pipe and fittings shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured. The Contractor shall submit in duplicate sworn certificates of such tests.

B. In addition, the City reserves the right to have any or all pipe, fittings and special castings inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the City's expense.

C. Provide the services of an independent testing laboratory to perform the pressure and disinfection tests specified herein.

D. The Contractor shall be responsible for the water-tightness and disinfection of the water main. If the pipe fails the tests specified in paragraph 3.06 of this section, the Contractor shall perform all work associated with locating and repairing the leaks and retesting until all pipe passes the tests, all without additional compensation from the City.

F. Only employees of the Somerville DPW will be allowed to operate existing hydrants and gates.

G. No existing water main shall experience any disruption in service without approval of the City and notification of a minimum of 48 hours in advance of any disruption. The Contractor will be responsible to notify users of any disruption of the water service a minimum of 48 hours in advance. **This requirement applies to the connection at the existing 20-inch water main at Newton Street.**

SUBMITTALS:

A. Submit the following:

1. Qualifications of independent testing laboratory.

2. Submit catalog cuts and product data for water pipe and fittings

3. Certification of compliance for pipe.

4. Certification that pipe has been tested as specified.

5. Proposed methods for performing testing, including plans showing sections to be tested:

a. Pressure/Leakage test.

b. Disinfection.

6. Certified test reports as specified and as contained in cited standards. Test results shall include, but not be limited to:

a. Pressure/Leakage test.

b. Disinfection.

7. Schedule of work, including dates and duration of proposed shutdown of water mains.

B. Additional requirements for restrained joints.

1. Piping layout drawings showing both plan and profile of the proposed pipeline. Data to be shown to include curve and deflection data, invert elevations, grades, joint locations, closure locations, joint openings if any, and all other necessary information.

2. Locations and type of restrained joints or devices to prevent joint separation.

MATERIALS

DUCTILE IRON PIPE:

A. Provide pipe conforming to ANSI A21.50/AWWA C150. The pipe shall be equipped with push-on type, restrained joint, or mechanical joints, as required.

B. Provide pipe manufactured in accordance with ANSI A21.51/AWWA C151.

C. The ductile iron pipe shall be Pressure Class 350 and thickness Class 52. Pipe shall be furnished in minimum nominal 18-foot lengths, with Push-on or Mechanical Joints with gaskets conforming to ANSI A21.11/AWWA C111.

D. The ductile iron pipe shall be double cement lined inside and then asphalt seal coated in accordance with ANSI A21.4/AWWA C104. The pipe shall be furnished along with necessary materials and equipment recommended by the manufacturer for use in joining pipe lengths and fittings.

E. Fittings shall be short body ductile iron Class 350 Mechanical Joint, conforming to ANSI A21.53/AWWA C153 for pipe sizes 16 inches and smaller. Fittings shall have the same lining and coating as the pipe specified above. All fittings shall be marked with the weight and shall have distinctly cast upon them the pressure rating, the manufacturer's identification, nominal diameter of openings and the number of degrees or fraction of the circle on all bends.

F. In order to provide positive joint restraint, valve anchor tees and restrained joints on 6-inch branch shall be used for hydrant branch connections.

G. Caps and plugs installed in all new work as indicated on the Drawings shall be provided with a threaded corporation or bleeder valve so that air and water pressure can be relieved prior to future connection.

H. Contractor shall provide all adapters and fittings such as transition couplings, as determined in the field, necessary to complete all connections, whether or not specifically stated in the Drawings and Specifications.

I. All pipe shall be marked with the class, thickness designation and initials of the manufacturer.

J. Restrained joints shall be furnished. Restraints for mechanical joint fittings shall be Megalug as manufactured by Ebba Iron Co., American Cast Iron Pipe Co., Birmingham, Alabama, Griffin Pipe Products Co., Florence, New Jersey or equal. Restraints for push-on joints shall be series 800 coverall as manufactured by Ebba Iron Co. or equal. Location of restrained joints shall be based on Thrust Restraint Design for Ductile Iron Pipe (Second Edition), published by Ductile Iron Pipe Research Association.

K. Pipe for use with split couplings shall be as specified except that the ends shall not have bells or beads but shall have cast or machined shoulders necessary for the couplings to be used and shall conform to the specifications of the manufacturer of the couplings.

L. Not Used

M. Gaskets, Glands, Nuts And Bolts:

1. Gaskets, glands, nuts, bolts and accessories shall conform to AWWA C111 or C153 as appropriate.

2. Gaskets shall be of plain tipped rubber, suitable for exposure to the liquid within the pipe.

3. Glands shall be ductile or cast iron.

4. Bolts and nuts shall be high strength alloy.

COUPLINGS AND ADAPTERS:

A. Sleeve-type couplings for plain-end pipe shall be provided with plain rubber gaskets and steel, tee-head bolts with nuts. Couplings shall be given a shop coat compatible with the same outside coating as the pipe specified above. Couplings shall be Dresser style 38 or 138, furnished preassembled, as manufactured by Dresser Industries, Inc., Smith-Blair, Coupling Systems, Inc. or equal.

B. Couplings or adapters as required for connecting existing pipe to new pipe or new pipe to new pipe shall be furnished as required and designed for compatibility with the pipe and operating pressures encountered. Couplings shall be Dresser Style 162 as manufactured by Dresser Industries Inc., Smith-Blair, Baker All Steel or equal. Flanged adapters shall be Dresser Style 128, or equal.

C. Split couplings may be used for connecting gray cast iron or ductile iron. If split couplings are used with grooved ductile iron pipe, the minimum pipe wall thickness shall be as specified. Split

couplings shall be made of malleable iron and shall be suitable for use with grooved-end or shouldered-end, cast iron pipe. They shall be:

1. Victualic couplings made by the Victualic Company of America, Elizabeth, New Jersey;
2. Gruvagrip couplings made by Gustin-Bacon Manufacturing Company, Kansas City, Missouri;
3. Groove couplings made by Eastern Malleable Iron Company, Pittsburgh, Pennsylvania;
4. Equal.

D. All couplings shall be furnished with the pipe stop removed.

E. Couplings shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe. The gaskets shall have metallic tips to provide electrical continuity through the joint.

F. The Contractor shall provide suitable filling rings where the layout of the flanged piping is such as to necessitate their use. In materials, workmanship, facing, and drilling, such rings shall conform to the 125 pound ANSI Standard. Filling rings shall be of suitable length with nonparallel faces and corresponding drilling, if necessary, to endure correct assembly of the adjoining piping or equipment.

G. Couplings for exposed pipe shall be of steel. The couplings shall be provided with steel bolts and nuts. They shall be:

1. Dresser Style 38
2. Smith-Blair Style 411
3. Baker Allsteel
4. Equal.

H. At the Contractor's option, flexible connections in the piping shall be sleeve-type couplings, split couplings or mechanical joint pipe as herein specified.

EXECUTION

A. Handling Ductile Iron Pipe and Fittings:

1. Care shall be taken in loading, transportation, and unloading to prevent injury to the pipe or coatings.

2. Pipe or fittings shall not be dropped.

3. Pipe shall be stored above ground at a height no greater than 5-feet, and with even support for the pipe barrel.

4. Only nylon-protected slings shall be used for handling the pipe. No hooks or bare cables will be permitted.

5. Gaskets shall be shipped in cartons and stored in a clean area, away from grease, oil, heat, direct sunlight and ozone producing electric motors.

B. Examination of Pipe:

1. All pipe or fittings shall be examined before placement, and no piece shall be installed which is found to be defective. Any damage to the pipe coatings shall be repaired as directed by the Engineer at no additional cost to the City.

2. Pipes and fittings shall be inspected and subjected to a hammer (ringing) test just before installation.

3. Any fitting showing a crack or any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, or any fitting or pipe discovered to be defective, shall be marked as rejected and removed from the Work Site.

    a. Pipe showing a crack may be cut off at a point at least 12 inches from the visible limit of the crack provided the remaining portion is sound as determined by the Engineer.

    b. Cut ends used with push-on joints shall be chamfered.

4. If any defective pipe is discovered after it has been placed, it shall be removed and replaced with a sound pipe by the Contractor, at no additional cost to the City.

C. Installation:

1. All pipe and fittings shall be thoroughly cleaned before placement.

    a. Each pipe shall be cleared of items, including, but not limited to, excess tar, debris, dirt, mud, snow, ice, before laying.

2. Ductile iron pipe and fittings shall be installed in accordance with requirements of AWWA Standard Specification C600 except as otherwise provided herein.

3. A firm even bearing throughout the length of the pipe shall be constructed by compacting screened gravel around the pipe, up to the springline.

    a. Blocking will not be permitted.

4. When laid, the pipe shall conform to the lines and grades required.

    a. Provide a minimum of 5 feet of cover below finished grade, unless otherwise indicated on the Drawings.

5. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means. The Contractor shall keep the trench free from water while the pipe is being installed.

6. Fittings, in addition to those shown on the Drawings, shall be provided where water lines cross utilities to provide vertical separation between the lines.

7. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a bell (push-on joint)

shall be beveled to conform to the manufactured spigot end. Cement lining shall be undamaged.

8. Yokes and tie rods, retainer glands or any combination thereof shall also be used as directed by the Authority based on actual field conditions encountered. Pipe up to and including 12 inch pipe shall have at least two 3/4 inch tie rods. All yokes and tie rods shall be coated with an approved bituminous paint after assembly.

9. Ductile iron pipe installed within 5-feet of gas lines shall be fully encased with polyethylene material. Polyethylene shall be 8 millimeters thick and comply with AWWA C 105.

10. No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece, at no additional cost to the City.

D. Deflection of Water Mains:

1. In laying a full 18 foot length of ductile iron pipe along a curve, the maximum changes in alignment of each length of pipe shall not exceed the following amounts:

	Maximum Permissible Deflection	
Size of Pipe Inches	Push-on Joint Inches	Mechanical Joint Inches
4	19	31
6	19	27
8-12	19	20

E. Joints for Water Mains:

1. Push-on joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe to be entered shall then be inserted in alignment with the bell of the pipe to which it is to be joined, and pushed home with a jack or by other means. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.

2. Mechanical joints shall be made up by first cleaning with a wire brush the surfaces against which the gasket will come in contact. The gasket, bell, and spigot shall be lubricated by washing with soapy water just prior to assembling the joint. After the nuts have been made up finger tight, the bottom nut, then top and then diametrically opposite nuts shall be progressively tightened. The tightening process should be repeated until the nuts are within the following range of torques:

Pipe Size Inches	Bolt Diameter Inches	Torque Inch-lbs	Wrench Length Inches
3	5/8	40-60	8
4-24	3/4	60-90	10
30-36	1	70-100	12
42-48	1-1/4	90-120	14

3. Restrained Joints

   a. Joining of restrained joint piping shall conform to the manufacturer's recommendations.

   b. If effective sealing of the joint is not attained, the joint shall be disassembled, thoroughly cleaned, a new gasket inserted and joint reassembled.

   c. Deflection of alignment at a joint shall not exceed the appropriate permissible deflection recommended by the manufacturer.

F. Sleeve Couplings for Water Mains:

1. After assembly, all exterior surfaces including the bolts and nuts shall be thoroughly coated with two coats of a heavy-duty protective coating. Surfaces to receive epoxy coating shall be prepared in accordance with Steel Structure Painting Council Specifications SP-3. All surfaces to receive epoxy coating shall be preheated. Electrical continuity (copper strip conductors) shall be provided across all joints in accordance with the manufacturer's instructions. Copper strips shall be cadwelded on each side of the joint.

TESTING, DISINFECTING, AND FLUSHING OF WATER MAINS:

A. Prior to the pressure and leakage tests, the piping shall be thoroughly flushed clean of all dirt, dust, oil, grease and other foreign material. This work shall be done with care to avoid damage to linings and coatings.

B. Pressure And Leakage Tests

1. Except as otherwise directed, all pipelines shall be given combined pressure and leakage tests in section of approved length. The Contractor shall furnish and install suitable temporary testing plugs or caps; all necessary pressure pumps, pipe connections, meters, gates, and other necessary equipment; and all labor required. The City or Engineer shall have the privilege of using their own gages.

2. Subject to approval and provided that the tests are made within a reasonable time considering the progress of the project as a whole, and the need to put the section into service, the Contractor may make the tests when he desires.

3. Unless it has already been done, the section of pipe to be tested shall be filled with water of approved quality, and all air shall be expelled from the pipe. The Contractor shall follow established procedures for filling the pipe and expelling trapped air to avoid exposing the piping system to water-hammer. If blowoffs are not available at high points for releasing air, the Contractor shall excavate as required and install the necessary taps. After completion of the test, if so directed by the Engineer, he shall remove corporations used for testing, plug the holes and backfill as necessary.

4. The section under test shall be maintained full of water for a period of 24 hours prior to the combined pressure and leakage test being applied.

5. The pressure and leakage test shall consist of first raising the water pressure (based on the elevation of the lowest point of the section under test corrected to the gage location) to a

pressure in pounds per square inch numerically equal to the pressure rating of the pipe not to exceed 200 psi. If the Contractor cannot acheve the specified pressure and maintain it for a period of two hour, the section shall be considered as having failed to pass the pressure test.

6. Following or during the pressure test, the Contractor shall make a leakage test by metering the flow of water into the pipe while maintaining in the section being tested a pressure equal to the pressure rating of the pipe. If the average leakage during a two-hour period exceeds a rate of 11.6 gallons per inch of diameter per 24 hours per mile of pipeline, the section shall be considered as having failed the leakage test. For example, if 1,000 feet of 12-inch pipe is to be tested, the allowable leakage is 2.2 gallons over a 2-hour period, calculated as follows:

$$L = \frac{(11.6\ \text{gal}) \times (12'') \times (2\ \text{hr.}) \times (1000')}{(I'') \times (24\ \text{hr.}) \times (5280')} = 2.2\ \text{gal}$$

7. If the section fails to pass the pressure and leakage test, the Contractor shall do everything necessary to locate, uncover, and repair or replace the defective pipe, fitting, or joint, all at his own expense and without extension of time for completion of the work. Additional tests and repairs shall be made until the section passes the specified test.

8. If, in the judgment of the Engineer, it is impracticable to follow the foregoing procedure exactly for any reason, modifications in the procedure shall be made as required and approved, but in any event the Contractor shall be responsible for the ultimate tightness of the line within the above leakage and pressure requirements.

9. All testing required per the Contract Documents shall be witnessed by the Engineer. Any testing or testing results not witnessed by the Engineer shall not be considered as having met any of the Contract Document requirements for testing.

C. Disinfection and Flushing:

1. The Contractor shall disinfect the lines carrying potable water.

2. The Contractor shall furnish all equipment and materials necessary to do the work of disinfecting, and shall perform the work in accordance with the procedure outlined in AWWA C651 and all amendments thereto.

3. In general, the procedure of disinfecting the main shall be to apply the chlorine through a tap in one end of the section and bleed it off through a tap at the other end.

4. The applied dosage shall be such as to produce a chlorine concentration of not less than 10 mgll after a contact time of not less than 24 hours.

5. During the disinfection period, care shall be exercised to prevent contamination of water in existing mains.

6. Any temporary connection to the mains or other facilities required to accomplish the disinfection of the mains shall be at the Contractor's expense.

7. After treatment, the main shall be flushed with clean water until the residual chlorine concentration is less than 0.2 mg/l.

8. Before disposing of the water used in disinfecting and flushing water mains the Contractor shall thoroughly neutralize it through the application of a reducing agent, as referenced in AWWA C65 1.

9. Bacteriological sampling and testing shall be done in accordance with AWWA C651 for each main and each branch. Sampling shall be accomplished with sterile bottles treated with sodium thiosulfate, as required by Standard Methods. No hose or fire hydrants shall be used in collection of samples. A corporation stop installed on the main, with a removable copper tube gooseneck assembly, is the recommended method.

10. Testing shall be done by a laboratory approved by the Engineer, in accordance with Standard Methods, and shall show the absence of coliform organisms. A standard plate count may be required at the option of the Engineer.

SEPARATION OF POTABLE WATER MAINS AND SEWER OR NON-POTABLE LINES:

A. Parallel Installation:

1. Water mains shall be laid at least 10 feet horizontally from any existing or proposed sewer or non-potable line. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten-foot separation, it is permissible to install a water main closer to a sewer, provide that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 19 inches above the top of the sewer.

B. Crossings:

1. Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. The water main shall cross over the sewer. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible.

C. When it is impossible to obtain the horizontal and vertical separation specified, construct both the water main and the sewer or non-potable line with either push-on or mechanical joint cement lined ductile iron pipe.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 303-006**
ITEM NO. 303-008
ITEM NO. 303-012
ITEM NO. 303-016
ITEM NO. 309-001
ITEM NO. 371-990

MEASUREMENT
Water pipe of various sizes will be measured per linear foot of continuous runs of such pipe actually laid, measuring along the centerline of the pipe.

DUCTILE IRON FITTINGS FOR WATER PIPE consisting of bends, tees, caps, wyes, sleeves, reducers, increasers and other special fittings, apply only when new materials are necessary and when these materials are not specifically provided for under other Bid Items. The fittings (excluding accessories comprising Rings, Gaskets, Bolts, Nuts, Washers and Clamps) will be measured by the pound based on

the weight stated on the invoice of the supplier or the manufacturer's rated weight in the catalog, whichever is the lesser..

CONNECTION TO EXISTING 20 INCH WATER MAIN will be measured as a lump sum.

PAYMENT

Payment will be at the unit price per linear foot of pipe furnished and installed. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary to furnish, install, and test one linear foot of water pipe.

Include all costs necessary for; preparing site; traffic controls incidental to the work; locating utilities; excavating and trenching; temporary excavation support systems; removing and disposing of debris; handling, storing, transporting and disposing of all material, including excess material; stockpiling material; supporting all utilities; preparing subgrades; trench dewatering including pumping and sedimentation control; bedding and backfilling; warning tape, compacting, including furnishing and installing imported backfill materials; surface restoration; testing; and other appurtenant work.

Include all costs of pipe, fittings, couplings, restrained joints, thrust blocks, testing and disinfecting. Include all cost for connections to existing piping, including reducers, couplings and sleeves (except for connection to existing water main which is included in Item No. 371-990). Include all costs of coordinating with the Engineer and the Devens Utility Department regarding arranging for water system shutdowns.

Payment for DUCTILE IRON FITTINGS FOR WATER PIPE will be at the Contract unit price per pound and will be considered full compensation for furnishing and installing the fittings.

Payment for CONNECTION TO EXISTING 20 INCH WATER MAIN will be at the Contract lump sump price and will be considered full compensation for all materials, labor and equipment necessary to connect to the existing 20-inch water main as indicated on the Drawings and as specified herein. It shall include cutting in the tee into the existing 20-inch cast iron main, including sleeve connections to joint the new ductile iron tee to the existing cast iron pipe. It shall include all work associated with the temporary shutdown of the 20-inch line and the notifications as specified herein. The 20-inch butterfly gate will be paid for under Item 356-020.

Pay Item		Pay Unit
ITEM NO. 303-006	**6 INCH DUCTILE IRON WATER PIPE**	**LINEAR FOOT**
ITEM NO. 303-008	**8 INCH DUCTILE IRON WATER PIPE**	**LINEAR FOOT**
ITEM NO. 303-012	**12 INCH DUCTILE IRON WATER PIPE**	**LINEAR FOOT**
ITEM NO. 303-016	**16 INCH DUCTILE IRON WATER PIPE**	**LINEAR FOOT**
ITEM NO. 309-001	**DUCTILE IRON FITTINGS FOR WATER PIPE**	**POUND**
ITEM NO. 371-990	**CONNECTION TO EXISTING 20 INCH WATER MAIN**	**LUMP SUM**

ITEM NO. 347-001 1-INCH COPPER TUBING TYPE K LINEAR FOOT
ITEM NO. 347-002 1-1/2-INCH COPPER TUBING TYPE K LINEAR FOOT

DESCRIPTION
The work of these Items includes the provision of water service piping.

REFERENCES:
Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. All work shall be in accordance with the requirements and specifications of the Somerville Department of Public Works.

Standard Specifications: The work to be performed under these Items shall conform to the relevant portions of the MHD Standard Specification Section 301.21, 301.22, 301.23, 301.24, 301.40, 301.60, and the following:

AWWA: American Water Works Association

SUBMITTALS
At least thirty (30) days prior to intended use, Contractor shall provide the following samples and submittals for approval. Do not order materials until Engineer's approval of samples, certifications and test results has been obtained. Delivered materials shall closely match the approved samples. Samples and approvals which are not obtained prior to the ordering of materials or the completion of work shall result in possible disapproval of obtained materials or completed work.

Shop Drawings and Manufacturer's Literature:
Prior to ordering the below listed materials, submit Shop Drawings to the Engineer for approval. Coordinated Shop Drawings shall show required sizes, dimensions, sections, profiles of units, the arrangement of and provision for anchoring, fastening, and supports, and other necessary details for delivery and lifting devices required for installation of work. Submit Shop Drawings and Manufacturer's literature for the following: as follows:

1. 1-Inch Copper Tubing Type K and fittings
2. 1-1/2-Inch Copper Tubing Type K and fittings
3. 1-Inch Corporation Cock and Curb Stop
4. 1-1/2-Inch Corporation Cock and Curb Stop

Do not order materials until samples and Shop Drawings and Manufacturer's Literature have been approved by the Engineer.

Provide certification that the water line has been tested and chlorinated as specified herein.

MATERIALS

Copper Tubing:
Copper tubing shall conform to the requirements of ASTM B88 Type k, annealed. To minimize joints, coiled tubing shall be used. Joints in copper tubing shall be made with three part compression couplings, flared tube fittings (ASA spec. B-16), or an approved equal. All fittings shall be electrically conductive.

Corporation Stops:
Corporation stops shall be cast bronze ball valves, conforming to the latest ASTM specification for Steam or Valve Bronze Castings, Serial Designation B62.

Curb Stops:
Curb Stops shall be:
1. Cast iron bronze, conforming to the specification above for corporation stops.
2. Equal in size to the new copper pipe, which the stop is connected to.
3. Full, round, smoothed, reamed waterway and shall operate freely as adjusted for testing.
4. Ball valve conforming to AWWA 800 with a one-piece tee head and shall open to the right.
5. Rated at 250 psi or greater.

Roadway Service Boxes:
Roadway service boxes shall have a minimum inside diameter of four and one-quarter (4 1/4") inches, shall be coated with asphaltum.

CONSTRUCTION METHODS

Excavation and Backfill:
Comply with the requirements of the General Earthwork Requirements included in the Specifications.

Pipe laying:
Shape trench bottoms to give uniform circumferential support to the full length of pipe.

Water pipe shall be laid with a minimum cover of five and one-half (5 1/2") feet.

When laying is not in progress, including lunchtime; the open ends of the pipe shall be closed by watertight plug. The Contractor shall keep the trench free from water while the pipe is being installed.

Corporation Stops:
Corporation stops shall be threaded into a tap in the main at the horizontal diameter of the main.

The tap shall be made in the main by means of a tapping machine manufactured for this purpose and supplied by the Contractor. The tap and drill shall be kept sharp and shall have standard threads.

Screw firmly into the water main with the key upward and the inlet end projecting at least 1/8 inch beyond the inside face of the main. Leave in the on (open) position. Fit with a roadway service box.

Curb Stops:
Install on one inch service lines. Set in a bed of crushed stone.

Blocking shall be placed under valve to insure against settlement.

Install curb stop at tap to main and between the fixtures and the meter.

Testing and Cleaning:
All service connections shall be tested for strength and tightness before being backfilled; they shall be tested for at least two (2) hours under the normal pressure in the water mains to which they are connected, and any signs of leakage or evidence of failure shall be promptly repaired by the Contractor at no additional cost to the City.

The Contractor shall furnish all apparatus, material, and labor for making the tests. The water required for testing will be furnished by the City of Somerville. The Contractor is responsible for all fees and charges for use of City water.

The Contractor shall remove any sediment deposit which may accumulate and impede the full flow of water when restoring the water service from the corporation stop to and through the water meter.

Disinfection:
After testing all water piping shall be disinfected in accordance with AWWA C601.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 347-001**
ITEM NO. 347-002

METHOD OF MEASUREMENT
Furnishing and installing of COPPER TUBING will be measured per linear foot of actual pipe installed, complete in place.

BASIS OF PAYMENT:
Furnishing and installing of COPPER TUBING will be paid for at the contract unit price per linear foot of actual pipe installed. Payment shall include full compensation for trench excavation to the depths as specified herein, furnishing all materials, transporting, protecting and installing (including joining) all pipe and fittings, placing and compacting bedding and backfill material (specified under General Earthwork Requirements), tapping the City water main, corporation stop/curb stop with roadway box, testing, disinfection, and all else in connection with the laying of the Copper Tubing for which there is no separate pay Item. All piping shall be left in a clean manner with no sediment accumulation.

Pay Item		Pay Unit
ITEM NO. 347-001	**1-INCH COPPER TUBING TYPE K**	**LINEAR FOOT**
ITEM NO. 347-002	**1-1/2-INCH COPPER TUBING TYPE K**	**LINEAR FOOT**

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ITEM NO. 350-006	**6 INCH GATE AND GATE BOX**	**EACH**
ITEM NO. 350-008	**8 INCH GATE AND GATE BOX**	**EACH**
ITEM NO. 350-012	**12 INCH GATE AND GATE BOX**	**EACH**
ITEM NO. 356-016	**16 INCH BUTTERFLY VALVE AND BOX**	**EACH**
ITEM NO. 356-020	**20 INCH BUTTERFLY VALVE AND BOX**	**EACH**

GENERAL

Furnish and install gate valves with gate boxes and stems as indicated on the Drawings and specified herein.

SUBMITTALS:

Submit catalog cuts and product data for valves.

MATERIALS

GATE VALVES:

1. Gate valves shall conform to AWWA C500.

2. Gate valves in sizes up to and including 12 inch shall be iron-body, New York Metropolitan pattern, bronze mounted, nonrising stem, double-disk type with parallel gates and rated for 200 psi working water pressure. Gate valves shall be manufactured by:

   a. M & H Valve Co., by Dresser Industries, Inc.
   b. Kennedy Valve, Division of McWane Inc.
   c. A.P. Smith by U.S. Pipe Corp.
   d. Or equal.

3. Valves shall have mechanical joints complete with accessories, including lead-tipped or copper-armored gaskets for electrical conductivity. Operating nuts shall be 2 inch square and shall be turned to the left (counter-clockwise) to open.

4. Valves shall be furnished with "O" ring seals utilizing two "O" rings. The design shall be such that the seal plate can be fitted with "O" rings when the valve is under pressure in the full open position.

5. Disks shall be bronze faced, and body seat rings shall be bronze.

6. The interior of the valve shall be coated with a minimum dry film thickness of 8 mils of a two-component, polymerized powder epoxy. Surfaces shall be prepared in accordance with SSPC SP 10.

VALVE BOXES:

Valve boxes shall be of the adjustable, telescoping, heavy duty pattern type with the lower part of cast iron and the upper part of steel or cast iron. They shall be designed to prevent the direct transmission of traffic loads to the pipe or valve. The upper portion shall be provided with a flange having a bearing area to prevent settlement. The lower section shall be designed to enclose the operator and stuffing box of the valve and rest on the bonnet. The inside diameter of boxes for valves shall be at least 4 1/2 inches and

provisions shall be made for adjustment through at least 6 inch vertically without reduction of lap between sections to less than 4 inches.

EXECUTION

INSTALLATION OF VALVES:

All material shall be inspected for defects, all foreign matter cleaned out of valve openings and seats, all mechanisms shall be operated to check their proper functioning. Nuts and bolts shall be complete and tight. Concrete pad shall be placed under each valve. Concrete pads shall be either precast concrete blocks or cast-in-place concrete of minimum 3000 psi strength.

METHOD OF MEASUREMENT AND PAYMENT

ITEM NO. 350-006
ITEM NO. 350-008
ITEM NO. 350-012
ITEM NO. 356-016
ITEM NO. 356-020

MEASUREMENT
Gate or butterfly valves and boxes of various sizes will be measured per each unit installed in place.

PAYMENT
Payment will be at the unit price per each. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary to furnish, install, and test one valve and box.

Include all costs necessary for preparing site; traffic controls incidental to the work; locating utilities; excavating and trenching; temporary excavation support systems; removing and disposing of debris; handling, storing, transporting and disposing of all material, including excess material; stockpiling material; supporting all utilities as required including services; maintaining flows; preparing subgrades; bedding and backfilling; compacting, including furnishing and installing imported backfill materials; surface restoration; and other appurtenant work.

Pay Item		Pay Unit
ITEM NO. 350-006	**6 INCH GATE AND GATE BOX**	**EACH**
ITEM NO. 350-008	**8 INCH GATE AND GATE BOX**	**EACH**
ITEM NO. 350-012	**12 INCH GATE AND GATE BOX**	**EACH**
ITEM NO. 350-016	**16 INCH BUTTERFLY VALVE AND BOX**	**EACH**
ITEM NO. 350-020	**20 INCH BUTTERFLY VALVE AND BOX**	**EACH**

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ITEM NO. 358-002 GATE BOX AND SERVICE BOX ADJUSTED EACH

DESCRIPTION:
The work of Item 358-002 shall include locating and adjusting existing shut off valves, curb stops, gate boxes and service boxes within the project limits to proposed finish grade. The Contractor is alerted that the Plans do not indicate all these facilities and that the Contractor is responsible for the proper adjustment and working order of such facilities within the project limits.

Standard Specifications: "Standard Specifications for Highway and Bridges", Massachusetts Department of Transportation (MassDOT), Highway Division (MHD), latest edition and all supplements The work to be performed under these Items shall conform to the relevant portions of the MHD Standard Specification Section 301.21, 301.22, 301.23, 301.24, 301.40, 301.60, and the following:

MATERIALS
Not Used

EXECUTION

Gate Boxes Adjusted to Grade:
The boxes shall be set in a true vertical position and if they are in the limits of the roadway or within limits where the plowing of snow will take place in the winter, the tops of the boxes shall be set 1/2 inch below the top of the surrounding finished grade. In locations where these boxes are not likely to be disturbed, the tops shall be set flush with the adjoining finished grade. Boxes shall be adequately supported during backfilling to maintain vertical alignment.

Gate and service boxes that are located in roadway pavement areas shall have concrete collars installed around them below the surface paving courses.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 358-002

METHOD OF MEASUREMENT
GATE BOX AND SERVICE BOX ADJUSTED will be measured per each, complete in place.

BASIS OF PAYMENT:
GATE BOX AND SERVICE BOX ADJUSTED will be paid for at the respective contract unit price per each, which price includes all labor, equipment, and materials necessary to complete the work.

Pay Item		Pay Unit
ITEM NO. 358-002	GATE BOX AND SERVICE BOX ADJUSTED	EACH

(Remainder of page is intentionally blank)

ITEM NO. 376-001 HYDRANT EACH
ITEM NO. 376-003 HYDRANT - REMOVED AND STACKED EACH

GENERAL

Furnish and install hydrants as indicated on the Drawings and specified herein.
Remove existing hydrant and deliver to Somerville DPW yard at Franey Road.

SUBMITTALS:

Submit catalog cuts and product data for hydrants.

Submit details of the proposed method of restraining hydrants.

Submit product data on filter cloth for crushed stone at hydrant drains.

MATERIALS

Hydrants shall be one of the following models:

1. American AVK 2780
2. Muller Centurion A-423
3. M&H 129
4. Clow Medallion
5. Approved equal

EXECUTION

Removal of Existing Hydrants:

Remove existing hydrants where indicated on the Drawings and deliver to Somerville DPW yard at Franey Road

Installation of New Hydrants and Resetting of Existing Hydrants:

1. Hydrants shall be set plumb with the steamer nozzle facing the roadway.

2. Hydrants shall be set with the center of the operating nut 18 inches back from the face of the curb.

3. Hydrants shall be set so that the manufacturer's "bury" mark or ground line is at finish grade. If there is no bury mark on the hydrant, the bottom of the breakaway feature shall be a minimum of 2 inches and a maximum of 4 inches above finish grade.

4. The depth of bury shall be either 5 1/2 or 6 feet.

5. Hydrants shall be set on a 3000 psi concrete base at least 14 inches square and 4 inches thick.

6. Hydrants shall be restrained by using rods and clamps, mechanical joint retainer glands, thrust blocks, or any combination thereof as required by the Authority.

7. A drainage pit shall be excavated below and around each hydrant and backfilled to a height of at least 6 inches above all drain ports with at least 12 cubic feet of 1 inch to 2 inch crushed stone. The crushed stone shall be covered with 4 mil thick plastic sheeting.

8. Hydrants shall be field painted red.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 376-001**
ITEM NO. 376-003

MEASUREMENT
HYDRANT and HYDRANT - REMOVED AND STACKED will be measured per each

PAYMENT

HYDRANT:
Payment will be at the unit price per each. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary to furnish, install, and test one hydrant.

HYDRANT - REMOVED AND STACKED
Payment will be at the unit price per each. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary to remove, deliver to the Somerville DPW yard and stack one hydrant.

BOTH ITEMS:
Include all costs necessary for preparing site; traffic controls incidental to the work; locating utilities; excavating and trenching; temporary excavation support systems; removing and disposing of debris; handling, storing, transporting and disposing of all material, including excess material; stockpiling material; supporting all utilities as required including services; maintaining flows; preparing subgrades; bedding and backfilling; compacting, including furnishing and installing imported backfill materials; surface restoration; and other appurtenant work.

Pay Item		Pay Unit
ITEM NO. 376-001	**HYDRANT**	**EACH**
ITEM NO. 376-003	**HYDRANT - REMOVED AND STACKED**	**EACH**

(Remainder of page is intentionally blank)

ITEM NO. 460-001	**HOT MIX ASPHALT PAVEMENT (ALL COURSES)**	**TON**
ITEM NO. 460-002	**HOT MIX ASPHALT FOR PATCHING**	**TON**
ITEM NO. 464-001	**BITUMEN FOR TACK COAT**	**GALLON**

DESCRIPTION:

The work under these Items shall consist of furnishing and placing plant mixed HOT MIX ASPHALT for new construction and resurfacing of bituminous roadway pavements, as indicated on the Plans or as directed by the Engineer.

MATERIALS:

All HOT MIX ASPHALT shall be in accordance with the latest version of the Massachusetts Department of Transportation (MassDOT), Highway Division (MHD), Specifications for Highways and Bridges for Class I-1, HOT MIX ASPHALT Pavements and Foundation Bases Sections 420, 460, 700 and M-3 where applicable, latest versions.

METHOD OF CONSTRUCTION

Where existing roadway pavement is to be resurfaced, the HOT MIX ASPHALT shall be placed in one course to the grade and contour approved by the Engineer and having a thickness of 3.5 to 4.5 times the nominal maximum size stone in the mix being placed.

Deliver, place and compact HOT MIX ASPHALT pavement according to the applicable provisions of Section 460 of the MHD Standard Specifications, including the aforementioned supplements.

Provide tack coat when overlaying existing hardened surfaces, as specified in Subsection 460.62 of the MHD Standard Specifications.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 460-001**
ITEM NO. 460-002
ITEM NO. 464-001

METHOD OF MEASUREMENT:

The quantity of HOT MIX ASPHALT to be paid for shall be the actual and verified number of tons of HOT MIX ASPHALT accepted in conformance with this specification, complete in place and approved.

The weight slips shall be countersigned on delivery by the Engineer, and any weight slip, not so countersigned, shall be excluded from any payment under the Contract.

Tack coat will be separately measured per gallon for the actual quantity used.

The quantity of temporary HOT MIX ASPHALT pavement will be measured by the actual and verified number of tons of HOT MIX ASPHALT, complete in place and accepted. Separate measurement or payment will not be made for the removal and disposal of temporary HOT MIX ASPHALT pavement and the installation and removal of bond breaker material.

BASIS OF PAYMENT:

The quantity of all the types of HOT MIX ASPHALT (except for patching) will be paid for at the same Contract unit price per ton complete in place for Item No. 460-001.

HOT MIX ASPHALT pavement for patching will be paid for at the Contract unit price per ton complete in place for Item No. 460-002.

Bitumen for tack coat, where directed, will be paid for at the contract unit price per gallon, complete in place.

HOT MIX ASPHALT Pavement not in compliance with the specified requirements will be removed or payment for such non-compliant HOT MIX ASPHALT pavement will be adjusted in accordance with the Engineer.

Payment shall also include the preparation and submittal of the plans and cross sections indicating the Contractor's means and methods for employing a combination of full-depth reconstruction and variable depth overlay to achieve the finish grades indicated on the Plans.

Pay Item		**Pay Unit**
ITEM NO. 460-001	**HOT MIX ASPHALT PAVEMENT (ALL COURSES)**	**TON**
ITEM NO. 460-002	**HOT MIX ASPHALT FOR PATCHING**	**TON**
ITEM NO. 464-001	**BITUMEN FOR TACK COAT**	**GALLON**

(Remainder of page is intentionally blank)

ITEM NO. 460-003 LIQUID ASPHALT PRICE ADJUSTMENT ALLOWANCE

DESCRIPTION:

To account for fluctuations (both up and down) in the price of liquid asphalt, this Item shall use the established bi-monthly averages prices calculated and published by MassDOT, Highway Division.

The base price shall be the last, calculated bi-monthly average price known before the due-date to submit bids. This price shall become the base price for Liquid Asphalt for this Contract.

On the internet, these average bi-monthly prices can be viewed at www.mhd.state.ma.us under the heading, "Permits, Forms & Publications", click on "More", then …under the heading, "Construction Publications", click on "Period Prices for Liquid Asphalt, Diesel Fuel & Gasoline".

BASIS OF PAYMENT

The Resident Engineer shall use these published, MHD, bi-monthly price averages, along with the actual mix tonnage installed in that two-month period to calculate the amount paid.

If the MHD period price for a given two-month period is more than the Contract's base price for liquid asphalt, the Engineer shall initiate an Alteration to pay for hot-mix asphalt using a corresponding, higher-than-bid unit price that can be justified by the MHD period price for that period.

If the MHD period price for a given two-month period is less than the Contract's base price for liquid asphalt, the Engineer shall initiate an Alteration to pay for hot-mix asphalt using a lower-than-bid unit price that can be justified by the MHD period price for that period.

Pay Item		Pay Unit
ITEM NO. 460-003	**LIQUID ASPHALT PRICE ADJUSTMENT**	**ALLOWANCE**

(Remainder of page is intentionally blank)

ITEM NO. 504-001 GRANITE CURB – TYPE VA-4 LINEAR FEET
ITEM NO. 516-001 GRANITE CURB CORNER EACH

GENERAL

Furnish and install granite curbing, including transition curb at wheelchair ramps, and granite curb corners where indicated on the Drawings.

Note that the intent of the Plans is to use new granite curb wherever granite curb is indicated. Existing curbing removed from these locations shall be removed and discarded under Item No. 594-001.

MATERIAL

All granite curb and edging shall be of structural granite and be hard and durable. It shall be light gray in color, free from seams and other structural imperfections or flaws which would impair its structural integrity and of a smooth splitting appearance. Natural variations characteristic of the deposit will be permitted for all curbing.

All granite curb to be used in this Contract shall be quarried from the same parent material source and shipped to the Contractor at the same time, regardless of construction phasing.

Test samples of curbing shall conform to requirements of ASTM C615.

Whenever curbing is sawed, all surfaces that are to be exposed shall be thoroughly cleaned and any iron rust or iron particles removed by sand blasting. Any saw mark in excess of 1/8 inch shall be removed.

Provide vertical granite curbs conforming to MHD (MassDOT Highway Division) Specifications Sections M9.04.0, M9.04.1 and M9.04.6 for granite curb type VA4 including curved curbing requirements.

Provide granite curb corners conforming to MHD Specifications Sections M9.04.6.

SAMPLE AND SHOP DRAWINGS

Submit the following:

1. Name and address of quarry.
2. Sample: 4 straight sections, 2 curved sections, each 6-foot length, for approval at the site.
3. Sample: 1 granite curb corner, for approval at the site.

EXECUTION

INSTALLATION:

Trench:

1. Excavate trench a width of 18 inches. The subgrade of the trench shall be 6 inches below the curb.

2. Spread and compact curb bedding at least 6 inches deep and at least 18 inches wide, in accordance with the details indicated on the Drawings. Tamp or ram the gravel bedding until it is unyielding.

3. Install concrete cradle as indicated on the Plans.

4. Where curbing crosses over a catch basin, provide a foundation of a full bed of Portland cement mortar on the supporting back wall of the catch basin and gravel on either side to support the overhang.

Setting Curb:

1. Set curbing vertically true. Set to the line and grade indicated on the Drawings.

2. All spaces under each piece of curbing shall be filled with gravel and thoroughly tamped so the whole length is completely supported on gravel.

3. Set pieces of curbing as close together as possible.

4. If pieces of curbing come from different quarries or have different color or appearance, segregate each so as to give the finished curbing a uniform appearance.

5. Set curb in concrete cradle with continuous concrete in trench along the front side of the curbing as indicated on the Drawings.

6. Place concrete cradle under and concrete backing on the back side of each piece of granite curb.

7. Backfill and tamp with gravel borrow on the back side of the curbing in the spaces between the concrete backing.

8. Ensure that the entire trench is backfilled with gravel and thoroughly tamped after the curbing is set. Do not disturb the line, grade or trueness of the curbing during the backfilling and tamping of the trench.

Pointing:

1. The joints between the pieces of curbing (both front and back) shall be carefully filled with cement mortar and neatly pointed on the top and front exposed portions.

2. After pointing, clean all excess mortar on the face and top.

Transition Curb for Wheelchair Ramps:

1. Provide transition sections of granite curb to form the sloped sides of wheelchair ramps as indicated in the details on the Drawings.

2. The granite curb for transition sections shall be the same type of curb and same color as the adjacent granite curb.

3. Where the transition sections are along a curve in the curbline, provide transition pieces cut to the radius of the curve.

4. Where transitions pieces abut the vertical granite curbing, the transition piece shall be cut so it fits tightly against the vertical curb with no voids in the top or exposed front greater than 2 inches.

Curb corners:

1. Granite curb corners shall match the adjacent curb in size, color and finish. The front arris line shall extend 1/4 of a circle having a radius of 3 feet. The back arris line shall be straight.

2. The curb corners shall be set to match the line and grade of the adjacent curb.

Catch Basins:

1. Granite curb inlets will **NOT** be used at catch basins in this Project.

2. Transition reveal at curb inlets as indicated in the detail on the Plans.

METHOD OF MEASUREMENT AND PAYMENT — ITEM NO. 504-001 / ITEM NO. 516-001

METHOD OF MEASUREMENT

The length of curb shall be measured along the front arris line of the curb. No distinction will be made for straight or curved curb, nor will any distinction be made for transition curbing at wheel chair ramps.

Each curb corner set complete in place will be measured as a single unit.

BASIS OF PAYMENT

Curb will be paid for at the unit price per linear foot.

Curb corners will be paid for per each unit.

No separate payment will be made for excavation, pavement sawcutting, or gravel borrow foundation for curbing, as these Items of work will be considered incidental to the furnishing and installation of curbing.

Pay Item		Pay Unit
ITEM NO. 504-001	GRANITE CURB – TYPE VA-4	LINEAR FEET
ITEM NO. 516-001	GRANITE CURB CORNER	EACH

(Remainder of page is intentionally blank)

ITEM NO. 580-001 GRANITE CURB – REMOVE & RESET LINEAR FEET
ITEM NO. 594-001 CURB – REMOVE & DISCARD LINEAR FEET

GENERAL

The work consists of removing existing curb of any cross section and any material and resetting or discarding them in accordance with these specifications and as directed by the Engineer.

Reset curbing shall not be used as transition curbing at wheelchair ramps.

EXECUTION

REMOVAL

Saw cut the existing HOT MIX ASPHALT pavement between 12 and 18 inches from face of curbing for the length of curb to be removed. Cut in a straight line. Remove HOT MIX ASPHALT pavement within saw cut.

Where there is concrete sidewalk behind the curb, saw cut the sidewalk on existing score lines and remove sidewalk.

Carefully remove existing granite curbing. Protect so that it may be reused in the Work. If existing curbing is damaged by the actions of the Contractor, the Contractor shall replace with new granite curbing at no additional cost to the City.

INSPECTION OF REMOVED GRANITE CURBING

The Engineer will inspect all existing granite curbing removed to determine if each piece is suitable for reuse.

REUSE IN PLACE

Where suitable existing granite curbing are removed and can be reset in place (adjusted to the proposed line and grade as shown on the Drawings), the resetting of the curb shall immediately follow its removal.

REUSE IN NEW LOCATION

Where suitable existing granite curbing are removed but cannot be used in place or immediately adjacent, the curbing shall be incorporated in a location where the Plans call for proposed granite curbing.

The Contractor shall stack and protect the removed curbing at a location acceptable to the Engineer until such time as they can be reset in the new location. Care shall be taken to prevent discoloration of the curbing. If existing curbing is damaged or lost by the actions of the Contractor (including the Contractor's failure to adequately protect the stacked curbing), the Contractor shall replace with new granite curbing at no additional cost to the City.

ADJUSTMENT

The lengths of any section of curb shall be altered by cutting in order to fit closures as necessary. The ends of all stones shall be square with the planes of the top and face so that when the stones are placed end-to-end as closely as possible, no space shall show in the joint at the top and face of more than 3/4 inch for the full with of the top and for 8 inches down the exposed face of the curb.

RESETTING OF GRANITE CURB AND GRANITE CURB CORNERS

Reset in accordance to the installation procedures as specified under Item No. 504-001.

DISCARDING OF CURB

The following types of curb and curb corners shall be discarded:

1. All concrete curb removed.

2. Granite curb (and not damaged by the Contractor) that are determined by the Engineer to be unsuitable for reuse.

The Contractor shall take possession of all curbing to be disposed of and shall dispose of them off-site in accordance with all applicable local, state and federal regulations.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 580-001**
ITEM NO. 594-001

MEASUREMENT

Granite Curbing Removed and Reset
The length of curb removed and reset shall be measured along the front arris line of the curb. No distinction will be made for straight or curved curb.

Curbing Removed and Discarded
The length of curb removed and discarded shall be measured along the front arris line of the curb. No distinction will be made for straight or curved curb, nor will any distinction be made for transition curbing at wheel chair ramps.

PAYMENT

Curb removed and reset will be paid for at the unit price per linear foot.

Curb removed and discarded will be paid for at the unit price per linear foot.

No separate payment will be made for excavation, pavement sawcutting, or gravel borrow foundation for curbing, as these items of work will be considered incidental to the removing and resetting of curbing.

Pay Item		Pay Unit
ITEM NO. 580-001	**GRANITE CURB – REMOVE & RESET**	**LINEAR FEET**
ITEM NO. 594-001	**CURB – REMOVE & DISCARD**	**LINEAR FEET**

ITEM NO. 635-100 HIGHWAY GUARD REMOVED AND DISCARDED LINEAR FOOT

DESCRIPTION

Remove steel guard rails as the locations indicated on the Drawings.

The work shall conform to the applicable provisions of Section 601 of the Standard Specification, as modified herein.

EXECUTION

Complete remove steel guard rail including rail, posts, and hardware. Remove posts completely or to a depth of at least 3 feet below the finish grade.

All material shall become the property of the Contractor and shall be disposed of legally at an off-site location.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 635-100

METHOD OF MEASUREMENT

Guard Rail removed will be measured by the actual linear feet of guard rail to be removed to the limits indicated on the Drawings, measured along the roadway face of the guard rail.

BASIS OF PAYMENT

Payment will be at the contract unit price per linear foot.

The unit price for removal shall be full compensation for all labor, equipment, materials and supervision necessary to remove and dispose of one linear foot of Guard Rail.

Item No.	Pay Item	Pay Unit
ITEM NO. 635-100	HIGHWAY GUARD REMOVED AND DISCARDED	LINEAR FOOT

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ITEM NO. 697-001 SEDIMENTATION FENCE LINEAR FEET

DESCRIPTION

This Item specifies sedimentation fence for erosion and sedimentation control for use when directed by the Engineer.

MATERIAL

Manufactured product including siltation control geotextile and support posts. Geotextile shall be a polypropylene, ultraviolet resistant material.

Support posts shall be softwood measuring 2 inches by 4 inches or oak measuring 1-1/2 inches by 1-1/2 inches.

Posts shall be a minimum of 4 feet long and pointed at one end. Filter fabric shall extend 6 inches below undisturbed ground to prevent undermining.

CONSTRUCTION METHODS

Prior to the start of construction, deliver 500 LF of siltation fence to site for use as directed.

Installation:

A trench shall be excavated approximately 6 inches wide and 6 inches deep along the upslope line of the fence. The filter fabric shall be extended into the trench and the trench backfilled with the excavated soils and thoroughly compacted.

The exact location of erosion and sediment controls shall be as approved by the Engineer in the field.

Inspection, Maintenance & Sediment Removal:

The Contractor shall inspect all erosion and sediment controls daily. The Contractor shall also inspect all erosion and sediment controls before an anticipated storm greater then 0.5 inches, and following a significant storm event (0.5 inches or greater total rainfall).

All erosion control devices shall be maintained so that they function as specified herein until final grading and stabilization is completed.

Any silt fence that becomes damaged during construction operations shall be repaired or replaced immediately at no additional cost to the Department.

Silt fences shall have sediment removed before depth of sediment is half height of fence.

Dispose of sediment deposits off-site, in accordance with all Federal, State, and local regulations.

Removal:

The silt fence shall remain in place until the graded areas have become permanently stabilized. Stabilization means that disturbed soil surfaces have a dense stand of vegetation or are covered by properly installed erosion control blanket, rip rap, pavement or other erosion-resistant surface.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 697-001**

METHOD OF MEASUREMENT
Siltation Fence will be measured by the actual length in linear feet of siltation fence with hay bales installed complete in place, as indicated on the Drawings or as directed by the Engineer.

BASIS OF PAYMENT
Payment will be at the unit price per linear foot. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary to install one linear foot of siltation fence.

Pay Item		Pay Unit
ITEM NO. 697-001	**SEDIMENTATION FENCE**	**LINEAR FOOT**

(Remainder of page is intentionally blank)

ITEM NO. 701-001 CEMENT CONCRETE SIDEWALKS & DRIVEWAYS (ALL THICKNESSES) SQUARE YARDS

GENERAL
The work includes the construction of concrete sidewalk and driveways of all thicknesses including wire mesh reinforcement.

ACCESSIBILITY CODES:
521 CMR Rules and Regulations of the AAB and ADA shall be adhered to on this Project.

SUBMITTALS
The Contractor shall submit a method to stamp the wave pattern in the concrete sidewalk, as indicated on the Plans.

MATERIAL
Cement Concrete Sidewalks shall be Air-Entrained 4000 psi, 3/4-inch aggregate, and conform to City standard concrete specification.

Welded wire concrete reinforcement fabric shall comply with ASTM A185 as revised. The gauge of wire and the dimensions of the mesh shall be 6x6 No. 10 gauge. Only sheet metal shall be sued. Mesh from rolls shall not be used.

EXECUTION

GENERAL:

1. All sidewalks shall be cement concrete, unless otherwise noted on the Plans.

2. All wheelchair ramps shall be cement concrete.

3. The Contractor shall construct sidewalks and wheelchair ramps in accordance with all applicable accessibility standards, including

    a. Massachusetts Highway Department Standard Specifications.
    b. Massachusetts Highway Department Wheelchair Ramp Standards.
    c. American with Disabilities Act Accessibility Guidelines.
    d. Regulations of Massachusetts Architectural Access Board (MAAB).

    See Appendix to Item 701-020 for MHD standards and applicable MAAB regulations.

SUBGRADE AND GRAVEL BORROW BASE:
Existing walk surfaces shall be broken up, removed, and disposed of off the site by the Contractor. All depressions shall be filled with gravel borrow and compacted.

Shape the subgrade parallel to finish grade of the sidewalk and compact as specified under Item 170-001.

All depressions shall be filled with gravel borrow and compacted.

Install Gravel Borrow base to the depth indicated on the Drawings and compact as specified under Item 151-001. The top of the gravel borrow base shall be parallel to the finish grade of the sidewalk.

Where excessively large roots interfere with sidewalk construction, the cement concrete shall be "boxed" around the tree trunk for a distance of at least 18 inches form the edge of the trunk. Roots protruding beyond 18 inches may be cut as directed by the Engineer.

Only sheet mesh shall be used. Mesh shall rest on concrete bricks and be installed at mid-depth in the concrete. Rolled mesh shall not be permitted.

FORMS:

1. Side forms and transverse forms shall be smooth, free from warp, and resistant to springing out of shape. Forms shall be of the same thickness as the proposed walk.

2. Mortar and dirt shall be completely removed from forms that have been previously used. The forms shall be well staked and thoroughly grades and set to the established line and grade of the walk. The upper edge of the forms shall conform to the finished grade of the sidewalk.

3. The forms shall be set to provide a cross slope for drainage not to exceed 1.6%.

4. Oil forms before placing concrete.

PLACING AND FINISHING CONCRETE (BROOM FINISH):

1. Concrete shall be placed in alternate slabs 30 feet long.

2. Place concrete to the depth indicated on the Drawings.

3. Preformed expansion joint fillers shall be 1/2-inch in thickness. Preformed expansion joint fillers shall be placed adjacent to or around existing structures, where directed.

4. No finishing shall occur while water is present.

5. Finishing operations shall be delayed until all bleed water and water sheen has left the surface and the concrete has started to stiffen.

6. After water sheen has disappeared, edging operations shall be completed.

7. After edging and jointing operations, the surface shall be floated. Immediately following floating, the surface shall be steel-troweled. Tooled joints shall be rerun before and after troweling to maintain uniformity. After troweling, the surface shall be brushed by drawing as soft-bristled push broom with a long handle over the surface to produce a non-slip surface.

8. Ensure that the concrete is of uniform composition throughout, particularly in handling the concrete between the mixer and placement.

9. The surface of the concrete shall be uniformly scored into rectangular blocks of not more than 4 square yards.

a. The depth of scoring shall be 1/4 of the thickness of the sidewalk.

b. Follow the scoring pattern as indicated on the Drawings.

c. Where new sidewalk meets existing, the scoring pattern shall match the existing pattern.

d. Consult the Engineer for special scoring pattern for sidewalk where the width of the sidewalk exceeds 6 feet.

9. The application of neat cement to surfaces in order to hasten hardening is prohibited. The finishing of concrete surfaces shall be done by experienced and competent cement finishers approved by the Engineer. When complete, the sidewalks and driveways shall be kept moist and protected from traffic and weather for at least 3 days. Curing compound approved by the Engineer or other methods approved by the Engineer may be used.

WHEELCHAIR RAMPS AND DETECTABLE WARNING SURFACE:
See Item 701-020.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 701-001**

METHOD OF MEASUREMENT
Concrete sidewalks and driveways, regardless of depth, with one course mesh welded wire fabric will be measured per square yard installed in place. No distinction will be made for sidewalks or driveways.

BASIS OF PAYMENT
Concrete sidewalks and driveways will be paid for at the Contract Unit Price per square yard. Payment at the unit price shall include full compensation for all labor materials, equipment and supervision to install one square yard of concrete sidewalk regardless of depth, including formwork, expansion joints, wire mesh, cutting and removing tree routes, placement, finishing, scoring, and stamping the patterns indicated on the Plans.

Fine Grading and Compaction –Subgrade Areas will be paid for under Item 170-001.

Gravel Borrow will be paid for under Item 151-001.

Detectable Warning Surface will be paid for under Item 701-020.

Pay Item		**Pay Unit**
ITEM NO. 701-001	**CEMENT CONCRETE SIDEWALKS & DRIVEWAYS (ALL THICKNESSES)**	**SQUARE YARD**

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ITEM NO. 701-020 CEMENT CONCRETE WHEELCHAIR RAMPS EACH

DESCRIPTION

Work under this Item consists of constructing wheel chair ramps in the sidewalks as shown on the enclosed sketches in accordance with 521 CMR: Architectural Access Board, and as directed by the Engineer. Work under this item also includes furnishing and installing Detectable Warning Panels.

SAMPLE AND SHOP DRAWINGS

Submit the following for approval of Detectable Warning Panels:

1. Product data.
2. Certificate of Compliance from the manufacturer
3. Standard and custom color chart.
4. Sample 24 inches by 24 inches.
5. Manufacturer's installation procedures.

MATERIALS

Concrete: Per Item 701-001.

Detectable Warning Surface

General:

1. Detectable warnings shall consist of a surface of truncated domes aligned in a square grid pattern.

2. Truncated domes in a detectable warning surface shall have a base diameter of 0.9 inches minimum to 1.4 inches maximum, a top diameter of 50% of the base diameter minimum to 65% of the base diameter maximum, and a height of 0.2 inches.

3. Truncated domes in a detectable warning surface shall have a center-to-center spacing of 2 inches minimum and 2.4 inches maximum, and a base-to-base spacing of 0.65 inches minimum, measured between the most adjacent domes on square grid.

4. Detectable warning surfaces shall contrast visually with adjacent walking surfaces either light-on-dark, or dark-on-light.

Material:

1. Materials: Detectable warning surface shall consist of a homogenous glass and carbon reinforced composite which is colorfast and UV Stable.

2. Color shall be contrast visually with the adjacent walking surface, either light-on-dark, or dark-on-light. Provide manufacturer's custom color chart. Color shall be selected by the Engineer.

3. Composite products relying on paint coatings or "UV Coatings" for color stability are not acceptable.

4. Composite tiles shall be a minimum of 24 inches wide.

The panel can be precast concrete, cast-in-place concrete or other suitable material permanently applied to the ramp. The Contractor is urged to visit the US Access Board's website for a list of manufacturers for these panels.
(visit www.access-board.com click on "Publications", go to "Public Rights of Way", go to "Detectable Warnings: Synthesis of US and International Practice")

EXECUTION

INSTALLATION:

Provide the services of a representative of the manufacturer of the detectable warning surface tiles for the following:

1. Pre-construction meeting with Contractor and Engineer.

2. Installation of the at least the first two ramps with detectable warning surface.

Location:

1. The detectable warning surface shall be located so that the edge nearest the curb line is 6 inches minimum and 8 inches maximum from the curb line.

2. Detectable warning surfaces shall extend 24 inches minimum in the direction of travel and the full width of the curb ramp, landing, or blended transition.

Installation:

1. Install cast-in-place type tiles into poured concrete in accordance with the manufacturer's recommendations.

2. Tile surface between the domes shall be flush with finish of adjacent concrete walk surface.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 701-020**

METHOD OF MEASUREMENT
The area included in the payment of each ramp shall not exceed 150 square feet of surface area, regardless of the size of the ramp necessary to conform to ADA & AAB slope requirements. Areas of any new ramp that exceeds 150 square feet, shall be paid under the relevant sidewalk item (Item 701-001).

BASIS OF PAYMENT
CEMENT CONCRETE WHEELCHAIR RAMPS shall be paid based on the accepted Contract bid price per each ramp. This payment shall include all removal and disposal of portions of existing edgestone and walks, all excavation, gravel, grading, replacement of edgestone and patching of walks, sawcutting of existing concrete sidewalks, all cutting and trimming, all labor, tools, equipment, hot-mix asphalt, cement concrete, all other necessary materials, transportation, shipping costs, detectable warning panels, and all other incidental work necessary to complete ramps to the satisfaction of the Engineer, and in compliance

with the most current Federal ADAAG (Americans with Disabilities Act Accessibility Guidelines) Codes and the Massachusetts Architectural Access Board (MAAB) whichever is more stringent.

Pay Item		Pay Unit
ITEM NO. 701-020	**CEMENT CONCRETE WHEELCHAIR RAMPS**	**EACH**

APPENDICES TO ITEM NO. 701-020:

1) Massachusetts Architectural Access Board Regulations for Curb Cuts and Walkways – see following pages.

2) Massachusetts Highway Department Standard Details:

- M/E 107.2.1R9 WCR on narrow SW w/ detectable warning panel)
- M/E 107.6.5R (Detectable warning panel for WCR)
- M/E 107.9.0 (Curb transition length for WCR)

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Appendix to Item 701-020 **Massachusetts Architectural Access Board Regulations**

521 CMR 21.00: **CURB CUTS**

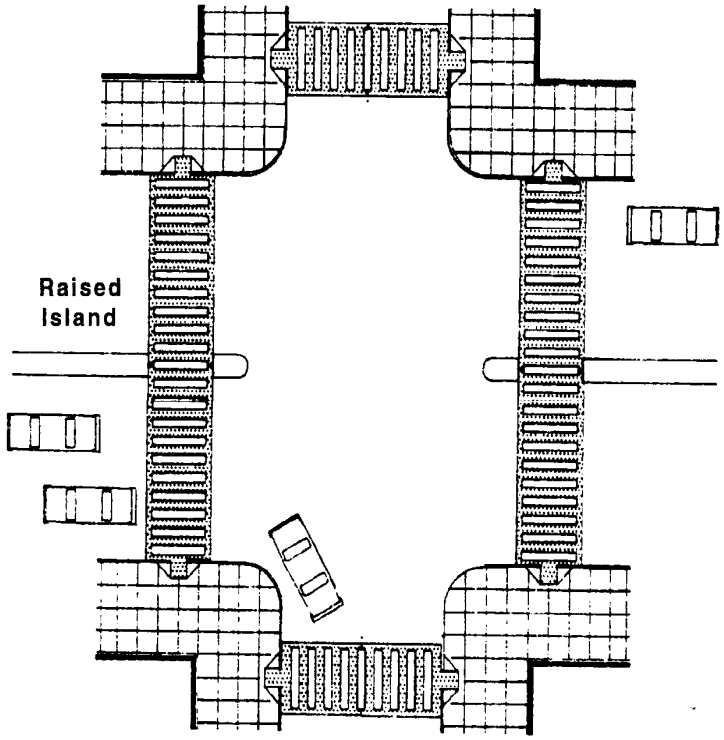
21.1 **GENERAL**

Whenever *sidewalks*, *walkways*, or curbs on streets and ways are *constructed*, *reconstructed*, or *repaired*, *curb cuts* are required. All *curb cuts* shall comply with the following:

21.2 **LOCATION**

Curb cuts shall occur wherever an *accessible route* crosses a curb and at the following locations:

21.2.1 *Curb cuts* are required at each corner of each intersection, located within the crosswalk and/or the pedestrian path of travel. *Curb cuts* shall be perpendicular to the curb at street crossings and each shall have a *level* landing at the top. At marked crossings, the bottom of the *ramp* run, exclusive of flared sides, shall be wholly contained with the marked crossing. **See Fig. 21a**. The crosswalk/pedestrian path of travel must also be perpendicular to the curb.



Curb Cuts at Intersection
Figure 21a

Appendix to Item 701-020 Massachusetts Architectural Access Board Regulations

Exception: Where pedestrian right-of-way established width will not accommodate a perpendicular *curb cut* and landing, a parallel public *sidewalk curb cut* with a *level* landing at its bottom shall be provided instead of a perpendicular *curb cut*.

21.2.1.1 Apex *curb cuts*: Where site constraints prevent the installation of a perpendicular *curb cut* or a parallel *curb cut* with a level landing, an apex curb cut is allowed. Site constraints include the following:

a. Driver or pedestrian line of sight to or from the front of the level landing on the ramp is impaired, preventing safe observation of crosswalks or approaching traffic at the intersection by a significant immovable or unalterable streetscape feature such as a building, structure or historic element, etc.
b. Stop line is beyond the allowed limit as stated in the Manual on Uniform Traffic Control Devices.
c. Vaults containing electrical, telecommunications, etc. that are under or on the existing sidewalk.
d. Large radius intersections which are 30 feet or greater.

21.2.1.2 When apex *curb cuts* are installed a 48 inch (48" = 1219mm) landing shall also be provided at the bottom of the *curb cut* and located within the marked crosswalk.

21.2.2 Reciprocal *curb cuts*: When *curb cuts* or *sidewalks* are being *constructed* or *reconstructed* on one side of the street, and when such *curb cuts* or *sidewalks* are connected to an opposite side of the street by one or more pedestrian paths of travel, then at least one *curb cut* shall be provided on the opposite side of the street where such side is controlled by the same owner.

21.2.3 Driveways: *Curb cuts* are required at driveways intersecting *sidewalks* when the driveway has side curbs.

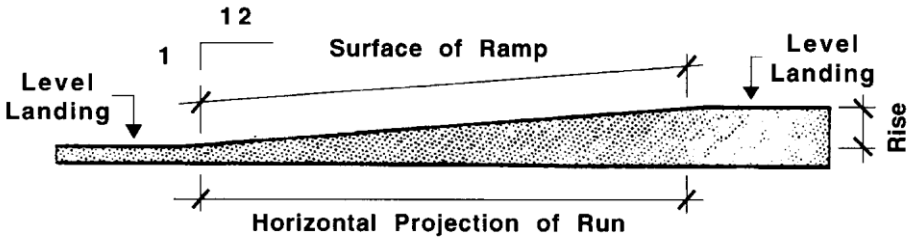
21.2.4 Raised Islands: Any raised islands in crossings shall be cut through *level* with the street or have *curb cuts* at both sides and a *level* area at least 48 inches (48" = 1219mm) long between the *curb cuts* in the part of the island intersected by the crossings.

21.2.5 Obstructions: *Curb cuts* shall be located or protected to prevent their obstruction by parked vehicles.

Appendix to Item 701-020 Massachusetts Architectural Access Board Regulations

21.3 SLOPE

The least possible slope should be used for any ramp. The maximum slope shall be one-in-12 (1:12) (8.3%). Where *sidewalks* are too narrow to install a straight-line *curb cut* at a slope of one-in-12 (1:12) (8.3%), the sides of the *curb cut* shall not exceed one-in-12 (1:12) (8.3%). **See Fig. 21b**. The maximum cross-slope for any *curb cut* shall be 1:50 (2%). (There is no tolerance allowed on slope requirements). (Refer to 521 CMR 2.4.4d).



Slope
Figure 21b

21.4 TRANSITIONS

Transitions from *curb cuts* to *walks*, gutters, or streets shall be flush or free of changes in *level* greater than 1/2 inch (1/2" = 13mm). Maximum slopes of adjoining gutters, road surface immediately adjacent to the curb cuts, or accessible route shall not exceed one-in-20 (1:20) (5%).

21.5 DRAINAGE

Grading and drainage shall be designed to minimize pooling of water, accumulation of ice, or flow of water across the base of the *curb cut*.

21.6 WIDTH

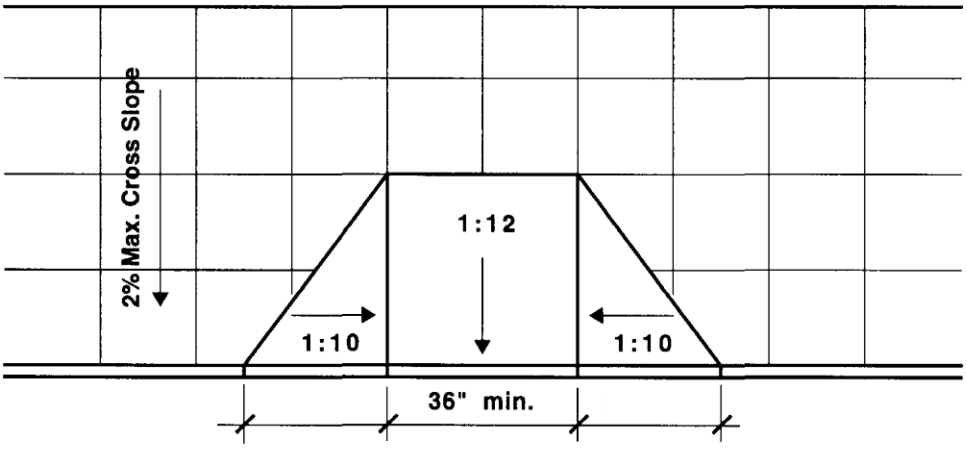
The minimum width of a *curb cut* shall be 36 inches (36" = 914mm), exclusive of flared sides. **See Fig. 21c**.

21.6.1 Landing width: Where a perpendicular *curb cut* is provided, a landing the width of the *curb cut* shall be provided at the top of the *curb cut*. The landing shall be 48 inches (48"= 1219mm) in length. The slope of said landing shall not exceed one-in-50 (1:50) (2%) in any direction.

21.7 FLARED SIDES

Sides of *curb cuts* shall extend at least 24 inches (24" = 610mm) at the curb. The maximum slope of the flare is one-in-ten (1:10) (10%). Curbing at the flared sides must blend with the slope of the flared sides. **See Fig. 21c**.

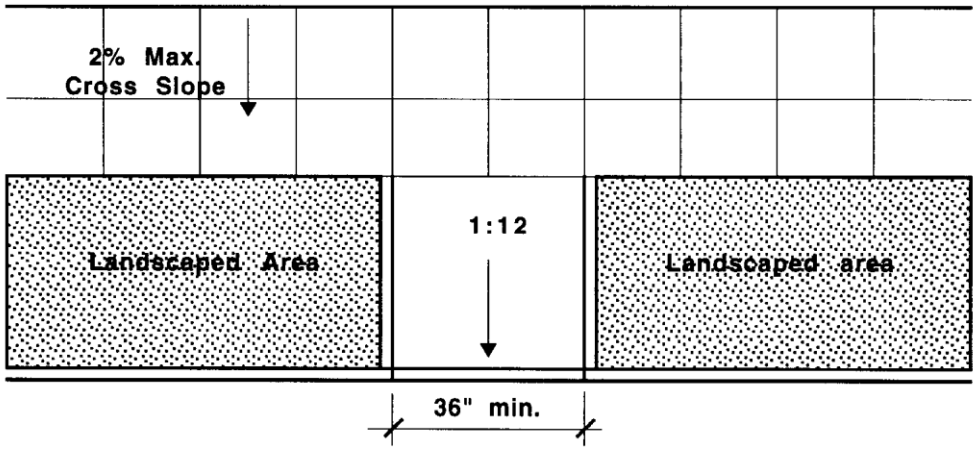
Appendix to Item 701-020 Massachusetts Architectural Access Board Regulations



Curb Cut with Flared Sides
Figure 21c

21.8 RETURNED SIDES

Curb cuts with returned sides are only permitted where they are protected by handrails pursuant to **521 CMR 24.5, Handrails** or where pedestrian travel across the *ramp* is obstructed by permanently installed street hardware or landscaping. **See Fig. 21d**.



Curb Cut With Returned Sides
Figure 21d

21.9 **BUILT-UP CURB CUTS**

Built-up *curb cuts* are allowed only where they do not project into vehicular traffic lanes. **See Fig. 21e**.

Appendix to Item 701-020 Massachusetts Architectural Access Board Regulations

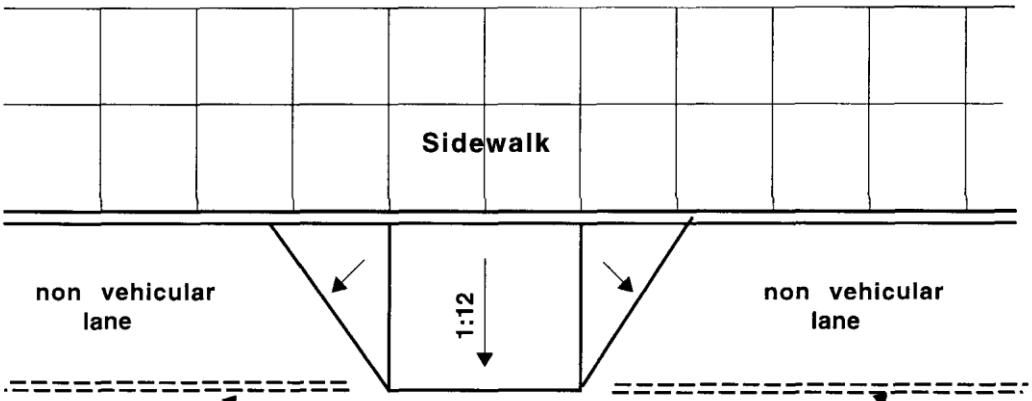


Figure 21e

21.10 **PEDESTRIAN STREET CROSSINGS**
Where provided, pedestrian street crossings at, above, or below grade shall comply with the following:

21.10.1 Crossing controls shall be raised from or flush with their housings and shall be a minimum of two inches (2" = 51mm) in the smallest dimension. The force required to activate controls shall be no greater than 5 lbs.

21.10.2 Location: Controls shall be located as close as practicable to the *curb cut* serving the controlled crossing and shall permit operation from a *clear* ground *space*.

21.10.3 Mounting Height: Pedestrian-actuated crossing controls shall be a maximum of 42 inches (42" = 1067mm) above the finished *sidewalk*.

21.10.4 *Clear* ground *space*: A stable and firm area, complying with **521 CMR 6.5, Forward Reach**, or **521 CMR 6.6, Side Reach** shall be provided at the controls. Where a parallel approach is provided, controls shall be within ten inches (10" = 254mm) horizontally of and centered on the *clear* ground *space*. Where a forward approach is provided, controls shall abut and be centered on the *clear* ground *space*.

21.11 **DETECTABLE WARNINGS** - Reserved until further notice.

21.12 **ACCESSIBLE PEDESTRIAN SIGNALS - Reserved**.

Appendix to Item 701-020 Massachusetts Architectural Access Board Regulations

521 CMR 22.00: **WALKWAYS**

22.1 **GENERAL**
Walkways shall include but not be limited to all *walks*, *sidewalks*, overpasses, bridges, tunnels, underpasses, plazas, courts and other pedestrian pathways, and shall comply with the following requirements:

22.2 **WIDTH**
Width of *walkways* shall be not less than 48 inches (48"= 1219mm), excluding curb stones. An unobstructed path of travel shall be provided which is at least 36 inches (36" = 914mm) *clear*, excluding curb stones.

22.3 **GRADE**
Walkways with a running slope greater than one-in-20 (1:20) (5%) are ramps and shall comply with **521 CMR 24.00: RAMPS**.

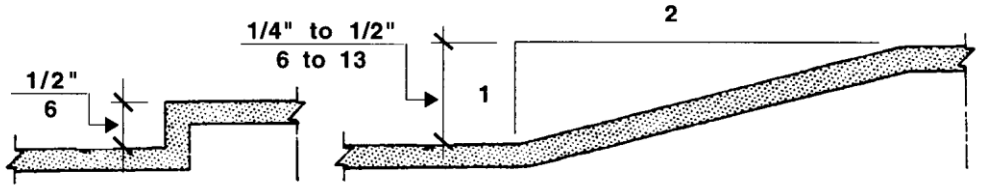
22.3.1 Nowhere shall the *cross slope* of *walkways* exceed one-in-50 (1:50) (2%). (Refer to 521 CMR 2.4.4d.)

Exception: *Sidewalks* on streets and ways shall be considered *walkways*, with the exception that if the slope of the natural topography exceeds one-in-20 (1:20) (5%) a *ramp* is not required.

22.3.2 Nowhere shall the surface slope of any plaza area exceed one-in-50 (1:50) (2%).

22.4 **LEVEL CHANGES**
Walkways shall have continuous common surfaces, not interrupted by steps or changes in *level* greater than 1/4 inch (1/4" = 6mm).

22.4.1 Changes in *level* between 1/4 inch and 1/2 inch (1/4" and 1/2" = 6mm and 13mm) shall be beveled with a slope no greater than 1:2 (50%). *See* **Fig. 22a**.



Changes in Level
Figure 22a

22.4.2 Changes in level greater than 1/2 inch (1/2" = 13mm) shall require a *curb cut*, *walkway*, *ramp*, elevator, or platform lift that complies with **521 CMR 21.00: CURB CUTS, 521 CMR 22.00: WALKWAYS, 521 CMR 24.00: RAMPS** or **521 CMR 28.00: ELEVATORS**.

Appendix to Item 701-020 Massachusetts Architectural Access Board Regulations

22.5 **SURFACE**

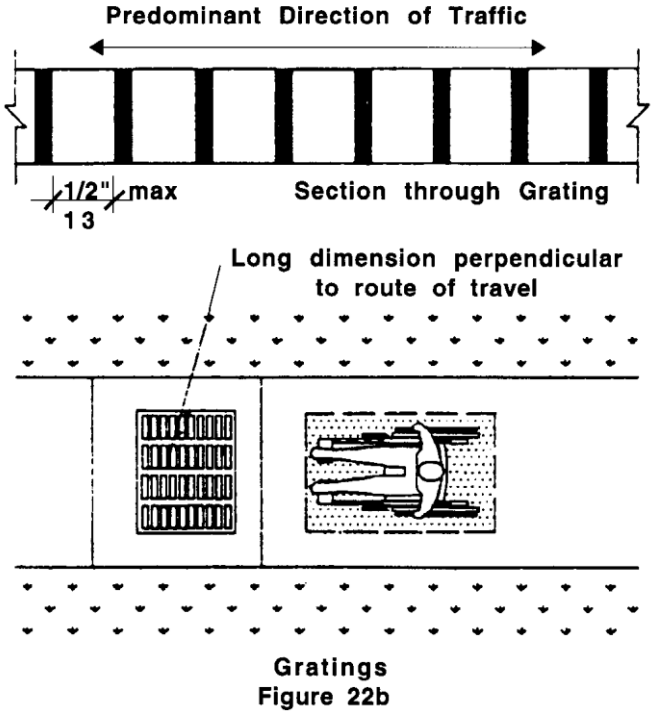
Walkway surfaces shall be stable, and firm and shall lie generally in a continuous plane with a minimum of surface warping.

22.6 **DRAINAGE**

Grading and drainage shall be designed to minimize pooling of water or accumulation of ice or flow of water across *walkways*.

22.7 **GRATINGS**

If gratings are located in walking surfaces, they shall have spaces no greater than 1/2 inch (1/2" = 13mm) wide in the direction of the flow of travel. If gratings have elongated openings, then they shall be placed so that the long dimension is perpendicular to the dominant direction of travel. *See* **Fig. 22b**.



Gratings
Figure 22b

22.8 **INTERSECTIONS**

Wherever a *walkway* crosses or joins streets, public ways, driveways or parking lots, it shall comply with the following:

22.8.1 The intersecting surfaces shall blend to a common *level* with a slope no greater than 1:20 (5%), or a *curb cut* shall be installed in compliance with **521 CMR 21.00: CURB CUTS**.

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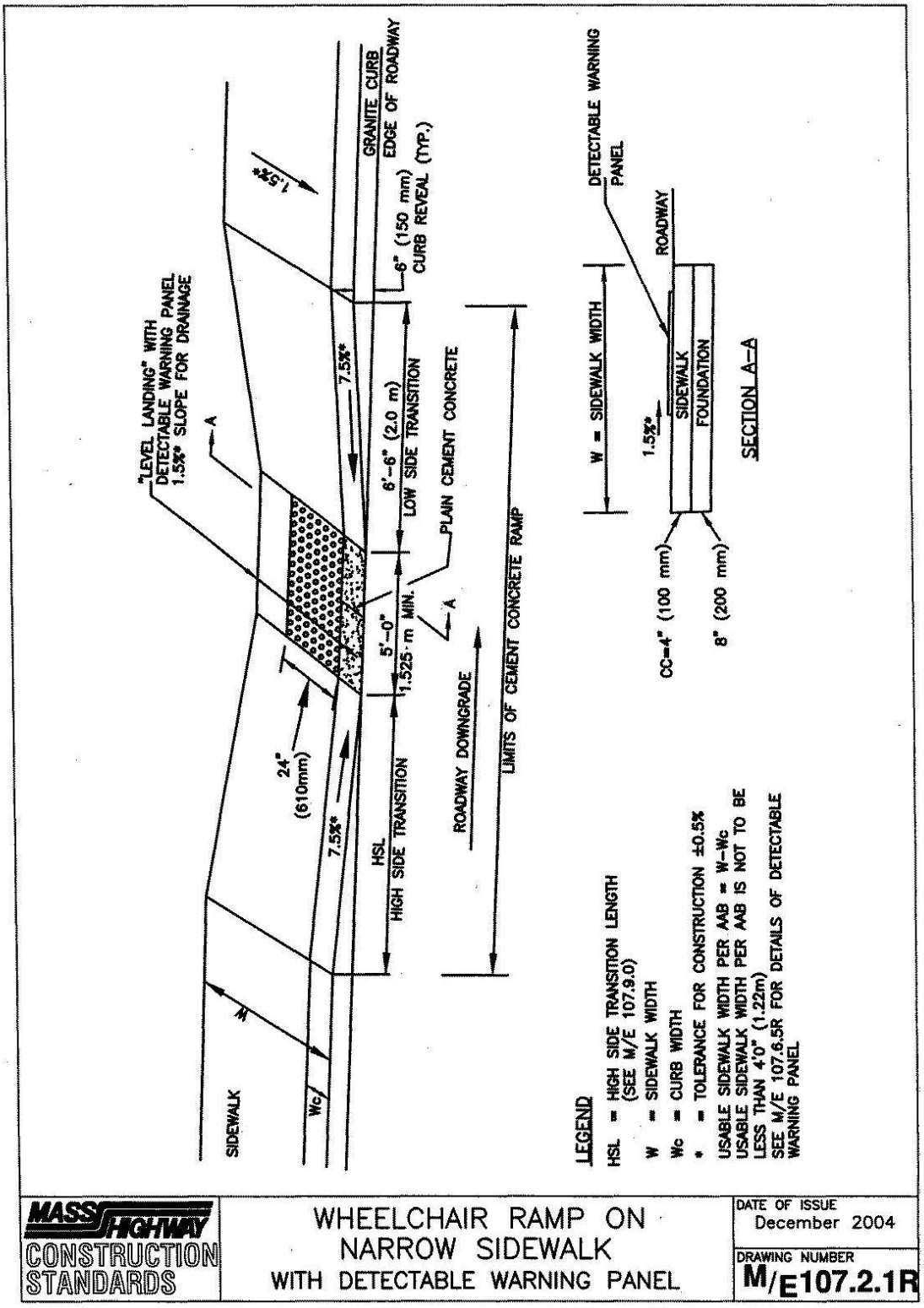
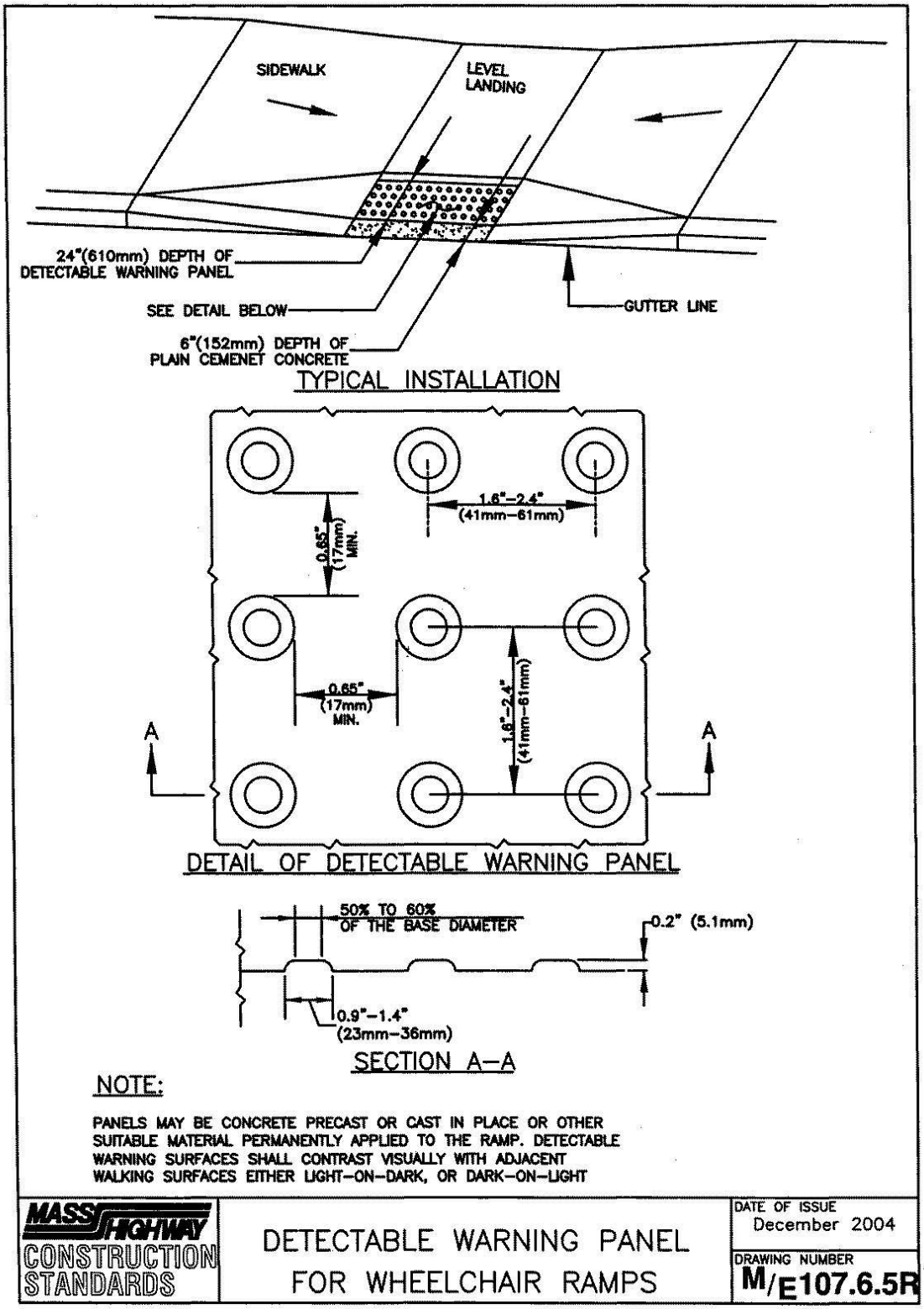
Appendix to Item 701-020 Massachusetts Highway Dept. Standard Details WCRs



Appendix to Item 701-020 Massachusetts Highway Dept. Standard Details WCRs



Appendix to Item 701-020 Massachusetts Highway Dept. Standard Details WCRs

ROADWAY PROFILE GRADE	*HIGH SIDE TRANSITION LENGTH	
%	METRIC UNITS	ENGLISH UNITS
0	2.0 m	6'–6"
>0⇒1	2.3 m	7'–8"
>1⇒2	2.7 m	9'–0"
>2⇒3	3.3 m	11'–0"
>3⇒4	4.3 m	14'–0"
>4	4.6 m Max	15'–0" Max

NOTE:

*BASED ON A DESIGN SLOPE OF 7.5% AND A REVEAL OF 150 mm (6").

MASS HIGHWAY CONSTRUCTION STANDARDS

CURB TRANSITION LENGTH FOR WHEELCHAIR RAMPS

DATE OF ISSUE December 2001

DRAWING NUMBER M/E 107.9.0

End of Appendix to Item 701-020

ITEM NO. 702-001 HOT MIX ASPHALT WALKWAY SQUARE YARD

DESCRIPTION

Furnish and install walks as indicated and specified.

ACCESSIBILITY CODES:

521 CMR Rules and Regulations of the AAB and ADA shall be adhered to on this Project.

Sidewalks shall conform to the applicable requirements of current editions of following:

a. Massachusetts Highway Department Standard Specifications.
b. Massachusetts Highway Department Wheelchair Ramp Standards.
c. American with Disabilities Act Accessibility Guidelines.
d. Regulations of Massachusetts Architectural Access Board.

See Appendix to Item 701-020 for MHD standards and applicable MAAB regulations.

MATERIALS

HOT MIX ASPHALT Sidewalks shall be Class I HOT MIX ASPHALT and conform to Section M3, Subsection 3.11.00 of the MHD Standard Specification.

CONSTRUCTION METHODS

Installation shall conform to Section 701 of MHD Standard Specifications.

The Contractor shall construct walkways in accordance with all applicable accessibility standards, including those referenced above.

Shape the subgrade parallel to finish grade of the sidewalk and compact as specified under Item 170-001.

All depressions shall be filled with gravel borrow and compacted.

Install Gravel Borrow base to the depth indicated on the Drawings and compact as specified under Item 151-001. The top of the gravel borrow base shall be parallel to the finish grade of the sidewalk.

Where excessively large roots interfere with sidewalk construction, the cement concrete shall be "boxed" around the tree trunk for a distance of at least 18 inches form the edge of the trunk. Roots protruding beyond 18 inches may be cut as directed by the Engineer.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 702-001

METHOD OF MEASUREMENT

HOT MIX ASPHALT walkways will be measured per square yard installed in place. No distinction will be made for sidewalks or driveways.

BASIS OF PAYMENT

HOT MIX ASPHALT walkways will be paid for at the Contract Unit Price per square yard. Payment at the unit price shall include full compensation for all labor materials, equipment and supervision to install one square yard of HOT MIX ASPHALT walkway, including cutting and removing tree routes, placement and compaction.

Fine Grading and Compaction –Subgrade Areas will be paid for under Item 170-001.

Gravel Borrow will be paid for under Item 151-001.

Pay Item		Pay Unit
ITEM NO. 702-001	**HOT MIX ASPHALT WALKWAY**	**SQUARE YARD**

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ITEM NO. 703-801 CONCRETE WHEEL STOP WITH DELINEATORS LINEAR FOOT

GENERAL

DESCRIPTION
Furnish and install precast concrete wheel stops with two high-visibility delineators mounted to each, as indicated on the Drawings and specified herein.

QUALITY ASSURANCE
Manufacturers of precast concrete wheel stops and delineators shall have been in the business of manufacturing the respective products for a period of at least 5 years.

SUBMITTALS
Submit name and qualifications of manufacturer of wheel stops and delineators. Include number of years in business.

Submit shop drawings and product data on precast concrete wheel stops.

Submit produce data on delineators.

Submit method of fastening delineators to wheel stops.

MATERIALS

PRECAST CONCRETE WHEEL STOPS
Precast concrete wheel stops shall be of the size and configuration indicated on the Drawings. Precast concrete shall be a minimum of 4,000 psi.

DELINEATORS
Delineators shall be impact-resistant, bolt-on, polyurethane units with a reboundable one-piece top part of the post to provide impact resistance. Provide 3 stripes with high-visibility reflected sheeting conforming to ASTM D 4956, Type 5.

CONSTRUCTION METHODS

Install wheel stops in locations indicated on the Drawings. Insert 3/4-in. diameter rods to secure wheel stops into pavement. **Do not install rods where wheel stops are installed on the bridge deck.**

Fasten delineators to wheel stops in accordance with the approved shop drawings.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 703-801

METHOD OF MEASUREMENT

The length of wheel stops shall be measured along the traffic side length of the wheel stop.

BASIS OF PAYMENT

CONCRETE WHEEL STOP WITH DELINEATORS will be paid for at the Contract unit price per linear foot.

Pay Item		Pay Unit
ITEM NO. 703-801	**CONCRETE WHEEL STOP WITH DELINEATORS**	**LINEAR FEET**

(Remainder of page is intentionally blank)

ITEM NO. 706-880 HEAVY DUTY INTERLOCKING CONCRETE PAVERS SQUARE FOOT

GENERAL

Provide heavy duty interlocking concrete pavers as indicated on the Drawings and as specified herein. The work includes furishing and installing pavers for the speed table at Newton Street, including the bedding sand and joint sand.

SUBMITTALS

Submit the following:

A. Sieve analysis per ASTM C 136 for grading of bedding and joint sand.

B. Concrete pavers:

1. Four representative full-size samples of each paver type, thickness, color, finish that indicate the range of color variation and texture expected in the finished installation. Color(s) selected by the Engineer from manufacturer's available colors.

2. Accepted samples become the standard of acceptance for the work.

3. Test results from an independent testing laboratory for compliance of concrete pavers with ASTM C 936.

4. Manufacturer's catalog product data, installation instructions, and material safety data sheets for the safe handling of the specified materials and products.

STANDARDS:

Where references are made in these Specifications to Standard Specifications, codes, etc., of the U.S. Government, State or local authorities, or professional and industrial societies and associations, the applicable portions thereof shall govern as fully as if they were recited at length herein, and shall include all revisions thereto issued as of the date of the Notice to Contractors pertaining hereto.

1. **Standard Specifications:** "Standard Specifications for Highway and Bridges", Massachusetts Department of Transportation, Highway Division (MHD), latest edition and all supplements.

2. **AASHTO:** American Association of State Highway and Transportation Officials, Standard Specifications, latest edition.

3. **ASTM:** American Society of Testing and Materials "Annual Book of ASTM Standards", latest edition.

4. **ADA**: Americans with Disabilities Act, latest edition and latest edition of the "Accessibility Guidelines for Buildings and Facilities, Transportation Facilities and Transportation Vehicles" of the United States Architectural and Transportation Barriers Compliance Board.

5. **AAB:** Architectural Access Board, Commonwealth of Massachusetts Regulation Chapter 521 CMR, latest edition.

MATERIALS

General

Concrete pavers shall be interlocking "L" shape blocks designed for heavy duty AASHTO H-20 loading.

Pavers shall be gray in color.

Product

Concrete pavers shall be Uni-Anchorlock by Ideal Concrete Block Company, Inc., Pavestone Company, or approved equal.

Bedding and Joint Sand

Provide bedding and joint sand as follows:

1. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.

2. Sieve according to ASTM C 136.

3. Bedding Sand Material Requirements: Conform to the grading requirements of ASTM C-33 with modifications as shown in Table 1.

Table 1
Grading Requirements for Bedding Sand
ASTM C 33

Sieve Size	Percent Passing
3/8 in.	100
No. 4	95 to 100
No. 8	85 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100	2 to 10
No. 200	0 to 1

4. Joint Sand Material Requirements: Conform to the grading requirements of ASTM C 144 as shown with modifications in Table 2 below:

Table 2
Grading Requirements for Joint Sand

	ASTM C 144 Natural Sand	ASTM C 144 Manufactured Sand
Sieve Size	Percent Passing	Percent Passing
No. 4	100	100
No. 8	95 to 100	95 to 100
No. 16	70 to 100	70 to 100
No. 30	40 to 75	40 to 100
No. 50	10 to 35	20 to 40
No. 100	2 to 15	10 to 25
No. 200	0 to 1	0 to 10

INSTALLATION

A. Spread bedding sand evenly over the base course and screed to a nominal 1 in. thickness, not exceeding 1 1/2 in. thickness. Spread bedding sand evenly over the base course and screed rails, using the rails and/or edge restraints to produce a nominal 1 in. thickness, allowing for specified variation in the base surface.

1. Do not disturb screeded sand.

2. Screeded area shall not substantially exceed that which is covered by pavers in one day.

3. Do not use bedding sand to fill depressions in the base surface.

B. Lay pavers in pattern parallel to the walkway. Place units hand tight without using hammers. Make horizontal adjustments to placement of laid pavers with rubber hammers and pry bars as required.

C. Provide joints between pavers between 1/16 in. and 3/16 in. wide. No more than 5% of the joints shall exceed 1/4 in. wide to achieve straight bond lines.

D. Joint (bond) lines shall not deviate more than ±1/2 in. over 50 ft. from string lines.

E. Fill gaps at the edges of the paved area with cut pavers or edge units.

F. Saw cut pavers to be placed along the edge to create a straight edge against the adjacent pavement.

G. All cut pavers exposed to vehicular tires shall be no smaller than one-third of a whole paver.

H. Use a low-amplitude plate compactor capable of at least minimum of 4,000 lbf (18 kN) at a frequency of 75 to 100 Hz to vibrate the pavers into the sand. Remove any cracked or damaged pavers and replace with new units.

I. Simultaneously spread, sweep and compact dry joint sand into joints continuously until full. This will require at least 4 to 6 passes with a plate compactor. Do not compact within 6 ft of unrestrained edges of paving units.

J. Remove excess sand from surface when installation is complete.

FIELD QUALITY CONTROL

A. The final surface tolerance from grade elevations shall not deviate more than ±3/8 in. under a 10 ft straightedge.

B. Check final surface elevations for conformance to the Grading Plans.

C. Lippage: No greater than 1/8 in. difference in height between adjacent pavers.

D. Finish surface shall conform to ADA and MAAB regulations, including the seam between the concrete pavers and adjacent concrete and HOT MIX ASPHALT pavement.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 706-880**

Measurement for HEAVY DUTY INTERLOCKING CONCRETE PAVERS shall be by the square foot of signs installed in place.

Payment for HEAVY DUTY INTERLOCKING CONCRETE PAVERS shall be by the Contract Unit Price per square foot, complete in place including joint sand and bedding sand, and other appurtenant work.

Pay Item		Pay Unit
ITEM NO. 706-880	**HEAVY DUTY INTERLOCKING CONCRETE PAVERS**	**SQUARE FOOT**

(Remainder of page is intentionally blank)

ITEM NO. 707-999 REMOVE AND RESET STREET FURNITURE EACH

GENERAL

This work shall consist of the removing and reinstalling street furniture items including trash receptacles, benches, and bike racks as required to construction new sidewalks and wheelchair ramps as indicated on the Drawings and as specified herein.

Obtain details and/or shop drawings of the items from the City before removal. If details are not available from the City, the Contractor shall obtain installation details from the item manufacturer.

MATERIALS

Provide new stainless steel hardware as required for the reinstallation of each item.

EXECUTION

Carefully remove the item from the concrete sidewalk or base.

Protect the item and store on or near the site until ready to reinstall.

Reinstall item on concrete sidewalk at the pre-existing location, unless otherwise directed by the Engineer. Fasten in place according to the details provided by the City and/or manufacturer.

The Contractor shall install all items level and with plumb vertical alignment.

Any incidence of damage to any item during installation shall be reported immediately to the Engineer, remedial action shall be decided, and repairs made to the satisfaction of the Engineer.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 707-999

METHOD OF MEASUREMENT

REMOVE AND RESET STREET FURNITURE will measured per each, complete in place and approved by the Engineer.

BASIS OF PAYMENT

REMOVE AND RESET STREET FURNITURE will be paid for at the contract price per each for each Item. Such price and payment shall be full compensation for all the work and materials required and specified under this Item to complete the work. Payment shall include full compensation for removal, protection, temporary storage and re-installation, including provision of new hardware.

Item No.	Pay Item	Pay Unit
ITEM NO. 707-999	REMOVE AND RESET STREET FURNITURE	EACH

(Remainder of page is intentionally blank)

ITEM NO. 740-001 ENGINEER'S FIELD OFFICE AND RELATED EQUIPMENT FOR ENGINEER MONTH

GENERAL

DESCRIPTION

The requirements of this item shall consist of furnishing all labor, materials and equipment and performing all work to satisfactorily provide and maintain the Engineer's Field Office as described in this section. The work shall also include winterizing and connection of water, sewer, electric, telephone, and internet services.

All electrical and plumbing work shall be done in accordance with the National and Massachusetts Electrical Code and the Massachusetts Plumbing Code, respectively.

MATERIAL

FIELD OFFICES

A. The Contractor shall provide and maintain a temporary field office for the Engineer. **If available, the Contractor is encouraged to rent office or retail space within 1,000 feet of the project area.** If space is not available, the Contractor shall provide a temporary field office trailer at a location within 500 feet of the project area. The exact location shall be at the discretion of City.

B. Provide a separate conference room space with conference table and chairs to accommodate twelve (12) persons.

C. In addition, the Contractor shall provide a new separate trailer of not less than 300 square feet on the site for City's Project Representative. The trailer shall have bars on the windows and locking doors. The trailer shall be set on concrete blocks, with the area beneath the trailer enclosed in exterior grade plywood with two coats of paint as approved by the Engineer. The field office trailer shall contain the following standard equipment:

2	Offices Venetian blinds on windows. Windows to be glazed with polycarbonate. 2 Shelves 1 Plan Table 1 Lavatory complete with automatic electric hot water heater, and supply of soap, toilet paper, and paper towels 1 small refrigerator 1 microwave oven Air Conditioners
1	Wardrobe Closet
1	Plan rack with holders
2	Fire Extinguishers
1	Indoor/Outdoor thermometer
1	100-ft. steel tape
1	Plumb bob

The field office shall be equipped with the following furnishings:

1	Water Cooler with hot and cold water; water will be supplied by the Contractor for the duration of the project.
1	Electrostatic dry copy machine, legal size (8 1/2" x 14") to be selected by the Resident Engineer.
2	Metal (fire resistant) four drawer filing cabinets with locks and keys
1	Metal Drafting Table 3' x 6'
2	Metal swivel type drafting stools with backs.
1	Metal office desks with Formica tops
1	Metal swivel desk chairs with arms, casters, and adjustable tilt
2	2 Light fluorescent drafting desk lamps
6	Metal straight back chairs
1	Electric water cooler
1	Metal cabinet type first aid kit
2	Metal lockers 18 inch wide by 24 inch deep 6 feet 6 inches high
1	100 LF measuring tape
4	25-ft. measuring tapes (to remain the property of the City)
1	Measuring wheel with a 15-in. minimum diameter
2	Telephones provided in the trailer with all services paid for by the Contractor.
1	First aid kit-large metal cabinet type
1	winterized outdoor faucet
1	MassDOT Highway Division "Standard Specifications for Highways and Bridges" latest edition, including "Supplemental Specifications" latest edition to become the property of the City
1	"Manual on Uniform Traffic Control Devices" latest edition, (MUTCD) to become the property of the City
1	Massachusetts State Building Code (to remain the property of City)
2	Complete sets of Contract Documents, including full-size and half-size drawings and specifications.

PHONE, CAMERA & LAP-TOP COMPUTER:
The Contractor shall provide high-speed internet access and all voice and data plans as necessary to maintain full functionality of all equipment provided. All furnished equipment shall be current model year. Any equipment that may fail under this provision shall be replaced within 48 hours of notification, at no additional cost to the City.

The following items to remain the property of the City on completion of project:

EXECUTION
The Contractor shall submit catalogs and vendors data for the equipment and furnishing to be furnished for approval by the Engineer.

Unless specifically stated, all office equipment and furnishings shall remain the property of the Contractor upon the completion of all work under this contract.

WATER, SEWER, ELECTRICAL AND TELEPHONE:
The Contractor shall perform and be responsible for all cost associate with the all work necessary, including excavation and backfill for installation, use and removal of water, sewer, electrical and telephone service. The Contractor shall insulate the water and sewer lines to prevent them from freezing. The Contractor shall install and maintain 3 phone lines for use of the Resident Engineer.

The Contractor shall provide suitable toilet facilities for its staff and additional facilities for the workmen on the job, including personnel of sub-contractors and file sub-contractors.

Chemical toilets and their maintenance shall meet requirements of state and local health regulations and ordinates and shall be subject to the approval of the Engineer.

MAINTENANCE:
All sewer, water, electric and telephone services shall be continuously connected. Electric lights and current, proper heating, hot and cold water, satisfactorily cooled drinking water and telephones shall be available at all times both night and day. The toilets and laboratories shall be maintained in continual service; trash, garbage and other wastes shall be properly and satisfactorily disposed of. Janitor service, to keep the quarters and equipment neat and clean as acceptable working space, shall be furnished regularly, at least once per week. Repairs and painting shall be made from time to time, as required and as directed by the Engineer.

The Contractor shall furnish a supply of fluorescent light bulbs and copy paper as approved by the Engineer.

The Contractor shall also provide snow removal of access and parking areas.

INSURANCE

At the time the field office is made available to the Engineer, the Contractor shall furnish evidence to the Engineer that insurance in the amount of $2,500.00 (non-deductible) has been obtained which will protect the City and/or its employees or agents against loss of property in the field office from fire, theft, storm or flood. The insurance will be kept in effect during the entire period of occupancy, with evidence of all necessary renewals being promptly forwarded to the Engineer.

In the case of fire, theft or breakdown, all equipment involved shall be repaired or replaced by the Contractor within 48 hours.

In the event the field office is destroyed or rendered untenable for any reasons, it shall be replaced within two weeks, or as directed.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 740-001**

The Engineer's field office will be measured on a monthly basis.

The Engineer's Field Office and equipment will be paid for at unit price bid per month for Engineer's Field Office, complete and as required which price shall include full compensation for all services (heat, gas, water, sanitary, telephone, etc.) for all labor, material, fencing, surfacing, equipment, servicing (including general inside cleaning at least once a week), and incidentals necessary to provide, equip, maintain, insure, remove and dispose of materials used for the field office and clean the site as directed.

Pay Item		Pay Unit
ITEM NO. 740-001	**ENGINEER'S FIELD OFFICE AND RELATED EQUIPMENT FOR ENGINEER**	**MONTH**

ITEM NO. 751-090 STRUCTURAL LOAM CUBIC YARD

GENERAL

Provide a mixture of gap-graded gravels (made of crushed stone), clay loam, and a hydrogel stabilizing agent to keep the mixture from separating in order to provide an integrated, root penetrable, high strength pavement system.

MATERIAL

STRUCTURAL LOAM shall be a mix of crushed stone, hydrogel and screened loam.

Crushed Stone – 1-1/2-Inch:

Durable crushed rock free from dust, clay or trash. Crushed stone shall be free from a detrimental quantity of thin, flat, elongated or other objectionable pieces. A detrimental quantity will be considered as any amount in excess of 15% of the total weight. The crushed stone shall meet the following gradation:

U.S. Standard Sieve Size	Percent Passing by Weight
2 inch	100
1-1/2 inch	90 - 100
3/4 inch	0 - 10
No. 4	0 - 5
No. 200	0 – 0.5

Screened Loam: MHD Standards Specifications, Material Specification M1.05.0 Loam Borrow.

EXECUTION

A. Preparation of Structural Loam:

1. Structural Loam shall be mixed on site and immediately installed. It shall not be stockpiled.
2. Place a layer of crushed stone 4 to 6 inches think on compacted subgrade.
3. Lightly apply dry hydrogel spreading it evenly on top of the stone.
4. Place moist screened loam on top, covering the stone and filling the interstitial spaces between the stones.
5. Turn and mix the stone and loam until a uniform blend is produced.
6. Compact the mixture with a plate compactor.
7. Repeat the procedure until the compacted thickness is 24 inches.
8. The concrete sidewalk is installed on top of the structural loam.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 751-090**

METHOD OF MEASUREMENT
STRUCTURAL LOAM will be measured by the cubic yard placed and compacted to the limits on the Drawings and specified herein.

BASIS OF PAYMENT
STRUCTURAL LOAM will be paid for at the Contract Unit Price per cubic yard. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary to furnish, place and compact one cubic yard of STRUCTURAL LOAM. Include the following costs: Furnishing, placing, compacting, and testing of materials; and dust control measures.

Pay Item		Pay Unit
ITEM NO. 751-090	STRUCTURAL LOAM	CUBIC YARD

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ITEM NO. 801-301	**3 INCH NON-METALLIC CONDUIT**	**LINEAR FOOT**
ITEM NO. 801-302	**3 INCH NON-METALLIC CONDUIT UNDER ROADWAYS**	**LINEAR FOOT**
ITEM NO. 806-301	**3 INCH METALLIC (GALVANIZED STEEL) CONDUIT**	**LINEAR FOOT**

GENERAL

Furnish and install conduit for traffic signal systems as indicated on the Drawings and as specified herein.

The work shall conform to the requirements of Section 801 of the MHD Standard Specifications, except as modified herein.

MATERIALS

Materials shall be in accordance with the Commonwealth of Massachusetts, Massachusetts Highway Department, Standard Specifications for Highways and Bridges (MHD Standard Specifications).

Non-metallic conduit shall be used for all underground runs unless specified otherwise. Schedule 80 conduit shall be used under traveled roadways, shoulders, and driveways; schedule 40 conduit shall be used at all other underground locations.

Rigid metallic conduit shall be used for all above ground runs for connections into the controller or from the power source.

EXECUTION

The Contractor shall provide and install all conduit and necessary fittings at the locations noted on the Plans. Conduits shall be capped during construction using manufactured seals to prevent entrance of water and debris. The conduits shall be cleaned before pulling wire.

The conduit shall be laid in the trench in the designed formation using precast concrete block or plastic spacers for spacing conduit. Electric and signal wires shall be placed in separate conduits.

Conduit shall be installed in not less than twenty foot lengths, except at the ends of runs or at bends. Conduit shall be free of cracks and chipped ends. The Contractor shall furnish and have available at the job site a sufficient quantity of conduit so that cracked pieces or those with chipped ends may be discarded.

Repairs to conduits will not be permitted. All individual lengths of broken, cracked, chipped, or impaired conduit shall be removed and replaced with new conduit.

The width and depth of trench shall be in accordance with the Commonwealth of Massachusetts, Massachusetts Highway Department, Standard Specifications for Highways and Bridges (MHD Standard Specifications).

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 801-301**
ITEM NO. 801-302
ITEM NO. 806-301

Measurement per linear foot for various types and sizes of conduit will be horizontally along the centerline of each individual conduit installed in place.

Furnishing and installing of conduit of various types and sizes will be paid for at the Contract unit price per linear foot of each individual conduit installed under the respective Item. Payment shall include full compensation for trench excavation to the depths required to provide for laying the conduit as shown on the Drawings, furnishing all materials, transporting, protecting and installing (including joining) all conduit and fittings, placing and compacting bedding and backfill material (specified under General Earthwork Requirements), and all else in connection with the laying of the drain pipe for which there is no separate pay Item. All conduits shall be left in a clean manner with no sediment accumulation.

Pay Item		**Pay Unit**
ITEM NO. 801-301	**3 INCH NON-METALLIC CONDUIT**	**LINEAR FOOT**
ITEM NO. 801-302	**3 INCH NON-METALLIC CONDUIT UNDER ROADWAYS**	**LINEAR FOOT**
ITEM NO. 806-301	**3 INCH METALLIC (GALVANIZED STEEL) CONDUIT**	**LINEAR FOOT**

(Remainder of page is intentionally blank)

ITEM NO. 811-310 PULL BOX 12 X 12 INCHES EACH

GENERAL

Furnish and install pull boxes for traffic signal systems as indicated on the Drawings and as specified herein.

The work shall conform to the requirements of Section 801 of the MHD Standard Specifications, except as modified herein.

MATERIALS

All pull boxes on this project shall be 12 inch by 12 inch.

EXECUTION

Pull Boxes shall be built to the lines, grades, dimensions and designs shown on the plans and details hereinafter, with the necessary frames covers etc. Construction methods for precast concrete units shall conform to the relevant provisions of Section 901, and Subsection M4.02.14 of the MHD Specifications. Frames and covers shall be LeBaron S612 (80 lbs), or equivalent.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 811-310

Measurement will be for each pull box installed in place.

Furnishing and installing of pull boxes will be paid for at the Contract unit price per each installed in place. Payment shall include full compensation for trench excavation to the depths required to provide for install the pull box as shown on the Drawings, furnishing all materials, transporting, protecting and installing pull boxes, placing and compacting bedding and backfill material (specified under General Earthwork Requirements), and all else in connection with the installation of pull boxes for which there is no separate pay Item. Any incidental work for materials for which no basis of payment is provided will be considered as completely covered by the unit price bid. All pull boxes shall be left in a clean manner with no sediment accumulation.

Pay Item		Pay Unit
ITEM NO. 811-310	PULL BOX 12 X 12 INCHES	EACH

(Remainder of page is intentionally blank)

ITEM NO. 815-701	**TRAFFIC CONTROL SIGNAL – PROSPECT STREET & SOMERVILLE AVENUE**	**LUMP SUM**
ITEM NO. 815-702	**TRAFFIC CONTROL SIGNAL – WASHINGTON STREET, WEBSTER, AVENUE, SOMERVILLE AVENUE & BOW STREET**	**LUMP SUM**
ITEM NO. 815-703	**TRAFFIC CONTROL SIGNAL – PROSPECT STREET & WEBSTER AVENUE**	**LUMP SUM**
ITEM NO. 815-704	**TRAFFIC CONTROL SIGNAL – BOW STREET & WARREN STREET**	**LUMP SUM**
ITEM NO. 815-098	**FOOTING COST ADJUSTMENT**	**LINEAR FOOT**

GENERAL

Furnish and install traffic signal systems for the various intersections as indicated on the Drawings and as specified herein. Existing traffic signals at intersections shall be maintained until new signals are functional.

The work shall conform to the requirements of Section 815 of the MHD Standard Specifications, except as modified herein.

Shop drawings and material data for traffic signal system shall be provided.

MATERIALS

The work of this Section shall include the furnishing and installation of part or all of the following items: controllers, cabinets and foundations; anchor bolts and foundations for mast arms; signal posts and foundations; signal heads; backplates; fire preemption detection systems; video detection; wireless Ethernet communication for interconnect between signals, all cable and wiring; ground rods, equipment grounding and bonding; service connection and meter post; pole risers, and all other equipment, materials and incidental costs necessary to provide a complete, fully operational traffic control signal systems as specific herein and as shown on the plans. All required mast arms for installation will be supplied by the City of Somerville. The Locations are as follows:

1. Location 1 – Prospect Street / Somerville Avenue / Washington Street
2. Location 2 – Webster Avenue / Somerville Avenue / Washington Street
3. Location 3 – Prospect Street / Webster Avenue
4. Location 4 –Somerville Avenue / Bow Street / Warren Street

The following equipment shall be furnished and installed as specified on plans:

A. Traffic controller and cabinet

1. The traffic signal controller units (CU), malfunction management units (MMU), detector amplifiers, cabinet power supply, bus interface units (BIUs) and all other ancillary traffic signal control components included in the traffic control cabinet shall comply with the National Electrical Manufacturers Association (NEMA) Standard No. TS 2-1998, Traffic

Controller Assemblies with National Transportation Communications for ITS Protocol (NTCIP) Requirements.

2. The traffic controllers supplied shall conform to Section 3 "Controller Units" of the NEMA TS 2 Standard. The traffic controllers shall be supplied in a TS 2 Type 1 Configuration as required in the list of major traffic signal items included on the plans for each intersection location. Specifically, the controller units (CU) shall be supplied as actuated controllers with NTCIP capabilities; defined as Type A1N in Subsection 3.2 of the NEMA TS 2 Standard.

3. The TS 2 Type 1 cabinet shall, at a minimum, meet the requirements of configuration 3 as defined in Table 5-2, "Type 1 Configurations" of the NEMA TS 2 Standard and according to the Item numbers listed above and on the traffic signal plans.

B. Malfunction Management Unit

1. The malfunction management unit (MMU) shall comply with Section 4 of the NEMA TS 2 standard. The MMU shall be capable of operating as either a Type 16 with 16 channels (8 vehicle, 4 pedestrian, 4 overlap) or a Type 12 with 12 channels (8 vehicles, 4 overlap). The MMU's supplied shall be configured to operate as Type 16 units.

2. The MMU's in either the Type 16 or Type 12 configuration shall be capable of operating in a NEMA TS 2 Type 1 cabinet, a NEMA TS 2 Type 2 cabinet, or a NEMA TS 1 cabinet without loss of functionality.

C. Bus Interface Units

1. The Bus Interface Units (BIU) shall comply with Section 8 of the NEMA TS 2 Standard. The BIU shall be fully interchangeable with any other manufacturer's unit and interchangeable in a NEMA TS 2 Type 2 cabinet assembly.

2. At a minimum the BIU shall perform the interface function between port 1 at the controller unit and the loop detector rack assembly and the terminal facilities. The cabinets shall be supplied with the appropriate number of BIUs required to provide an operating traffic control signal according to the plans and these specifications.

3. As a minimum, two LED indicators shall be provided on the BIU front panel. One indicator shall serve a dual use; as a power on indication and as a diagnostic indicator for proper operation of the device. The second indicator shall serve as a transmit indicator illuminating each time data is transmitted.

D. Cabinet Power Supply

1. A power supply shall be supplied and installed in the TS 2 cabinet. As a minimum, the power supply shall meet all requirements of Paragraph 5.3.5 of the NEMA TS 2 Standard. The unit shall be AC line powered and provide regulated DC power, unregulated AC power, a line frequency reference for the rack mounted loop amplifiers, bus interface units, load switches and other auxiliary cabinet equipment as required.

2. The power supply shall be either shelf mounted or installed as part of the loop detector rack assembly. The unit shall contain four LED indicators on the front panel to indicate the four outputs;

+ 12 VDC +/- 1 VDC @ 2.0 amps,
+ 24 VDC +/- 2 VDC @ 2.0 amps,
AC @ 250 milliamps, and
60 z line frequency reference.

A test point terminal shall also be located on the units front panel for + 24 VDC and logic ground testing.

E. Load Switches

1. Load switches shall comply with Subsection 6.2 of the NEMA TS 2 standard. All load switches shall utilize optically isolated encapsulated modular solid state relays. Discrete components on circuit boards are not acceptable.

2. Load switch indicator lights shall be LED-type and wired on the input side of the device.

F. Flasher

1. Flashers shall comply with Subsection 6.3 of the NEMA TS 2 standard and be equipped with two output indicator lights which will show flashing power out to the cabinet assembly.

2. Flash transfer relays shall comply with Subsection 6.4 of the NEMA TS 2 standard.

G. Video Detection

1. The Contractor shall provide Video Detection Systems to detect vehicles (Gridsmart 360 Camera or approved equal). The system shall also provide full motion video output showing zones highlighted during detection for fine-tuning. All hardware and software within the traffic signal cabinet shall be NEMA TS-2 compliant.

2. Prior to installation of the Video Detection System a detailed site survey shall be conducted by a factory trained and certified representative. The site survey shall ensure that the design of the camera, camera location, camera optics, and video/data interconnect is appropriate for the application.

3. The supplier of the Video Detection System shall supervise the installation and testing of the Video Detection System and computer software. A factory certified representative from the supplier shall be on site during installation.

4. The Video Detection System shall provide a minimum of 20 detection zones. The system shall provide flexible, user configurable detection zone placement at any orientation within the field of view of the Video Detection System Camera. It shall be possible to overlap detection zones. It shall be possible to configure the Video Detection System to provide detection signals to the traffic signal controller which are comprised of Boolean combinations of detection zones.

5. The Video Detection System shall provide failsafe operation whereby it places continuous vehicle calls to the traffic signal controller on all detection zones in the event it senses unacceptable video from the Video Detection System Camera.

6. The Video Detection System shall provide count & presence detection performance with at least 96% accuracy under normal (day and night) conditions.

7. The Video Detection System shall be comprised of a Video Detection System Camera, Video Detection System Cable, and Video Detection System Hardware.

8. The Video Detection System Camera shall operate without degradation over a temperature range of -34 to 60 degrees Celsius at a relative humidity of 10% to 90% condensing. The Video Detection System Cameras shall be housed in a water resistant, dust proof NEMA-4 housing. The housing shall be field rotatable to allow for proper alignment between the camera and the traveled road surface. The Video Detection System Cameras shall prevent the formation of ice and condensation in cold weather and allow the camera to operate correctly while exposed to precipitation and direct sunlight.

9. The Video Detection System Cable shall interconnect the Video Detection System Camera with the Video Detection System Hardware in the traffic signal control cabinet. The Video Detection System Cable shall meet the design requirements of the Video Detection System Camera manufacturer, and shall be designed and manufactured specifically for the Video Detection System Camera supplied. Cable shall be capable of withstanding the rigors of outdoor environments, including all combinations of precipitation, heat and cold from -34 to 74 degrees Celsius, and direct exposure to sunlight without exhibiting any signs of deterioration over time.

10. The Video Detection System Hardware shall operate without degradation over a temperature range of -34 to 74 degrees Celsius at a relative humidity of 10% to 90% condensing. They shall include interface device(s) which shall be installed in the traffic control cabinet.

11. The Video Detection System Hardware shall include all necessary cables for interconnection to the traffic signal controller, AC power service, and a modem for remote access of all video detection data including counts, classifications, and speed.

H. Surge Protection

1. Wherever expensive electronic equipment is located (cabinets, cameras, etc.), each input & output should be surge protected except traffic signal outputs. Signal outputs from load switches do not need surge suppression since the load switches act as surge suppressors.

2. The surge protector must be electrically connected to the nearest grounded metal structure or nearest ground rod.

3. Surge protection for all video, loop, pedestrian button, and pre-emption connections should have peak surge current protection of at least 10K amperes with a response time of less than 5 nanoseconds. The product complies when a lab report from an independent test laboratory stating the product passes this specification is submitted with the shop drawings.

4. Units shall be unconditionally warranteed for at least 10 years.

I. Signal Heads

1. Signal heads mounted on mast arms shall be rigidly attached to the mast arms, with the bottom of all signals at the same height. All traffic signal lenses shall be 12 inch in diameter

unless otherwise noted on the plans. Louvered backplates shall be 5 inch provided on all signal heads as noted on the plans. All signal heads shall be equipped with 12 inch ball or arrow light emitting diode (LED) modules.

J. LED Traffic Signal Housings

1. All Red, Yellow, and Green signal housings shall conform to the following: The LED signal module shall conform to "Vehicle Traffic Control Signal Heads – Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules", July 1998 Version or most current version, Institute of Transportation Engineers (ITE), 525 School St., S.W., Suite 410, Washington DC 20024-2797, Telephone: (202) 554-8050, FAX: (202) – 863-5486 and shall conform to the following: (In the case of a conflict, the special provision shall overrule.). LED signal modules must be type tested and approved by the MHD according to the requirements of Subsection 815.21, of the MHD Specifications.

2. LED signal modules shall fit without modifications into existing traffic signal housings conforming to "Vehicle Traffic Control Signal Heads" (VTCSH) published in the Equipment and Materials Standards of the Institute of Transportation Engineers. The LED signal module shall be a single, self-contained device not requiring onsite assembly for installation. LED signal assembly construction shall conform to ASTM specifications for the materials. Each LED signal module shall comprise a smooth surfaced Red and Green UV stabilized polycarbonate outer shell, multiple LED light sources, a power supply and a polycarbonate back cover assembled in a gasketted or silicon sealed unit.

3. The minimum luminous intensity values and light output shall be maintained within the rated input voltage of 117 Volts AC. LED signal modules shall not be allowed to fall short of the minimum intensity values at any of the 44 measuring points of the standard when lamp is turned on cold for measurements and after a 30 minute warm-up time period at 100% duty cycle.

4. The maximum wattage for 12 inch ball should be 20 watts and 10 watts for 12 inch arrow. The LED sources shall not be powered above the 70% of the manufacturer's specified rated load. This shall be clearly shown in layman's terms through calculations, schematics, catalogue cuts, etc. The LED sources shall be made of the type shown clearly in a catalogue cut or similar literature.

L. Pedestrian Heads

1. Pedestrian head indications shall be illuminated LED type displaying the full-filled graphical symbols of a walking person and upraised hand, both within a single housing and a countdown timer.

2. APS Pedestrian push button controls shall be raised from or flush with their housings and shall be a minimum of 1 inch in the smallest dimension. The force required to activate the controls shall be no greater than 5 lbs. Verbal message utilized by the APS system shall be coordinated with the City of Somerville.

3. 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 pushbuttons and/or legends on the pedestrian push button signs should clearly indicate which crosswalk signal is actuated by each pedestrian push button.

4. A maximum mounting height of 3.5 feet above the finish sidewalk grade shall be used for pedestrian push buttons. Signage for APS system shall comply with the MUTCD 2009.

5. Signal posts and bases shall be aluminum shafts with cast aluminum transformer bases. Signal base foundations shall not obstruct a sidewalk or crosswalk so that passage by physically challenged persons is impaired.

6. All local controller, malfunction management unit, and amplifier software shall be supplied with the latest available revision. Any software upgrades released by the manufacturer shall be supplied at no charge to the City of Somerville for a period of five years after acceptance of the traffic signal installations.

7. Each programmable local hardware component (controller, malfunction management unit, and detector amplifier) shall be initially programmed by the Contractor based on information contained on the plans. Three sets of hard copy programming per device shall be supplied in three ring binders supplied by the CONTRACTOR.

8. All computer system, controller, conflict monitor and amplifier software shall be supplied with the latest available revision and be Y2K compatible. Any software upgrades released by the manufacturer shall be supplied at no charge to the City. Minor upgrade releases such as version 2.10 to 2.11 or 2.20 are considered minor and should be supplied to the City at no charge. Upgrades such as the release of a new version is considered a major change and should not be required to be supplied to the City free of charge.

M. Mast Arm Foundations

1. Mast arm foundations shall be fabricated and constructed in conformance with the Interim 1998 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and the Contract Documents.

2. Mast arms and poles will be provided by the City of Somerville and will comply with City of Somerville specifications.

3. For all mast arm pole foundation designs shall be submitted to the Engineer for review.

4. Contractor responsible for soil borings for mast arm foundation design.

N. Emergency Vehicle Pre-emption

1. Emergency vehicle pre-emption shall be provided. The preemption system shall be infrared series of emergency vehicle preemption hardware. Hardware shall be installed in the same cabinet as the controller. This will include a phase selector in the cabinet, confirmation strobe(s), and optical detectors as shown on the plans and all cable and electrical connections required for a functional system.

2. Preemption signals shall be serviced on a first detected, first served basis

3. When optical energy impulses are received at the intersection, control of the signals shall transfer to the controller's internal pre-emption logic which shall cause the signal controller to show a selected display identical to one of the color interval displays normally available as specified, which will assist the vehicle through the intersection without cross street conflict. After the vehicle has passed through the intersection, control of the signals shall then return to normal operation which shall restore the appropriate timings that were in effect prior to pre-emption.

4. Minimum green and normal vehicle clearance interval times shall be maintained on phases that are to be terminated by preemption demand.

5. Confirmation strobe shall be illuminated whenever any emergency preemption green is on.

6. Contractor shall install pre-emption system, and once in place, contact local fire department for testing.

7. Contractor shall submit shop drawings for the preemption system to the Engineer for review prior to installation.

EXECUTION

The Contractor shall install and perform testing of the equipment grounding system in the presence of the Engineer in accordance with the MHD Specifications.

After the Contractor has finished installing controllers and all other associated signal equipment and after Contractor has set the signal equipment to operate as specified in the contract documents, the fine tuning, adjusting, and testing period shall begin. During this period, the Contractor, under the direction of the Engineer will make necessary adjustments and tests to ensure safe and efficient operation of the equipment. This period shall not last for less than 30 days. No request for final acceptance will be considered until successful completion of the testing period.

After the initial 30-day period the Contractor shall make adjustments to the signal timing on up to three occasions. Engineer will provide updated timing plans based on the remote data collection.

METHOD OF MEASUREMENT AND PAYMENT

ITEM NO. 815-701
ITEM NO. 815-702
ITEM NO. 815-703
ITEM NO. 815-704

MEASUREMENT

Except for the work of Items 801-30,801-302, 806-301, 811-310, and 815-098, all traffic signal work will be measured as a lump sum for each intersection.

Measurement under Item 815-098 will be by the vertical linear foot when authorized by the Engineer.

PAYMENT

The lump sum price bid for this item shall be full compensation for all labor, materials and equipment necessary or incidental to the installation of the complete signal system, and the removal of the existing flashing signal components at each respective intersection.

No separate payment will be made for excavation, backfill, concrete, temporary installations, restoration of damaged facilities or other incidental work but all costs in connection therewith shall be included in the Lump Sum price bid.

The cost of maintenance of the proposed traffic signal equipment shall be deemed to be included in the various traffic signal contract items, and no additional payments shall be made thereof, except as provided by Subsection 7.17 of the MHD Specifications as amended..

Payment under Item 815-098 will be at the Contract unit price per vertical linear foot when authorized by the Engineer.

Pay Item		**Pay Unit**
ITEM NO. 815-701	**TRAFFIC CONTROL SIGNAL – PROSPECT STREET & SOMERVILLE AVENUE**	**LUMP SUM**
ITEM NO. 815-702	**TRAFFIC CONTROL SIGNAL – WASHINGTON STREET, WEBSTER AVENUE, SOMERVILLE AVENUE & BOW STREET**	**LUMP SUM**
ITEM NO. 815-703	**TRAFFIC CONTROL SIGNAL – PROSPECT STREET & WEBSTER AVENUE**	**LUMP SUM**
ITEM NO. 815-704	**TRAFFIC CONTROL SIGNAL – BOW STREET & WARREN STREET**	**LUMP SUM**
ITEM NO. 815-098	**FOOTING COST ADJUSTMENT**	**LINEAR FOOT**

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ITEM NO. 820-700 ROADWAY LIGHTING MODIFICATIONS LUMP SUM

DESCRIPTION:
Under this Item, work shall consist of furnishing and installing complete in place one new light pole with arm suitable for accepting one luminaire. The light pole location shall be confirmed in the field and approved by the Engineer. The work also includes connecting the new light pole to the existing City lighting circuit and lighting controller, including new conduit, handhole, and wiring as necessary.

PRODUCTS

Light Pole and Luminaire
City Standard

Concrete Lightpole Foundation
pre-cast concrete foundations shall be designed and manufactured to the Pole Manufacturer Specification, for bending movements, axial force, shear force, torsion force, anchor bolt diameter and bolt circle. Concrete foundations shall conform to the MHD Standard Specifications Section 901, for 4000 psi, 3/4 in. aggregate concrete.

Pre-Cast Electric Handhole
Precast unit and heavy duty frame and cover shall be capable of withstanding an AASHTO H20 vehicle load.

Conduit
Schedule 80 PVC

Conductors
The cable type shall be-USE-RHH-RHW-XLP with a voltage rating as recommended by the cable manufacturer. The cable shall be copper stranded with an insulation thickness of approximately 60 mils. The insulation shall be equal to cross-linked polyethylene. Use color-coding tape such as 3M Scotch 35. Furnish and install #6 Bare Copper ground wire, which runs from the Control Center to and/or through the handholes, to the luminaire.

The conductor insulation shall be cross linked polyethylene and the rating shall be 90 degree C wet or dry. Color coding shall be black for Phase A and red or blue for Phase B. Conductors No. 8 AWG and smaller shall be fully color coded by the manufacturer with larger conductors color coded per the NEC. Conductors shall be No. 10 AWG minimum and sized as indicated on the Drawings and as specified in this specification section. Conductors connecting from the electric handholes up the pole to the luminaire shall be No. 10 AWG.

EXECUTION

INSTALLATION

A. Install concrete lightpole foundation as follows:

1. Excavation shall be made to the minimum depth necessary to install the light pole foundation.

2. The foundation shall be installed perfectly plumb and at the proper elevation as indicated on the Drawings.

3. Backfill shall be placed around the foundation and compact in accordance with the General Earthwork Requirements section of these Specifications. No large rocks or large pieces of concrete or organic material shall be included in the backfill material.

B. Install precast electrical handhole as follows:

1. Handholes shall have an approved expansion joint filter material between it and any abutting, bituminous cement and/or concrete and be installed on 6 inch of Gravel Borrow as shown on the Drawings. Gravel Borrow shall to Item 151-001.

2. The Contractor shall install a 3/4 inch 56T star insert in the handholes centered along the 24 inch wall and about 3 inch above the height of the conduit entrance. This insert will be used as the anchor point for a small rack to support the cable inside the handhole. This rack shall be constructed to keep the cable splices off the bottom of the handhole and out of the possible water table that might develop from the surrounding areas.

3. The Contractor shall furnish and install complete in place, 3/4 inch by 8 ft copper-clad ground rod or equal, connected to ground wire using an exothermic weld in the proposed handhole(s) as directed by the Engineer; a ground rod shall be installed in each proposed handhole throughout the entire system and as herein directed to complete a satisfactory grounded system. The ground rod installation shall measure 25 Ohms to earth maximum; supplemental ground rods shall be driven and bonded together to meet this requirement and requirements described in NEC Article 250. Likewise, all handhole covers shall be bonded to the grounding system to avoid electric shock if any individual accidental contact occurs; the bonding jumper shall be connected to allow removal of the cover by service personnel. All ground rod connections shall be exothermically welded. The Contractor shall submit to the Engineer prior to installation, a location layout for these proposed ground rod(s) for the Engineer's approval.

4. Excavate, backfill and compact in accordance with the General Earthwork Requirements included in these Specifications. Pre-cast concrete unit shall be placed in excavation from which all loose material has been removed. All conduits, ground rods or other items shall be rigidly in place for proper connections.

5. After installation of handholes, the remaining excavation shall be filled, compacted and graded. Grading, planting and/or patching shall be completed to match the surrounding area in its finished conditions.

D. Install conduit as follows:

1. Excavate and backfill in accordance with the General Earthwork Requirements included in these Specifications.

2, Conduit shall be mounted beneath grade, buried at least 24 inches

3. Backfill with Gravel Borrow, as specified in Item 151-001.

4. All conduit beneath a roadway shall be reinforced concrete encased and as indicated on the Drawings and in accordance with the MHD Standard Specification Section 901, 4000 psi, 3/4 in. aggregate.

5. Conduit shall be 1-inch minimum and sized as indicated on the Drawings. Conduit connecting from the Electric Handholes to the concrete pole base shall be 1-1/2 inch.

E. Install pole as follows:

1. Use web fabric slings (not chain or cable) to raise and set pole.

2. Mount pole to foundation with leveling nuts and flat-washers, and tighten top nuts (including flat-washers and locknuts) to torque level as specified by the pole manufacturer.

3. Secure pole level, plumb, and square.

4. Align bolts according to template furnished by pole manufacturer, and align pole to roadway.

5. Install pole and mounting arm in accordance with the manufacturer's installation requirements.

E. Install each luminaire as follows:

1. Install each luminaire so that it is plumb, level, and square.

2. Install each fixture on pole to be level with finished surface.

3. Install lamps in each fixture.

4. Make grounding in accordance with NEC and Contract Drawings.

5. Install label on pole indicating lighting fixture power supply (e.g.: 120 V, 60 Hz, single phase.)

F. Install conductors as follows:

1. All cable splices must be insulated properly against moisture. Method of Water Proof Splices shall be approved by the Engineer.

2. The new electrical wiring shall be tested for continuity, grounds, resistance to ground, insulation resistance, shorts and opens. This shall be done by means of a 1000-volt Megohm - Meter Test.

3. After installation of the new wiring system, complete with required splices, but prior to the final connection to the new load center, the lamp ballast primary shall be disconnected and each circuit shall be tested with a 1000-volt megger. Test on each circuit shall be between each phase conductor where required. When the insulation resistance is less than 100 megohms between an insulated conductor and an uninsulated conductor, or less than 200 megohms between two insulated conductors, the Contractor shall locate the point or points at fault and eliminate.

4. The tests shall be performed in the presence of the Engineer.

5. The test results shall be submitted to the Engineer for further review and acceptance. If any results are questionable or inconsistent, the Contractor shall repeat the tests and make any necessary corrections at the request of the Engineer. No wiring system will be accepted until these tests are satisfactorily performed and approved.

6. The Contractor shall furnish repairs or replacements, which are indicated by this test to produce a fault-free system. All of this work will be performed at the Contractor's expense.

7. The dielectric strength of all splices shall be at least equal to that of the cable insulation.

8. All conductor connections/splices shall be UL Listed for wet locations and installed in accordance with the NEC.

GROUNDING

A. The entire lighting system must be properly grounded in keeping with all applicable local codes and regulations. The grounding consists of connecting all of the non-current carrying metal parts of the system to the ground rods control centers and to the ground rods located in the handholes included non-current carrying metal parts is the metal cabinets and lighting standards. Complete electrical continuity must be obtained from the Control Cabinet ground to the ground point inside the lighting standard. It is noted that all conduits used in this lighting project are of ground wire system from each of the control centers to each street light standard.

B. Ground metal poles/support structures.

1. "Grounding and Bonding."

a. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

b. Provide a sufficient length of grounding conductor to extend a minimum of 12 inches outside the hand hole.

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL486A and UL486B.

D. The poles shall be grounded in a manner to protect the structure and support from stray currents.

CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Use Loctite-RTV in all fasteners before installation.

FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 820-700

MEASUREMENT
The work of Item 820-700 will be measured as a lump sum.

PAYMENT
Payment shall be made for work under this Item at the contract lump sum price, which shall include all labor, materials, transportation, equipment, removal, excavation, coordination with Eversource, backfill, compaction, disposal, complete in place, and all other work necessary to complete the specified work to the satisfaction of the Engineer

Pay Item		Pay Unit
ITEM NO. 820-700	**ROADWAY LIGHTING MODIFICATIONS**	**LUMP SUM**

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ITEM NO. 824-001 RECTANGULAR RAPIDLY FLASHING BEACON SYSTEM LUMP SUM

GENERAL

Furnish and install RECTANGULAR RAPID FLASHING BEACON (RRFB) SYSTEM as indicated on the Drawings and as specified herein.

The work shall conform to the requirements of Section 8245 of the MHD Standard Specifications, except as modified herein.

MATERIALS

The RRFB system shall be compliant with the MUTCD Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons. The RRFB system shall include two RRFB units and corresponding W6-1 (Pedestrian) crossing warning sign with a diagonal downward arrow (W16-7P) plaque mounted on standard poles/pedestal bases to be installed to either side of a crosswalk. At each pole, LED displays shall be provided for each direction of travel.

EXECUTION

Installation of RRFB system and signage shall follow manufacturer's recommendations for proprietary products and shall meet applicable requirements of the Standard Specifications for the various non-proprietary components of the work.

The system shall be designed to operate from a 120VAC power source and shall include an electric meter socket and a circuit breaker of appropriate rating.

The system shall be designed to operate over a temperature range from -30F to + 165F. Wiring diagrams and manuals shall be supplied for all equipment installed as part of the System. Documentation shall involve instructions for set up and troubleshooting of all components in the system.

The RRFB system shall include a warrantee by its supplier for two (2) years from the date of installation.

The system shall utilize a pushbutton for activation at each pole. A sign shall be located at each pushbutton with the legend "Push Button to turn on Warning Lights". The system shall include ADA compliant pushbuttons and include logic to allow use of APS pushbuttons. If an APS system is utilized a verbal message "Flashing yellow lights are on" shall be repeated for the duration of flashing.

Beacon Dimensions and Placement in Sign Assembly:

a. Each RRFB shall consist of two rectangular-shaped yellow indications, each with an LED-array based light source. Each RRFB indication shall be a minimum of approximately 5 inches wide by approximately 2 inches high.

b. The two RRFB indications shall be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of approximately seven inches (7 in), measured from inside edge of one indication to inside edge of the other indication.

c. The outside edges of the RRFB indications, including any housings, shall not project beyond the outside edges of the W6-1 sign.

d. A small LED light integral to the pushbutton or RRFB directed at and visible to pedestrians shall be provided to give confirmation that the RRFB is in operation.

Beacon Flashing Requirements:

a. When activated, the two yellow indications in each RRFB shall flash in a rapidly alternating "wig-wag" flashing sequence (left light on, then right light on).

b. Each of the two yellow indications of an RRFB shall have 70 to 80 periods of flashing per minute and shall have alternating but approximately equal periods of rapid pulsing light emissions and dark operation. During each of its 70 to 80 flashing periods per minute, one of the yellow indications shall emit two rapid pulses of light and the other yellow indication shall emit three rapid pulses of light.

c. The flash rate of each individual yellow indication, as applied over the full on-off sequence of a flashing period of the indication, shall not be between 5 and 30 flashes per second, to avoid frequencies that might cause seizures.

d. The light intensity of the yellow indications shall meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January 2005.

Beacon Operation:

a. The RRFB shall be normally dark, shall initiate operation only upon pedestrian actuation, and shall cease operation at a predetermined time after the pedestrian actuation.

b. All RRFBs associated with a given crosswalk shall, when activated, simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously.

c. Duration of flashing after activation shall be based on pedestrian clearance time required by the MUTCD (18 SECONDS). This time setting shall be adjustable by the user.

RRFB system (Two RRFB units and corresponding W6-1 and W16-7P plaque mounted on standard poles/pedestal bases installed on either side of a crosswalk) shall be operational after mid-block crosswalk on Somerville Avenue has been installed.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 824-001

MEASUREMENT
The work of Item 824-001 will be measured as a lump sum for each completed and accepted installation.

PAYMENT
The lump sum price bid for this item shall be full compensation for all labor, materials and equipment necessary or incidental to the installation of the complete RECTANGULAR RAPID FLASHING BEACON SYSTEM.

No separate payment will be made for excavation, backfill, concrete, temporary installations, conduit, electrical connections, restoration of damaged facilities or other incidental work but all costs in connection therewith shall be included in the Lump Sum price bid.

Pay Item		Pay Unit
ITEM NO. 824-001	**RECTANGULAR RAPIDLY FLASHING BEACON SYSTEM**	**LUMP SUM**

(Remainder of page is intentionally blank)

ITEM NO. 828-001 PERMANENT TRAFFIC SIGNAGE SQUARE FEET

GENERAL

Provide permanent traffic signage as indicated on the Drawings and as specified herein. The work includes warning signs, parking regulatory signs, other regulatory signs, street name signs, destination signs and other signs as indicated on the Drawings.

In general, the work of this Item shall conform to Section 828 of the MHD Standard Specifications and the MUTCD, except as otherwise indicted on the Drawings or specified herein.

MATERIALS

Permanent Traffic Signs: aluminum panels in accordance with subsections 828.42 and 828.50 through 828.53 of the MHD Standard Specifications and the following:

1. Sign panels shall be fabricated from flat sheet aluminum sheeting, ASTM B209, Alloy 6061-T6 not less than 0.080 inches thick.

2. The sign background shall be reflective sheeting conforming to Federal specification - L-S-300A. The reflective sheeting shall include a precoated pressure sensitive adhesive or a tack free heat activated adhesive either of which shall be applied exactly as specified by the sheeting manufacturer to recommended, properly prepared flat surfaces without necessity of additional adhesive coats on the reflective sheeting or application surface. The reflective sheeting and its application shall conform to the requirements of the MHD Specifications, material specification M9.30.1 Reflective Sheeting. The sign lettering shall be as noted on Drawings.

3. Unless otherwise noted typefaces shall be Helvetica medium and shall be industry standard normal letter spacing.

4. Typefaces and letter spacing shall be approved by the Engineer before final manufacture.

5. Application of all lettering, arrows, and other artwork shall be by photographic silk screen. No modification of typefaces or layout rules and the arrow/circle will be permitted without approval by the Engineer.

Sign posts shall be in conformance with Massachusetts Highway Department Standard Drawings for Sign and Supports, Type P-5 Channel Post. Post for street name sign shall be galvanized steel pipe with a nominal 2-3/8 inches outer diameter and a weight of at least 3.65 pounds per linear foot.

EXECUTION

REMOVAL OF EXISTING TRAFFIC SIGNS:

Refer to Items 874-200 and 874-300.

ERECTION OF PERMANENT TRAFFIC SIGNS:

As adjacent construction is completed, install new traffic signs. Install parking regulatory signs before parking is permitted in areas where new curbing and sidewalk is installed.

Furnish and install shims, tabs, clips, screws, nuts, bolts, spacer sleeves, brackets, supports and all necessary items to make the complete installation.

Install sign posts in concrete to a depth of three feet below finished grade.

Where indicated, erect sign on street light pole. Otherwise, all signs shall be installed on sign posts. The exact location of all signs will be determined by the Engineer. Prior to installation, the Contractor shall provide a field layout using stakes, paint, chalk, and/or other marking to indicate the location of each sign post.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 828-001**

Measurement for PERMANENT TRAFFIC SIGNS shall be by the square foot of signs installed in place.

Payment for PERMANENT TRAFFIC SIGNS shall be by the Contract Unit Price per square foot, complete in place including new support posts and assemblies, and other appurtenant work.

Removal of existing traffic signage is included in Items 874-200 and 874-300.

Pay Item		Pay Unit
ITEM NO. 828-001	**PERMANENT TRAFFIC SIGNAGE**	**SQUARE FEET**

(Remainder of page is intentionally blank)

ITEM NO. 850-001 TRAFFIC CONTROL SERVICES ALLOWANCE

GENERAL

A. The Contractor shall contact the City of Somerville Police Department to have its officers protect traffic and pedestrians on roadway and walkways that will be interfered with by the Contractor's operation. Where traffic is maintained, the work shall be so conducted and guarded that there shall exist, at all times, a safe passageway for all.

B. Only law enforcement officers shall be employed on highways under the care and control or jurisdiction of the City.

C. Only law enforcement officers shall be employed on highways under the care and control or jurisdiction of the MassDOT.

D. Law enforcement officers shall be employed by the Contractor on a temporary basis, and be considered employees of the Contractor for payment purposes only.

BASIS OF PAYMENT ITEM NO. 850-001

A. The Contractor shall include in its bid allowance of the amounts set forth in the bid proposal section for each item for furnishing Traffic Control Services. Payments to be made under this item shall only be for amounts actually paid by the Contractor to provide satisfactory Traffic Control Services as stipulated herein. No allowance for overhead shall be included, it having been considered to be included for payment in prices stipulated for all other numbered items in the Proposal.

B. The Contractor shall submit, with each request for payment under this item, a certified statement listing names, dates, rate of pays, hours of service rendered, and total amount paid to each Police Officer.

Pay Item		Pay Unit
ITEM NO. 850-001	TRAFFIC CONTROL SERVICES	ALLOWANCE

ITEM NO. 850-002 TRAFFIC MANAGEMENT DURING CONSTRUCTION LUMP SUM

GENERAL

Work under this Item shall include preparing and implementing traffic control plans and devices and also providing, placing, erecting, maintaining, and removing all necessary barricades, barriers, fences, and signage to prevent injury to persons or damage to property.

Work shall include providing, installing, maintaining and removing (when work is completed) of temporary traffic control devices for the purpose of maintaining vehicular traffic, protecting that traffic from construction operations, and for providing safe and ADA-accessible pedestrian pathways that provide continuous access along at least one sidewalk for the entire length of each street within the Project area.

The Contractor shall provide safe warning and demarcation of the Contractor staging areas.

Traffic control devices shall include concrete barriers, barrier fencing (chain link), other barricades, temporary signage, temporary pavement markings, and other devices. These devices shall conform to the applicable requirements of the Standard Specifications (Massachusetts DOT Highway Division) and the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD), latest edition.

The Contractor is responsible for the installation of adequate safety precautions for the protection of the traveling and walking public, on streets within the Project Area, and the Contractor's personnel. All materials provided by the Contractor under this Item shall remain the property of the Contractor upon completion of the project.

Comply with the requirements of Section 01015 with regard to the maintenance of traffic operations and the sequence of the switchover to two-way operations on Webster Avenue and Prospect Street.

MATERIALS

A. All barriers, barrier fences, traffic signs, and other traffic devices shall conform to the Manual of Uniform Traffic Control Devices and the following:

   1. Barriers shall be precast concrete, double faced and moveable, in accordance with Massachusetts Department of Transportation Highway Division (MHD) standards.

   2. Barrier fence used in the street shall be 8-foot high chain link fence in 10-foot sections, with end posts on each section. The posts shall not be core-drilled into the pavement, but shall be supported on concrete blocks or base plates for easy removal and relocation as work proceeds and if directed by the Engineer. The fabric shall be no tighter than a 3-inch mesh. Tighter meshes that restrict sight distance will not be permitted.

B. Materials for signs shall conform to the MHD Standard Specifications, Sections 828 and 840 except the plywood material shall conform to the following:

   1. Plywood sign panels and independent route markers shall be fabricated from 5 ply 5/8-inch thick Medium Density Overlaid (MDO) Exterior Type, A-B both sides surface in natural color and the whole conforming with the requirements and tests for the above as set forth in U.S. Product Standards PSI-74 for Construction and Industrial Plywood. AR plywood shall

bear the grade trademark of an approved testing agency. The entire sign face shall be reflectorized sheeting conforming to M9.30.0, Type III, High Performance, of the MHD Standard Specifications.

C. Sign posts shall be in conformance with Massachusetts Highway Department Standard Drawings for Sign and Supports, Type P-5 Channel Post.

D. Reflectorized Drums: Reflectorized drums with warning lights shall be non-metallic conforming to MHD Standard Specifications material subsection M9.30.9. Newly developed products providing equivalent target value and stability that are acceptable to the Engineer may be used.

1. Warning lights shall conform to MUTCD Subsection 6D-5 for Type A or Type C.

E. Pavement marking material shall be an acrylic type, low VOC, fast drying white traffic paint (M7.01.23) conforming to MHD Standard Specifications, Section M7, Subsection M7.01.

F. All other materials as part of this section shall be as specified in the MHD Standard Specifications, Section 850-Materials.

G. Materials required under this section need not be new but must be physically capable of performing their intended function. Any materials that, in appearance or performance are not in such condition, shall be removed and immediately replaced.

EXECUTION

GENERAL

Install traffic control devices prior to the start of construction activities.

Provide at least 72 hours notice of lane closures (for staging area and if necessary for other construction logistics) to:

1. City.
2. Police Department
3. Fire Department
4. EMS
5. MBTA Bus Operations

Traffic devices shall be installed in accordance with the Drawings, the MHD Standard Specifications, MUTCD and as directed by the Engineer.

All traffic control devices shall be maintained in good conditions. Damaged traffic control devices shall be removed and replaced at no additional cost to the City.

All personnel who are working within travel or parking lanes, unless protected by concrete barriers or fencing, shall wear Department-approved safety vests. The Contractor shall furnish such vests and maintain a sufficient supply of such at the work site for the Contractor's use and for Department personnel assigned to the project, as well as for those visiting the worksite.

TRAFFIC MANAGEMENT PLAN

Comply with the traffic management plan shown on the Drawings and the following:

A. Maintain existing traffic patterns on all streets unless otherwise specified.

B. The switchover of traffic on Webster Avenue and Prospect Street from one-way to two-way operations must be in accordance with the sequence of operations specified in Section 01015.

C. **The Contractor shall submit traffic management plans for all work in the street that is not covered by traffic management plans included in the Drawings. Traffic management plans must be approved by the City Traffic Engineer before they are implemented.**

RESTORATION:

A. The Contractor shall remove all traffic control devices, signage, pavement markings, and other measures when no longer required or needed. The Contractor shall repair any damage caused by such measures being implemented, at no additional cost to the City.

B. Restoration of Pavement Markings:

1. After removal of all traffic control devices, restore crosswalks by repainting, using traffic paint as specified in the MassDOT Standard Specifications.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 850-002**

All work under this Item shall be paid for as a lump sum. The lump sum price shall constitute full payment for all material, labor and equipment required or incidental to the satisfactory completion of the work as described above.

Pay Item		Pay Unit
ITEM NO. 850-002	**TRAFFIC MANAGEMENT DURING CONSTRUCTION**	**LUMP SUM**

(Remainder of page is intentionally blank)

ITEM NO. 852-100 TEMPORARY CONSTRUCTION SIGNS SQUARE FEET

GENERAL

Work under this Item includes providing, installing, maintaining, and removal of temporary construction signs for the protection of the traveling public and working personnel during construction and maintenance operations.

MATERIALS

Materials for signs shall conform to the MHD (Massachusetts Transportation Department, Highway Division) Standard Specifications, Sections 828 and 840 except the plywood material shall conform to the following:

1. Plywood sign panels and independent route markers shall be fabricated from 5 ply 5/8-inch thick Medium Density Overlaid (MDO) Exterior Type, A-B both sides surface in natural color and the whole conforming with the requirements and tests for the above as set forth in U.S. Product Standards PSI-74 for Construction and Industrial Plywood. AR plywood shall bear the grade trademark of an approved testing agency. The entire sign face shall be reflectorized sheeting conforming to M9.30.0, Type III, High Performance, of the MHD Standard Specifications.

2. Interim traffic signage, such as warning and regulatory signs, shall conform to the Drawings and to the Manual of Uniform Traffic Control Devices.

Sign posts for use in lawns and planted areas (or areas where the sidewalk or pavement will be reconstructed under this Project) shall be in conformance with MHD Standard Drawings for Sign and Supports, Type P-5 Channel Post.

Sign posts for use on existing sidewalks that will not be reconstructed by this project shall be metal or wood posts with a base sufficient to make the post stable

EXECUTION

Install temporary signage as indicated on the Drawings and in accordance with the Contractor's approved Traffic Management Plan. The exact location of each sign shall be subject to approval by the Engineer in the field.

Where possible, install temporary signs on existing sign posts, light poles, temporary barriers or barricades. Avoid the installation of new posts in existing concrete sidewalks, unless specifically directed by the Engineer.

Warning signs for motor vehicles shall be mounted at least 6 feet above pavement grade, with 8-foot mounting height preferred. Pedestrian warning signs shall be mounted 3 to 5 feet above grade, so that they are in the line of sight of pedestrians.

Signs that are missing or damaged shall be replaced by the Contractor at no additional cost to the City.

All signs shall be maintained so that they are readable. The Contractor shall clean the signs and remove dirt and soot that accumulates on the face of the sign.

All signs not consistent with the current traffic configuration shall be removed or covered.

REMOVAL:
The Contractor shall remove all temporary construction signage (signs and posts) when no longer required or needed. The Contractor shall repair any damage caused by such measures being implemented, at no additional cost to the City.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 850-100**
Measurement for TEMPORARY CONSTRUCTION SIGNS shall be by the square foot of signs installed in place. Regardless of the number of times a sign is used on the Project, it will be measured for payment only once.

Payment for TEMPORARY CONSTRUCTION SIGNS shall be by the Contract Unit Price per square foot.

Pay Item		Pay Unit
ITEM NO. 850-100	**TEMPORARY CONSTRUCTION SIGNS**	**SQUARE FEET**

(Remainder of page is intentionally blank)

ITEM NO 854-026 TEMPORARY PAVEMENT MARKINGS – 4-INCH PAINT LINEAR FOOT

ITEM NO 854-120 PAVEMENT MARKING REMOVAL LINEAR FOOT

GENERAL

The work of Item 854-026 includes the installation of temporary painted pavement marking, in accordance with the Traffic Management Plan and as directed by the Engineer. Temporary Pavement markings consist of furnishing, applying, maintaining and removing temporary white and yellow reflectorized and black non-reflectorized pavement markings during trucking operations at the Saugus site.

The work of Item 854-120 includes the removal of existing pavement markings (painted or thermoplastic).

The work of these Items shall conform to Section 850 of the MHD Standard Specifications as modified herein.

MATERIALS

Temporary pavement markings shall conform to Section 850.44 of the Standard Specifications.

EXECUTION

Temporary Pavement Markings:

The Contractor shall provide temporary pavement markings as indicated on the Traffic Management Drawings.

Temporary pavement markers shall be supplemented with tape or painted markings to assure lane delineation.

As the expected reflectivity of the temporary pavement markings, the Contractor shall re-apply the markings every 3 months.

Pavement Marking Removal:

Pavement marking removal shall not cause damage to the pavement or cause drastic change in texture, which could be construed as delineation at night, and shall he approved by the Engineer and MassDOT.

Pavement markings shall be removed to the fullest extent possible by an approved method. Any damage to the pavement or surfacing caused by pavement marking removal shall be repaired by the Contractor at no cost to the City by methods acceptable to the Engineer and MassDOT. MassDOT-approved methods include but are not limited to:

1. Sand blasting using air or water
2. High pressure water
3. Steam or superheated water
4. Mechanical devices such as grinders, sanders, scrapers, scarifiers and wire brushes.

Painting over a pavement marking line by use of asphaltic liquids or paints will not be permitted.

Pavement markings shall be removed before any change is made in the traffic pattern.

Material deposited on the pavement as a result of removing markings shall be removed as the work progresses. Accumulations of sand or other material which might interfere with drainage or could constitute a hazard to traffic will not be permitted.

Where blast cleaning is used for the removal of pavement markings and such removal operation is being performed within 10 feet of a lane occupied by traffic, the residue including dust shall be removed immediately alter contact between the sand and the surface being treated- Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation. or by other methods approved by the Engineer.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 854-026**
ITEM NO. 854-120

MEASUREMENT
Temporary pavement markings shall be measured by the linear foot of marking installed complete in place, as measured by the Engineer.

Pavement marking removal shall be measured by the linear foot of pavement marking actually removed, as measured by the Engineer.

PAYMENT
Payment for Temporary Pavement Markings will be paid for at the Contract unit price per linear foot. Such payment shall include full compensation for furnishing, installing, maintaining and removing the markings.

Payment marking removal will be paid for at the Contract unit price per linear foot. Such payment shall include full compensation for the markings.

Pay Item		Pay Unit
ITEM NO 854-026	**TEMPORARY PAVEMENT MARKINGS – 4-INCH PAINT**	**LINEAR FOOT**
ITEM NO 854-120	**PAVEMENT MARKING REMOVAL**	**LINEAR FOOT**

ITEM 856-105 PORTABLE CHANGEABLE MESSAGE SIGNS DAY

GENERAL
Provide two (2) portable changeable message signs for traffic control during construction.

MATERIALS
The Portable Changeable Message Signs shall be temporary traffic control devices with the flexibility to display a variety of messages while meeting the requirements of the latest Manual of Uniform Traffic Control Devices (MUTCD), Section 6F-55. When it is in operating mode, minimum mounting height shall be 7 feet above the roadway to the bottom of the panel, except on vehicle mounted panels which should be mounted as high as possible.

EXECUTION
Locate signs as directed by the Engineer. Signs shall be placed and angled so as to be easily readable by the passing traffic. Signs shall be placed so as not to be a hazard to either motor vehicle traffic or pedestrian traffic. Signs shall not block driveways or sidewalks. Signs shall be on City property.

Relocate signs as construction progresses, when and as directed by the Engineer.

MESSAGE PROGRAMMING
The Contractor shall program, operate and maintain the message on the signs and update such message on a weekly basis. Each message displayed shall have prior approved by the Engineer. All messages shall be related to traffic control during construction. No other messages shall be displayed, unless directed by the Engineer.

REMOVAL
After completion of the project, the Contractor shall remove the remove the signs from the Project area.

The Contractor shall repair any damage done be placement of the sings, including, but not limited to, rutting of lawns, cracking of sidewalks, and any other damage to public or private property. All repairs shall be performed to the satisfaction of the Engineer, at no additional cost to the City.

METHOD OF MEASUREMENT AND PAYMENT ITEM NO. 856-105

MEASUREMENT
Provision of PORTABLE CHANGEABLE MESSAGE SIGN will be measured per day a sign is provided and operational and in use at the project site.

PAYMENT
Payment for PORTABLE CHANGEABLE MESSAGE SIGN will be at the Unit Price per each day the sign is operational and in use at the project site. Payment shall include all labor, materials, equipment and supervision for the provision of the sign, maintaining the sign for the duration of the Contract, programming the sign message on the average of once per week, providing power for the sign, and repairing any damage to the sign over the duration of the Contract. Payment shall also include the removal of the sign from the Project site upon completion of construction.

Pay Item		Pay Unit
ITEM NO. 856-105	PORTABLE CHANGEABLE MESSAGE SIGN	DAY

ITEM NO. 860-001	**4-INCH WHITE PAVEMENT MARKINGS**	**LINEAR FEET**
ITEM NO. 860-002	**4-INCH YELLOW PAVEMENT MARKINGS**	**LINEAR FEET**
ITEM NO. 860-004	**12-INCH WHITE STOP LINES**	**SQUARE FEET**
ITEM NO. 860-005	**CROSSWALK STRIPING**	**SQUARE FEET**
ITEM NO. 860-006	**PAVEMENT ARROWS AND LEGENDS**	**SQUARE FEET**
ITEM NO. 860-900	**GREEN BIKE LANE PAINT**	**SQUARE FEET**

GENERAL:

Furnish and apply permanent reflectorized pavement markings as indicated on the Drawings and in accordance with the MUTCD. Furnish and apply green bike lane paint as indicated on the Drawings and as specified herein.

MATERIAL

Permanent pavement marking material shall be white thermoplastic reflectorized pavement markings (M7.01.03) and yellow thermoplastic reflectorized pavement markings (M7.01.04) conforming to MHD Standard Specifications, Section M7, Subsection M 7.01.

Green bike lane paint shall be a highly specialized coasting systems specifically designed for application to asphalt pavement to delineate bicycle lanes. For product specification, see Attachment C to the Technical Specifications.

SAMPLE AND SHOP DRAWINGS

Submit manufacturer's product data/catalog cuts for interim pavement marking material and permanent pavement marking material.

Submit manufacturer's application instructions for interim pavement marking material and permanent pavement marking material.

Submit shop drawings for layout of signs (other than standard MUTCD signs).

MATERIALS:

A. Pavement Marking Materials:

1. Materials shall be in accordance with the Commonwealth of Massachusetts, Massachusetts Highway Department, Standard Specifications for Highways and Bridges (MHD Standard Specifications).

2. Interim Pavement Marking Material

   a. Interim pavement parking material shall be an acrylic type, low VOC, fast drying white traffic paint (M7.01.03) conforming to MHD Standard Specifications, Section M7, Subsection M7.01.

3. Permanent Pavement Marking Material

   a. Permanent pavement marking material shall be white thermoplastic reflectorized pavement markings (M7.01.03) and yellow thermoplastic reflectorized pavement markings (M7.01.04) conforming to MHD Standard Specifications, Section M7, Subsection M 7.01.

EXECUTION

A. PREPARATION:

1. Clean pavement prior to application of pavement markings so that pavement is dry and free of sand, grease, oil and other foreign substances.

B. INSTALLATION:

1. Pavement Markings:

   a. Install pavement marking in accordance with the MUTCD. The location and layout of pedestrian crosswalks and stop bars shall be approved by the Engineer. The Contractor shall provide a spray-painted layout of all pavement markings for approval by the Engineer.

   b. Application of Pavement Markings: Apply pavement marking in accordance with Section 860 of the MHD Specifications.

2. Bike lane paint: apply per the manufacturer's printed application procedures. See Attachment C to the Technical Specifications.

METHOD OF MEASUREMENT AND PAYMENT

ITEM NO. 860-001
ITEM NO. 860-002
ITEM NO. 860-004
ITEM NO. 860-005
ITEM NO. 860-006
ITEM NO. 860-900

Measurement for pavement markings will be by the linear foot or square foot of marking installed complete in place, as measured by the Engineer.

Payment will be at the Contract Unit Price per linear foot or square foot. The unit price shall be full compensation for all labor, equipment, materials and supervision necessary.

Pay Item		Pay Unit
ITEM NO. 860-001	**4-INCH WHITE PAVEMENT MARKINGS**	**LINEAR FEET**
ITEM NO. 860-002	**4-INCH YELLOW PAVEMENT MARKINGS**	**LINEAR FEET**
ITEM NO. 860-004	**12-INCH WHITE STOP LINES**	**SQUARE FEET**
ITEM NO. 860-005	**CROSSWALK STRIPING**	**SQUARE FEET**
ITEM NO. 860-006	**PAVEMENT ARROWS AND LEGENDS**	**SQUARE FEET**
ITEM NO. 860-900	**GREEN BIKE LANE PAINT**	**SQUARE FEET**

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ITEM NO. 874-200 TRAFFIC SIGN REMOVED AND RESET EACH
ITEM NO. 874-300 TRAFFIC SIGN REMOVED AND DISCARDED EACH

GENERAL:

Where indicated on the Plans or as directed, remove existing traffic signage and reset or discard.

EXECUTION

Where indicated for removal, completely remove existing signage including existing sign posts. Where signs are attached to utility poles, remove sign and all attachment brackets and hardware.

Unless otherwise indicated on the Plans, fill hole resulting from pole removal. Restore surface with same material as surrounding.

Reset sign and sign post in conformance with the applicable requirements of Item 828-001.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 874-200**
ITEM NO. 874-300

Traffic signs removed and reset or discarded will be measured per each sign.

Payment for traffic signs removed and reset or discarded will be by the Contract Unit Price per each and shall include all labor, materials, and equipment for the removal of the sign, support brackets and hardware, and sign post and for either the resetting or discarding of removed materials. Payment shall also include the cost of new support brackets and attachment hardware for the resetting of signs.

Pay Item		Pay Unit
ITEM NO. 874-200	TRAFFIC SIGN REMOVED AND RESET	EACH
ITEM NO. 874-300	TRAFFIC SIGN REMOVED AND DISCARDED	EACH

(Remainder of page is intentionally blank)

ITEM NO. 875-001 PARKING METER REMOVED AND RESET EACH
ITEM NO. 875-002 PARKING METER REMOVED AND STACKED EACH

GENERAL:

Where indicated on the Plans or as directed, remove existing parking meters with posts and reset or stack.

EXECUTION

Prior to removing a parking meter, provide at least 72 hours notice to the City Traffic Engineer. Place "NO PARKING" signage as directed by the Engineer.

Where indicated for removal, completely remove existing parking meter including head and post. In concrete sidewalks, neatly saw cut around the post.

Parking meter heads shall be delivered to the City Traffic Engineer.

Where parking meters are to be relocated, the exact location will be marked in the field by the City Traffic Engineer. Core drill existing concrete sidewalk to install post. Where new sidewalk is indicated on the Drawings, install posts before installing sidewalk.

Obtain meter heads from the City Traffic Engineer and install on posts as directed by the Engineer.

Unless otherwise indicated on the Plans, fill hole resulting from post removal. Restore surface with same material as surrounding, in conformance with the applicable provisions of Item 701-001 for concrete sidewalks and Item 702-001 for HOT MIX ASPHALT sidewalks.

METHOD OF MEASUREMENT AND PAYMENT **ITEM NO. 875-001**
ITEM NO. 875-002

Parking meters removed and reset or stacked will be measured per each meter post.

Payment for parking meters removed and reset or stacked will be by the Contract Unit Price per each and shall include all labor, materials, and equipment for the removal of the post and head and for either the resetting or stacking removed materials.

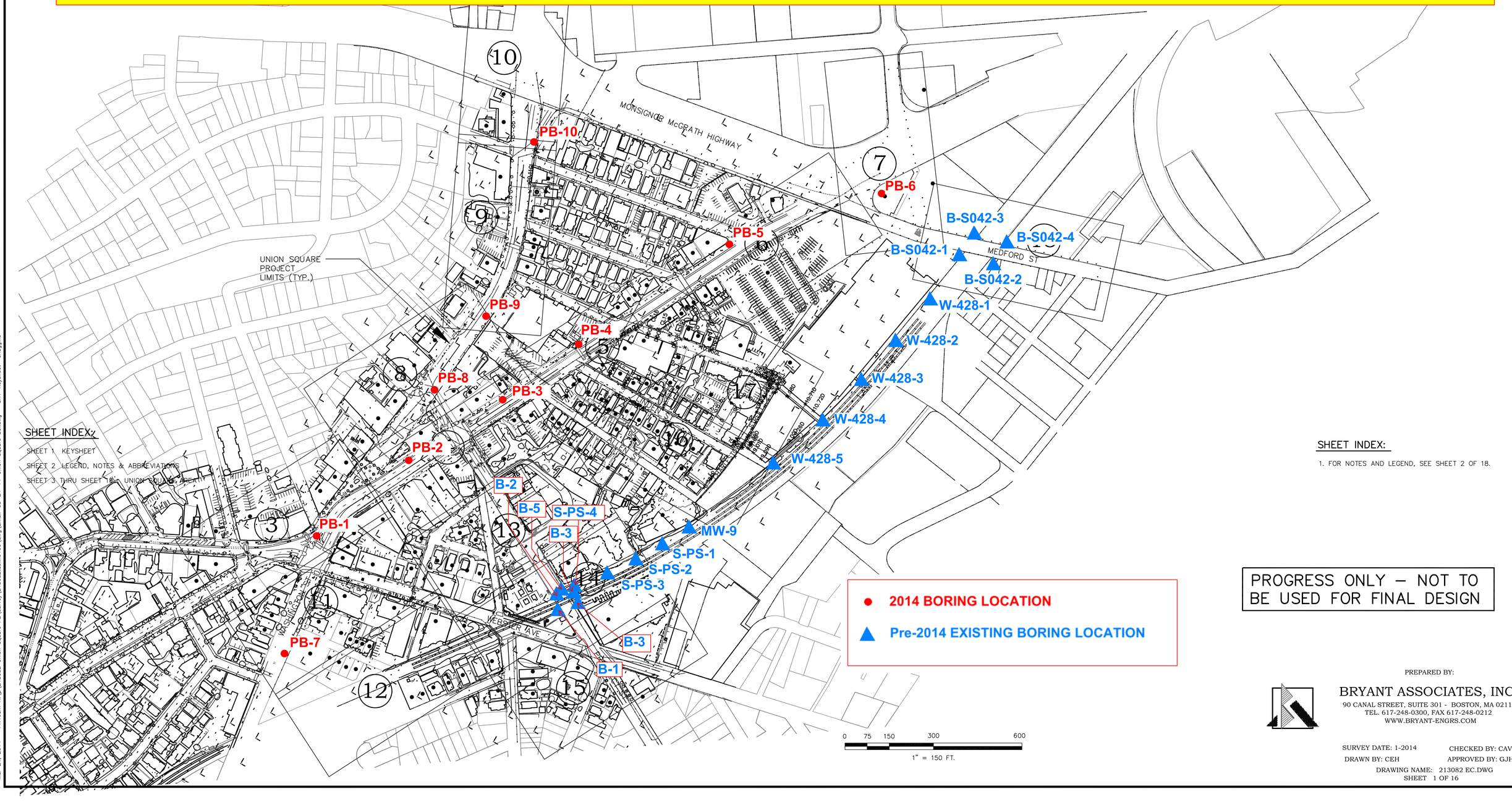
Pay Item		Pay Unit
ITEM NO. 875-001	PARKING METER REMOVED AND RESET	EACH
ITEM NO. 875-002	PARKING METER REMOVED AND STACKED	EACH

ATTACHMENT A – GEOTECHNICAL INFORMATION

EXISTING CONDITIONS PLAN
OF LAND IN
SOMERVILLE, MASSACHUSETTS
PREPARED FOR: THE CITY OF SOMERVILLE

Mark up of Existing Conditions Plan to Show the As-Drilled Location of Sample Borings obtained in 2014 and Those Known to Exist Pre-2014

MASSACHUSETTS STATE PLANE
NAD 1983 (1998)
COORDINATE SYSTEM



SHEET INDEX:

SHEET 1 KEYSHEET

SHEET 2 LEGEND, NOTES & ABBREVIATIONS

SHEET 3 THRU SHEET 18 UNION SQUARE AREA

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

PROGRESS ONLY – NOT TO BE USED FOR FINAL DESIGN

PREPARED BY:

BRYANT ASSOCIATES, INC.
90 CANAL STREET, SUITE 301 - BOSTON, MA 02114
TEL. 617-248-0300, FAX 617-248-0212
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SURVEY DATE: 1-2014 CHECKED BY: CAV
DRAWN BY: CEH APPROVED BY: GJH
DRAWING NAME: 213082 EC.DWG
SHEET 1 OF 16

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BOW STREET

WARREN AVENUE

STONE AVENUE

WASHINGTON STREET

WEBSTER STREET

GOODYEAR
1 STORY BRICK

PARKING LOT

SCOM
THE GIRL FROM IPANEMA
DAVIDSON'S LAUNDRY
2 STORY BRICK

WAGNER JEWELERS
SOSM
2 STORY BRICK

UNION SQ.
VETERINARY
CLINIC
2 STORY BRICK

CITIZENS BANK
1 STORY BRICK

RELIABLE
MARKET
1 STORY BRICK

RELIABLE VIDEO
BRASIL INSURANCE
UNION SQ SMOKE SHOP
GRACE SALON
2 STORY BRICK/WOOD

MASTER SIGNS
EL POTRO
BRAZILIAN BUFFET
BARRISTERS HALL
4 STORY MASONRY/STUCCO

PIZZA & SUBS
BANK OF AMERICA ATM
1 STORY BRICK

PRECINCT BAR
3 STORY BRICK

G & T TAILORS
3 WOOD

ELEGANT
FURNITURE
3 STORY BRICK

CREATIVE UNION
LIFETIME TRANSFER
MACHU PICCHU
POLLOS A LA BRASA
RED HOUSE
INDIA PALACE
SHERMAN MARKET
SOMMERVILLE CLEANERS
SHERMAN CAFE
1 STORY BRICK/STUCCO/GRANITE

MID-NITE CONVENIENT
METRO PCS
WESTERN UNION
1 STORY WOOD/BRICK

BUK KYUNG KOREAN
RESTAURANT
ANGEL NAILS
MANDARIN CHINESE FOOD
1 STORY BRICK/METAL SIDING

BENCHMARK
MAGNETIC NAIL SET IN
BITUMINOUS CONCRETE
ELEVATION = 13.19

PB-1

● 2014 BORING LOCATION

▲ Pre-2014 EXISTING BORING LOCATION

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

EXISTING CONDITIONS
PLAN OF LAND
IN
SOMERVILLE, MASSACHUSETTS

PREPARED FOR
CITY OF SOMERVILLE

PREPARED BY:
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APRIL, 07 2014

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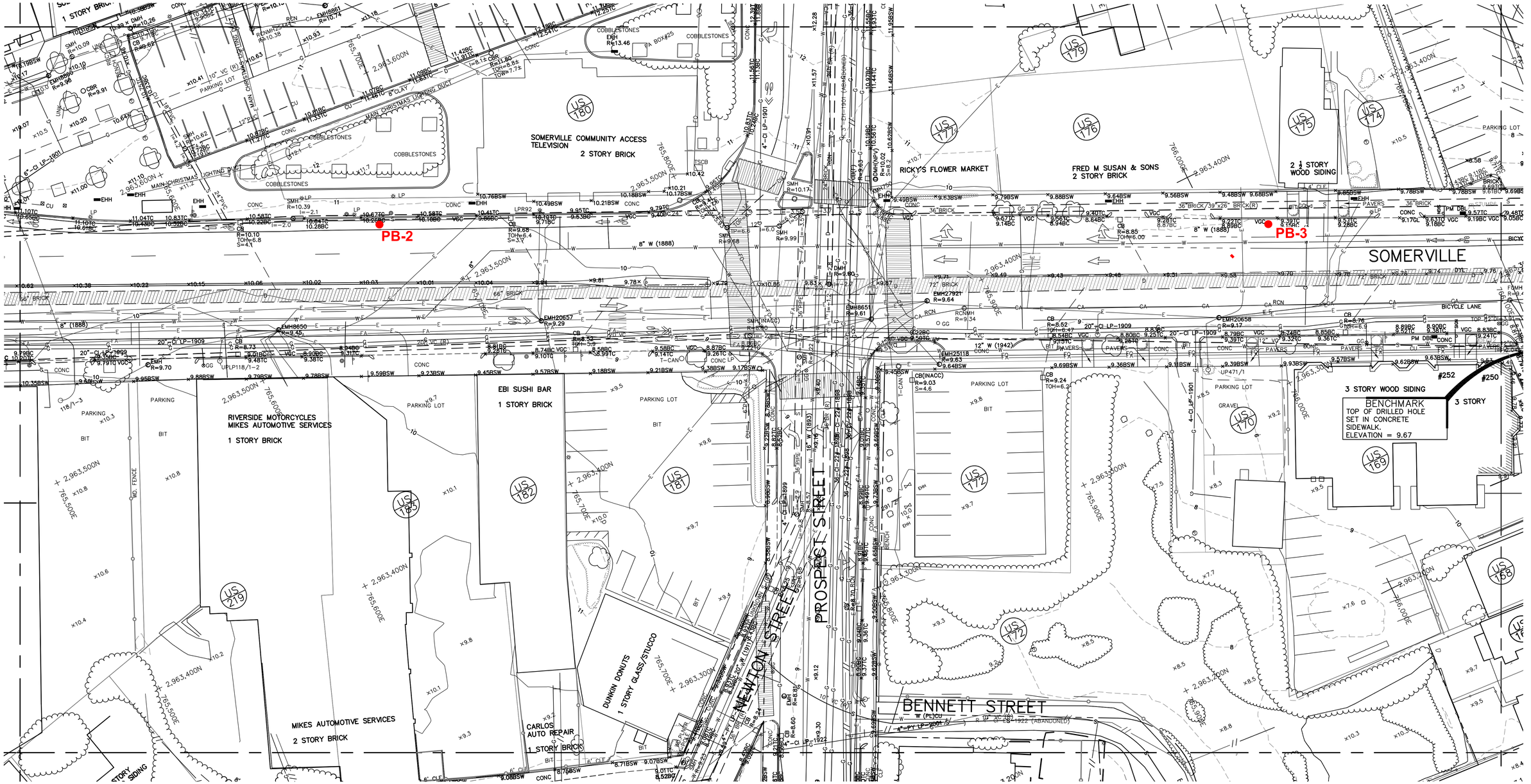

● 2014 BORING LOCATION

▲ Pre-2014 EXISTING BORING LOCATION

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

EXISTING CONDITIONS PLAN OF LAND IN SOMERVILLE, MASSACHUSETTS

PREPARED FOR

CITY OF SOMERVILLE

PREPARED BY:

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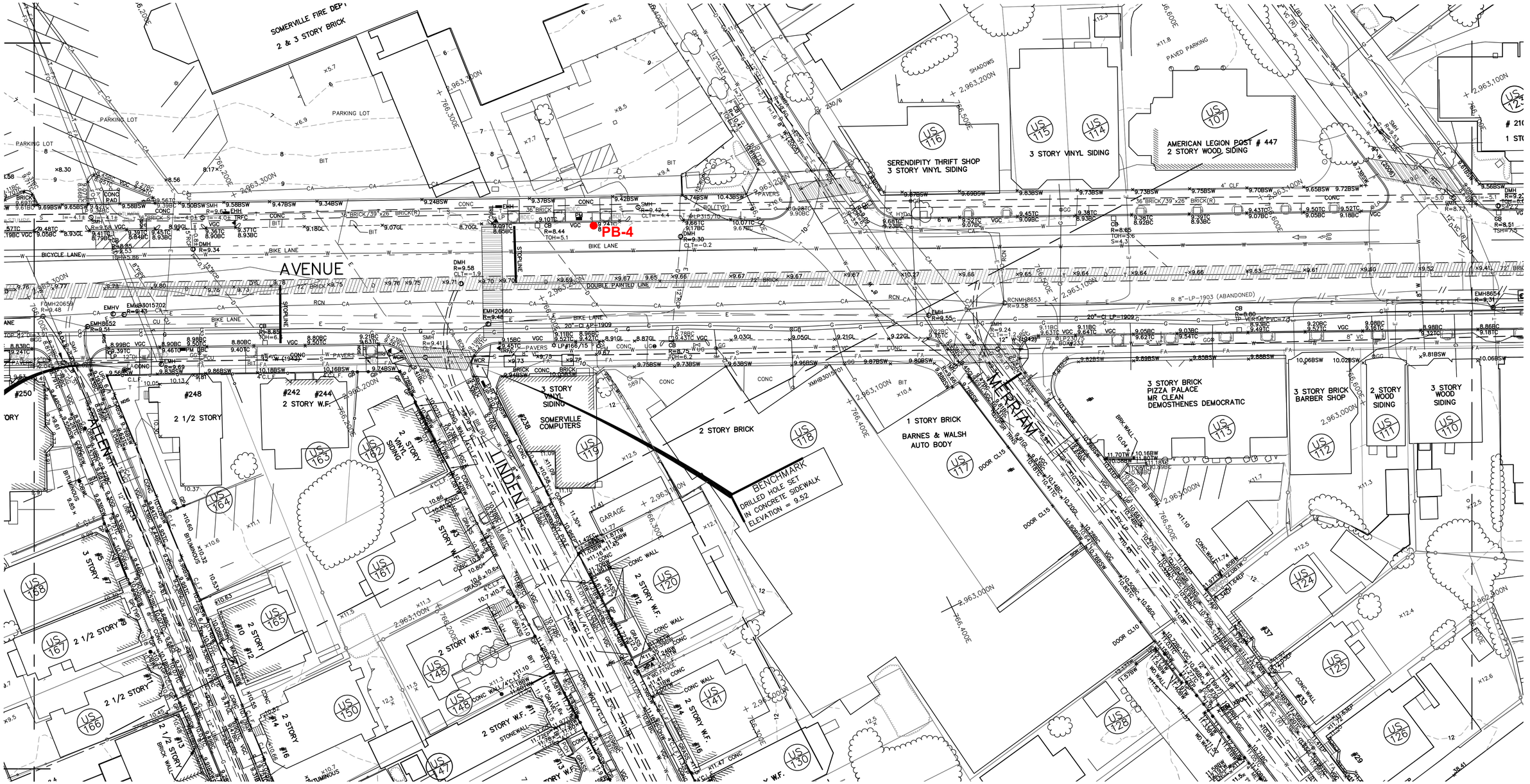

● 2014 BORING LOCATION

▲ Pre-2014 EXISTING BORING LOCATION

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

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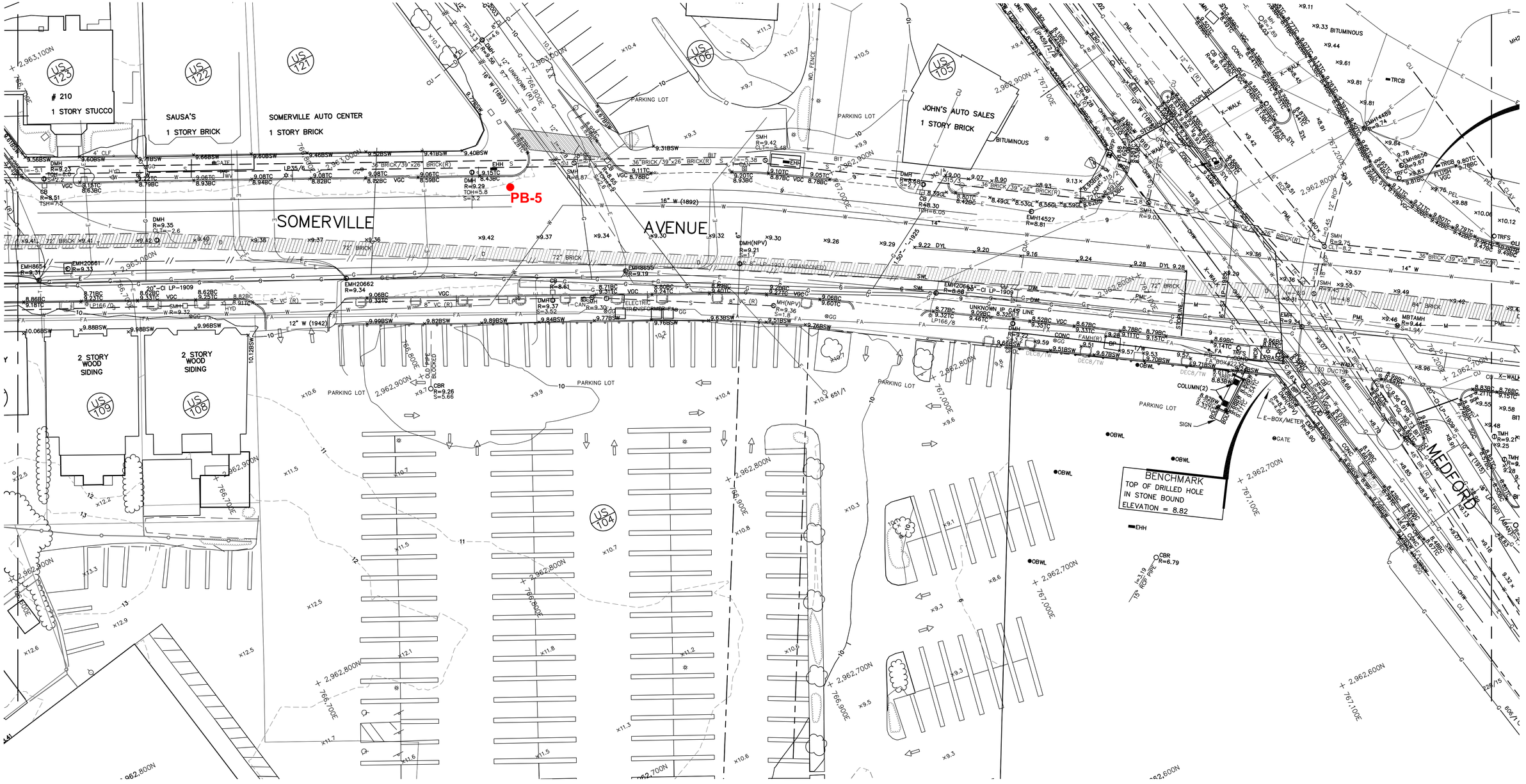

● 2014 BORING LOCATION

▲ Pre-2014 EXISTING BORING LOCATION

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

EXISTING CONDITIONS
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CITY OF SOMERVILLE

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SHEET 6 OF 18

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PB-6

BENCHMARK
TOP OF NAIL FOUND
IN BITUMINOUS PAVEMENT.
ELEVATION = 9.80

SOMERVILLE AVENUE

POPLAR STREET

EXISTING SEWER EASEMENT
(PLAN 418A OF 1943)

962,500N

2,962,400E

767.200E

US 1 (ALT)

US 1

2014 BORING LOCATION

Pre-2014 EXISTING BORING LOCATION

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

EXISTING CONDITIONS
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DRAWING NAME: 213082 EC.DWG
SHEET 7 OF 18

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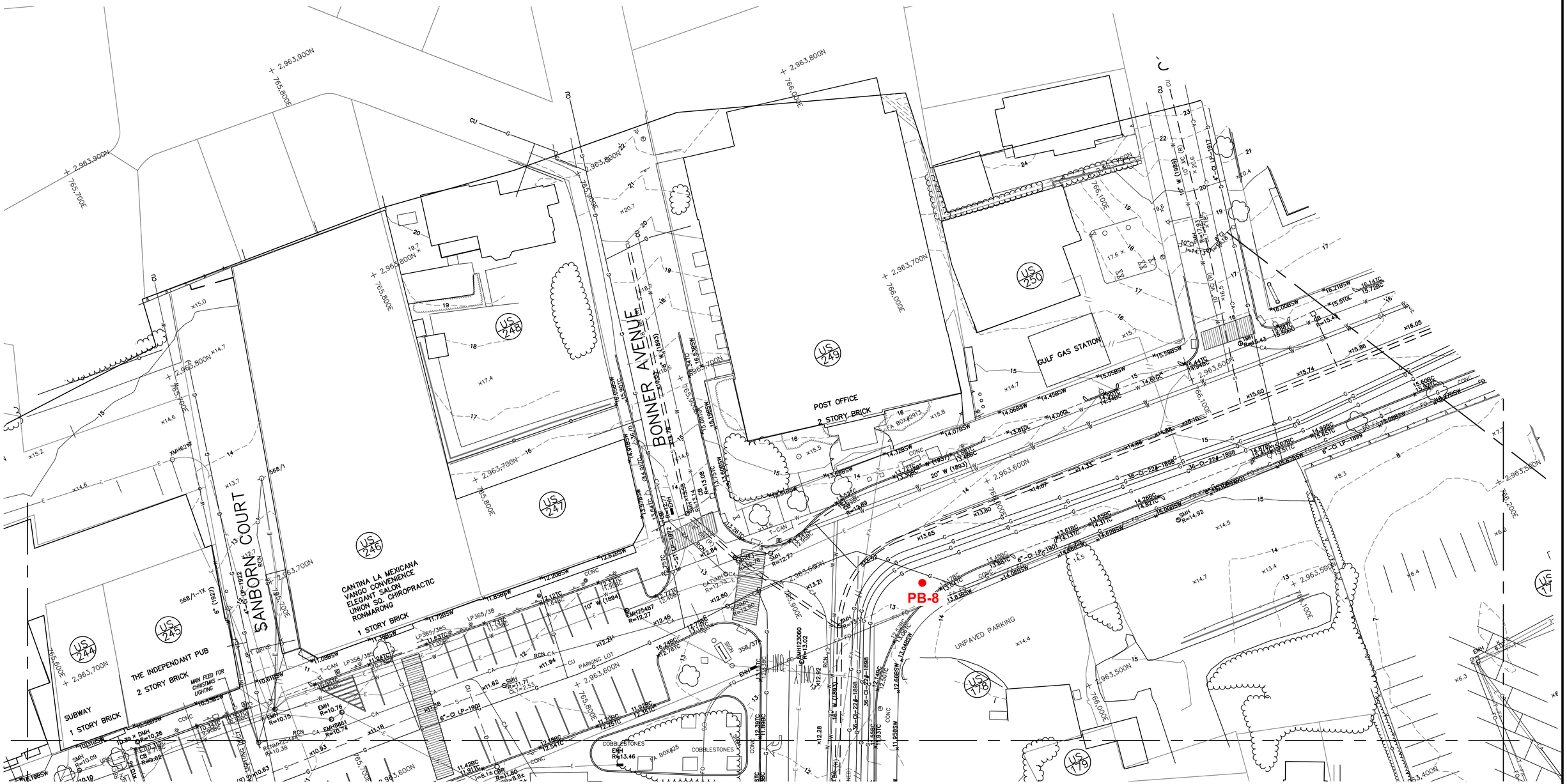

● 2014 BORING LOCATION

▲ Pre-2014 EXISTING BORING LOCATION

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

EXISTING CONDITIONS

PLAN OF LAND

IN

SOMERVILLE, MASSACHUSETTS

PREPARED FOR

CITY OF SOMERVILLE

PREPARED BY:

BRYANT ASSOCIATES, INC.

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● **2014 BORING LOCATION**

▲ **Pre-2014 EXISTING BORING LOCATION**

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

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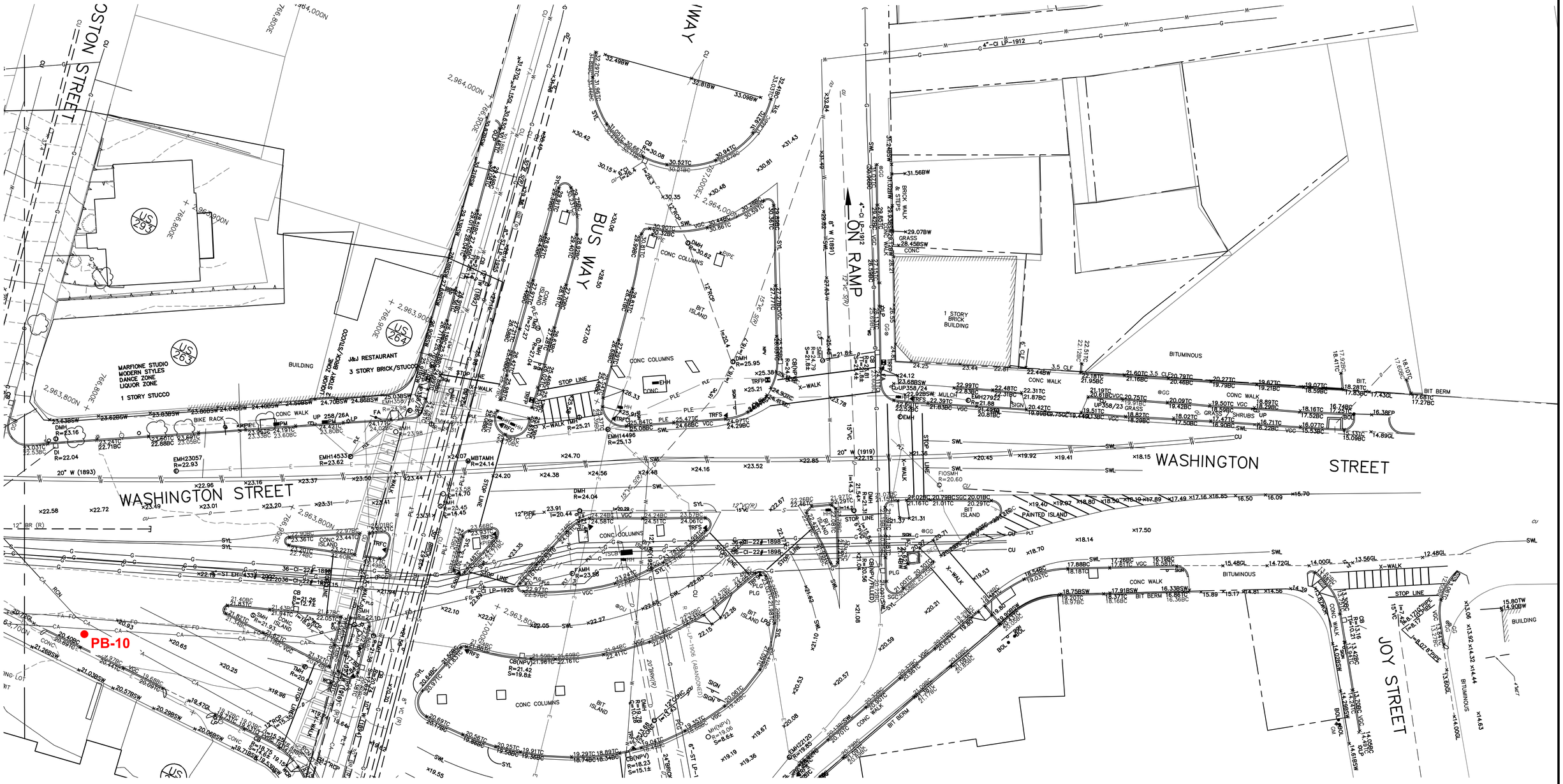

● 2014 BORING LOCATION

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1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

EXISTING CONDITIONS
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SHEET 10 OF 18

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● 2014 BORING LOCATION

▲ Pre-2014 EXISTING BORING LOCATION

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

0 10 20 40 80

1" = 20 FT.

EXISTING CONDITIONS
PLAN OF LAND
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SHEET 11 OF 18

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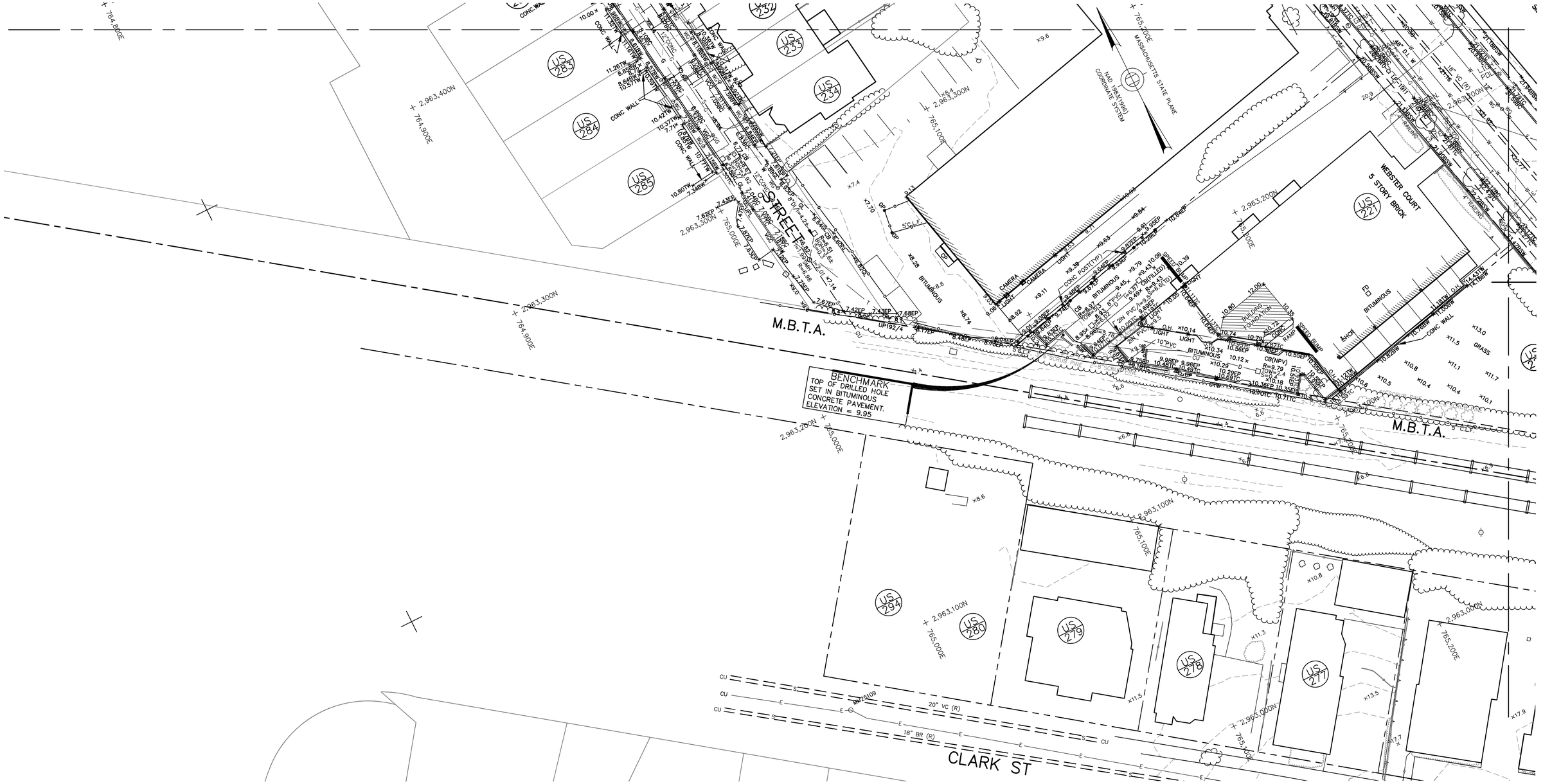

2014 BORING LOCATION

Pre-2014 EXISTING BORING LOCATION

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

0 10 20 40 80

1" = 20 FT.

EXISTING CONDITIONS
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SHEET 12 OF 18

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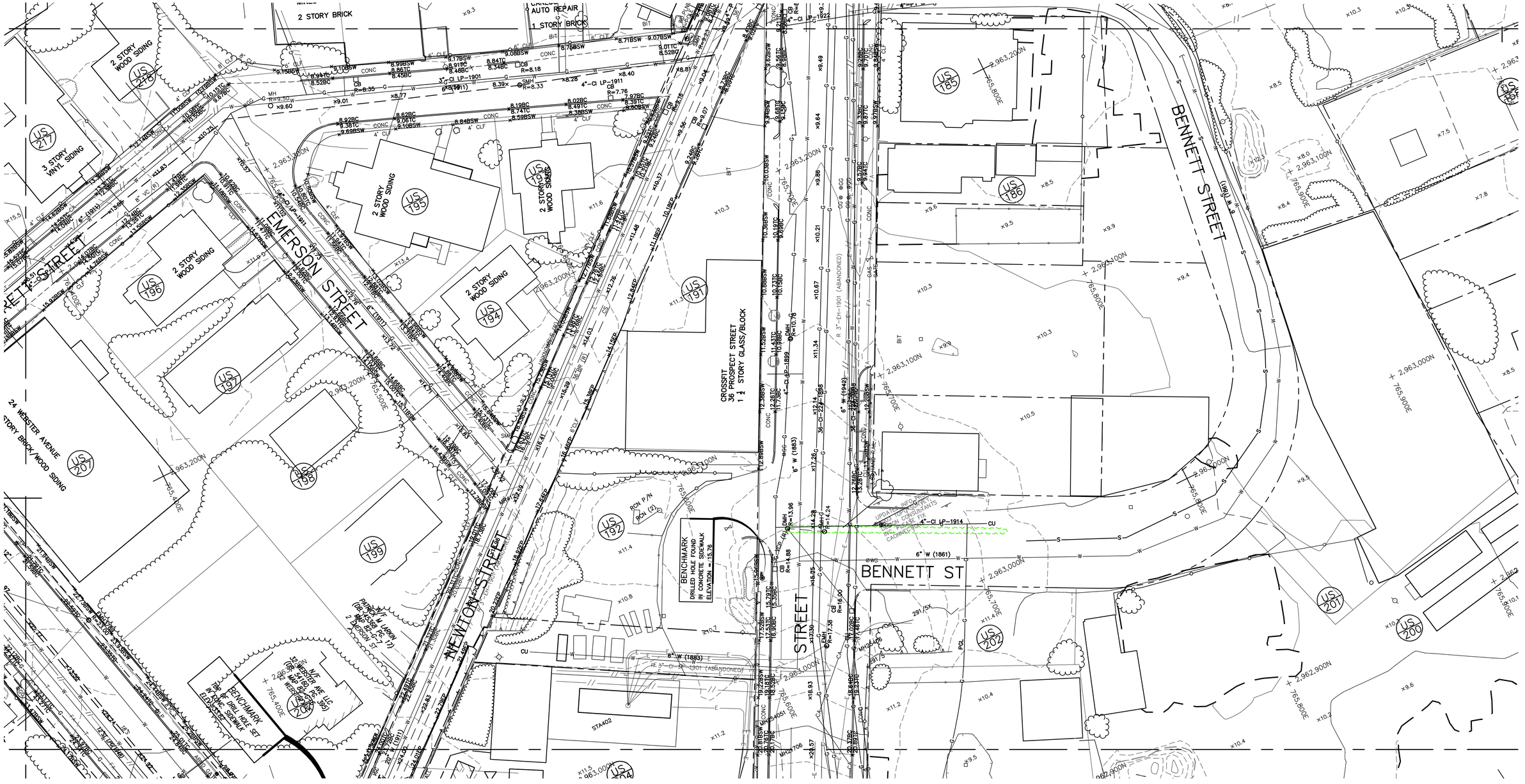

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

● 2014 BORING LOCATION

▲ Pre-2014 EXISTING BORING LOCATION

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SHEET 13 OF 18

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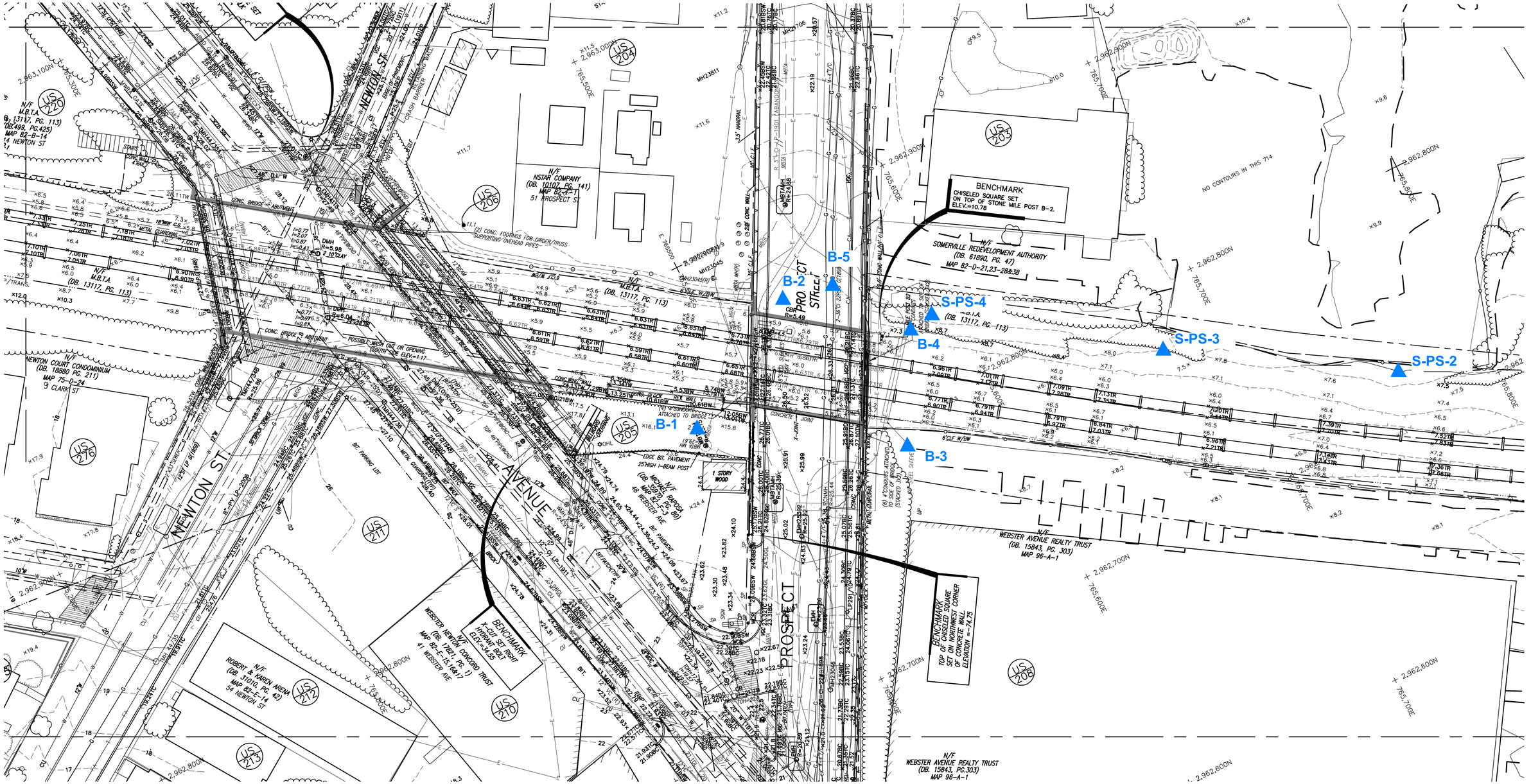
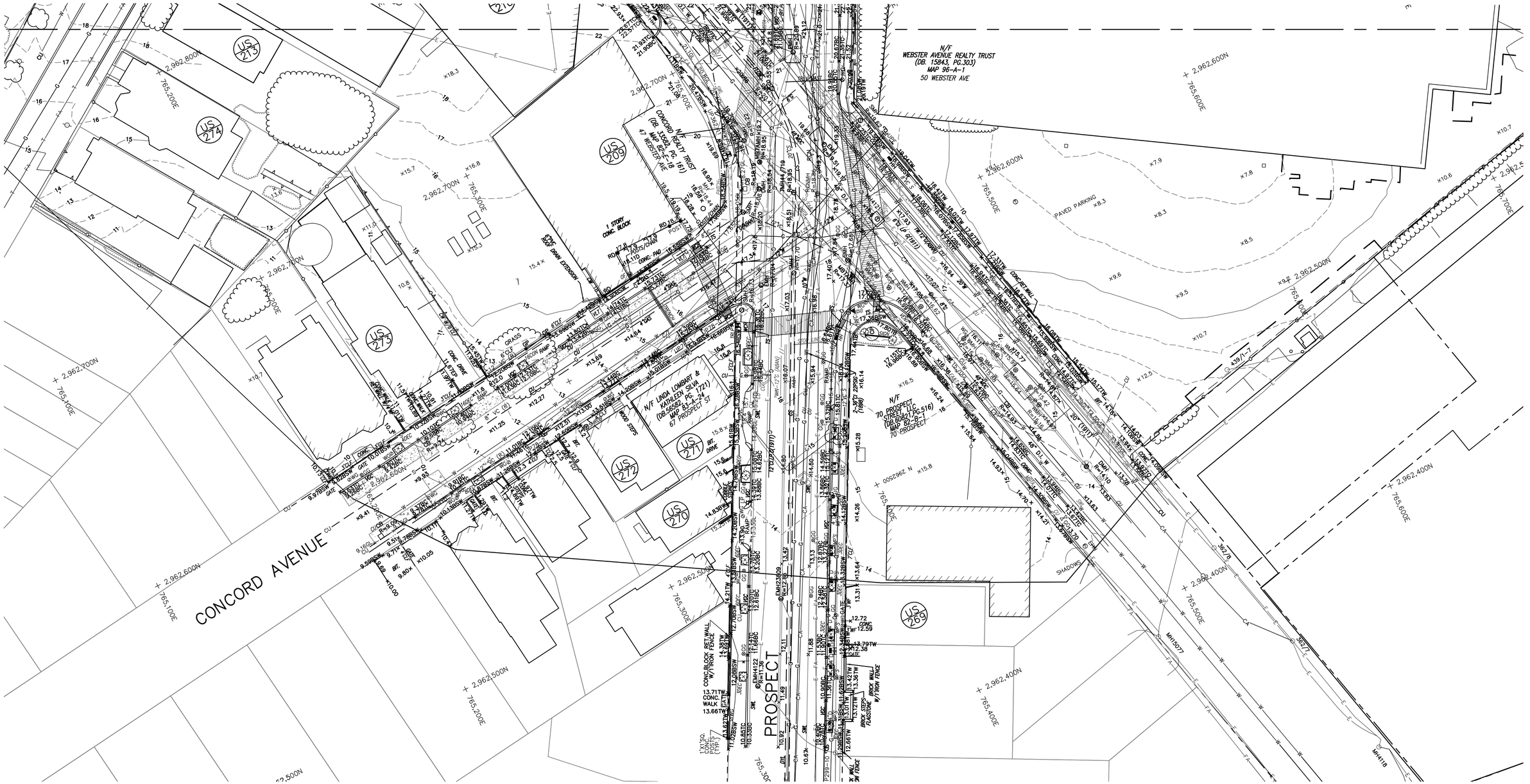

B-1
B-2
B-3
B-4
B-5
S-PS-2
S-PS-3
S-PS-4
PROJECT
PROJECT
NEWTON ST
AVENUE
N/F NSTAR COMPANY (DB. 10107, PG. 141) MAP 82-C-1 51 PROSPECT ST
N/F SOMERVILLE REDEVELOPMENT AUTHORITY (DB. 61890, PG. 47) MAP 82-D-21,23-28&38
BENCHMARK CHISELED SQUARE SET ON TOP OF STONE MILE POST B-2. ELEV.=10.78
NO CONTOURS IN THIS 714
N/F WEBSTER AVENUE REALTY TRUST (DB. 15843, PG. 303) MAP 96-A-1
BENCHMARK TOP OF CHISELED SQUARE SET ON NORTHWEST CORNER OF CONCRETE WALL ELEVATION = 74.75
N/F WEBSTER AVENUE REALTY TRUST (DB. 15843, PG.303) MAP 96-A-1
N/F NEWTON COURT CONDOMINIUM (DB. 18880 PG. 211) MAP 75-D-24 9 CLARK ST
N/F ROBERT & KAREN ARENA (DB. 31010, PG. 42) MAP 82-E-14 54 NEWTON ST
N/F WEBSTER NEWTON CONCORD TRUST (DB. 17801, PG. 1) MAP 82-E-15,16&17 41 WEBSTER AVE
BENCHMARK X-CUT SET RIGHT HYDRANT BOLT ELEV=34.55
1 STORY WOOD
N/F M.B.T.A. (DB. 13117, PG. 113)
N/F M.B.T.A. (DB. 13117, PG. 499, PG.425) MAP 82-B-14 4 NEWTON ST
N/F M.B.T.A. (DB. 13117, PG. 113)
N/F M.B.T.A. (DB. 13117, PG. 113)
N/F M.B.T.A. (DB. 13117, PG. 113)



- ● **2014 BORING LOCATION**
- ▲ **Pre-2014 EXISTING BORING LOCATION**

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

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SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

● **2014 BORING LOCATION**

▲ **Pre-2014 EXISTING BORING LOCATION**

▲ S-PS-1 (70' west)

▲ MW-9

0 10 20 40 80

1" = 20 FT.

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MASSACHUSETTS STATE PLANE
NAD 1983(1996)
COORDINATE SYSTEM

BENCHMARK
TOP OF FRONT HYDRANT BOLT.
ELEVATION = 12.38

BENCHMARK
DRILLED HOLE SET IN CONCRETE SIDEWALK
ELEVATION = 9.52

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

- 2014 BORING LOCATION
- Pre-2014 EXISTING BORING LOCATION

0 10 20 40 80
1" = 20 FT.

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BENCHMARK
CHISELED SQUARE FOUND
AT SOUTHWEST CORNER
OF CONCRETE WALL
ELEVATION = 15.69

B-S042-1
B-S042-2
B-S042-3
B-S042-4

STREET

2,962,400N
767,200E
2,962,300N
767,200E
2,962,300N

6" LP 1901 (ABAN)
18"-ST-EH (433 PSI) 2002
UNKNOWN IP GAS LINE
48" BR (R)
69" X 62 BR (R)
69x62"BRK S
10" W (1915)
20" W (1891)
10" (1891)
45" X 30" BR (R)
CB R=-1.86 TOH=-3.9± TOW=-4.5W S=-7.5
CB R=-3.42 TOW=-5.6 S=-9.44
SMH(F/NPV) R=-0.53
FAMH R=1.97
WMH R=2.56
SMH R=8.45
SMH R=8.70
EMH4781 R=8.94
EMH4782 R=-1.51
MH4783
MH =3.60

● 2014 BORING LOCATION

▲ Pre-2014 EXISTING BORING LOCATION

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

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ABBREVIATIONS

ABND	ABANDONED
APPROX	APPROXIMATE
APPX	APPROXIMATE
B=	BOTTOM
BG	BRIDGE GIRDER
BSW	BACK OF SIDEWALK
BIT	BITUMINOUS CONCRETE
BC	BOTTOM CURB
BP	BITUMINOUS PATCH
BRK	BRICK
BW	BOTTOM WALL
BWL	BROKEN WHITE PAINTLINE
BYL	BROKEN YELLOW PAINTLINE
CC	CONCRETE CURB
CLF	CHAIN LINK FENCE
CLT	CENTERLINE TROUGH
CMP	CORRUGATED METAL PIPE
CO	CLEAN OUT
CONC	CONCRETE
COND.	CONDUIT
CI	CAST IRON PIPE
CP	CONCRETE PAD
CPP	CORRUGATED PLASTIC PIPE
CU	CONNECTION UNKNOWN
DB	DEED BOOK
DBL	DOUBLE
DWL	DASHED WHITE LINE
DEC	DECIDUOUS
DH	DRILL HOLE
DI	DROP INLET
DIA	DIAMETER
DYL	DOUBLE YELLOW PAINTLINE
ELEC	ELECTRIC
E-BOX	ELECTRIC BOX
EP	ESCHUIN PIN
(FL)	FLUSH
(F)	FILLED W/DEBRIS
FD	FOUND
FF	FINISH FLOOR
GASM	GAS METER
GRAN	GRANITE
GRDL	GUARDRAIL
GL	GUTTERLINE
HR	HANDRAIL
HP	HIGH PRESSURE
I=	INVERT
I.PIPE	IRON PIPE
IP	IRON PIPE
INACC	INACCESSIBLE
I.ROD	IRON ROD
IRR.	IRRIGATION
JB	JERSEY BARRIER
LP	LOW PRESSURE
MLBX	MAILBOX
MET	METAL
MDC	METROPOLITAN DISTRICT COMMISSION
N/A	NO ACCESS
NPV	NO PIPES VISIBLE
NSM	NONSKID MAT
OH	OVERHANG
OR	ORIENTAL FENCE
PA	PLANTED AREA
P&C	POST AND CABLE
PEL	PAINTED ELECTRIC LINE
PG	PAGE
PGL	PAINTED GAS LINE
PKT	PICKET FENCE
PML	PAINTED MASSACHUSETTS BAY TRANSPORTATION LINE
PCH	PORCH
PSIG	POUNDS PER SQ. INCH GAGE
PL	PLAN
PLNTR	PLANTER
PTL	PAINTED TELEPHONE LINE
PVC	POLYVINYL CHLORIDE
PWL	PAINTED WATER LINE
(R)	RECORD
R=	RIM
RCD	RECESSED
RECY	RECYCLE BIN
RET	RETAINING
RR TIE	RAILROAD TIE
RD	ROOF DRAIN
RET	RETAINING
RCP	REINFORCED CONCRETE PIPE
S=	SUMP
SGC	SLOPED GRANITE CURB
S&C	MBTA SIGNAL & COMMUNICATION
S&M	STONE AND MASONRY WALL
SIG	SIGNAL
ST	STEEL
STK	STOCKADE FENCE
STY	STORY
SW	SIDEWALK
SWL	SINGLE WHITE PAINTLINE
SYL	SINGLE YELLOW PAINTLINE
TC	TOP CURB
T-CAN	TRASH CAN
TD	TOP OF DEBRIS
TOH	TOP OF HOOD
TOW	TOP OF WATER
TP	TOP OF PIPE
TR	TOP RAIL
TRANS	TRANSFORMER
TRI	TRIPLE
TT	TOP OF TRAP
TW	TOP WALL
TWL/TW	TREE WELL
TYP	TYPICAL
VPIT	VALVE PIT
V-PIPE	VERTICAL PIPE
VC	VITRIFIED CLAY PIPE
VCC	VERTICAL CONCRETE CURB
VERT	VERTICAL
VGC	VERTICAL GRANITE CURB
VLT	VAULT
WCR	WHEELCHAIR RAMP
WD	WOOD
WF	WOOD FRAME
WP	WOOD POST
WPL	WHITE PAINTED LINE
X-JOINT	EXPANSION JOINT
X-WALK	CROSSWALK
YPL	YELLOW PAINTED LINE
10"D	(TREE) 10" DECIDUOUS
12"M	(TREE) 12" MAPLE
6"S	(TREE) 6" SUMAC

LEGEND

- EXISTING CONTOUR
- EXISTING INDEX CONTOUR
- × 22.5 — SPOT GRADE
- CA — CABLE TELEVISION
- D — SURFACE DRAIN
- E — ELECTRIC
- T — TELEPHONE
- W — WATER MAIN
- W — ABANDONED WATER MAIN
- G — GAS
- PL G/PYLP — LOW PRESSURE PLASTIC GAS
- G — ABANDONED GAS
- S — SANITARY SEWER
- OHW — OVERHEAD WIRE
- FA — FIRE ALARM
- FO — FIBRE OPTIC
- CLF — CHAIN LINK FENCE
- GUARDRAIL
- WOOD FENCE
- RAILROAD TRACKS
- N45°35'W 10.00' — TRAVERSE LINE
- BUILDING
- BITUMINOUS PATCH (BP)
- MB 1 — GLX PARCEL NUMBER
- BO — BLOW OFF
- BOL — BOLLARD
- BOL — BOLLARD
- BOR — BORING
- CB — CATCH BASIN
- CATVMH — COMMUNICATION MANHOLE
- CO — CLEANOUT
- DCB — DOUBLE CATCH BASIN
- DMH — DRAIN MANHOLE
- 6DEC — 6"DECIDUOUS TREE
- CON — CONIFEROUS TREE
- EBX — ELECTRIC BOX
- EHH — ELECTRIC HANDHOLE
- EMH — ELECTRIC MANHOLE
- FA — FIRE ALARM
- FP — FLAG POLE
- FP — FENCE POST
- FL — FLOOD LIGHT
- FDO — FLOOR DRAIN OIL
- FMH — FIRE MANHOLE
- FOMH — FIBER OPTIC MANHOLE
- GD — GAS DRIP
- GG — GAS GATE
- GM — GAS METER
- GP — GATE POST
- GV — GATE VALVE
- HH — HANDHOLE
- HYD — HYDRANT
- IRRHH — IRRIGATION HANDHOLE
- LP — LIGHT POLE
- MB — MAIL BOX
- MH — MANHOLE
- MHH — MASSACHUSETTS HIGHWAY HANDHOLE
- MBTAMH — MASSACHUSETTS BAY TRANSPORTATION AUTHORITY MANHOLE
- MH — OIL MANHOLE
- OBWL — OBSERVATION WELL
- OHH — OIL HANDHOLE
- RAILROAD SIGNAL
- RRS — RAILROAD SIGNAL
- SMH — SANITARY SEWER MANHOLE
- SIGN — SIGN
- SP — STEEL POST
- SHRUB
- SWCH — RAILROAD SWITCH
- TRAVERSE POINT
- TMH — TELEPHONE MANHOLE
- TRFC — TRAFFIC POLE (COMBINED)
- TRFP — TRAFFIC POLE (PEDESTRIAN)
- TRFV — TRAFFIC POLE (VEHICLE)
- TSCB — TRAFFIC SIGNAL CONTROL BOX
- 6M — MAPLE TREE WITH SIZE IN INCHES
- WC — WATER GATE
- GATE — UNKNOWN GATE
- UP — UTILITY POLE
- UPLP — UTILITY LIGHT POLE
- UPSTMP — UTILITY POLE STUMP
- WPST — WOOD POST
- WMH — WATER MANHOLE

NOTES:

1. HORIZONTAL DATUM IS MASSACHUSETTS STATE PLANE COORDINATE SYSTEM AND 1983(1996) DERIVED BY CONTROL ON PLAN ENTITLED "EXISTING CONDITIONS" DATED MARCH 11, 2011 PREPARED BY VANASSE HANGEN BRUSTLIN, INC. FOR THE GREENLINE EXTENSION PROJECT.

2. VERTICAL DATUM IS NAVD 1988.

3. THE SURFACE EVIDENCE OF THE UTILITIES SHOWN HAS BEEN LOCATED BY FIELD SURVEY. THE LINEWORK REPRESENTING UNDERGROUND STRUCTURES AND PIPES HAS BEEN SHOWN HEREON IN ITS APPROXIMATE LOCATION BASED ON UTILITY RESEARCH RECEIVED. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

4. THE EXISTING CONDITIONS SHOWN ON THIS PLAN ARE BASED UPON AERIAL MAPPING PREPARED BY COL-EAST, INC. ON OR BEFORE NOVEMBER, 2013 AND SUPPLEMENTAL FIELD SURVEY PERFORMED BY BRYANT ASSOCIATES.

5. M.B.T.A. RIGHT OF WAY LINES SHOWN HEREON ARE SHOWN FROM AN ON THE GROUND FIELD SURVEY AND PLANS OF RECORD. PROPERTY LINES OF ABUTTERS ARE APPROXIMATE.

6. WETLAND MAPPING WAS NOT INCLUDED IN SCOPE OF PROJECT.

SHEET INDEX:

1. FOR NOTES AND LEGEND, SEE SHEET 2 OF 18.

PROGRESS ONLY – NOT TO BE USED FOR FINAL DESIGN

0 10 20 40 80

1" = 20 FT.

EXISTING CONDITIONS
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BORING LOG

BORING NUMBER: **S-PS-1**
SHEET NUMBER: **1** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **E of Prospect St**
COORD. **N: 2962660 E: 765859**
STN. NO.: OFFSET:
SURFACE ELEV.: **7.5 feet**
DATUM: **NAVD-88**
START DATE: **6/4/10**
FINISH DATE: **6/4/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ⊟
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/4/10	10:15 am	2.5	7.0	8.0
6/4/10	2:30 pm	7.5	0.0	45.3

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	Depth Elev.	FIELD CLASSIFICATION AND REMARKS
5		S	1		13				12	22	22	19	44		2.0	Dark brown fine to coarse SAND, some fine to coarse gravel, little silt, moist, dense (LABORATORY ANALYSIS PERFORMED)
		S	2		19				15	16	23	22	39		5.5 4.0	Gray SILT, little fine to coarse gravel, little fine sand, wet, dense
0	5	S	3		17				16	17	16	16	33		3.5	Gray SILT, little fine sand, wet, dense
		S	4		12				4	3	2	2	5		8.0	Gray SILT, little fine sand, wet, loose
-5	10	S	5		24				WOH	WOH	WOH	7	0		-0.5 10.0	Brown organic SILT and PEAT, trace clay, wet, loose
		S	6		12				6	4	5	8	9		-2.5	Gray clayey SILT, some clay, little fine to coarse sand, mostly fine, trace fine gravel, loose (LABORATORY ANALYSIS PERFORMED)
-10	15	S	7		24				3	6	6	7	12			Gray CLAY and SILT, stiff pp= 1.5, 1.5, 1.375 tons/ft^2 tv = 0.3, 0.55, 0.67 tons/ft^2
-15	20	S	8		20				5	6	5	7	11			Gray CLAY and SILT, trace fine sand, stiff (LABORATORY ANALYSIS PERFORMED) pp= 1.25, 0.5, 0.5 tons/ft^2 tv = 0.5, 0.475 tons/ft^2

BORING LOG

(continued)

BORING NUMBER: **S-PS-1**
SHEET NUMBER: **2** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	9		6				3	4	5	5	9		Gray CLAY and SILT, wet, stiff Note: Sample disturbed, unable to take tv or pp readings
-20															
	30	S	10		24				2	3	3	4	6		Gray CLAY and SILT, trace fine sand, medium stiff (LABORATORY ANALYSIS PERFORMED) pp= 1.0, 1.0, 1.25 tons/ft^2 tv = 0.3, 0.35, 0.45 tons/ft^2
-25															
	35	S	11		24				2	3	4	5	7		Gray CLAY and SILT, medium stiff pp= 1.0, 1.0, 1.0 tons/ft^2 tv = 0.4 tons/ft^2
-30															38.5 -31.0
	40	S	12		16				5	6	34	100	40		Top 10": Gray fine SAND and SILT, wet, dense 41.0 -33.5 Bot 6": Gray fine to coarse GRAVEL (rock fragments) and fine to coarse SAND, trace silt, trace clay (WEATHERED ROCK) (LABORATORY ANALYSIS PERFORMED)
-35															
	45	S	13		3				100/3"				>100		45.3 -37.8 Gray fine to coarse GRAVEL (rock fragments), little silt, very dense (WEATHERED ROCK) Bottom Of Hole - 45.3ft
-40															
	50														
-45															
	55														
-50															

BORING LOG

BORING NUMBER: **S-PS-2**
SHEET NUMBER: **1** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **E of Prospect St**
COORD. **N: 2962718 E: 765761**
STN. NO.: OFFSET:
SURFACE ELEV.: **7.7 feet**
DATUM: **NAVD-88**
START DATE: **6/7/10**
FINISH DATE: **6/8/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ⊟
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/7/10	8:15 am	2.0	0.0	6.0
6/8/10	7:30 am	7.8	0.0	55.9

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS (Depth Elev.)
		S	1		6				9	33	75	34	108		Dark brown fine SAND and fine to coarse GRAVEL, trace silt, wet, very dense (2.0)
5		S	2		4				20	14	12	10	26		Gray SILT, some clay, little fine to coarse gravel, wet, medium dense (5.7 / 4.0)
	5	S	3		12				3	3	8	21	11		Dark brown fine to coarse SAND, some fine to coarse gravel, little to trace silt, wet, medium dense (3.7) (LABORATORY ANALYSIS PERFORMED) (6.0) Note: Permeability test conducted between 5 to 7ft (1.7)
0		S	4		24				20	20	29	48	49		Top 15": Dark brown fine to coarse SAND, some silt, little fine gravel, wet, dense (7.0 / 0.7) Bot 9": Gray mottled brown CLAY and SILT, hard Light gray CLAY, some silt, wet, hard
	10	S	5		12				20	30	36	62	66		
		S	6		23				9	24	30	37	54		Light gray CLAY and SILT, wet, hard
-5															
	15	S	7		22				7	13	16	16	29		Light gray CLAY and SILT, trace fine sand, wet, hard (LABORATORY ANALYSIS PERFORMED) pp= 2.0, 3.25, 3.25 tons/ft^2 tv= 0.8 tons/ft^2
-10															
	20	S	8		24				4	5	5	6	10		Light gray CLAY and SILT, wet, stiff pp= 1.0, 1.0 tons/ft^2 tv= 0.625, 0.525 tons/ft^2
-15															

BORING LOG

(continued)

BORING NUMBER: **S-PS-2**
SHEET NUMBER: **2** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	Depth / Elev.	FIELD CLASSIFICATION AND REMARKS
-20		S	9		19				3	2	4	4	6			Light gray CLAY and SILT, trace fine sand, wet, stiff (LABORATORY ANALYSIS PERFORMED) pp= 1.0, 0.75, 1.0 tons/ft^2 tv= 0.575, 0.525 tons/ft^2
	30															
-25		S	10		24				WOH	2	2	3	4			Light gray CLAY and SILT, wet, soft to medium stiff pp= 0.50, 0.75, 0.75 tons/ft^2 tv= 0.35, 0.375 tons/ft^2
	35															
-30		S	11		24				WOH	3	3	4	6			Light gray CLAY and SILT, trace fine sand, wet, medium stiff (LABORATORY ANALYSIS PERFORMED) pp= 0.75, 0.75, 0.75 tons/ft^2 tv= 0.35, 0.225 tons/ft^2
	40															
-35		S	12		24				WOR	4	6	12	10		41.5 / -33.8	Top 18": Light gray CLAY, some silt, wet, medium stiff pp= 0.75, 0.75 tons/ft^2 tv= 0.15 tons/ft^2 Bot 6": Light gray fine SAND and SILT, little fine gravel, wet, loose to medium dense
	45															
-40		S	13		12				12	99	16	16	115			Gray fine to coarse SAND, some fine to coarse gravel, some silt, little to trace clay, wet, very dense (LABORATORY ANALYSIS PERFORMED)
	50														50.0 / -42.3	
-45		S	14		7				23	22	28	29	50			Gray fine to coarse GRAVEL (rock fragments), little silt, little to trace clay, trace fine sand, wet, dense to very dense (WEATHERED ROCK)
	55															
-50		S	15		8				50	100/5"			>100		55.9 / -48.2	Gray fine to coarse GRAVEL (rock fragments), trace silt, trace clay, wet, very dense (WEATHERED ROCK) Bottom Of Hole - 55.3ft

BORING LOG

BORING NUMBER: **S-PS-3**
SHEET NUMBER: **1** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **E of Prospect St**
COORD. **N: 2962774** **E: 765674**
STN. NO.: OFFSET:
SURFACE ELEV.: **8.1 feet**
DATUM: **NAVD-88**
START DATE: **6/3/10**
FINISH DATE: **6/3/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ⊟
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/3/10	7:30 am	2.5	0.0	4.0
6/3/10	2:30 pm	2.0	0.0	55.3

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	1		10				6	14	16	9	30		Brown fine to coarse GRAVEL, some fine to coarse sand, trace silt, dry, medium dense to dense (LABORATORY ANALYSIS PERFORMED)
5		S	2		10				18	30	40	40	70		Dark brown fine to coarse GRAVEL, some fine to coarse sand, trace silt, wet, very dense
	5	S	3		8				23	21	17	39	38		Dark brown fine to coarse GRAVEL, little fine to coarse sand, trace silt, wet, dense
		S	4		13				26	33	17	18	50		Top 6": Light brown fine to medium SAND, trace silt, wet, dense to very dense Bot 7": Dark brown fine to coarse GRAVEL and fine to coarse SAND, little silt Note: Permeability test conducted from 7 to 8ft
0		S	5		5				21	8	8	8	16		
	10	S	6		9				8	3	6	12	9		Dark brown fine to coarse GRAVEL, little fine to coarse sand, trace silt, wet, medium dense Light gray CLAY and SILT, trace fine sand, wet, stiff (LABORATORY ANALYSIS PERFORMED) pp= 2.25 tons/ft^2 tv= 0.55 tons/ft^2
-5		S	7		19				15	12	8	10	20		
	15	S	8		21				15	9	10	10	19		Light gray CLAY and SILT, wet, very stiff pp= 1.5 tons/ft^2 tv= 0.575 tons/ft^2 Light gray CLAY and SILT, wet, very stiff pp= 1.5 tons/ft^2 tv= 0.55 tons/ft^2
-10															
	20	S	9		9				5	6	7	8	13		Light gray CLAY and SILT, trace fine gravel, trace fine to coarse sand, wet, stiff (LABORATORY ANALYSIS PERFORMED) pp= 0.5 tons/ft^2
-15															

Depth / Elev.
6.0 / 2.1
7.0 / 1.1
8.0 / 0.1
10.0 / -1.9

BORING LOG

(continued)

BORING NUMBER: **S-PS-3**
SHEET NUMBER: **2** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	10		24				3	3	5	6	8		Light gray CLAY and SILT, trace fine sand, wet, medium stiff to stiff (LABORATORY ANALYSIS PERFORMED) pp= 1.25 tons/ft^2 tv= 0.3 tons/ft^2
-20															
	30	S	11		24				2	3	3	4	6		Light gray CLAY and SILT, wet, medium stiff pp= 1.0 tons/ft^2 tv= 0.275 tons/ft^2
-25															
	35	S	12		24				1	2	3	4	5		Light gray CLAY and SILT, trace fine sand, wet, medium stiff (LABORATORY ANALYSIS PERFORMED) pp= 1.0 tons/ft^2 tv= 0.3 tons/ft^2
-30															
	40	S	13		24				1	2	3	6	5		Light gray CLAY and SILT, wet, medium stiff pp= 1.0 tons/ft^2 tv= 0.2 tons/ft^2
															42.5
-35															-34.4
	45	S	14		7				16	24	32	26	56		Gray fine to coarse SAND, mostly fine, some fine to coarse gravel, little silt, little to trace clay, wet, very dense (TILL) (LABORATORY ANALYSIS PERFORMED)
-40															
	50	S	15		7				45	60	52	76	112		50.0 -41.9 Gray SILT and fine to coarse GRAVEL (rock fragments), little fine to coarse sand, very dense (WEATHERED ROCK)
-45															
	55	S	16		3				100/3"				>100		55.3 -47.1 Gray coarse GRAVEL (rock fragments), little silt, wet, very dense (WEATHERED ROCK) Bottom Of Hole - 55.3ft
-50															

BORING LOG

BORING NUMBER: **S-PS-4**
SHEET NUMBER: **1** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **E of Prospect St**
COORD. **N: 2962833 E: 765591**
STN. NO.: OFFSET:
SURFACE ELEV.: **9.5 feet**
DATUM: **NAVD-88**
START DATE: **6/2/10**
FINISH DATE: **6/2/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ⊟
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/2/10	2:29 pm	2.5	0.0	55.4

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	Depth Elev.	FIELD CLASSIFICATION AND REMARKS
		S	1		12				5	13	7	10	20			Dark brown fine to medium SAND, little fine to coarse gravel, trace silt, dry, medium dense
		S	2		13				5	6	6	5	12			Light brown fine to medium SAND, little fine gravel, trace coarse sand, trace silt, wet, medium dense (LABORATORY ANALYSIS PERFORMED)
5	5	S	3		16				3	2	3	3	5			Light brown fine to medium SAND, little fine gravel, wet, loose
		S	4		18				5	4	3	3	7			Light brown medium SAND, little fine to coarse gravel, trace coarse sand, trace silt, wet, loose Note: Permeability test conducted from 7 to 8ft
		S	5		6				7	3	1	1	4			Light gray fine to medium SAND, trace fine to coarse gravel, little silt, wet, very loose
0	10	S	6		14				1	1	1	4	2			Gray fine to coarse SAND, mostly fine, little fine gravel, trace silt, wet, very loose (LABORATORY ANALYSIS PERFORMED)
															12.0	
		S	7		13				12	25	18	10	43		-2.5	Gray fine SAND, little medium sand, trace fine gravel, trace silt, wet, dense
-5	15	S	8		10				12	9	14	13	23		15.0 -5.5	Top 5": Gray fine SAND, little medium sand, trace fine to coarse gravel, wet, medium dense Bot 5": Light gray CLAY and SILT, wet, very stiff pp= 1.75 tons/ft^2 tv= 0.5 tons/ft^2
-10	20	S	9		6				6	8	9	9	17			Light gray CLAY and SILT, trace fine gravel, trace fine to coarse sand, wet, very stiff (LABORATORY ANALYSIS PERFORMED)
-15																

BORING LOG

(continued)

BORING NUMBER: **S-PS-4**
SHEET NUMBER: **2** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	10		16				2	3	4	6	7		Light gray CLAY and SILT, wet, medium stiff pp= 1.0 tons/ft^2 tv= 0.525 tons/ft^2
-20	30	S	11		22				2	3	2	4	5		Light gray CLAY and SILT, wet, medium stiff pp= 0.75 tons/ft^2 tv= 0.3575 tons/ft^2
-25	35	S	12		24				WOH	WOH	WOH	WOH	0		Light gray CLAY and SILT, wet, soft (LABORATORY ANALYSIS PERFORMED) pp= 0.5 tons/ft^2 tv= 0.25 tons/ft^2
-30	40	S	13		16				WOR	WOH	WOH	WOH	0		Light gray CLAY and SILT, wet, soft pp= 0.5 tons/ft^2 tv= 0.25 tons/ft^2
															Depth Elev. 43.0 -33.5
-35	45	S	14		10				20	24	25	24	49		Gray fine to coarse SAND, little fine to coarse gravel, little silt, trace clay, moist, dense (TILL)
-40	50	S	15		6				30	31	36	66	67		Light gray fine GRAVEL, some fine to coarse sand, mostly medium, little silt, trace clay, wet, very dense (TILL) (LABORATORY ANALYSIS PERFORMED)
-45	55	S	16		5				100/5"				>100		55.0 -45.5 Light gray SILT and coarse GRAVEL, wet, very dense (WEATHERED ROCK)
															55.4 -45.9 Bottom Of Hole - 55.4ft
-50															

BORING LOG

BORING NUMBER: **MW-9**
SHEET NUMBER: **1** of **1**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **E of Prospect St**
COORD. **N: 2962615 E: 765930**
STN. NO.: OFFSET:
SURFACE ELEV.: **8.3 feet**
DATUM: **NAVD-88**
START DATE: **6/4/10**
FINISH DATE: **6/4/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▯	G ☒	C ⊟
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/4/10	11:45 am	2.9		11.5

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	Depth Elev.	FIELD CLASSIFICATION AND REMARKS
		S	1		12				5	8	14	15	22			Dark brown fine to coarse SAND, little silt, dry, medium dense (LABORATORY ANALYSIS PERFORMED)
5		S	2		15				20	13	13	34	26			Dark brown fine to medium SAND, some fine to coarse gravel, little silt, moist to wet, medium dense
		S	3		4				85/4"				>85		4.3	
	5														4.0	Dark brown fine to medium SAND, some coal/slag, little fine to coarse gravel, wet, very dense
															5.5	Note: COBBLE from 4.33 to 5.5ft
		S	4		6				16	16	8	12	24		2.8	Gray SILT and fine SAND, little fine gravel, wet, medium dense
															7.5	
0		S	5		12				6	9	6	4	15		0.8	Gray-brown organic SILT and CLAY, little peat fibers, trace fine to medium sand, wet, stiff (LABORATORY ANALYSIS PERFORMED)
	10															Top 9": Dark brown PEAT, some organic silt, wet, loose
		S	6		24				1	1	2	8	3		11.3	Mid 12": Dark brown organic SILT, little peat fibers, trace fine sand
															-3.0	
															11.5	Bot 3": Dark brown fine to medium SAND, trace silt
-5															-3.2	Bottom Of Hole - 11.5ft
	15															
-10																
	20															
-15																

BORING LOG

BORING NUMBER: **W-428-1**
SHEET NUMBER: **1** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **W of Medford St**
COORD. **N: 2962289 E: 767043**
STN. NO.: OFFSET:
SURFACE ELEV.: **14.0 feet**
DATUM: **NAVD-88**
START DATE: **6/16/10**
FINISH DATE: **6/17/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ⊟
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/17/10	12:30 pm	11.5	25.0	65.0
6/17/10	2:10 pm	9.5	0.0	65.0

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS / Depth Elev.
		S	1	■	10				8	19	19	14	38		Dark brown fine to coarse SAND, little fine to coarse gravel, trace silt, moist, dense
															3.5
10	5														10.5
		S	2	■	9				2	5	4	4	9		Light brown CLAY and SILT, trace fine gravel, trace fine to coarse sand, wet, stiff (LABORATORY ANALYSIS PERFORMED) pp= 2.0, 2.25 tons/ft^2 tv= 0.45, 0.5 tons/ft^2
5	10														10.5
															3.5
0	15	S	3	■	9				6	2	1	2	3		Dark gray organic SILT and CLAY, trace fine to medium sand, trace peat, trace shells, wet, soft (LABORATORY ANALYSIS PERFORMED)
															18.0
-5	20														-4.0
		S	4	■	12				5	7	8	12	15		Dark gray fine to coarse SAND, mostly fine, little silt, trace fine gravel, wet, medium dense (LABORATORY ANALYSIS PERFORMED)
															23.5
-10															-9.5

BORING LOG

(continued)

BORING NUMBER: **W-428-1**
SHEET NUMBER: **2** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	5		12				7	9	9	12	18		Olive-gray CLAY, some fine sand, trace fine gravel, trace silt, wet, very stiff
															28.5
-15															-14.5
	30	S	6		24				4	4	5	5	9		Olive-gray CLAY and SILT, trace fine sand, wet, very stiff (LABORATORY ANALYSIS PERFORMED) pp = 0.5 tons/ft^2 tv = 0.25 tons/ft^2
-20		U	1												Light gray silty CLAY, with 1/16-1/8" thick silt and 1/16-1/8" thick sand lenses UU-Test Shear Strength = 794 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
	35	S	7		24				2	3	4	4	7		Light gray CLAY, medium stiff pp = 0.75, 1.0, 0.75 tons/ft^2 tv = 0.35, 0.4 tons/ft^2
		V	1												Field Vane Shear Test Shear Strength = 2109 lbs/ft^2
-25	40	S	8		24				3	4	5	7	9		Light gray CLAY and SILT, trace fine sand, stiff (LABORATORY ANALYSIS PERFORMED) pp = 1.25, 1.0 tons/ft^2 tv = 0.425, 0.525 tons/ft^2
-30		U	2												Light gray silty CLAY, with 1/16-1/8" thick silt lenses and 1/16-1/8" thick sand lenses UU-Test Shear Strength = 1833 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
	45	S	9		24				3	4	6	7	10		Light gray CLAY, wet, medium stiff pp = 1.0, 1.0, 1.0 tons/ft^2 tv = 0.5, 0.475 tons/ft^2
		V	2												Field Vane Shear Test Shear Strength = 2047 lbs/ft^2
-35															50.0
	50	S	10		20				18	5	7	30	12		-36.0 Light gray fine SAND and CLAY, little coarse gravel, little silt, wet, medium dense
															53.5
-40															-39.5
	55	S	11		15				32	64	49	62	113		Light gray fine to coarse SAND and fine to coarse GRAVEL, trace silt, wet, very dense (TILL)
-45															

BORING LOG

(continued)

BORING NUMBER: **W-428-1**

SHEET NUMBER: **3** of **3**

PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**

LOCATION: **Cambridge - Somerville - Medford, Massachusetts**

CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**

DRILLER: **M Gallo**

INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	12		8				15	19	27	33	46		Light gray fine to coarse SAND, some coarse gravel, little clay, trace silt, wet, dense (TILL)
-50															
	65	S	13		0				100/1"				>100		Depth Elev. 65.1 -51.1 No Recovery Bottom Of Hole - 65.1ft
-55	70														
-60	75														
-65	80														
-70	85														
-75	90														
-80															

BORING LOG

BORING NUMBER: **W-428-2**
SHEET NUMBER: **1** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **W of Medford St**
COORD. **N: 2962321 E: 766846**
STN. NO.: OFFSET:
SURFACE ELEV.: **13.0 feet**
DATUM: **NAVD-88**
START DATE: **6/15/10**
FINISH DATE: **6/15/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ▤
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA				
Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS (Depth / Elev.)
		S	1		6				2	12	12	13	24		Light gray fine to coarse GRAVEL, some fine to coarse sand, some silt, wet, medium dense (LABORATORY ANALYSIS PERFORMED)
10															3.5 / 9.5
	5	S	2		9				16	13	8	7	21		Dark brown fine to coarse SAND, trace fine to coarse gravel, trace silt, wet, medium dense
5															8.5 / 4.5
	10	S	3		6				19	15	15	11	30		Light brown fine to coarse SAND, mostly medium little fine gravel, trace silt, wet, medium dense to dense (LABORATORY ANALYSIS PERFORMED)
0															
	15	S	4		10				31	18	22	19	40		Dark brown fine to coarse SAND, little fine gravel, trace coarse gravel, trace silt, wet, dense
-5															
	20	S	5		9				8	21	14	8	35		Gray fine to coarse SAND, mostly fine, little fine gravel, trace silt, wet, dense
-10															25.0

BORING LOG

(continued)

BORING NUMBER: **W-428-2**
SHEET NUMBER: **2** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
															Depth Elev.
		S	6		24				3	3	4	5	7		-12.0 Light gray CLAY, little silt, wet, medium stiff pp = 1.25 tons/ft^2 tv = 0.6, 0.625 tons/ft^2
-15															
	30	S	7		24				2	3	3	4	6		Light gray CLAY and SILT, trace fine sand, wet, medium stiff (LABORATORY ANALYSIS PERFORMED) pp = 1.25, 0.75, 0.75 tons/ft^2 tv = 0.425, 0.5 tons/ft^2
-20															
	35	S	8		24				2	3	4	5	7		Light gray CLAY, little silt, wet, medium stiff pp = 1.25, 1.0 tons/ft^2 tv = 0.4, 0.425 tons/ft^2
-25															
	40	S	9		24				2	3	5	6	8		Light gray SILT and CLAY, trace fine sand, wet, medium stiff to stiff (LABORATORY ANALYSIS PERFORMED) pp = 1.25, 1.25, 1.0 tons/ft^2 tv = 0.45, 0.425 tons/ft^2
-30															
	45	S	10		24				2	3	4	6	7		Light gray CLAY, little silt, wet, medium stiff pp = 1.25, 1.25, 1.0 tons/ft^2 tv = 0.525, 0.55 tons/ft^2
-35															
	50	S	11		24				3	4	4	7	8		Light gray CLAY and SILT, trace fine sand, wet, medium stiff to stiff (LABORATORY ANALYSIS PERFORMED) pp = 1.25 tons/ft^2 tv = 0.6, 0.625 tons/ft^2
-40															53.5 -40.5
	55	S	12		3				23	33	90	100/4"	123		Light gray CLAY, some fine to coarse gravel, little fine sand, little silt, wet, hard (TILL) 56.8 -43.8
-45															

BORING LOG

(continued)

BORING NUMBER: **W-428-2**

SHEET NUMBER: **3** of **3**

PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**

LOCATION: **Cambridge - Somerville - Medford, Massachusetts**

CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**

DRILLER: **M Gallo**

INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	13		2				100/2"				>100		Depth Elev. 60.2 -47.2 Light gray coarse GRAVEL (rock fragments), trace silt, very dense (WEATHERED ROCK) Bottom Of Hole - 60.2ft
-50	65														
-55	70														
-60	75														
-65	80														
-70	85														
-75	90														
-80															

BORING LOG

BORING NUMBER: **W-428-3**
SHEET NUMBER: **1** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **W of Medford St**
COORD. **N: 2962359 E: 766647**
STN. NO.: OFFSET:
SURFACE ELEV.: **12.1 feet**
DATUM: **NAVD-88**
START DATE: **6/11/10**
FINISH DATE: **6/14/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ⊟
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/14/10	8:00 am	7.0	7.0	7.5

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
10		S	1	■	14				10	14	14	12	28		Dark brown fine to coarse SAND, trace fine gravel, dry to moist, medium dense
	5	S	2	■	6				3	3	2	4	5		Dark brown fine to coarse SAND and fine to coarse GRAVEL, mostly fine, trace silt, wet, loose (LABORATORY ANALYSIS PERFORMED)
5															Depth 10.0 / Elev. 2.1
	10	S	3		0				50/0"				>50		No Recovery Note: Obrstuction from 10 to 12ft
0															Depth 12.0 / Elev. 0.1
	15	S	4	■	24				1	1	1	2	2		Top 12": Dark brown PEAT and organic SILT, wet, loose Depth 16.0 / Elev. -3.9 Bot 12": Light gray CLAY, little silt pp= 1.0 tons/ft^2 tv= 0.5 tons/ft^2
-5															
	20	S	5	■	24				10	13	13	15	26		Gray CLAY and SILT, little fine to coarse gravel, trace fine sand, wet, very stiff (LABORATORY ANALYSIS PERFORMED)
-10															

BORING LOG

(continued)

BORING NUMBER: **W-428-3**
SHEET NUMBER: **2** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	6		24				3	5	5	6	10		Light gray CLAY, little silt, wet, stiff pp= 1.0 tons/ft ^{2} tv= 0.55, 0.475 tons/ft ^{2}
-15															
		U	1												Light gray CLAY and SILT, with 1/16-1/8" thick silt lenses, trace gravel UU-Test Shear Strength = 1058 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
	30														
		S	7		24				2	4	4	7	8		Light gray CLAY and SILT, trace fine sand, wet, medium stiff to stiff (LABORATORY ANALYSIS PERFORMED) pp= 1.0, 0.75 tons/ft ^{2} tv= 0.45 tons/ft ^{2}
-20															
		V	1												Field Vane Shear Test Shear Strength = 930 lbs/ft^2
	35														
		S	8		24				2	2	4	6	6		Light gray CLAY, little silt, wet, medium stiff pp= 1.25, 1.5 tons/ft ^{2} tv= 0.40 tons/ft ^{2}
-25															
	40														40.0
		S	9		17				60	39	22	70	61		-27.9 Light gray fine to coarse GRAVEL, little fine to coarse sand, trace silt, trace clay, wet, very dense (TILL) 42.0 -29.9 (LABORATORY ANALYSIS PERFORMED)
-30															Note: Pssible top of rock at 42ft.
	45	S	10		0				100/0"				>100		45.0 -32.9 No Recovery Bottom Of Hole - 45ft
-35															
	50														
-40															
	55														
-45															

BORING LOG

BORING NUMBER: **W-428-4**
SHEET NUMBER: **1** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **W of Medford St**
COORD. **N: 2962407 E: 766457**
STN. NO.: OFFSET:
SURFACE ELEV.: **11.0 feet**
DATUM: **NAVD-88**
START DATE: **6/10/10**
FINISH DATE: **6/11/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▯	G ☒	C ⊟
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/11/10	7:30 am	9.5	45.0	45.0

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
10		S	1		12				8	7	12	11	19		Dark brown fine to coarse SAND, little fine gravel, trace coarse gravel, trace silt, moist, medium dense
	5														
5		S	2		6				14	16	15	14	31		Light brown-orange fine to coarse SAND, mostly medium, and fine to coarse GRAVEL, mostly fine, trace silt, wet, dense (LABORATORY ANALYSIS PERFORMED)
	10														Depth 10.0 / Elev. 1.0
0		S	3		12				16	21	25	34	46		Top 6": Gray SILT, little clay, wet, dense; Depth 11.0 / Elev. 0.0 — Bot 6": Gray CLAY and SILT, hard
	15														
-5		S	4		13				17	13	16	24	29		Brown-gray CLAY and SILT, trace fine to medium sand, wet, very stiff (LABORATORY ANALYSIS PERFORMED)
	20														
-10		S	5		12				8	10	11	15	21		Brown CLAY, little silt, very stiff pp = 0.5 tons/ft^2

BORING LOG

(continued)

BORING NUMBER: **W-428-4**
SHEET NUMBER: **2** of **2**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
-15		S	6		24				2	3	4	6	7		Light gray CLAY and SILT, trace fine sand, medium stiff (LABORATORY ANALYSIS PERFORMED) pp = 1.0 tons/ft^2 tv = 0.55, 0.475 tons/ft^2
	30														
-20		S	7		24				3	5	5	7	10		Light gray CLAY, little silt, stiff pp = 0.75, 0.75, 1.0 tons/ft^2 tv = 0.40, 0.575 tons/ft^2
	35														
-25		S	8		10				5	5	6	7	11		Light gray CLAY and SILT, trace fine sand, stiff (LABORATORY ANALYSIS PERFORMED) pp = 0.5 tons/ft^2 tv = 0.225, 0.225 tons/ft^2
	40														
-30		S	9		13				2	9	14	45	23		Light gray CLAY, little silt, wet, very stiff pp = 1.25, 1.25 tons/ft^2 tv = 0.475, 0.55 tons/ft^2
	45														Depth Elev. 45.0
-35		S	10		6				22	13	11	14	24		-34.0 Gray fine to coarse GRAVEL, some fine to coarse sand, trace silt, medium dense (LABORATORY ANALYSIS PERFORMED)
															48.5 -37.5
	50														
-40		S	11		4				45	100/1"			>100		Gray ARGILLITE, fine to coarse gravel-size (rock fragments), very dense
	55	S	12		0				100/0"				>100		55.0 No Recovery
-45															-44.0 Bottom Of Hole - 55ft

BORING LOG

BORING NUMBER: **W-428-5**
SHEET NUMBER: **1** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **W of Medford St**
COORD. **N: 2962470** **E: 766272**
STN. NO.: OFFSET:
SURFACE ELEV.: **10.0 feet**
DATUM: **NAVD-88**
START DATE: **6/8/10**
FINISH DATE: **6/10/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ▤
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/9/10	7:30 am	3.3	15.0	32.0

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	1	■	9				8	13	11	8	24		Dark brown fine to coarse SAND, some fine to coarse gravel, little silt, moist, medium dense (LABORATORY ANALYSIS PERFORMED)
5	5	S	2	■	9				15	16	20	14	36		Light brown and orange fine SAND, little fine to coarse gravel, little medium to coarse sand, little silt, wet, dense
0	10	S	3	■	8				13	12	14	8	26		Gray fine to medium SAND, little silt, trace fine gravel, trace coarse sand, wet, medium dense (LABORATORY ANALYSIS PERFORMED)
															Depth 15.0 / Elev. -5.0
-5	15	S	4	■	19				4	5	7	10	12		Light gray CLAY, little silt, stiff pp = 1.0, 1.0, 0.75 tons/ft^2 tv = 0.40, 0.45 tons/ft^2
		U	1	▯											Light gray silty CLAY, with 1/16-1/8" thick silt lenses, trace gravel UU-Test Shear Strength = 1702 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
-10	20	S	5	■	24				3	5	5	7	10		pp = 1.5, 1.25 tons/ft^2 tv = 6.0 tons/ft^2 Light gray CLAY and SILT, trace fine sand, stiff (LABORATORY ANALYSIS PERFORMED)
		V	1	▯											pp = 0.75, 1.25 tons/ft^2 tv = 0.5, 0.525 tons/ft^2 Field Vane Shear Test

BORING LOG

(continued)

BORING NUMBER: **W-428-5**
SHEET NUMBER: **2** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	6		24				0	1	3	4	4		Shear Strength = 876 lbs/ft^2 Light gray CLAY, little silt, soft to medium stiff pp = 1.0, 1.25, 0.75 tons/ft^2 tv = 0.425, 0.4 tons/ft^2
		U	2		15										Light gray silty CLAY with 1/16-1/8" silt lenses, trace gravel UU-Test Shear Strength = 732 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
-20	30	S	7		24				WOH	4	4	4	8		pp = 1.0, 1.0 tons/ft^2 tv = 0.45 tons/ft^2 Light gray CLAY and SILT, trace fine sand, medium stiff to stiff (LABORATORY ANALYSIS PERFORMED)
		V	2												pp = 1.0, 1.0 tons/ft^2 tv = 0.55 tons/ft^2 Field Vane Shear Test Shear Strength = 830 lbs/ft^2
-25	35	S	8		24				WOH	WOH	2	5	2		Light gray CLAY, little silt, wet, soft pp = 0.5, 0.5 tons/ft^2 tv = 0.325, 0.425 tons/ft^2
		U	3		24										Light gray silty CLAY, with 1/16-1/8" thick silt lenses, trace gravel, wet UU-Test Shear Strength = 957 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
-30	40	S	9		24				WOH	WOH	WOH	4	0		Light gray SILT and CLAY, trace fine sand, wet, soft (LABORATORY ANALYSIS PERFORMED) pp = 0.5, 0.75 tons/ft^2 tv = 0.4, 0.475 tons/ft^2
		V	3												Field Vane Shear Test Shear Strength = 1551 lbs/ft^2
-35	45	S	10		24				2	2	3	24	5		Light gray CLAY, little silt, medium stiff pp = 0.5, 0.75, 1.0 tons/ft^2 tv = 0.38 tons/ft^2
															46.4 -36.4
-40	50	S	11		4				18	100/3"			>100		Light gray fine to coarse SAND and CLAY, some fine to coarse gravel, little silt, very dense (TILL)
-45	55	S	12		6				52	75	48	100/4"	123		Gray fine to coarse GRAVEL, little fine sand, little silt, wet, very dense (TILL) 56.8 -46.8 Note: Drillers noted top of rock at 56.8ft 60.0

BORING LOG

(continued)

BORING NUMBER: **W-428-5**

SHEET NUMBER: **3** of **3**

PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**

LOCATION: **Cambridge - Somerville - Medford, Massachusetts**

CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**

DRILLER: **M Gallo**

INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	13		0				100/0"				>100		Depth Elev. -50.0 No Recovery Bottom Of Hole - 60ft
-55	65														
-60	70														
-65	75														
-70	80														
-75	85														
-80	90														

BORING LOG

BORING NUMBER: **B-S042-1**
SHEET NUMBER: **1** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **Diedrich D-50 Track Mounted Rig**

LOCATION: **Medford St**
COORD. **N: 2962254** **E: 767241**
STN. NO.: OFFSET:
SURFACE ELEV.: **15.0 feet**
DATUM: **NAVD-88**
START DATE: **6/18/10**
FINISH DATE: **6/23/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ▤
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/23/10	7:00 am	16.0	60.0	80.5

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	Depth Elev.	FIELD CLASSIFICATION AND REMARKS
		S	1		9				7	10	8	10	18			Dark brown fine to coarse SAND, some fine gravel, trace coal fragments, moist, medium dense (FILL)
		S	2		12				17	12	9	11	21			Dark brown fine to coarse SAND and fine to coarse GRAVEL, little silt, moist, medium dense (FILL) (LABORATORY ANALYSIS PERFORMED)
10	5	S	3		8				11	16	14	12	30			Dark brown fine to coarse SAND, some fine to coarse gravel, little coal fragments, moist, medium dense to dense (FILL)
		S	4		5				14	13	11	8	24			Dark brown fine to coarse SAND, some fine to coarse gravel, little coal fragments, moist, medium dense (FILL)
		S	5		4				100/5"				>100		8.5 6.5	Dark brown fine to coarse SAND, some fine to coarse gravel, trace silt, moist, very dense (FILL)
															10.0	Note: Obstruction from 8.5 to 10ft
5	10	S	6		3				3	100/2"			>100		5.0 10.7	Gray SILT and CLAY, some fine sand, trace fine gravel, wet, very dense (FILL)
															4.3 13.0	Note: Obstruction from 10.7 to 13ft
		S	7		0				9	5	5	6	10		2.0	No Recovery
0	15															
		S	8		9				9	7	4	3	11			Dark gray-brown fine SAND and organic SILT, little clay, trace fine gravel, wet, medium dense (LABORATORY ANALYSIS PERFORMED)
		S	9		6				4	3	3	4	6			Dark gray-brown PEAT and organic SILT, little clay, trace fine sand, wet, medium stiff
															19.0	
-5	20	S	10		0				13	5	6	10	11		-4.0	No Recovery; Redrive with 3" spoon: Gray fine SAND and fine to coarse GRAVEL, trace silt, wet, medium dense
															25.0	

BORING LOG

(continued)

BORING NUMBER: **B-S042-1**
SHEET NUMBER: **2** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **M Gallo**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
															Depth Elev.
		S	11		20				5	6	6	7	12		-10.0 Green-gray SILT and CLAY, trace fine to coarse sand, stiff (LABORATORY ANALYSIS PERFORMED) pp=0.5 tons/ft^2 tv=0.33 tons/ft^2
-15	30														30.0
		S	12		24				1	1	2	4	3		-15.0 Green-gray CLAY,wet, soft pp=0.5, 0.5, 1.0 tons/ft^2 tv=0.45, 0.35 tons/ft^2
		U	1			14									Gray CLAY with silt lenses, trace gravel UU-Test Shear Strength = 849 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
-20	35														Green-gray SILT and CLAY,wet, soft
		S	13		24				WOH	WOH	2	2	2		(LABORATORY ANALYSIS PERFORMED) pp=0.5, 0.5, 0.5 tons/ft^2 tv=0.33 tons/ft^2
		V	1												Field Vane Shear Test Shear Strength = 737 lbs/ft^2 Remolded Shear Strength = 481 lbs/ft^2
-25	40														Green-gray CLAY,wet, medium stiff
		S	14		24				WOH	3	3	5	6		pp=0.25, 0.25, 0.5 tons/ft^2 tv=0.35, 0.40 tons/ft^2
-30	45														
		U	2			24									Gray CLAY with silt lenses, trace gravel UU-Test Shear Strength = 1112 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
		S	15		24				WOH	3	3	5	6		Gray SILT and CLAY, wet, medium stiff (LABORATORY ANALYSIS PERFORMED) pp=0.5, 0.75 tons/ft^2 tv=0.35, 0.25 tons/ft^2
-35	50														
		V	2												Field Vane Shear Test
		S	16		24				3	4	5	8	9		Light gray CLAY, wet, stiff pp=0.5, 1.0, 0.5 tons/ft^2 tv=0.23, 0.25 tons/ft^2
															55.0
-40	55	S	17		6				17	30	14	18	44		-40.0 Gray fine to coarse GRAVEL, some fine to coarse sand, trace silt, wet, dense (LABORATORY ANALYSIS PERFORMED)
															60.0

BORING LOG

(continued)

BORING NUMBER: **B-S042-1**

SHEET NUMBER: **3** of **3**

PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**

LOCATION: **Cambridge - Somerville - Medford, Massachusetts**

CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**

DRILLER: **M Gallo**

INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	Depth Elev.	FIELD CLASSIFICATION AND REMARKS
		S	18		1				100/1"				>100		-45.0	Gray CLAY and SILT, very dense (WEATHERED ROCK)
-50	65														65.0	
		C	1		23	74	5	16							-50.0	Dark gray DIABASE, weak, slightly weathered, moderately fractured, fine grained Min/Ft - 6.5, 6.8, 9.5/7"
		C	2		25	71	0	0								Dark gray DIABASE, weak, moderately weathered, moderately fractured, fine grained Min/Ft - 6, 9.5, 10.5/11"
-55	70															Dark gray DIABASE, weak, moderately weathered, moderately fractured, fine grained Min/Ft - 6, 14.5, 9, 7, 6.5
		C	3		36	60	0	0								
-60	75															Dark gray DIABASE, weak, slightly weathered, moderately fractured, fine grained Min/Ft - 2.5, 3.5, 5, 6, 7
		C	4		42	70	10	17								
-65	80														80.5	
															-65.5	Bottom Of Hole - 80.5ft
-70	85															
-75	90															

BORING LOG

BORING NUMBER: **B-S042-2**
SHEET NUMBER: **1** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **S Cooley**
INSPECTOR: **E Fulton**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **CME 750 Rubber Tire ATV Rig**

LOCATION: **Medford St**
COORD. **N: 2962200** **E: 767247**
STN. NO.: OFFSET:
SURFACE ELEV.: **15.0 feet**
DATUM: **NAVD-88**
START DATE: **9/19/10**
FINISH DATE: **9/21/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ▤
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
9/20/10	8:30 am	3.2	19.0	35.0
9/21/10	1:30 pm	16.5	19.0	68.5

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	Depth Elev.	FIELD CLASSIFICATION AND REMARKS
		G	1													Gray and dark brown fine to coarse GRAVEL (Ballast), little fine to coarse sand, trace silt, dry (FILL)
																Dark brown medium SAND, little fine gravel, little silt, trace fine and coarse sand, moist (FILL)
10	5	S	1		13				3	3	4	4	7			Olive and light brown SILT and CLAY, trace fine to coarse sand, trace fine gravel, medium stiff (FILL) (LABORATORY ANALYSIS PERFORMED)
		S	2		16				4	8	7	7	15			Black/dark medium to coarse SAND, little fine gravel, little silt, little ash/cinders, trace fine sand, moist to wet, medium dense (FILL)
5	10	S	3		6				14	5	4	8	9			Gray fine SAND, some silt, some wood, trace fine gravel, trace medium to coarse sand, wet, loose (FILL)
															11.0	
		S	4		9				10	5	4	10	9		4.0	Dark brown to brown mottled gray SILT, some fine to coarse sand, little clay, trace fine gravel, wet, stiff (LABORATORY ANALYSIS PERFORMED)
		S	5		11				5	4	3	3	7			Green and gray SILT and CLAY, little fine sand, trace fine gravel, trace peat, wet, medium stiff
0	15															
		S	6		0				3	8	11	12	19			No Recovery
		S	7		0				12	14	13	13	27			No Recovery; Redrive with 3" spoon: Olive brown mottled gray SILT and CLAY, trace fine sand, trace peat, very stiff (LABORATORY ANALYSIS PERFORMED)
															19.5	
-5	20														-4.5	
		S	8		0				5	6	8	11	14			No Recovery; Redrive with 3" spoon: Top 12": Olive brown SILT, little clay, stiff Bot 12": Olive brown CLAY, some silt pp = 1.5, 1.25 tons/ft^2
		U	1		24											Gray lean CLAY, very stiff consistency UU-Test Shear Strength = 2197 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)

BORING LOG

(continued)

BORING NUMBER: **B-S042-2**
SHEET NUMBER: **2** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **S Cooley**
INSPECTOR: **E Fulton**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		S	9		24				4	5	5	4	10		Olive brown and gray SILT and CLAY, stiff pp = 1.0 tons/ft^2
		V	1												Field Vane Shear Test Shear Strength = 775 lbs/ft^2 Remolded Shear Strength = 465 lbs/ft^2
-15	30	S	10		24				1	2	3	3	5		Olive brown and gray SILT and CLAY, stiff pp = 0.5 tons/ft^2
		U	2		24										Gray fat CLAY, stiff consistency UU-Test Shear Strength = 1175 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
-20	35	S	11		24				1	2	3	2	5		Olive brown and gray CLAY, some silt seams, medium stiff pp = 0.5 tons/ft^2
		V	2												Field Vane Shear Test Shear Strength = 682 lbs/ft^2 Remolded Shear Strength = 372 lbs/ft^2
-25	40	S	12		24				2	2	2	2	4		Olive gray CLAY, little silt, soft to medium stiff pp = 0.5 tons/ft^2
		U	3		24										Gray fat CLAY, stiff consistency UU-Test Shear Strength = 1255 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
-30	45	S	13		24				2	3	4	4	7		Depth Elev. 45.0 -30.0 Olive gray SILT, some clay, trace fine to medium sand, medium stiff (LABORATORY ANALYSIS PERFORMED) pp = 1.0 tons/ft^2 48.5
-35	50	S	14		5				18	16	15	20	31		-33.5 Gray SILT and fine SAND, little fine gravel, trace clay, dense (TILL)
-40	55	S	15		6				13	23	23	23	46		57.0 Gray SILT and fine to coarse SAND, little fine gravel, little clay, dense (TILL) (LABORATORY ANALYSIS PERFORMED) -42.0 Note: Top of weathered rock noted by driller at depth 57ft 58.5 -43.5 Gray ARGILLITE, weak to medium strong, unweathred to highly weathered, fine grained

BORING LOG

(continued)

BORING NUMBER: **B-S042-2**
SHEET NUMBER: **3** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **S Cooley**
INSPECTOR: **E Fulton**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		C	1		60	100	23	38							Min/Ft - 5.5, 5, 5, 5.5, 5
-50	65	C	2		53	88	12	20							Gray ARGILLITE, weak to medium strong, unweathred to highly weathered, fine grained Unconfined Compressive Strength = 6.54 KSI (LABORATORY ANALYSIS PERFORMED)
															Min/Ft - 5, 5.5, 5.5, 5, 5
															Depth 68.5 Elev. -53.5 Bottom Of Hole - 68.5ft
-55	70														
-60	75														
-65	80														
-70	85														
-75	90														

BORING LOG

BORING NUMBER: **B-S042-3**
SHEET NUMBER: **1** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **S Cooley**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **CME 750 Rubber Tire ATV Rig**

LOCATION: **Medford St**
COORD. **N: 2962248** **E: 767319**
STN. NO.: OFFSET:
SURFACE ELEV.: **14.5 feet**
DATUM: **NAVD-88**
START DATE: **9/27/10**
FINISH DATE: **9/29/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ▤
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
9/28/10	8:15 am	8.4	20.0	40.0

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
															Depth / Elev.
															1.0 BALLAST, little fine to coarse sand, little silt
		G	1	☒											13.5 Black fine to coarse SAND, some ash/cinders, little fine gravel, little silt, dry (FILL)
10	5														
		S	1	■	7				7	7	7	12	14		Black fine to coarse SAND, some ash/cinders, little fine gravel, little silt, dry, medium dense (FILL)
		S	2	■	4				9	7	9	8	16		Black fine to coarse SAND, some ash/cinders, little fine gravel, little silt, dry, medium dense (FILL)
5	10	S	3	■	10				7	4	4	4	8		Black fine to coarse SAND, some fine gravel, little ash/cinders, little silt, dry, loose (FILL) (LABORATORY ANALYSIS PERFORMED)
		S	4	■	3				10	2	5	4	7		Black fine to coarse SAND, some ash/cinders, little fine gravel, little silt, dry, loose (FILL)
															13.0
		S	5	■	16				3	3	6	12	9		1.5 Gray SILT and CLAY, trace fine to coarse sand, trace peat, wet, stiff (LABORATORY ANALYSIS PERFORMED)
0	15														
		S	6	■	0				24	29	29	34	58		No Recovery
															17.0
		S	7	■	13				7	9	10	14	19		-2.5 Brown SILT, trace clay, wet, medium dense
-5	20														
		S	8	■	16				5	7	9	12	16		Brown SILT, little clay, wet, medium dense
-10															25.0

BORING LOG

(continued)

BORING NUMBER: **B-S042-3**
SHEET NUMBER: **2** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **S Cooley**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
															Depth Elev.
		S	9		24				4	4	6	6	10		-10.5 Gray SILT and CLAY, trace fine sand, wet, stiff (LABORATORY ANALYSIS PERFORMED) pp= 1.5, 1.75 tons/ft^2 tv= 0.15, 0.20 tons/ft^2
		U	1		24										Gray lean CLAY, stiff consistency UU-Test Shear Strength = 1565 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
-15	30	S	10		24				2	2	2	3	4		Olive gray CLAY, wet, soft to medium stiff pp= 1.25, 1.25 tons/ft^2 tv= 0.3, 0.35 tons/ft^2
		V	1												Field Vane Shear Test Shear Strength = 876 lbs/ft^2 Remolded Shear Strength = 248 lbs/ft^2
-20	35	S	11		24				2	2	2	3	4		Olive gray CLAY, wet, soft to medium stiff pp= 1.0 tons/ft^2 tv= 0.43 tons/ft^2
		U	2		24										Gray lean CLAY, stiff consistency UU-Test Shear Strength = 1258 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
-25	40	S	12		24				2	2	4	4	6		Light gray SILT and CLAY, wet, medium stiff (LABORATORY ANALYSIS PERFORMED) pp= 0.5, 0.75 tons/ft^2 tv= 0.4 tons/ft^2
		V	2												Field Vane Shear Test
-30	45	S	13		24				WOH	WOH	2	3	2		Olive brown CLAY, wet, soft pp= 0.5, 0.75 tons/ft^2 tv= 0.4, 0.45 tons/ft^2
		U	3		14										Gray lean CLAY, stiff consistency 49.0 UU-Test Shear Strength = 1480 lbs/ft^2
-35	50	S	14		10				24	20	27	18	47		-34.5 (LABORATORY ANALYSIS PERFORMED) Gray fine SAND, trace silt, trace clay, wet, dense
-40	55	S	15		9				19	33	28	28	61		Gray fine to coarse SAND, some fine to coarse gravel, some silt, wet, very dense (LABORATORY ANALYSIS PERFORMED)
-45															58.5 -44.0 Dark green DIABASE, medium strong, highly weathered, moderately to extemely fractured, fine

BORING LOG

(continued)

BORING NUMBER: **B-S042-3**

SHEET NUMBER: **3** of **3**

PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**

LOCATION: **Cambridge - Somerville - Medford, Massachusetts**

CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**

DRILLER: **S Cooley**

INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
															Depth Elev.
		C	1		58	97	0	0							grained Min/Ft - 8.8, 3.8, 3.8, 4, 4.5
-50	65	C	2		60	100	31	52							Dark green DIABASE, medium strong, moderately to slightly weathered, sound to extemely fractured, fine grained Unconfined Compressive Strength = 23.09 KSI (LABORATORY ANALYSIS PERFORMED) Min/Ft - 4, 3.5, 2.5, 2.5, 3.5
															68.5
-54.0															Bottom Of Hole - 68.5ft
-55	70														
-60	75														
-65	80														
-70	85														
-75	90														
-80															

BORING LOG

BORING NUMBER: **B-S042-4**
SHEET NUMBER: **1** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**
CONTRACTOR: **NH Boring Company**
DRILLER: **S Cooley**
INSPECTOR: **G Brooks**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **CME 750 Rubber Tire ATV Rig**

LOCATION: **Medford St**
COORD. **N: 2962198** **E: 767332**
STN. NO.: OFFSET:
SURFACE ELEV.: **15.0 feet**
DATUM: **NAVD-88**
START DATE: **9/22/10**
FINISH DATE: **9/24/10**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ▤
I.D.	4"	1.375"	"	"	Hand auger	1.875"
O.D.	4.5"	2"	"	"	Hand Auger	2.980"
Length	60"	24"	"	"	60"	7.5'
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		N	
Hammer Fall	24"	30"	I.D. (O.D.)		1.875" (2.65")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
9/24/10	8:00 am	14.6	54.0	57.0

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
		G	1	☒											Dark and light brown fine to coarse GRAVEL, dry
10	5	S	1	■	3				5	7	7	13	14		Dark brown fine to coarse SAND, little fine gravel, dry, medium dense (FILL)
		S	2	■	9				18	12	13	20	25		Brown SILT, little fine gravel, little fine to coarse sand, trace clay, dry, medium dense (FILL) (LABORATORY ANALYSIS PERFORMED)
5	10	S	3	■	10				8	5	6	5	11		Brown fine to coarse SAND and fine to coarse GRAVEL, little silt, wet, medium dense (FILL)
															Depth 11.0 / Elev. 4.0
		S	4	■	8				5	4	5	4	9		Dark brown fine to coarse SAND, some fine to coarse gravel, trace silt, wet, loose
		S	5	■	13				2	5	8	11	13		Gray fine to medium SAND, some silt, little coarse sand, trace fine gravel, wet, medium dense (LABORATORY ANALYSIS PERFORMED)
0	15	S	6	■	7				7	8	11	14	19		Dark brown fine SAND, some silt, little fine gravel, wet, medium dense
		S	7	■	0				7	10	13	16	23		No Recovery
															Depth 19.0 / Elev. -4.0
-5	20	S	8	■	24				13	12	10	15	22		Olive brown CLAY, some silt, trace fine sand, moist, very stiff pp= 3.5, 3.25 tons/ft^2 tv= 0.53, 0.5 tons/ft^2
		S	9	■	6				5	8	8	9	16		Gray-brown SILT and CLAY, trace fine to coarse sand, wet, very stiff (LABORATORY ANALYSIS PERFORMED)

BORING LOG

(continued)

BORING NUMBER: **B-S042-4**
SHEET NUMBER: **2** of **3**
PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**
LOCATION: **Cambridge - Somerville - Medford, Massachusetts**
CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**
DRILLER: **S Cooley**
INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	Depth / Elev.	FIELD CLASSIFICATION AND REMARKS
																pp= 1.0, 1.5 tons/ft^2
		U	1		24											Gray lean CLAY, stiff consistency UU-Test Shear Strength = 2129 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
		S	10		24				2	4	5	4	9			Olive brown CLAY, trace silt, stiff pp= 1.0, 1.0 tons/ft^2 tv= 0.4 tons/ft^2
-15	30															
		V	1													Field Vane Shear Test
		S	11		24				2	3	4	5	7			Olive brown CLAY, wet, medium stiff pp= 1.0, 1.0 tons/ft^2 tv= 0.4 tons/ft^2
-20	35															
		U	2		24											Gray lean CLAY, stiff consistency UU-Test Shear Strength = 1813 lbs/ft^2 (LABORATORY ANALYSIS PERFORMED)
		S	12		24				3	4	6	6	10			Olive gray SILT and CLAY, wet, stiff (LABORATORY ANALYSIS PERFORMED) pp= 1.0, 1.3 tons/ft^2 tv= 0.6, 0.58 tons/ft^2
-25	40															
		V	2													Field Vane Shear Test
		S	13		24				3	3	4	5	7			Olive gray CLAY, wet, medium stiff pp= 1.0, 1.25 tons/ft^2 tv= 0.4, 0.43 tons/ft^2
-30	45														47.0	
		S	14		24				25	16	22	43	38		-32.0	Olive gray CLAY, some fine sand, little fine gravel, little silt, dense (TILL)
-35	50															
		S	15		6				7	10	11	13	21			Gray fine to coarse GRAVEL, some fine to coarse sand, trace silt, wet, medium dense (TILL) (LABORATORY ANALYSIS PERFORMED)
-40	55														57.0	
		S	16		6				22	31	49	84	80		-42.0 59.0	Gray and dark gray fine to coarse GRAVEL, wet, very dense (WEATHERED ROCK)
															-44.0	

BORING LOG

(continued)

BORING NUMBER: **B-S042-4**

SHEET NUMBER: **3** of **3**

PROJECT NUMBER: **52432S**

PROJECT: **Green Line Extension**

LOCATION: **Cambridge - Somerville - Medford, Massachusetts**

CLIENT: **MassDOT**

CONTRACTOR: **NH Boring Company**

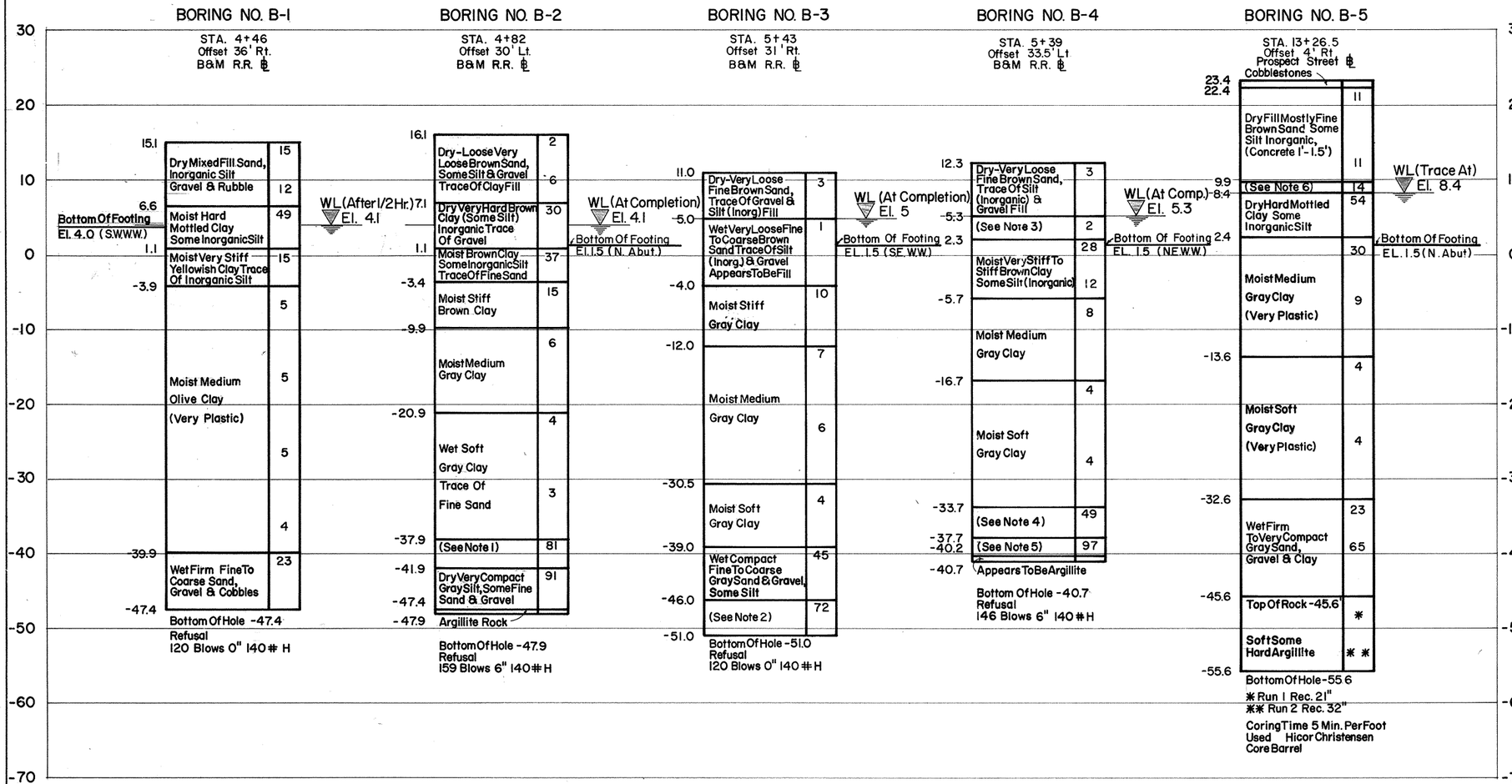
DRILLER: **S Cooley**

INSPECTOR: **G Brooks**

ELEVATION (feet)	DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE RECOVERY (in.)	SAMPLE RECOVERY (%)	SAMPLE RQD (in.)	SAMPLE RQD (%)	SOIL BLOWS/6 in. ON SAMPLER (* denotes 300 lb hammer) 0/6	6/12	12/18	18/24	N VALUE	GRAPHIC LOG	FIELD CLASSIFICATION AND REMARKS
															Depth Elev.
		C	1		55	92	0	0							Greenish gray ARGILLITE, weak to extremely weak, highly weathered, moderately to extremely fractured, fine grained Min/Ft - 4.5, 7, 16.5, 4.5, 3
-50	65														
		C	2		55	92	4	7							Greenish gray ARGILLITE, weak to medium strong, moderately weathered, moderately to extremely fractured, fine grained Min/Ft - 4, 5, 3.5, 3.5, 5
-55	70														70.5
															-55.5 Bottom Of Hole - 70.5ft
-60	75														
-65	80														
-70	85														
-75	90														

SOMERVILLE - PROSPECT STREET

PUB. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	MASS.				



GENERAL NOTES FOR BORINGS:

A. Ground Surface Elevation Based On U.S.C. & G.S. Mean Sea Level.

B. Borings Do Not Necessarily Show The Nature Of Materials To Be Encountered During Construction. They Are Taken For Design Purposes & Show Conditions At Boring Points Only.

C. Water Levels Shown Were Observed When Borings Were Taken, And Do Not Necessarily Indicate Ground Water Elevations.

D. Figures In The Right Hand Column Indicate Number Of Blows Required To Drive A 2" O.D. Spoon Sampler 12" Using 140-lb Weight Falling 30" Unless Otherwise Noted.

E. Borings Were Taken By Northeast Test Boring Co. Inc., Weymouth, Massachusetts; During April 1977.

F. The Depths As Shown On The Original Boring Logs Have Been Converted To Elevations On These "BORINGS LOGS" By The Engineer.

G. Boring Samples May Be Examined At The Offices Of D. P. W. Research And Materials Division, 99 Worcester Street, Wellesley, Massachusetts 02181. (Intersection Of Routes 9 And 128).

H. Boring Locations Are Shown Thus ⊕ On Sheet 1.

NOTES:

1. Wet Very Compact Fine Gray Sand Some Silt (Inorganic) Trace Of Gravel.
2. Moist Very Compact Gray Silt Some Gravel & Fine Sand.
3. Wet Very Loose Brown Silt, (Inorganic) Gravel, Some Sand & Clay Fill.
4. Wet Compact Fine To Coarse Gray Sand And Gravel, Some Silt (Inorganic).
5. Moist V. Compact Gray Silt (Inorg.) Some Fine Sand & Gravel.
6. Dry Firm Mixed Fill Cinders, Inorg. Silt.

GENERAL NOTES (CONT.)

SURVEY BOOK NUMBERS

Survey Notebooks Used In The Preparation Of Construction Drawings:
Baseline: 17438; 23472; 36539
Details: 17438; 19028; 36539
Cross Sections: 34715; 40201

UTILITIES

All Existing Utilities Shall Be Located And Protected By The Contractor. Test Pits Shall Be Performed By The Contractor, Prior To Construction To Determine Exact Utility Locations. (In Particular, This Shall Include; Gas, Electric, Telegraph & Sewer Lines Located In The Abutment Areas.)

STANDARD PROTECTIVE SCREEN

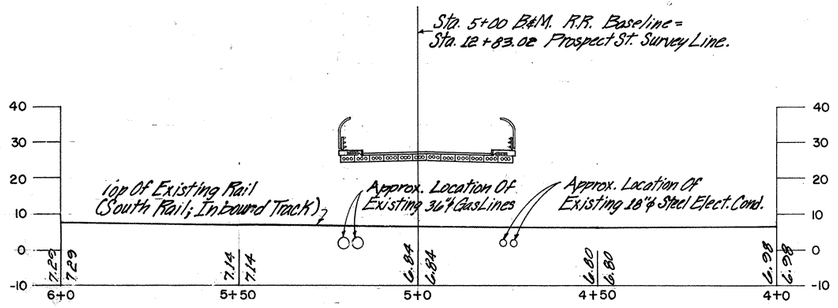
See Department Standard Plans Dated Jan., 1975; Revised May 1976 For Details Of Protective Screen. Also See Special Provisions For Project Requirements.

BRIDGE RAILING

See Department Standard Plans Dated Oct. 1978 For Details Of Bridge Railing.

DIMENSIONS

All Dimensions And Details Shown For Existing Structure Shall Be Checked In The Field By The Contractor. Plans Of The Existing Structure Are Available At The Office Of The Bridge Section, 100 Nashua St. Boston Mass.



PROFILE B. & M. R.R.
SCALE: 1" = 20'
(VIEW LOOKING DOWNSTATION)

SCALE IN FEET
0 8 20 40

APR. 24, 1982	ISSUED FOR CONSTRUCTION

BORING LOGS
Scale: 1" = 8'

SHEET 2 OF 9 SHEETS BRIDGE NO. S-17-20

BORING REPORT	Boring: PB-1
LOCATION: Somerville, Massachusetts	
PROJECT NAME: Union Square Utility and Roadway Improvements Project	Date Started: 8/18/2014
	Date Finished: 8-18-2014
PB PROJECT NUMBER: 52647	N. Coordinate 2963671
INSPECTOR (Parsons Brinckerhoff): David D'Angelo	E. Coordinate 765287
DRILLER (New Hampshire Boring): Mark D'Ambrosio	Surface Elevation: 13.0

Groundwater Observations:

Measured at depth of 12.9 feet from ground surface post well installation

	Casing				Auger		Mud	Sampler		Core Barrel			
Utilized													
Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
Size I.D. (in)			4					1 3/8					
Hammer (lb)			300					140		Type		Diamond	
Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
0								0 to 0.5' Concrete Sidewalk
							0.5	
		G-1	0.5 - 2.5				12.5	Brown fine to coarse SAND and fine to coarse GRAVEL
1								little silt
								- NRCS Texture: Loamy sand, very gravelly (LS,GRV)
								- Hydrologic Soil Group: C
2								
							2.5	
		S-1	2.5 - 4.5	8 8 6 4	24	14	8.5	Brown fine to coarse SAND and fine to coarse GRAVEL
3								trace silt, medium dense
								- NRCS Texture: Loamy sand, very gravelly (LS,GRV)
								- Hydrologic Soil Group: B
4								
		S-2	4.5 - 6.5	3 2 3 3	24	12		Brown fine to medium SAND, trace fine to coarse
5								gravel, trace silt, loose
								- NRCS Texture: Loamy sand (LS)
								- Hydrologic Soil Group: B
6								
							6.5	
		S-3	6.5 - 8.5	7 7 7 10	24	18	6.5	Brown fine SAND, trace silt, medium dense
7								- NRCS Texture: Sand (S)
								- Hydrologic Soil Group: A

NOTES: 1. Boring drilled using a truck-mounted Diedrich D-50 rig

2. Split spoon samples taken using a 140# safety hammer and rope & cathead

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-1

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8/18/2014

Date Finished: 8-18-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963671

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765287

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 13.0

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
8								
		S-4	8.5 - 10.5	11 9 8 9	24	20		Brown fine to medium SAND, trace silt, medium dense
9								- NRCS Texture: Sand (S)
								- Hydrologic Soil Group: A
10								
		S-5	10.5 - 12.5	7 10 10 12	24	12		Brown fine to medium SAND, trace silt, medium dense
11								- NRCS Texture: sand (S)
								- Hydrologic Soil Group: A
12								
		S-6	12.5 - 14.5	10 11 8 10	24	19		Brown fine to medium SAND, little fine gravel, trace
13								silt, medium dense
								- NRCS Texture: Sand (S)
								- Hydrologic Soil Group: A
14								
15							15.0	

NOTES: 1. Boring drilled using a truck-mounted Diedrich D-50 rig

2. Split spoon samples taken using a 140# safety hammer and rope & cathead

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-1

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8/18/2014

Date Finished: 8-18-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963671

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765287

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 13.0

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
15		S-7	15 - 17	16 17 19 30	24	10	-2.0	Brown fine SAND, little silt, dense - NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B
20		S-8	20 - 22	8 10 13 16	24	14		Brown fine SAND, little silt. Medium dense - NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B

NOTES: 1. Boring drilled using a truck-mounted Diedrich D-50 rig

2. Split spoon samples taken using a 140# safety hammer and rope & cathead

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-1

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8/18/2014

Date Finished: 8-18-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963671

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765287

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 13.0

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
23								
24								
25								
		S-9	25 - 27	10 11 8 13	24	16		S-9A (above 26'): Brown fine SAND, trace silt, medium dense
26							26.0	- NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B
							-13.0	S-9B (below 26'): Gray CLAY, little silt, very stiff
27							27.0	- NRCS Texture: Clay (C) - Hydrologic Soil Group: D
28							-14.0	Bottom of Boring 27 feet NOTE: Observation well installed with depths as follows: Screen: 14.5' to 24.5' Riser: ~0.5' to 14.5' Well Sand: 10' to 27' Bentonite Plug: 8' to 10'
29								
30								

NOTES: 1. Boring drilled using a truck-mounted Diedrich D-50 rig

2. Split spoon samples taken using a 140# safety hammer and rope & cathead

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-2

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8/12/2014

Date Finished: 8-12-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963538

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765676

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 10.3

Groundwater Observations:

Estimated at ~10.0 feet

	Casing				Auger		Mud	Sampler		Core Barrel			
Utilized													
Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
Size I.D. (in)			4					1 3/8					
Hammer (lb)			300					140		Type		Diamond	
Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
0								0 to 0.6' Asphalt pavement
							0.6	
							9.7	0.6' to 1.3' Brown fine to coarse SAND, some fine to
1								coarse gravel, little silt
							1.3	
							9.0	1.3' to 1.8' Concrete
							1.8	
2							8.5	
		S-1	2 - 4	9 6 5 6	24	14		Brown fine to coarse SAND, little silt, little fine to
								coarse gravel, medium dense
								- NRCS Texture: Sandy loam, gravelly (SL,GR)
3								- Hydrologic Soil Group: C
4								
		S-2	4 - 6	6 9 7 5	24	1		S-2: 1 inch of recovery. Spoon likely pushing gravel.
								Material presumed similar to S-1
5								
6							6.0	
		S-3	6 - 8	6 4 3 3	24	0	4.3	S-3: No recovery. Spoon likely pushing gravel.
								Material presumed similar to S-4A
7								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT	Boring: PB-2
LOCATION: Somerville, Massachusetts	
PROJECT NAME: Union Square Utility and Roadway Improvements Project	Date Started: 8/12/2014
	Date Finished: 8-12-2014
PB PROJECT NUMBER: 52647	N. Coordinate 2963538
INSPECTOR (Parsons Brinckerhoff): David D'Angelo	E. Coordinate 765676
DRILLER (New Hampshire Boring): Mark D'Ambrosio	Surface Elevation: 10.3

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
								S-4A (above 8.5'): Brown fine to coarse SAND, some silt,
8								trace fine coarse gravel, trace brick, loose
		S-4	8 - 10	4 4 5 4	24	24		- NRCS Texture: Sandy loam, gravelly (SL, GR)
							8.5	- Hydrologic Soil Group: C
							1.8	S-4B (8.5' to 9.5'): Dark gray-brown ORGANIC SILT and
9								PEAT, stiff
								- NRCS Texture: Silt, peaty (Si, PT)
							9.5	- Hydrologic Soil Group: D
							0.8	S-4C and S-5A (9.5' to 10.5'): Gray-brown fine to coarse
10								SAND, some silt, very loose to loose
		S-5	10 - 12	2 2 2 2	24	16		- NRCS Texture: Sandy loam (SL)
							10.5	- Hydrologic Soil Group: C
							-0.2	S-5B (below 10.5'): Gray fine to coarse SAND, little silt,
11								trace fine to coarse gravel, very loose to loose
								- NRCS Texture: Loamy sand (LS)
								- Hydrologic Soil Group: C
12							12.0	
		S-6	12 - 14	8 10 10 12	24	20	-1.7	Gray-Brown fine SAND, trace silt, medium dense
								- NRCS Texture: Loamy sand (LS)
								- Hydrologic Soil Group: B
13								
14								
15								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-2

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8/12/2014

Date Finished: 8-12-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963538

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765676

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 10.3

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
15		S-7	15 - 17	8 13 16 17	24	12		Brown fine SAND, little silt, medium dense - NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B
20		S-8	20 - 22	6 9 10 10	24	12		Brown fine SAND, little silt, medium dense - NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-2

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8/12/2014

Date Finished: 8-12-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963538

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765676

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 10.3

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
23								
							23.5	
							-13.2	
24								
								S-9A (above 25.5'): Brown fine to medium SAND, some silt, medium dense
25								
		S-9	25 - 27	9 5 18 11	24	20		- NRCS Texture: Sandy loam (SL)
							25.5	- Hydrologic Soil Group: C
							-15.2	S-9B (below 25.5'): Gray SILT and fine SAND, little clay, medium dense
26								- NRCS Texture: Silt loam (SiL)
								- Hydrologic Soil Group: D
27								
28								
							28.5	
							-18.2	
29								
30								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-2

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8/12/2014

Date Finished: 8-12-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963538

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765676

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 10.3

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
30		S-10	30 - 32	7 9 14 13	24	24		Gray CLAY, little silt, very stiff
								- NRCS Texture: Clay (C)
								- Hydrologic Soil Group: D
31								
32							32.0	
							-21.7	Bottom of Boring 32 feet
33								
34								
35								
36								
37								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-3

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-4-2014

Date Finished: 8-14-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963366

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766023

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 9.2

Groundwater Observations:

Measured at depth of 9.0 feet from ground surface post well installation

	Casing				Auger		Mud	Sampler		Core Barrel			
Utilized													
Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
Size I.D. (in)			4					1 3/8					
Hammer (lb)			300					140		Type		Diamond	
Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
0								0 to 0.5' Asphalt pavement
							0.5	
		G-1	0.5 - 7.0				8.7	Brown fine to coarse SAND, little silt, trace fine to coarse gravel, trace cobbles - NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B
1								
2								
3								
4								
5								
6								
7							7	
		S-1	7 - 9	9 14 14 15	24	6	2.2	Brown fine to coarse SAND, trace fine to medium gravel, medium dense

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 7 feet on 8-4 and drilled from 7 feet to 27 feet on 8-14

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT	Boring: PB-3
LOCATION: Somerville, Massachusetts	
PROJECT NAME: Union Square Utility and Roadway Improvements Project	Date Started: 8-4-2014
	Date Finished: 8-14-2014
PB PROJECT NUMBER: 52647	N. Coordinate 2963366
INSPECTOR (Parsons Brinckerhoff): David D'Angelo	E. Coordinate 766023
DRILLER (New Hampshire Boring): Mark D'Ambrosio	Surface Elevation: 9.2

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
								- NRCS Texture: sand (S)
8								- Hydrologic Soil Group: A
9							9	
		S-2	9 - 11	15 12 15 18	24	5	0.2	Brown fine to medium SAND,little silt, trace fine gravel,
								medium dense
								- NRCS Texture: Loamy sand (LS)
10								- Hydrologic Soil Group: B
11								
		S-3	11 - 13	9 10 11 13	24	20		Brown fine to medium SAND, trace silt, trace fine gravel,
								medium dense
								- NRCS Texture: Sand (S)
12								- Hydrologic Soil Group: B
13								
14								
							14.5	
							-5.3	
15								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 7 feet on 8-4 and drilled from 7 feet to 27 feet on 8-14

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-3

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-4-2014

Date Finished: 8-14-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963366

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766023

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 9.2

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
15		S-4	15 - 17	10 10 17 20	24	13		Brown fine to coarse SAND, trace silt, medium dense
								- NRCS Texture: Sand (S)
								- Hydrologic Soil Group: A
16								
17							17	
							-7.8	
18								
19								
20								
		S-5	20 - 22	13 20 32 39	24	20		
								S-5A (above 21'): Brown fine SAND, some silt, dense
								- NRCS Texture: Sand (S)
21							21	- Hydrologic Soil Group: A
							-11.8	S-5B (below 21'): Brown fine to coarse GRAVEL, some ,
								silt, some fine to coarse sand
								- NRCS Texture: Sandy loam, extremely gravelly (SL,GRX)
22								- Hydrologic Soil Group: D

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 7 feet on 8-4 and drilled from 7 feet to 27 feet on 8-14

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-3

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-4-2014

Date Finished: 8-14-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963366

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766023

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 9.2

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
23							23	
							-13.8	
24								
25								
		S-6	25 - 27	7 7 8 12	24	8		Gray CLAY, little silt, stiff to very stiff - NRCS Texture: Clay (C) - Hydrologic Soil Group: D
26								
27							27	
							-17.8	Bottom of Boring 27 feet
28								NOTE: Observation well installed with depths as follows: Screen: 9.5' to 24.5' Riser: ~0.5' to 9.5' Well Sand: 7' to 27' Bentonite Plug: 4' to 7'
29								
30								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 7 feet on 8-4 and drilled from 7 feet to 27 feet on 8-14

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-4

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-13-2014

Date Finished: 8-13-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963218

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766334

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 8.8

Groundwater Observations:

Measured at ~9.0 feet

	Casing				Auger		Mud	Sampler		Core Barrel			
Utilized													
Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
Size I.D. (in)			4					1 3/8					
Hammer (lb)			300					140		Type		Diamond	
Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
0								0 to 0.5' Asphalt Pavement
							0.5	
							8.3	0.5' to 1.0' Cobblestones
1							1.0	
							7.8	
		S-1	1.5 - 3.5	21 9 6 12	24	18		Brown fine to coarse SAND, some silt, tace fine gravel
2								medium dense
								- NRCS Texture: Sandy loam (SL)
								- Hydrologic Soil Group: C
3								
							3.5	
		S-2	3.5 - 5.5	14 10 12 11	24	18	5.3	Brown fine to medium SAND, trace silt, trace fine
4								gravel, medium dense
								- NRCS Texture: Sand (S)
								- Hydrologic Soil Group: B
5								
							5.5	
		S-3	5.5 - 7.5	14 14 10 10	24	19	3.3	Light brown fine to medium SAND, little silt, medium dense
6								- NRCS Texture: Loamy Sand (LS)
								- Hydrologic Soil Group: B
7								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-4

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-13-2014

Date Finished: 8-13-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963218

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766334

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 8.8

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
		S-4	7.5 - 9.5	10 9 9 10	24	19		S-4A (above 8.5'): Light brown fine SAND, little silt,
8								medium dense
								- NRCS Texture: Loamy Sand (LS)
							8.5	- Hydrologic Soil Group: B
							0.3	S-4B (below 8.5'): Gray fine SAND, trace silt, medium
9								dense
								- NRCS Texture: Sand (S)
								- Hydrologic Soil Group: A
		S-5	9.5 - 11.5	5 6 8 9	24	24		Gray fine SAND, trace silt, medium dense
10								- NRCS Texture: Sand (S)
								- Hydrologic Soil Group: A
11								
		S-6	11.5 - 13.5	4 6 9 14	24	24		Gray fine to medium SAND, trace silt, medium dense
12								- NRCS Texture: Sand (S)
								- Hydrologic Soil Group: A
13								
14								
15								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-4

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-13-2014

Date Finished: 8-13-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963218

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766334

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 8.8

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
15		S-7	15 - 17	6 9 10 12	24	6		Gray fine to medium SAND, trace silt, medium dense - NRCS Texture: Sand (S) - Hydrologic Soil Group: A
16								
17								
18								
							18.5	
							-9.7	
19								
20								
		S-8	20 - 22	14 14 20 24	24	18		Brown stratified fine to medium SAND and SILT, trace clay, dense - NRCS Texture: Sandy loam - Silt Loam (SL - SiL) - Hydrologic Soil Group: D
21								
22								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-4

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-13-2014

Date Finished: 8-13-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963218

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766334

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 8.8

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
23							23.5	
24							-14.7	
25		S-9	25 - 27	5 5 6 8	24	24		Gray CLAY, little silt, stiff - NRCS Texture: Clay (C) - Hydrologic Soil Group: D
26								
27								
28								
29								
30								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-4

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-13-2014

Date Finished: 8-13-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963218

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766334

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 8.8

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
30		S-10	30 - 32	4 4 4 5	24	24		Gray CLAY, little silt, medium stiff to stiff
								- NRCS Texture: Clay (C)
								- Hydrologic Soil Group: D
31								
32							32.0	
							-23.2	Bottom of Boring 32 feet
33								
34								
35								
36								
37								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-5

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-5-2014

Date Finished: 8-5-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2962956

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766871

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 8.8

Groundwater Observations:

Measured at ~9.0 feet

	Casing				Auger		Mud	Sampler		Core Barrel			
Utilized													
Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
Size I.D. (in)			4					1 3/8					
Hammer (lb)			300					140		Type		Diamond	
Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
0							0.3	0 to 0.3' Asphalt Pavement
							8.5	0.3' to 0.7' Cobblestones
							0.7	
1							8.1	
		S-1	1 - 3	4 5 6 8	24	17		Brown fine to coarse SAND, little silt, trace fine gravel, medium dense - NRCS Texture: Loamy Sand (LS) - Hydrologic Soil Group: C
2								
3							3.0	
		S-2	3 - 5	8 8 8 8	24	19	5.8	Brown fine to coarse SAND, trace silt, trace fine gravel, medium dense - NRCS Texture: Sand (S) - Hydrologic Soil Group: B
4								
5							5.0	
		S-3	5 - 7	11 11 8 10	24	14	3.8	Brown fine to medium SAND, trace silt, trace fine gravel, medium dense - NRCS Texture: Sand (S) - Hydrologic Soil Group: A
6								
7							7.0	
		S-4	7 - 9	10 11 9 10	24	20	1.8	Brown fine to medium SAND, trace silt, trace fine gravel, medium dense

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-5

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-5-2014

Date Finished: 8-5-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2962956

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766871

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 8.8

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
8								- NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B
9							9.0	
10		S-5	9 - 11	7 9 8 8	24	20	-0.2	Brown fine to coarse SAND, medium dense - NRCS Texture: Sand (S) - Hydrologic Soil Group: A
11							11.0	
12		S-6	11 - 13	9 18 20 17	24	24	-2.2	Brown fine SAND, trace silt, dense - NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B
13								
14								
15								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-5

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-5-2014

Date Finished: 8-5-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2962956

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766871

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 8.8

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
15		S-7	15 - 17	9 9 10 13	24	10		Brown fine to medium SAND, trace silt, medium dense - NRCS Texture: Sand (S) - Hydrologic Soil Group: B
16								
17								
18							18.0	
							-9.2	
19								
20								
		S-8	20 - 22	7 18 19 25	24	14		Brown stratified fine SAND and SILT, trace clay, dense - NRCS Texture: Sandy loam - Silt Loam (SL - SiL) - Hydrologic Soil Group: D
21								
22								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-5

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-5-2014

Date Finished: 8-5-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2962956

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766871

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 8.8

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
23								
							23.5	
							-14.7	
24								
25								
		S-9	25 - 27	WOR 4 4 5	24	24		Gray CLAY, little silt, medium stiff to stiff - NRCS Texture: Clay (C) - Hydrologic Soil Group: D
26								
27								
28								
29								
30								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-5

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-5-2014

Date Finished: 8-5-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2962956

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766871

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 8.8

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
30		S-10	30 - 32	2 2 3 3	24	24		Gray CLAY, little silt, medium stiff
								- NRCS Texture: Clay (C)
								- Hydrologic Soil Group: D
31								
32							32.0	
							-23.2	Bottom of Boring 32 feet
33								NOTE: Observation well installed with depths as follows:
								Screen: 15' to 25'
								Riser: ~0.5' to 15'
								Well Sand: 14' to 25'
34								Bentonite Plug: 13' to 14'
35								
36								
37								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-6

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-7-2014

Date Finished: 8-7-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2962669

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 767218

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 9.5

Groundwater Observations:

Measured at ~9.5 feet

	Casing				Auger		Mud	Sampler		Core Barrel			
Utilized													
Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
Size I.D. (in)			4					1 3/8					
Hammer (lb)			300					140		Type		Diamond	
Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
0							0.3	0 to 0.3' Asphalt Pavement
							9.2	
1								
		S-1	1 - 3	7 5 4 2	24	6		Brown fine to coarse SAND and fine to coarse GRAVEL, trace silt, loose - NRCS Texture: Loamy gravelly sand (LS, GR) - Hydrologic Soil Group: C
2								
3								
		S-2	3 - 5	3 2 2 2	24	7		Brown fine to coarse SAND some fine to coarse gravel, some silt, very loose to loose - NRCS Texture: Loamy gravelly sand (LS, GR) - Hydrologic Soil Group: C
4								
5								
		S-3	5 - 7	3 4 4 4	24	8		Brown to white fine to coarse SAND, some silt, some fine to coarse gravel, loose - NRCS Texture: Loamy gravelly sand (LS, GR) - Hydrologic Soil Group: C
6								
7								S-4A (above 8'): Brown to white fine to coarse SAND, some silt, trace fine to medium gravel, loose
		S-4	7 - 9	4 2 2 2	24	11		- NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: C

NOTES: 1. Boring drilled using a truck-mounted Mobile B-57 rig

2. Split spoon samples taken using a 140# safety hammer and rope & cathead

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT	Boring: PB-6
LOCATION: Somerville, Massachusetts	
PROJECT NAME: Union Square Utility and Roadway Improvements Project	Date Started: 8-7-2014
	Date Finished: 8-7-2014
PB PROJECT NUMBER: 52647	N. Coordinate 2962669
INSPECTOR (Parsons Brinckerhoff): David D'Angelo	E. Coordinate 767218
DRILLER (New Hampshire Boring): Mark D'Ambrosio	Surface Elevation: 9.5

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
8							8.0	
							1.5	S-4B (below 8'): Brown fine to coarse SAND, some silt little fine to medium gravel, trace wood, very loose to loose - NRCS Texture: Loamy sand (LS)
9							9.0	- Hydrologic Soil Group: D
		S-5	9 - 11	2 2 10 4	24	4	0.5	Black WOOD, little organic silt, trace fine to coarse sand, trace fine to medium gravel (probable timber structure) - Probable NRCS Texture: Silt (Si)
10								- Probable Hydrologic Soil Group: D
11								
		S-6	11 - 13	4 7 8 7	24	6		Black WOOD, little organic silt, trace fine to coarse sand, trace fine to medium gravel (probable timber structure) - Probable NRCS Texture: Silt (Si)
12								- Probable Hydrologic Soil Group: D
13								
14								
		S-7	14 - 16.3	1 / 24" 4 / 3"	27	3		Black WOOD (probable timber structure and possible void from 14 to 16 feet) - Probable NRCS Texture: Silt (Si)
15								- Probable Hydrologic Soil Group: D

NOTES: 1. Boring drilled using a truck-mounted Mobile B-57 rig

2. Split spoon samples taken using a 140# safety hammer and rope & cathead

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-6

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-7-2014

Date Finished: 8-7-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2962669

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 767218

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 9.5

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
15								
16								
17								
18								
19								
		S-8	19 - 21	10 7 7 5	24	7		
								S-8A (above 20.5'): Black silty WOOD (probable timber structure)
20								- Probable NRCS Texture: Silt (Si)
								- Probable Hydrologic Soil Group: D
							20.5	
							-11.0	S-8B (below 20.5'): Gray fine to coarse SAND, little silt,
21								medium dense
								- NRCS Texture: Loamy sand (LS)
								- Hydrologic Soil Group: B
22								
							22.5	

NOTES: 1. Boring drilled using a truck-mounted Mobile B-57 rig

2. Split spoon samples taken using a 140# safety hammer and rope & cathead

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-6

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-7-2014

Date Finished: 8-7-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2962669

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 767218

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 9.5

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
							-13.0	
23								
24								
		S-9	24 - 26	1 2 2 3	24	24		Gray CLAY, little silt, soft to medium stiff
								- NRCS Texture: Clay (C)
								- Hydrologic Soil Group: D
25								
26								
27								
28								
29								
		S-10	29 - 31	1 1 1 1	24	24		Gray CLAY, little silt, very soft to soft
								- NRCS Texture: Clay (C)
								- Hydrologic Soil Group: D
30								

NOTES: 1. Boring drilled using a truck-mounted Mobile B-57 rig

2. Split spoon samples taken using a 140# safety hammer and rope & cathead

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT	Boring: PB-6
LOCATION: Somerville, Massachusetts	
PROJECT NAME: Union Square Utility and Roadway Improvements Project	Date Started: 8-7-2014
	Date Finished: 8-7-2014
PB PROJECT NUMBER: 52647	N. Coordinate 2962669
INSPECTOR (Parsons Brinckerhoff): David D'Angelo	E. Coordinate 767218
DRILLER (New Hampshire Boring): Mark D'Ambrosio	Surface Elevation: 9.5

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
30								
31							31.0	
							-21.5	Bottom of Boring 31 feet
32								
33								
34								
35								
36								
37								

NOTES: 1. Boring drilled using a truck-mounted Mobile B-57 rig

2. Split spoon samples taken using a 140# safety hammer and rope & cathead

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT	Boring: PB-7
LOCATION: Somerville, Massachusetts	
PROJECT NAME: Union Square Utility and Roadway Improvements Project	Date Started: 8-6-2014
	Date Finished: 8-8-2014
PB PROJECT NUMBER: 52647	N. Coordinate 2963551
INSPECTOR (Parsons Brinckerhoff): David D'Angelo	E. Coordinate 764895
DRILLER (New Hampshire Boring): Mark D'Ambrosio	Surface Elevation: 13.1

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
Estimated at ~14.0 feet	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
0								0 to 0.4' Asphalt Pavement
							0.4	
							12.7	0.4' to 1.0' Concrete and Sand
1							1.0	
		G-1	1 - 8.5				12.1	Brown fine to medium SAND, trace silt, trace fine gravel
								- NRCS Texture: Loamy sand (LS)
								- Hydrologic Soil Group: B
2								
3								
4								
5								
6								
7								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 8.5 feet on 8-6 and drilled from 8.5 feet to 32 feet on 8-8

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-7

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-6-2014

Date Finished: 8-8-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963551

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 764895

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 13.1

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
8							8.5	
9							4.6	
		S-1	9 - 11	7 7 10 17	24	16		Brown fine SAND, trace silt, medium dense - NRCS Texture: Sand (S) - Hydrologic Soil Group: B
10								
11							11.0	
		S-2	11 - 13	15 16 14 17	24	14	2.1	S-2A (above 12'): Brown fine SAND and SILT, medium dense to dense - NRCS Texture: Sandy loam (SL) - Hydrologic Soil Group: D
12							12.0	
							1.1	S-2B (below 12'): Brown fine to medium SAND, trace silt, medium dense to dense - NRCS Texture: Sand (S) - Hydrologic Soil Group: A
13							13.0	
		S-3	13 - 15	16 14 19 22	24	20	0.1	Brown fine SAND, trace silt, dense - NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B
14								
15								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 8.5 feet on 8-6 and drilled from 8.5 feet to 32 feet on 8-8

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-7

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-6-2014

Date Finished: 8-8-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963551

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 764895

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 13.1

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
15		S-4	15 - 17	15 12 17 16	24	17		Brown fine SAND, some silt, medium dense
								- NRCS Texture: Sandy loam (SL)
								- Hydrologic Soil Group: C
16								
17								
		S-5	17 - 19	13 20 17 30	24	24		
								S-5A (above 18'): Brown fine SAND, little silt, dense
								- NRCS Texture: loamy sand (LS)
18							18.0	- Hydrologic Soil Group: C
							-4.9	S-5B (below 18'): Brown SILT, some fine sand, little clay,
								dense
								- NRCS Texture: Silt loam (SiL)
19							19.0	- Hydrologic Soil Group: D
							-5.9	
20								
		S-6	20 - 22	7 11 18 17	24	14		Brown fine SAND, some silt including a 1-inch silt layer at
								21 feet, medium dense
								- NRCS Texture: Sandy loam (SL)
21								- Hydrologic Soil Group: D
22								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 8.5 feet on 8-6 and drilled from 8.5 feet to 32 feet on 8-8

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT	Boring: PB-7
LOCATION: Somerville, Massachusetts	
PROJECT NAME: Union Square Utility and Roadway Improvements Project	Date Started: 8-6-2014
	Date Finished: 8-8-2014
PB PROJECT NUMBER: 52647	N. Coordinate 2963551
INSPECTOR (Parsons Brinckerhoff): David D'Angelo	E. Coordinate 764895
DRILLER (New Hampshire Boring): Mark D'Ambrosio	Surface Elevation: 13.1

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
23								
24								
25								
		S-7	25 - 27	5 8 10 11	24	16		Brown fine SAND, some silt including a 4-inch silt layer at 25.5 feet, medium dense - NRCS Texture: Sandy loam (SL) - Hydrologic Soil Group: D
26								
27								
28								
							28.5	
							-15.4	
29								
30								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 8.5 feet on 8-6 and drilled from 8.5 feet to 32 feet on 8-8

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-7

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-6-2014

Date Finished: 8-8-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963551

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 764895

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 13.1

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
30		S-8	30 - 32	12 16 27 30	24	15		Brown fine SAND, little silt, dense
								- NRCS Texture: Loamy sand (LS)
								- Hydrologic Soil Group: C
31								
32							32.0	
							-18.9	Bottom of Boring 32 feet
33								
34								
35								
36								
37								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 8.5 feet on 8-6 and drilled from 8.5 feet to 32 feet on 8-8

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-8

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-14-2014

Date Finished: 8-14-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963572

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765955

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 13.1

Groundwater Observations:

Estimated at ~13.5 feet

	Casing				Auger		Mud	Sampler		Core Barrel			
Utilized													
Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
Size I.D. (in)			4					1 3/8					
Hammer (lb)			300					140		Type		Diamond	
Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
0								0 to 0.5' Asphalt Pavement
							0.5	
		G-1	0.5 - 2				12.6	Brown fine to coarse SAND, some silt, little fine to
1								medium gravel
								- NRCS Texture: Sandy loam (SL)
								- Hydrologic Soil Group: C
2								
		S-1	2 - 4	5 5 5 7	24	17		Brown fine to coarse SAND, some silt, little fine to
								medium gravel, loose to medium dense
								- NRCS Texture: Sandy loam (SL)
3								- Hydrologic Soil Group: C
4							4	
		S-2	4 - 6	10 14 15 13	24	18	9.1	Brown and gray fine to coarse SAND, little fine gravel,
								trace silt, medium dense
								- NRCS Texture: Loamy sand, gravelly (LS, GR)
5								- Hydrologic Soil Group: B
6							6	
		S-3	6 - 8	18 16 21 27	24	12	7.1	Olive - gray (mottled) CLAY, hard
								- NRCS Texture: Clay (C)
								- Hydrologic Soil Group: D
7								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT	Boring: PB-8
LOCATION: Somerville, Massachusetts	
PROJECT NAME: Union Square Utility and Roadway Improvements Project	Date Started: 8-14-2014
	Date Finished: 8-14-2014
PB PROJECT NUMBER: 52647	N. Coordinate 2963572
INSPECTOR (Parsons Brinckerhoff): David D'Angelo	E. Coordinate 765955
DRILLER (New Hampshire Boring): Mark D'Ambrosio	Surface Elevation: 13.1

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
8								
		S-4	8 - 10	29 30 32 38	24	16		Olive - gray (mottled) CLAY, hard - NRCS Texture: Clay (C) - Hydrologic Soil Group: D
10		S-5	10 - 12	12 11 17 21	24	24		Olive - gray (mottled) CLAY, very stiff - NRCS Texture: Clay (C) - Hydrologic Soil Group: D
12								
13								
14								
15								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-8

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-14-2014

Date Finished: 8-14-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963572

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765955

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 13.1

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
15		S-6	15 - 17	6 6 9 10	24	24		Gray CLAY, little silt, stiff to very stiff - NRCS Texture: Clay (C) - Hydrologic Soil Group: D
20		S-7	20 - 22	3 3 4 4	24	24		Gray CLAY, little silt, medium stiff - NRCS Texture: Clay (C) - Hydrologic Soil Group: D

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-8

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-14-2014

Date Finished: 8-14-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963572

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765955

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 13.1

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
23								
24								
25							25.0	
		S-8	25 - 27	3 3 5 4	24	24	-11.9	Gray SILT and fine to coarse SAND, little fine to medium gravel, little clay, loose - NRCS Texture: Silt loam, gravelly (SiL - GR) - Hydrologic Soil Group: D
26								
27								
							27.5	
							-14.4	
28								Note: Drill through probable boulder from 27.5 to 29 feet
29							29.0	
							-15.9	
30								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-8

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-14-2014

Date Finished: 8-14-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963572

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 765955

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 13.1

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
30		S-9	30 - 32	12 15 18 21	24	12		Gray SILT and fine to coarse SAND, some fine to coarse gravel, little clay, dense
								- NRCS Texture: Silt loam, very gravelly (SL - GRV)
31								- Hydrologic Soil Group: D
32							32.0	
							-18.9	Bottom of Boring 32 feet
33								
34								
35								
36								
37								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-9

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-11-2014

Date Finished: 8-11-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963551

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766241

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 15.9

Groundwater Observations:

Estimated at ~13.5 feet

	Casing				Auger		Mud	Sampler		Core Barrel			
Utilized													
Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
Size I.D. (in)			4					1 3/8					
Hammer (lb)			300					140		Type		Diamond	
Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
0								0 to 1.0' Asphalt Pavement
1							1.0	
		S-1	1 - 3	7 6 6 4	24	17	14.9	Brown - gray fine to medium SAND, little silt, trace fine gravel, medium dense - NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B
2								
3							3.0	
		S-2	3 - 5	9 9 6 6	24	20	12.9	Brown - gray fine to coarse SAND and fine GRAVEL, little silt, medium dense - NRCS Texture: Sandy loam, extremely gravelly (SL - GRX) - Hydrologic Soil Group: C
4								
5								
		S-3	5 - 7	7 5 5 7	24	10		Brown - gray fine to coarse GRAVEL, little fine to coarse sand, little silt, medium dense - NRCS Texture: Sandy loam, extremely gravelly (SL - GRX) - Hydrologic Soil Group: C
6								
7							7.0	
		S-4	7 - 9	16 16 23 25	24	17	8.9	S-4A (above 8'): Brown - gray fine to coarse SAND, some fine to medium gravel, little clay, little silt, dense

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-9

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-11-2014

Date Finished: 8-11-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963551

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766241

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 15.9

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
								- NRCS Texture: Sandy clay (SC)
8							8.0	- Hydrologic Soil Group: D
							7.9	S-4B (below 8'): Olive - gray (mottled) CLAY, hard
								- NRCS Texture: Clay (C)
								- Hydrologic Soil Group: D
9								
		S-5	9 - 11	27 37 42 39	24	12		Olive - gray (mottled) CLAY, hard
								- NRCS Texture: Clay (C)
								- Hydrologic Soil Group: D
10								
11								
		S-6	11 - 13	10 17 18 26	24	22		Olive - gray (mottled) CLAY, hard
								- NRCS Texture: Clay (C)
								- Hydrologic Soil Group: D
12								
13								
14								
								S-7A (above 15.5'): Olive - gray (mottled) CLAY, hard
15								- NRCS Texture: Clay (C)

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-9

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-11-2014

Date Finished: 8-11-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963551

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766241

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 15.9

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
15		S-7	15 - 16	11 30 100/ <1"	12	12	15.5	- Hydrologic Soil Group: D
							0.4	S-7B (below 15.5'): Olive SILT, some fine to coarse sand,
								some fine to coarse gravel, little clay, very dense
16							16	- NRCS Texture: Silt loam, extremely gravelly (SL - GRX)
							-0.1	- Hydrologic Soil Group: D
17								Note: Drill into probable bedrock, possible boulder
								from 16 to 20 feet
18								
19								
20							20	
							-4.1	Bottom of Boring 20 feet
21								
22								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-10

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-6-2014

Date Finished: 8-15-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963710

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766842

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 20.5

Groundwater Observations:

No discernable groundwater levels observed

	Casing				Auger		Mud	Sampler		Core Barrel			
Utilized													
Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
Size I.D. (in)			4					1 3/8					
Hammer (lb)			300					140		Type		Diamond	
Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
0								0 to 0.8' Asphalt Pavement
							0.8	
1		G-1	0.8 - 6				19.7	Brown fine to coarse SAND, some fine to coarse gravel, trace silt - NRCS Texture: Loamy sand, gravelly (LS - GR) - Hydrologic Soil Group: C
2								
3								
4								
5								
6							6.0	
		S-1	6 - 8	11 10 11 12	24	18	14.5	Brown fine to coarse SAND, trace fine gravel, trace silt, medium dense - NRCS Texture: Loamy sand (LS) - Hydrologic Soil Group: B
7								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 6 feet on 8-6 and drilled from 6 feet to 25 feet on 8-15

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-10

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-6-2014

Date Finished: 8-15-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963710

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766842

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 20.5

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
8								
		S-2	8 - 10	10 13 11 14	24	24		S-2A (above 9'): Brown fine to coarse SAND, trace silt, medium dense - NRCS Texture: loamy sand (LS) - Hydrologic Soil Group: B
9							9.0	
							11.5	S-2B (below 9'): Olive CLAY, little silt, very stiff - NRCS Texture: Clay (C) - Hydrologic Soil Group: D
10								
		S-3	10 - 12	8 11 10 12	24	12		Olive CLAY, little silt, very stiff - NRCS Texture: Clay (C) - Hydrologic Soil Group: D
11								
12								
13							13.0	
							7.5	
14								
15								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 6 feet on 8-6 and drilled from 6 feet to 25 feet on 8-15

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT	Boring: PB-10
LOCATION: Somerville, Massachusetts	
PROJECT NAME: Union Square Utility and Roadway Improvements Project	Date Started: 8-6-2014
	Date Finished: 8-15-2014
PB PROJECT NUMBER: 52647	N. Coordinate 2963710
INSPECTOR (Parsons Brinckerhoff): David D'Angelo	E. Coordinate 766842
DRILLER (New Hampshire Boring): Mark D'Ambrosio	Surface Elevation: 20.5

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
15		S-4	15 - 17	32 10 13 30	24	14		Gray SILT, some fine to coarse sand, some fine to coarse gravel, little clay, medium dense - NRCS Texture: Silt loam, very gravelly (SL - GRV) - Hydrologic Soil Group: D
16								
17							17	
							3.5	Note: Drill through probable boulder from 17 to 18 feet
18								
19								
20								
		S-5	20 - 21	12 10 60 / 0"	12	8		Gray SILT, some clay, little fine to medium gravel, little fine fine to coarse sand, medium dense - NRCS Texture: Silt loam, very gravelly (SL - GRV) - Hydrologic Soil Group: D
21							21	
							-0.5	Note: Drill into probable bedrock, possible boulder from 21 to 25 feet
22								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 6 feet on 8-6 and drilled from 6 feet to 25 feet on 8-15

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

BORING REPORT

Boring: PB-10

LOCATION: Somerville, Massachusetts

PROJECT NAME: Union Square Utility and Roadway Improvements Project

Date Started: 8-6-2014

Date Finished: 8-15-2014

PB PROJECT NUMBER: 52647

N. Coordinate 2963710

INSPECTOR (Parsons Brinckerhoff): David D'Angelo

E. Coordinate 766842

DRILLER (New Hampshire Boring): Mark D'Ambrosio

Surface Elevation: 20.5

Groundwater Observations:		Casing				Auger		Mud	Sampler		Core Barrel			
	Utilized													
	Type	BW	NW	HW	Pipe	Solid	Hollow		S	U	B (st)	B (dt)	NX (st)	NX (dt)
	Size I.D. (in)			4					1 3/8					
	Hammer (lb)			300					140		Type		Diamond	
	Fall (in)			24					30		of Bit		Carbide	

DEPTH (FT)	CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE DEPTH (FT) FROM - TO	BLOWS PER 6 INCHES	PEN. (IN)	REC. (IN)	DEPTH ELEV. (FT)	DESCRIPTION
23								
24								
25							25.0	
							-4.5	Bottom of Boring 25 feet
26								
27								
28								
29								
30								

NOTES: 1. Boring drilled using a truck-mounted Acker ADII rig

2. Split spoon samples taken using a 140# safety hammer and rope & spooling winch

3. Stated Hydrologic Soil Groups are independent of water level or depth to impermeable layers

4. Borehole vacuum-excavated from 0 to 6 feet on 8-6 and drilled from 6 feet to 25 feet on 8-15

SAMPLE TYPE CODING: S=Standard Split Spoon G = Grab Sample C=Core U=Undisturbed Piston

PROPORTIONS USED: Trace = 1 -10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

LABORATORY TESTING DATA SHEET

Project Name: Union Square Utility and Roadway Improvements
Project Location: Somerville, MA
Reviewed By:
Project No.: 74-13-0003.23
Assigned By: David D'Angelo
Project Manager: David D'Angelo
Date: 10/4/2014
Date Reviewed: 10/4/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
PB-1	S-1	2.5-4.5	1				7.3											Brown f-c SAND and f-c GRAVEL, trace Silt (SP-SM)
PB-1	S-2	4.5-6.5	2				7.5											Brown f-m SAND, trace Gravel, trace Silt (SP-SM)
PB-1	S-3	6.5-8.5	3				4.2											Light brown fine SAND, trace Silt (SP)
PB-1	S-6	12.5-14.5	4				4.9											Gray-brown f-m SAND, little fine Gravel, trace Silt (SP)

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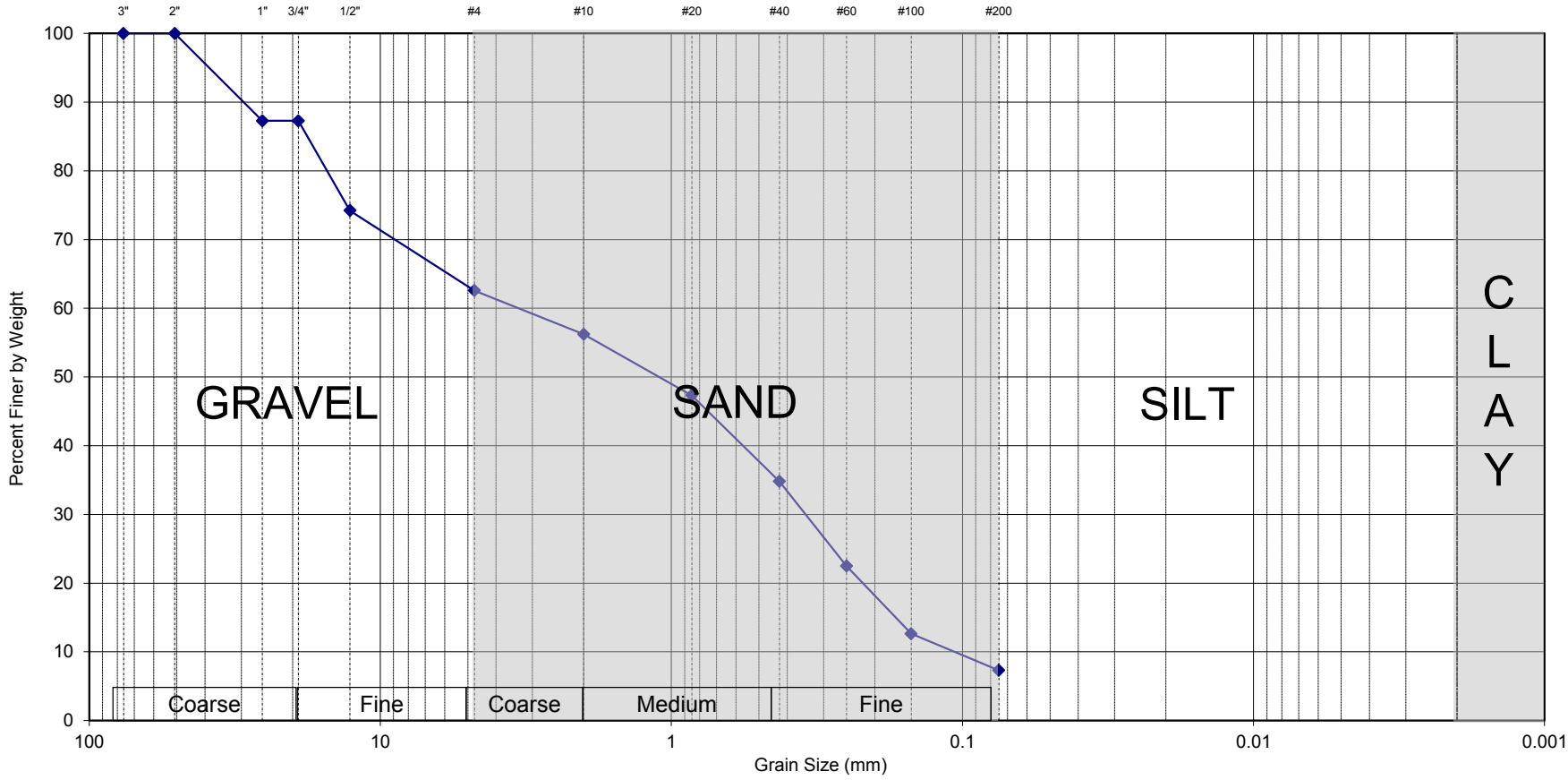

Gravel	Sand	Fines
37.4%	55.3%	7.3%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
1	PB-1	S-1	2.5-4.5'	Brown f-c SAND and f-c GRAVEL, trace Silt (SP-SM)				

Sieve Size	% Passing
¾"	87.3
½"	74.2
#4	62.6
#10	56.2
#20	47.3
#40	34.8
#60	22.5
#100	12.6
#200	7.3

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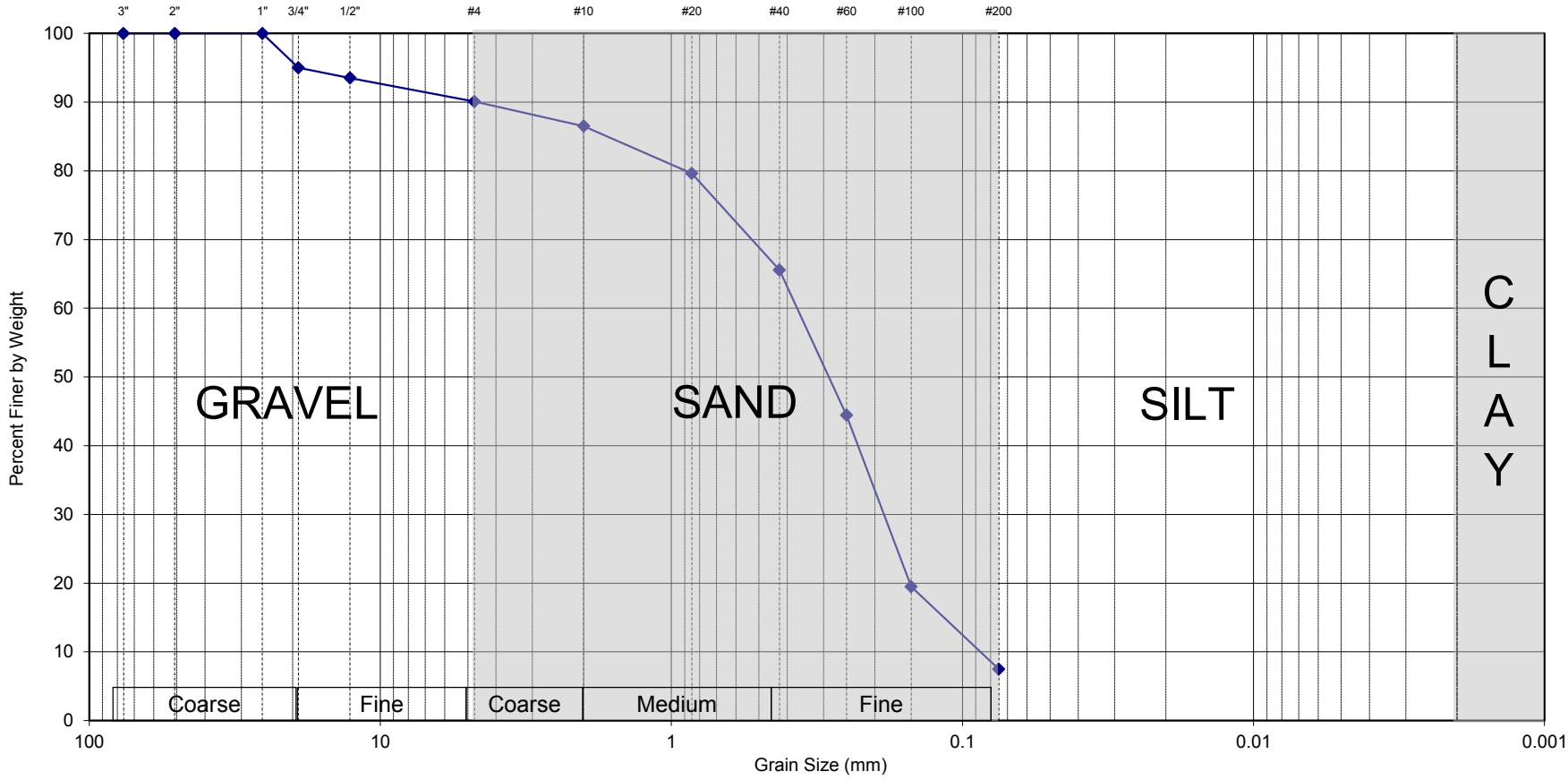
Union Square Utility and Roadway Improvements
Somerville, MA
Thielsch CTS Project # 74-14-0003.23c

Tested by: LM/MS Date: 10/1/14
Reviewed by: MBP Date: 10/4/14

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
9.9%	82.6%	7.5%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
2	PB-1	S-2	4.5-6.5'	Brown f-m SAND, trace Gravel, trace Silt (SP-SM)				

Sieve Size	% Passing
¾"	95.0
½"	93.5
#4	90.1
#10	86.5
#20	79.6
#40	65.6
#60	44.4
#100	19.5
#200	7.5

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Union Square Utility and Roadway Improvements
Somerville, MA
Thielsch CTS Project # 74-14-0003.23c

Tested by: LM/MS Date: 10/1/14
Reviewed by: MBP Date: 10/4/14

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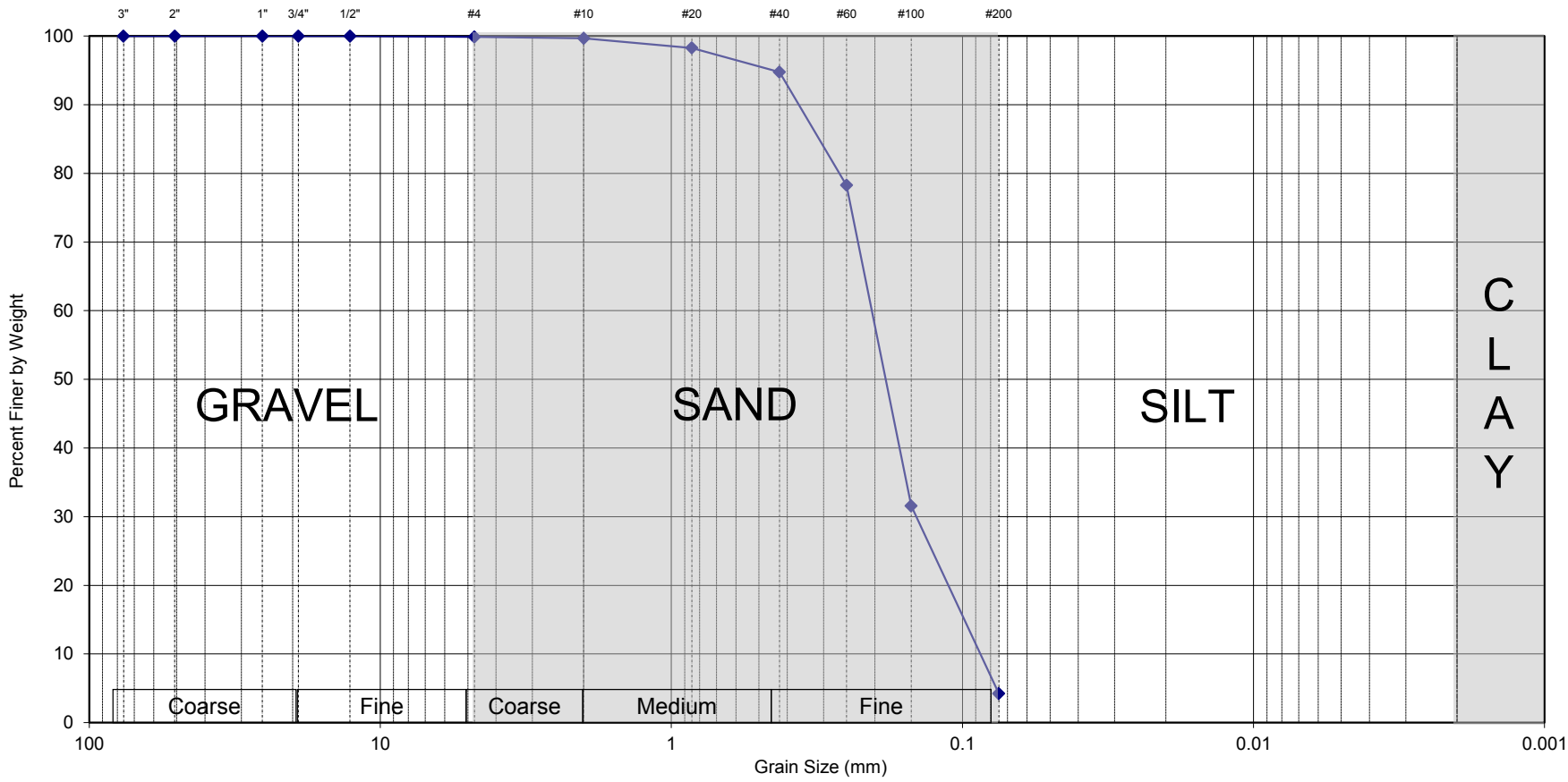
U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.1%	95.7%	4.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
3	PB-1	S-3	6.5-8.5'	Light brown fine SAND, trace Silt (SP)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	99.9
#10	99.7
#20	98.3
#40	94.8
#60	78.3
#100	31.6
#200	4.2

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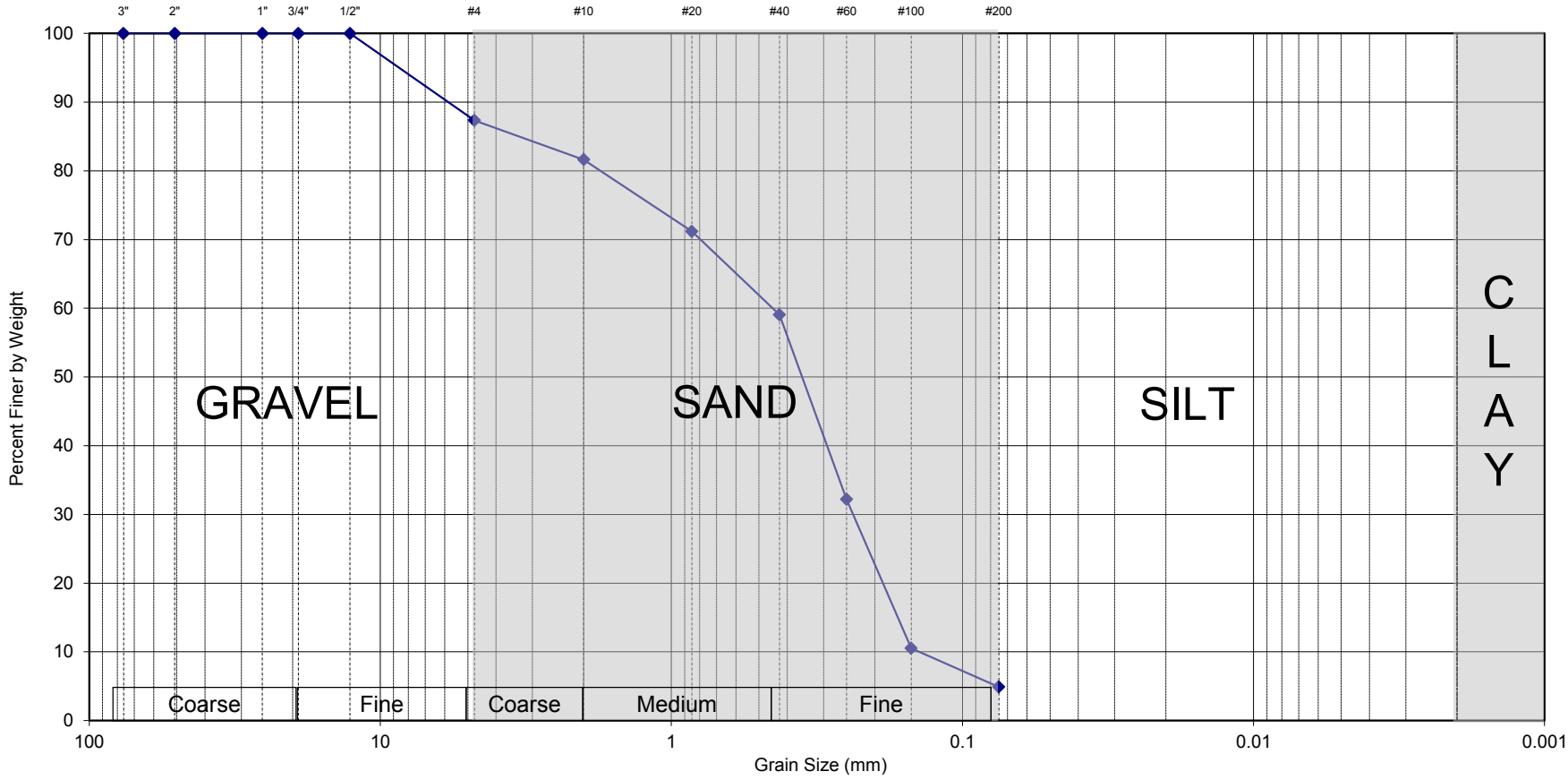

Gravel	Sand	Fines
12.7%	82.4%	4.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
4	PB-1	S-6	12.5-14.5'	Gray-brown f-m SAND, little fine Gravel, trace Silt (SP)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	87.3
#10	81.6
#20	71.2
#40	59.1
#60	32.2
#100	10.5
#200	4.9

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Union Square Utility and Roadway Improvements
Somerville, MA
Thielsch CTS Project # 74-14-0003.23c

Tested by: LM/MS Date: 10/1/14
Reviewed by: MBP Date: 10/4/14

LABORATORY TESTING DATA SHEET

Project Name: Union Square Utility and Roadway Improvements
Project Location: Somerville, MA
Reviewed By:
Project No.: 74-13-0003.23
Assigned By: David D'Angelo
Project Manager: David D'Angelo
Date: 10/4/2014
Date Reviewed: 10/4/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
PB-2	S-1	2-4	5				12.1											Brown f-c SAND, little f-c Gravel, little Silt (SM)
PB-2	S-4A	8-8.5	6				27.2											Brown f-c SAND, some Silt, trace Gravel (SM)
PB-2	S-6	12-14	7				4.6											Gray-brown fine SAND, trace Silt (SP)

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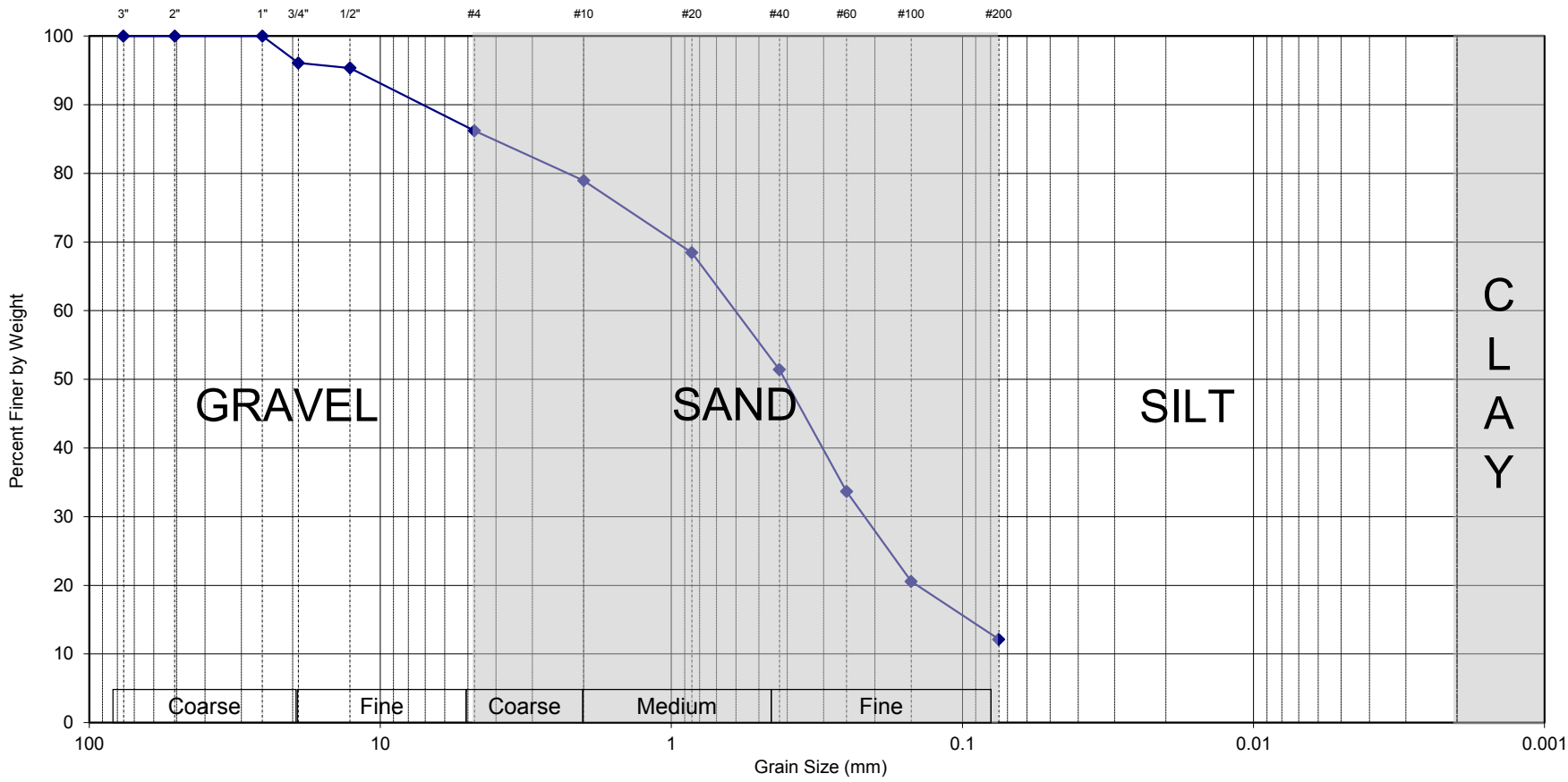

Gravel	Sand	Fines
13.8%	74.1%	12.1%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
5	PB-2	S-1	2-4'	Brown f-c SAND, little f-c Gravel, little Silt (SM)				

Sieve Size	% Passing
¾"	96.1
½"	95.3
#4	86.2
#10	78.9
#20	68.5
#40	51.4
#60	33.6
#100	20.5
#200	12.1

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Union Square Utility and Roadway Improvements
Somerville, MA
Thielsch CTS Project # 74-14-0003.23c

Tested by: LM/MS Date: 10/1/14
Reviewed by: MBP Date: 10/4/14

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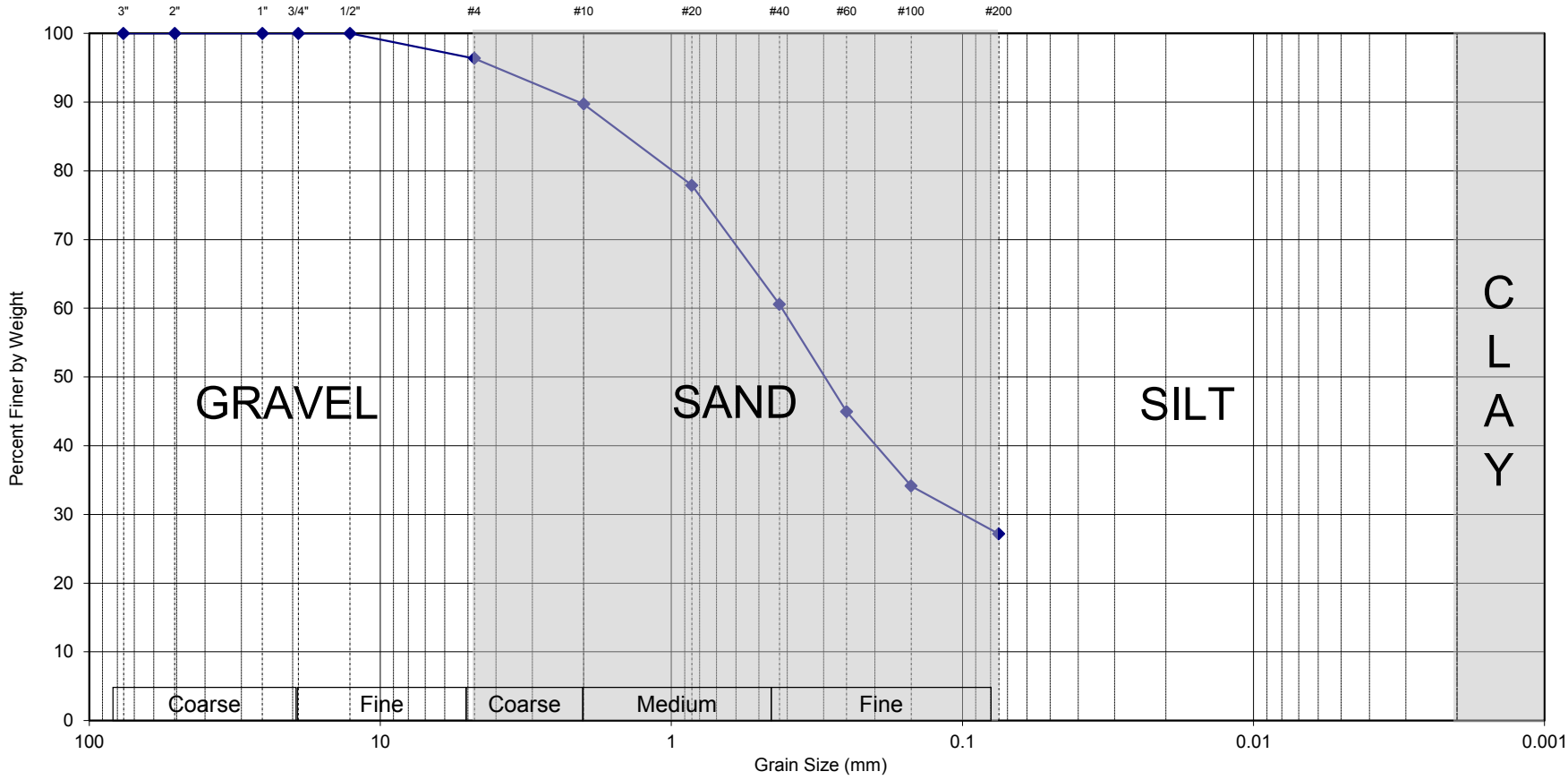
U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
3.6%	69.2%	27.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
6	PB-2	S-4A	8-8.5'	Brown f-c SAND, some Silt, trace Gravel (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	96.4
#10	89.7
#20	77.9
#40	60.6
#60	45.0
#100	34.1
#200	27.2

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Union Square Utility and Roadway Improvements
Somerville, MA
Thielsch CTS Project # 74-14-0003.23c

Tested by: LM/MS Date: 10/1/14
Reviewed by: MBP Date: 10/4/14

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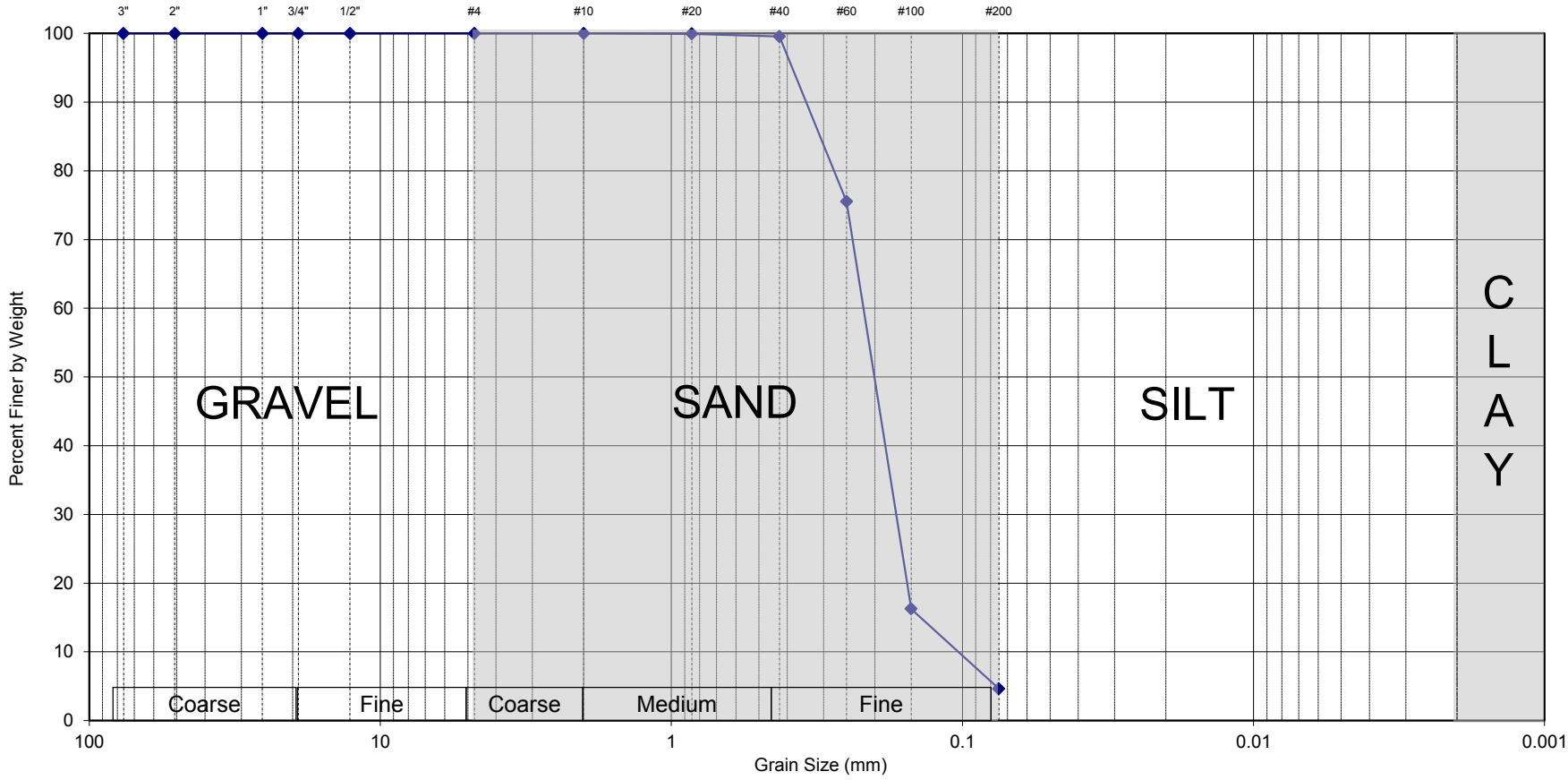

Gravel	Sand	Fines
0.0%	95.4%	4.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
7	PB-2	S-6	12-14'	Gray-brown fine SAND, trace Silt (SP)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	99.5
#60	75.5
#100	16.2
#200	4.6

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Union Square Utility and Roadway Improvements
Somerville, MA
Thielsch CTS Project # 74-14-0003.23c

Tested by: LM/MS Date: 10/1/14
Reviewed by: MBP Date: 10/4/14

LABORATORY TESTING DATA SHEET

Project Name: Union Square Utility and Roadway Improvements
Project Location: Somerville, MA
Reviewed By:
Project No.: 74-13-0003.23
Assigned By: David D'Angelo
Project Manager: David D'Angelo
Date: 10/4/2014
Date Reviewed: 10/4/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
PB-3	G-1	0.5-7.5	8				16.3											Brown f-c SAND, little Silt, trace Gravel (SM)
PB-3	S-3	11-13	9				3.8											Brown f-m SAND, trace Silt, trace Gravel (SP)

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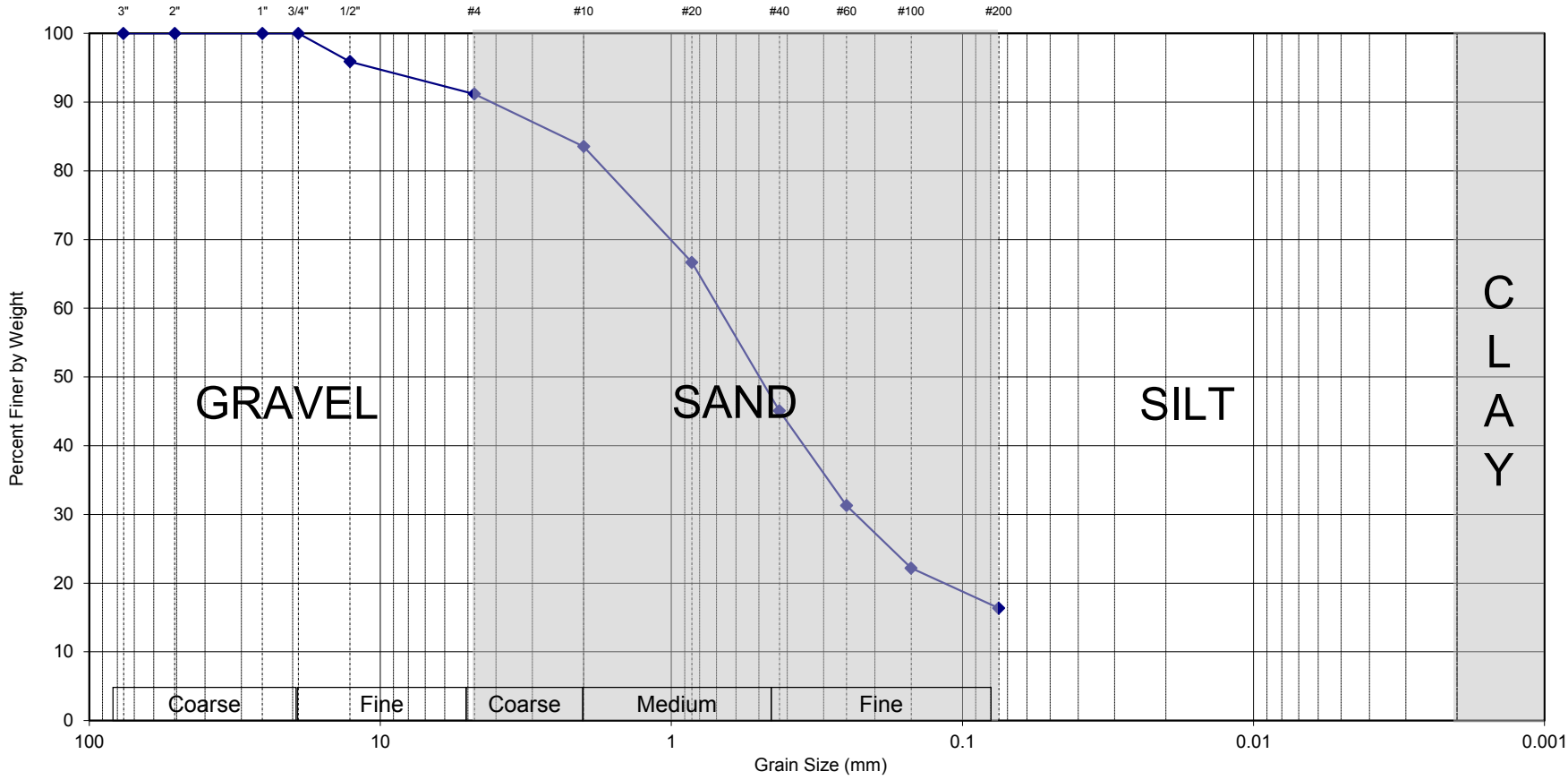
Cranston, RI 02910
401-467-6454

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
8.8%	74.8%	16.3%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
8	PB-3	G-1	0.5-7.5'	Brown f-c SAND, little Silt, trace Gravel (SM)				

Sieve Size	% Passing
¾"	100.0
½"	95.9
#4	91.2
#10	83.5
#20	66.7
#40	45.1
#60	31.3
#100	22.2
#200	16.3

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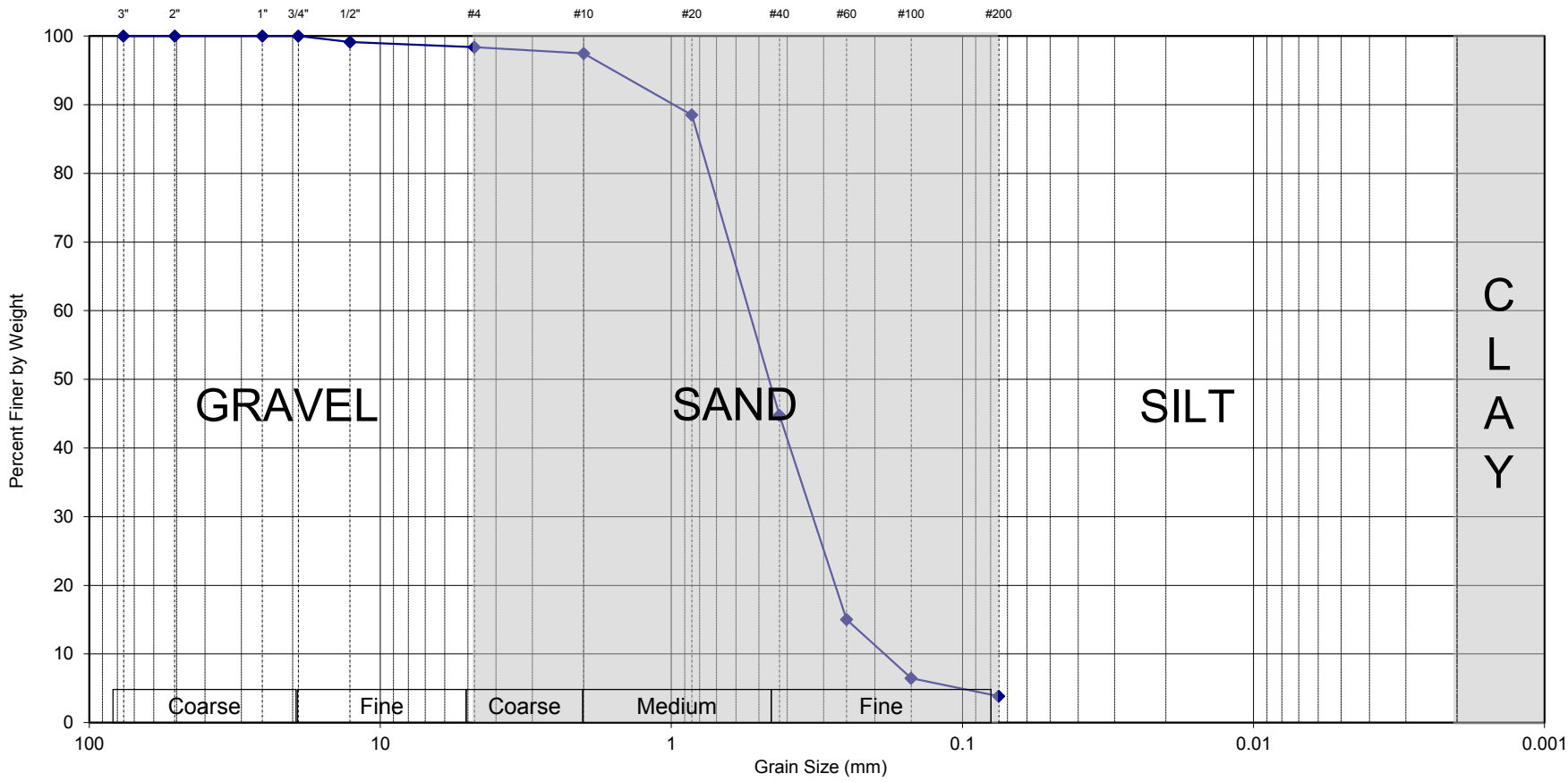
Union Square Utility and Roadway Improvements
Somerville, MA
Thielsch CTS Project # 74-14-0003.23c

Tested by: LM/MS Date: 10/1/14
Reviewed by: MBP Date: 10/4/14

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
1.6%	94.5%	3.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
9	PB-3	S-3	11-13'	Brown f-m SAND, trace Silt, trace Gravel (SP)				

Sieve Size	% Passing
¾"	100.0
½"	99.1
#4	98.4
#10	97.5
#20	88.5
#40	44.8
#60	15.0
#100	6.5
#200	3.8

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LABORATORY TESTING DATA SHEET

Project Name Union Square Utility and Roadway Improvements | Project Location Somerville, MA | Reviewed By

Project No. 74-13-0003.23 | Assigned By David D'Angelo

Project Manager David D'Angelo | Date 10/4/2014 | Date Reviewed 10/4/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	$\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
PB-4	S-1	1.5-3.5	10				21.4											Brown f-c SAND, some Silt, trace Gravel (SM)
PB-4	S-2	3.5-5.5	11				4.1											Brown f-m SAND, trace Silt, trace Gravel (SP)
PB-4	S-3	5.5-7.5	12				14.8											Light brown f-m SAND, little Silt (SM)
PB-4	S-6	11.5-13.5	13				3.8											Gray-brown f-m SAND, trace Silt (SP)

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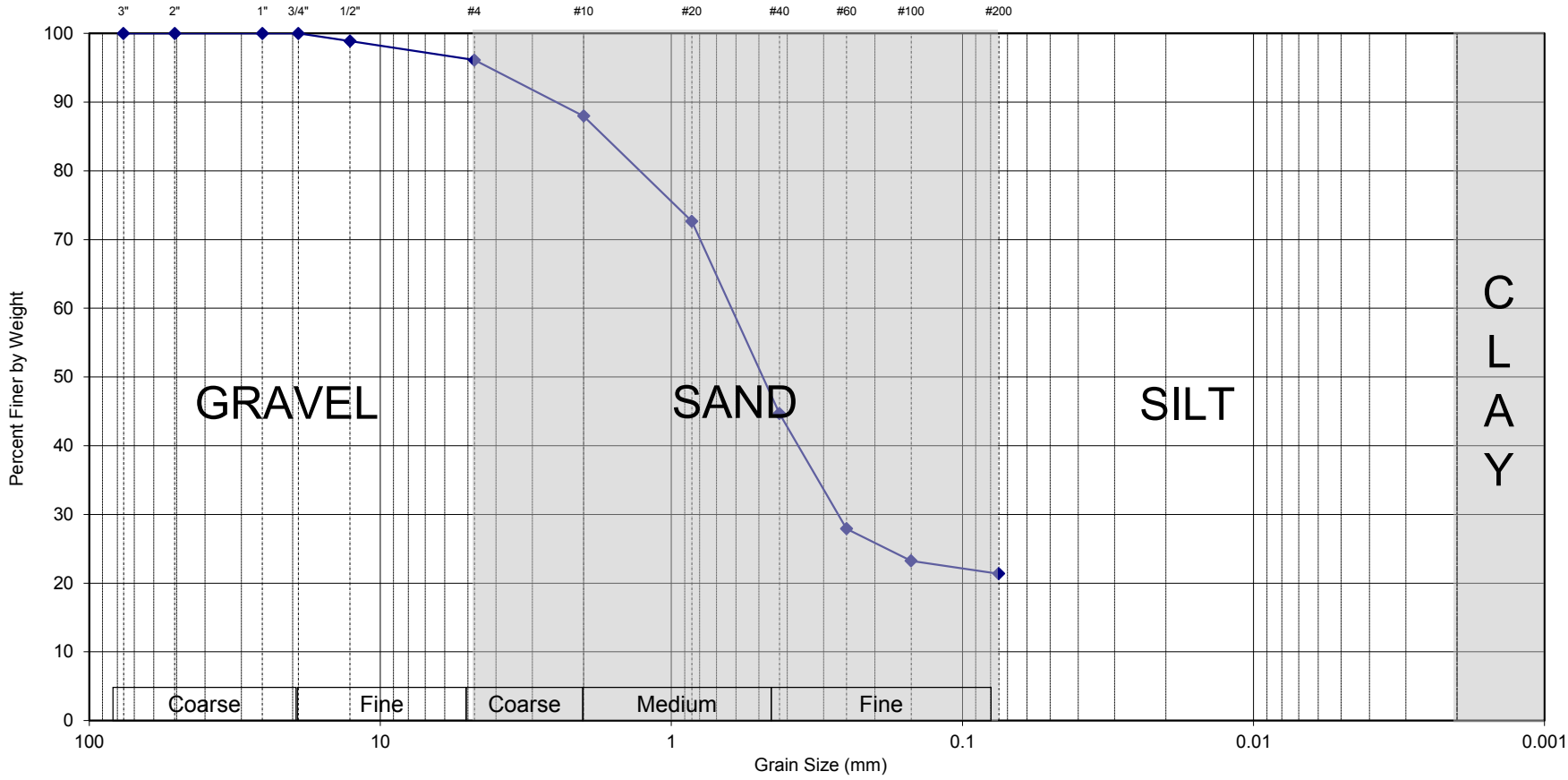

Gravel	Sand	Fines
3.9%	74.7%	21.4%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
10	PB-4	S-1	1.5-3.5'	Brown f-c SAND, some Silt, trace Gravel (SM)				

Sieve Size	% Passing
¾"	100.0
½"	98.9
#4	96.1
#10	88.0
#20	72.6
#40	44.7
#60	27.9
#100	23.2
#200	21.4

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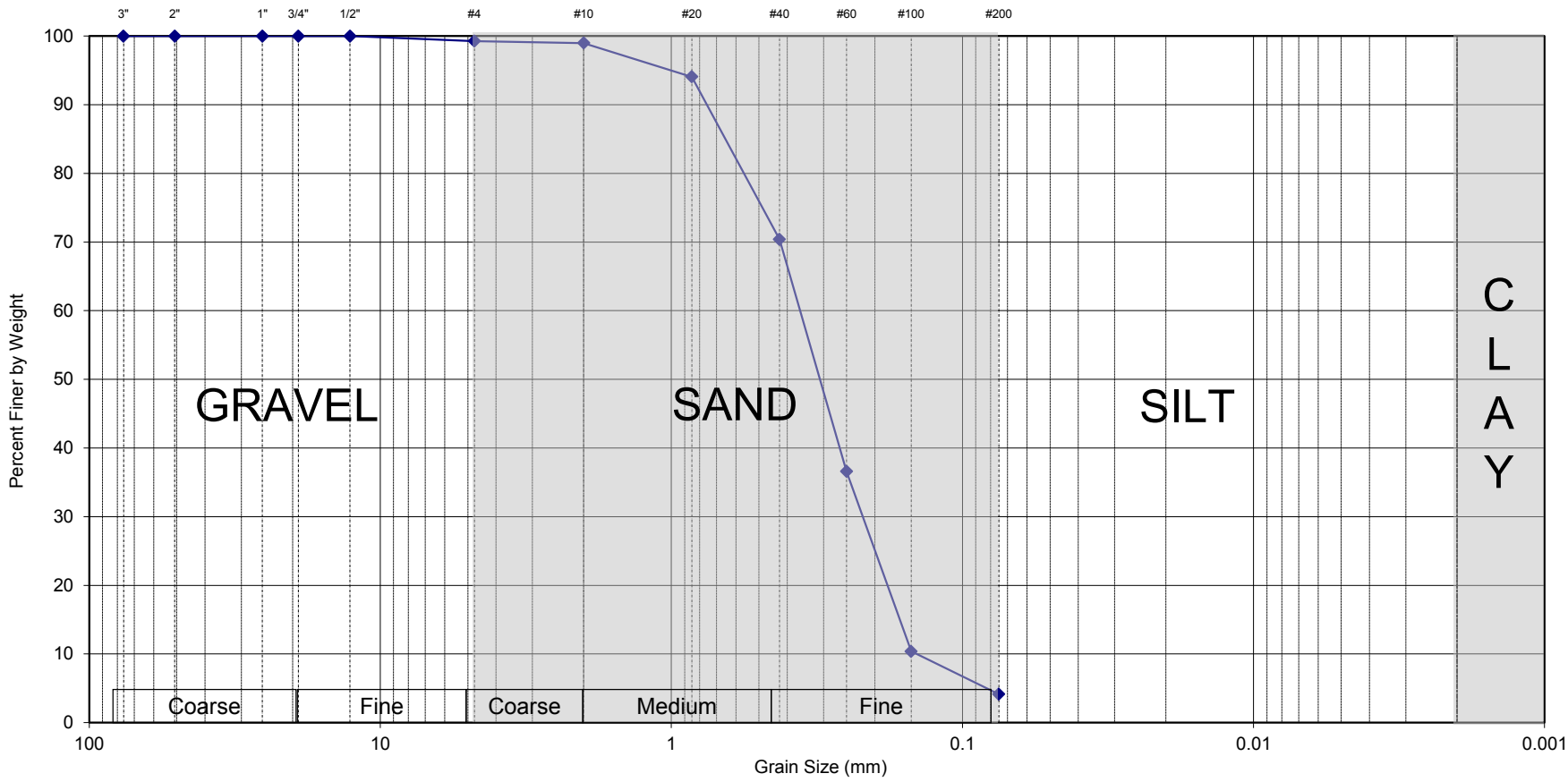

Gravel	Sand	Fines
0.7%	95.1%	4.1%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
11	PB-4	S-2	3.5-5.5'	Brown f-m SAND, trace Silt, trace Gravel (SP)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	99.3
#10	99.0
#20	94.1
#40	70.4
#60	36.6
#100	10.4
#200	4.1

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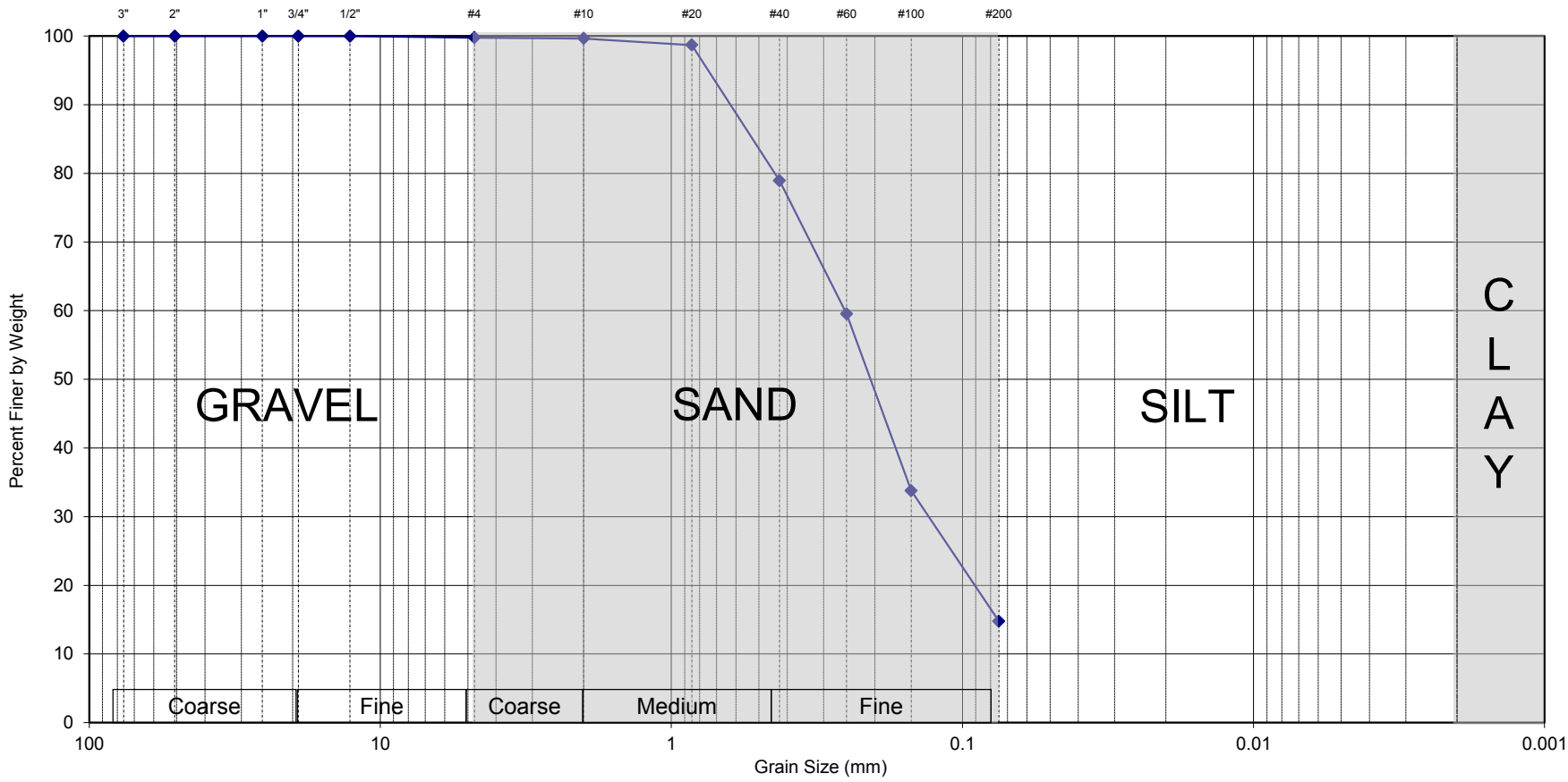

Gravel	Sand	Fines
0.2%	85.0%	14.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
12	PB-4	S-3	5.5-7.5'	Light brown f-m SAND, little Silt (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	99.8
#10	99.7
#20	98.7
#40	79.0
#60	59.5
#100	33.8
#200	14.8

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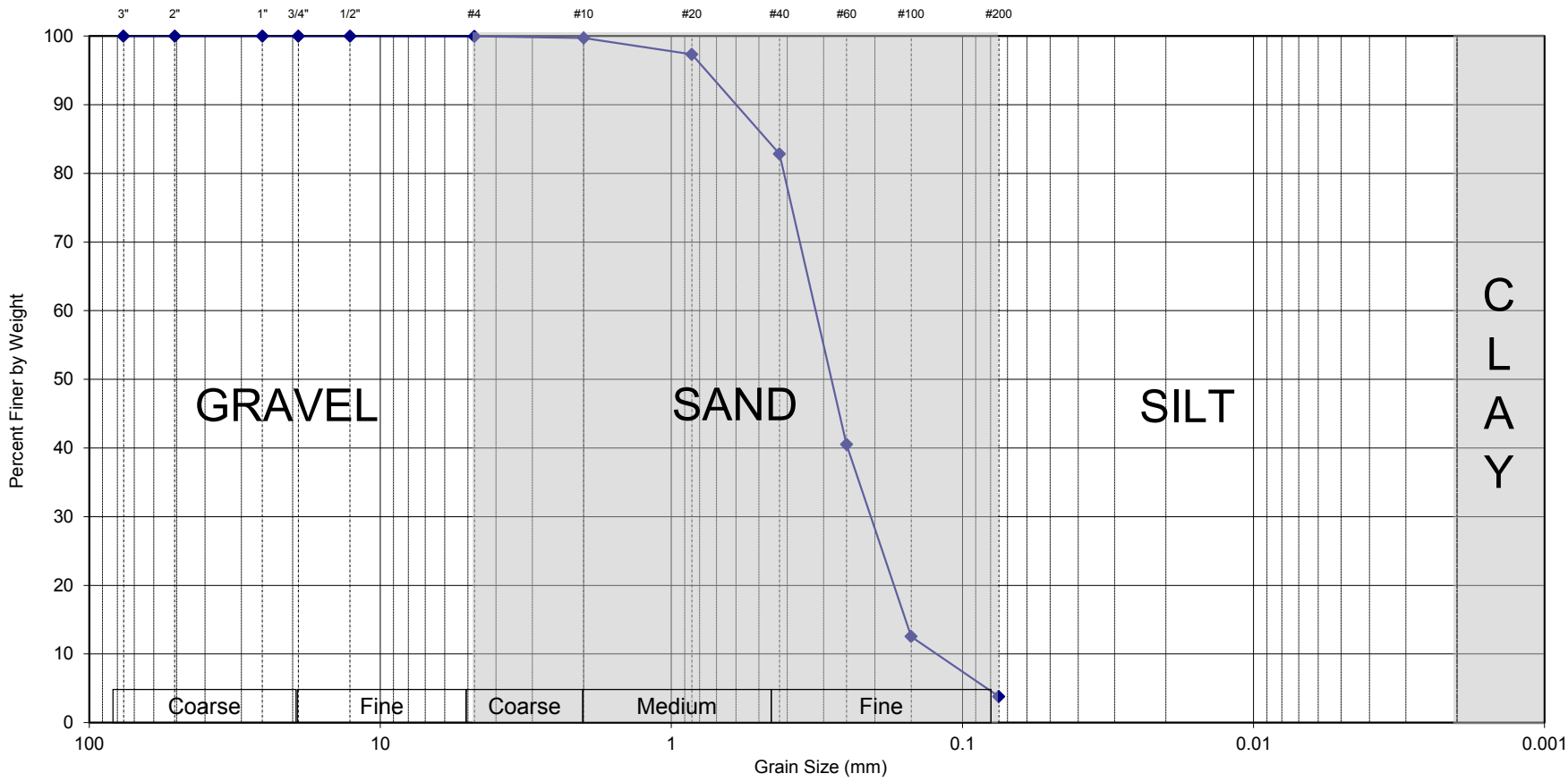

Gravel	Sand	Fines
0.0%	96.2%	3.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
13	PB-4	S-6	11.5-13.5'	Gray-brown f-m SAND, trace Silt (SP)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.7
#20	97.3
#40	82.8
#60	40.5
#100	12.5
#200	3.8

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				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	$\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
PB-5	S-2	3-5	14				3.4											Light brown f-m SAND, trace Silt, trace Gravel (SP)
PB-5	S-3	5-7	15				4.7											Light brown f-m SAND, trace Silt, trace Gravel (SP)
PB-5	S-4	7-9	16				4.8											Light brown f-m SAND, trace Silt, trace Gravel (SP)
PB-5	S-6	11-13	17				7.5											Light brown fine SAND, trace Silt (SP-SM)

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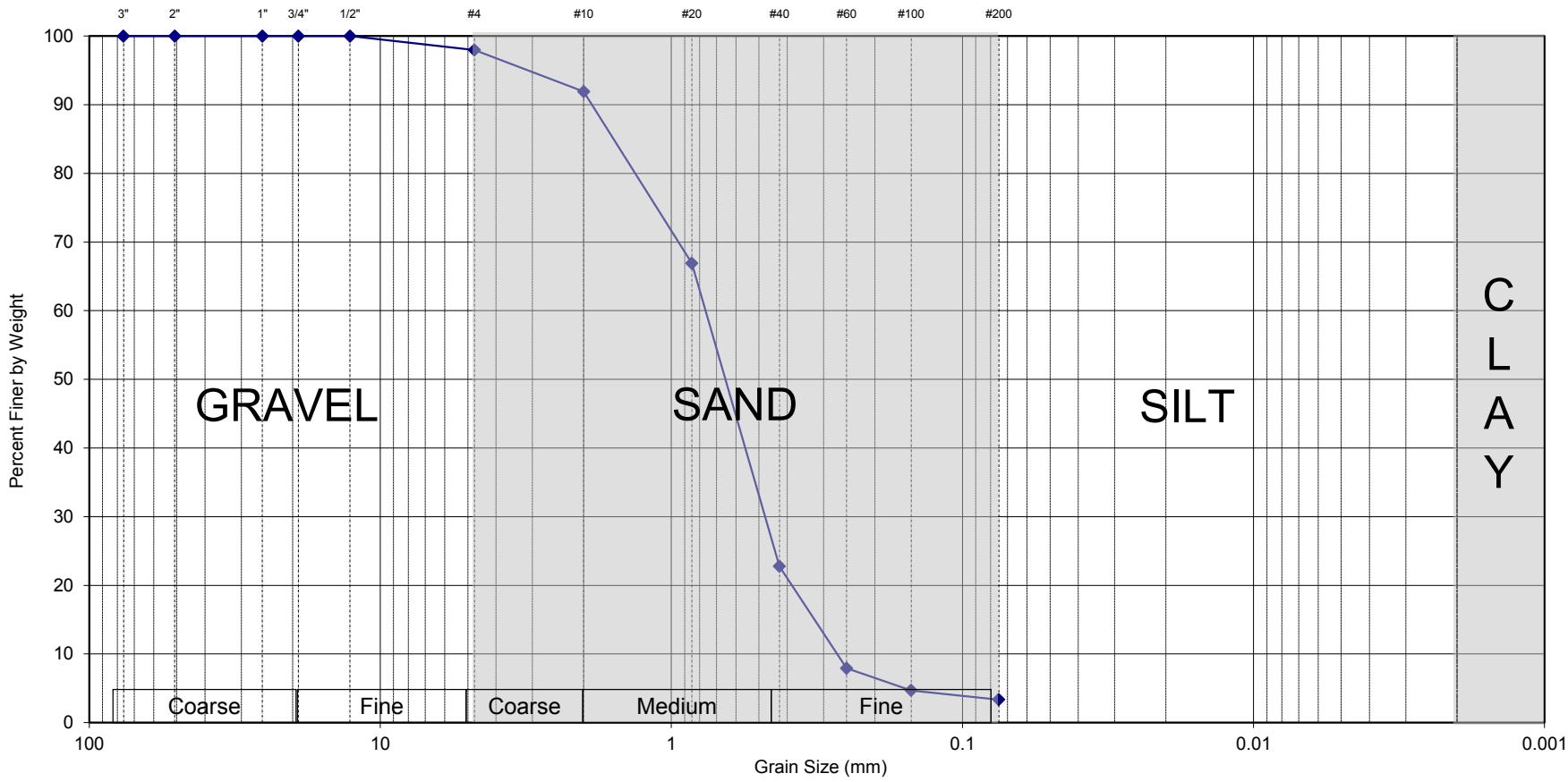

Gravel	Sand	Fines
2.0%	94.6%	3.4%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
14	PB-5	S-2	3-5'	Light brown f-m SAND, trace Silt, trace Gravel (SP)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	98.0
#10	91.9
#20	66.9
#40	22.7
#60	7.9
#100	4.7
#200	3.4

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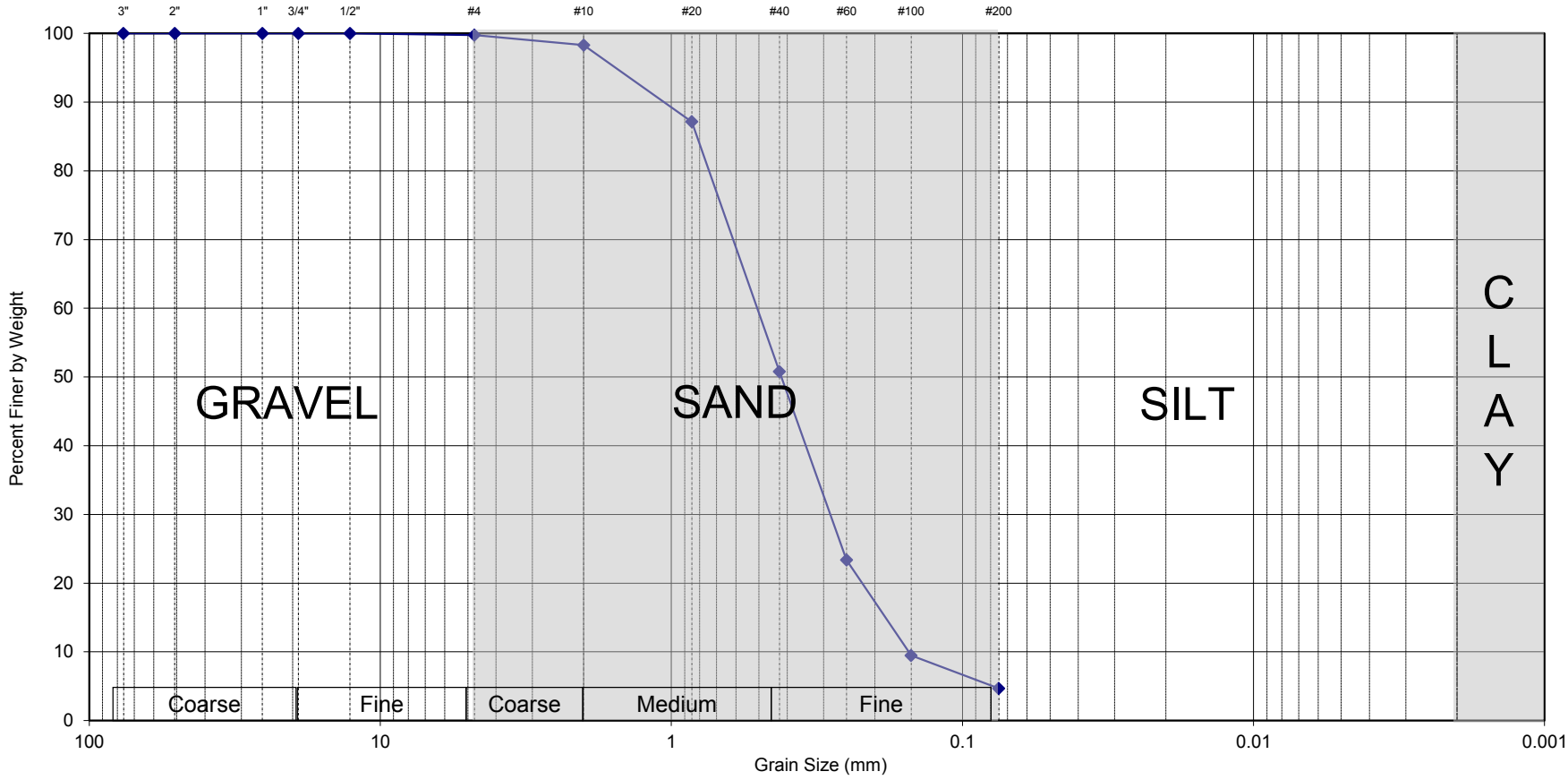

Gravel	Sand	Fines
0.2%	95.1%	4.7%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
15	PB-5	S-3	5-7'	Light brown f-m SAND, trace Silt, trace Gravel (SP)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	99.8
#10	98.3
#20	87.1
#40	50.8
#60	23.4
#100	9.5
#200	4.7

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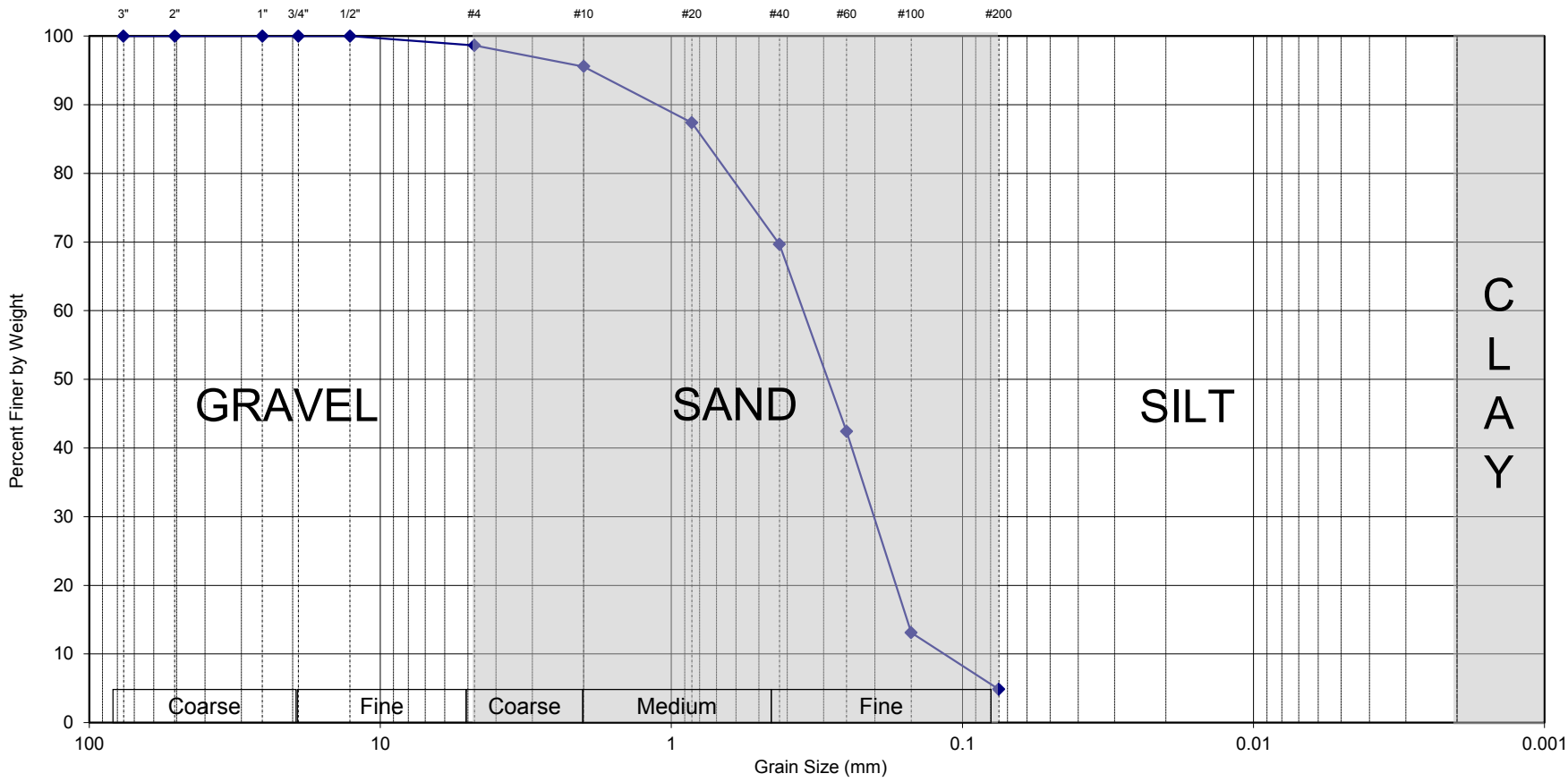

Gravel	Sand	Fines
1.4%	93.8%	4.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
16	PB-5	S-4	7-9'	Light brown f-m SAND, trace Silt, trace Gravel (SP)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	98.6
#10	95.6
#20	87.4
#40	69.7
#60	42.4
#100	13.1
#200	4.8

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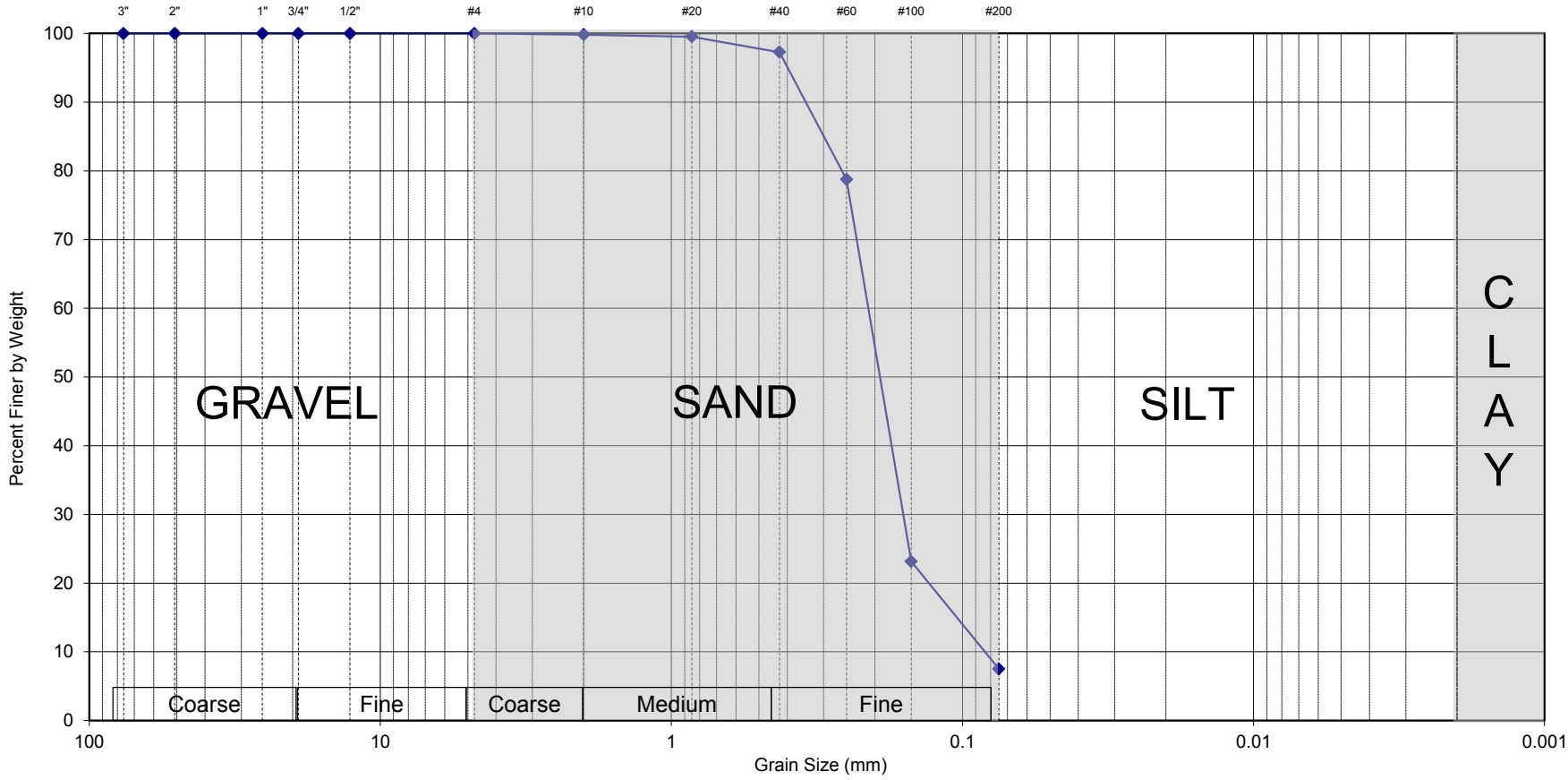

Gravel	Sand	Fines
0.0%	92.5%	7.5%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
17	PB-5	S-6	11-13'	Light brown fine SAND, trace Silt (SP-SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.8
#20	99.5
#40	97.3
#60	78.8
#100	23.1
#200	7.5

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Project No. 74-13-0003.23 | Assigned By David D'Angelo

Project Manager David D'Angelo | Date 10/4/2014 | Date Reviewed 10/4/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	$\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
PB-6	S-1	1-3	18				8.4											Dark brown f-c SAND and f-c GRAVEL, trace Silt (SW-SM)
PB-6	S-3	5-7	19				27.5											Brown f-c SAND some Silt some f-c Gravel (SM)

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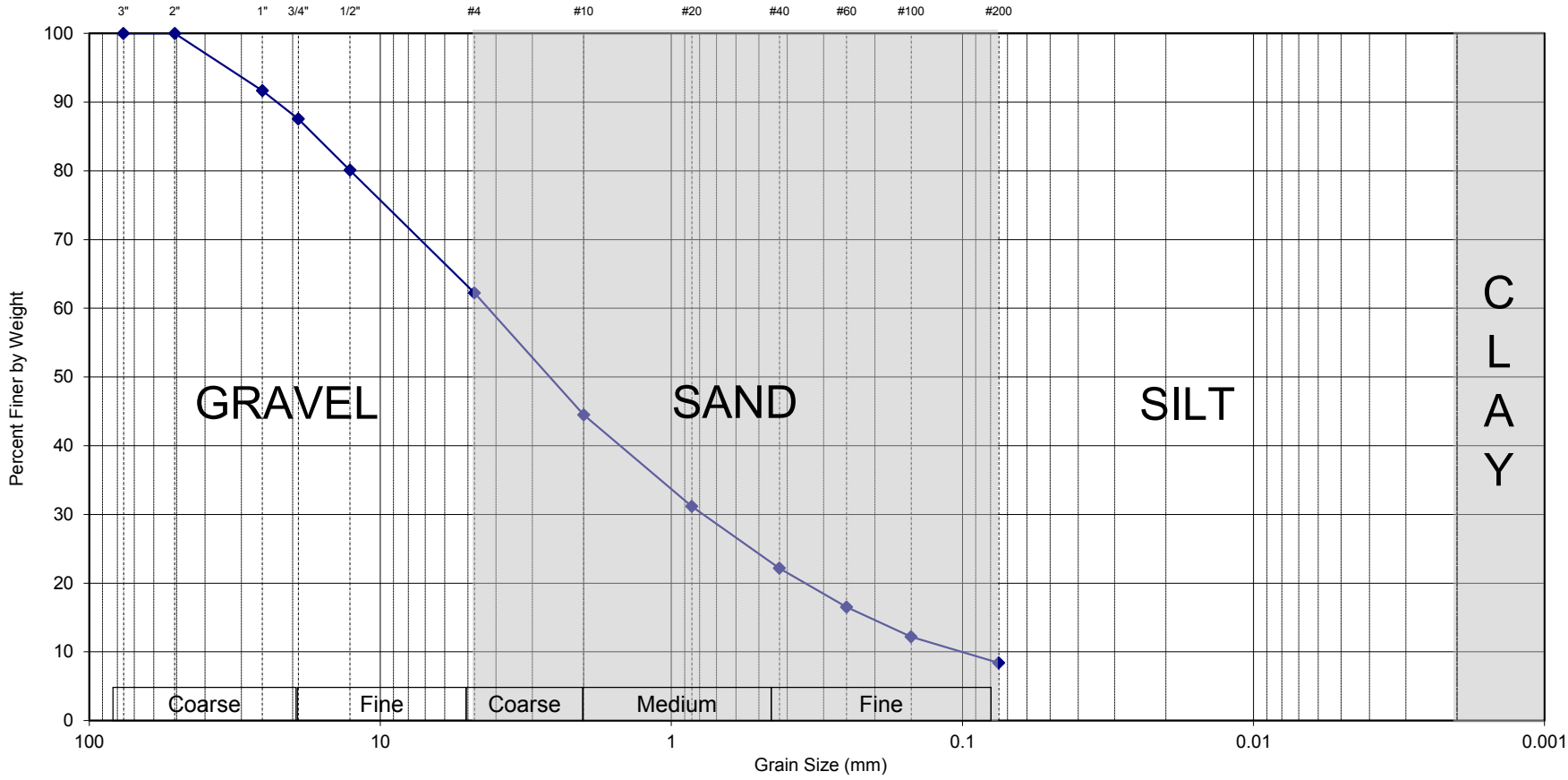

Gravel	Sand	Fines
37.8%	53.8%	8.4%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
18	PB-6	S-1	1-3'	Dark brown f-c SAND and f-c GRAVEL, trace Silt (SW-SM)				

Sieve Size	% Passing
¾"	87.6
½"	80.1
#4	62.2
#10	44.5
#20	31.2
#40	22.1
#60	16.5
#100	12.2
#200	8.4

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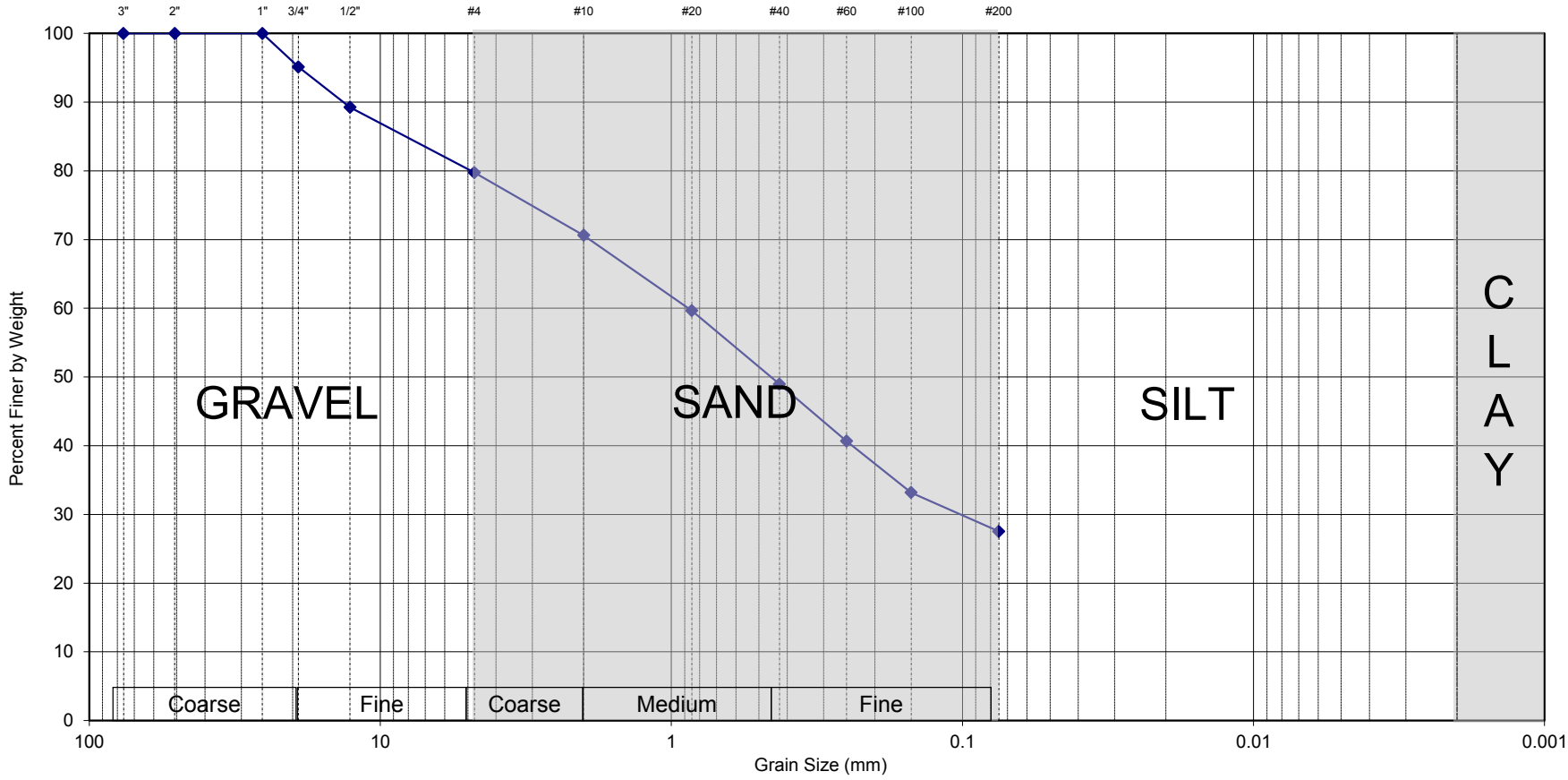

Gravel	Sand	Fines
20.3%	52.2%	27.5%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
19	PB-6	S-3	5-7'	Brown f-c SAND some Silt some f-c Gravel (SM)				

Sieve Size	% Passing
¾"	95.1
½"	89.2
#4	79.7
#10	70.6
#20	59.7
#40	48.9
#60	40.7
#100	33.2
#200	27.5

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Assigned By: David D'Angelo
Project Manager: David D'Angelo
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PB-7	G-1	1-8.5	20				4.9											Brown f-m SAND, trace Silt, trace Gravel (SP)
PB-7	S-3	13-15	21				8.3											Brown fine SAND, trace Silt (SP-SM)

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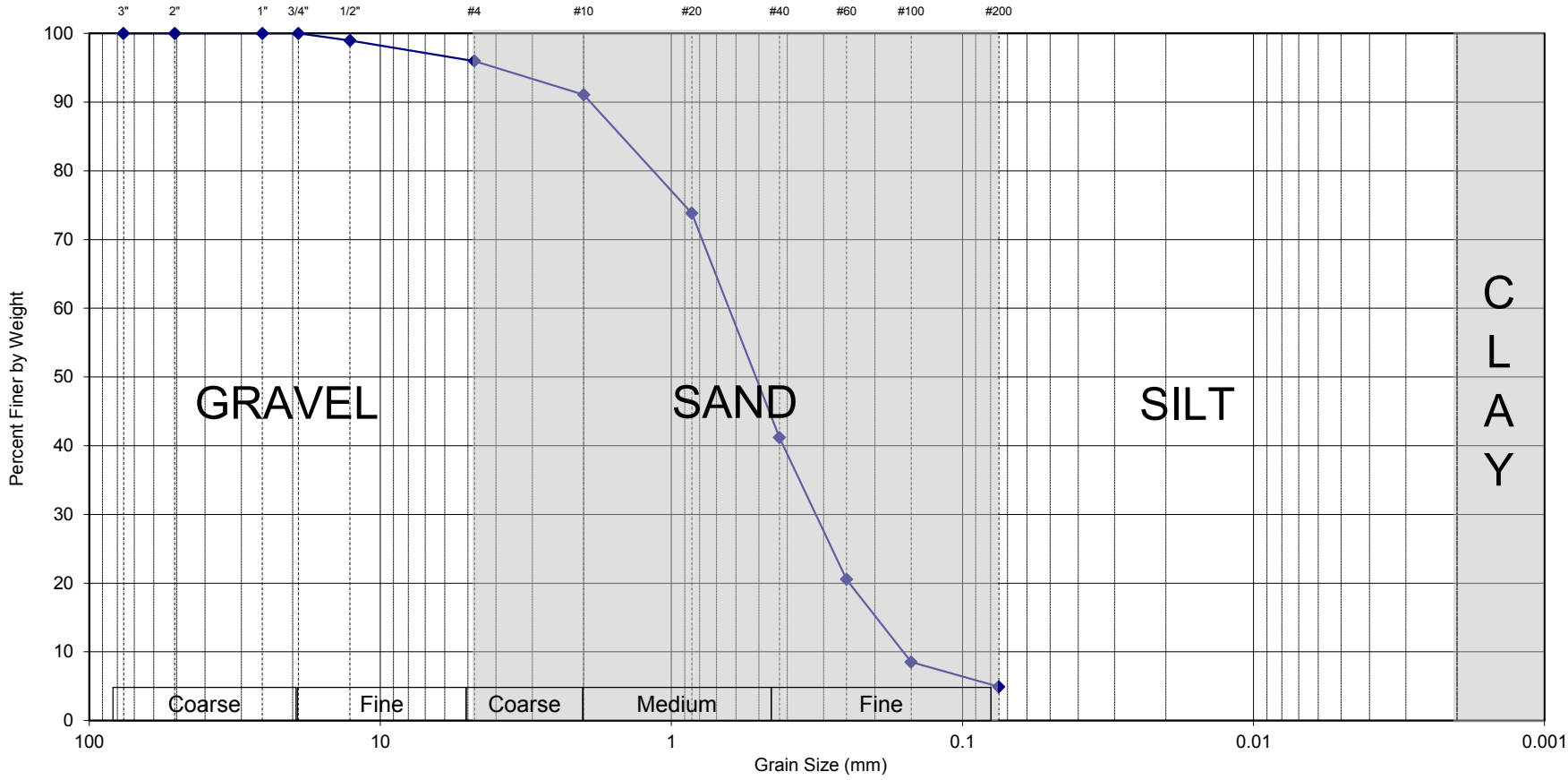

Gravel	Sand	Fines
4.0%	91.1%	4.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
20	PB-7	G-1	1-8.5'	Brown f-m SAND, trace Silt, trace Gravel (SP)				

Sieve Size	% Passing
¾"	100.0
½"	99.0
#4	96.0
#10	91.1
#20	73.8
#40	41.2
#60	20.5
#100	8.5
#200	4.9

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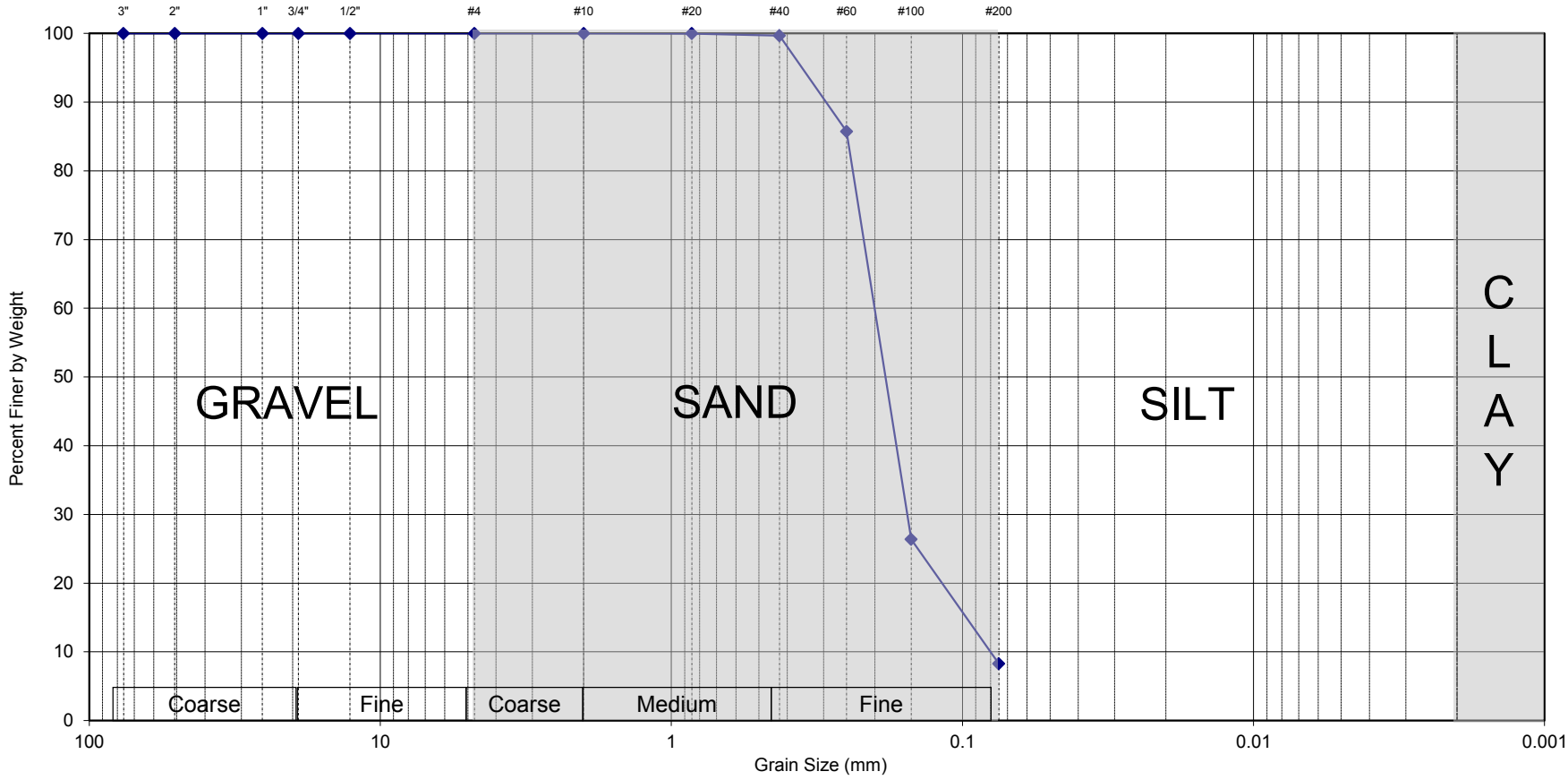

Gravel	Sand	Fines
0.0%	91.7%	8.3%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
21	PB-7	S-3	13-15'	Brown fine SAND, trace Silt (SP-SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	100.0
#40	99.7
#60	85.7
#100	26.4
#200	8.3

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Date: 10/4/2014
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Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
PB-8	S-2	4-6	22				8.0											Gray-brown f-c SAND, little fine Gravel, trace Silt (SP-SM)

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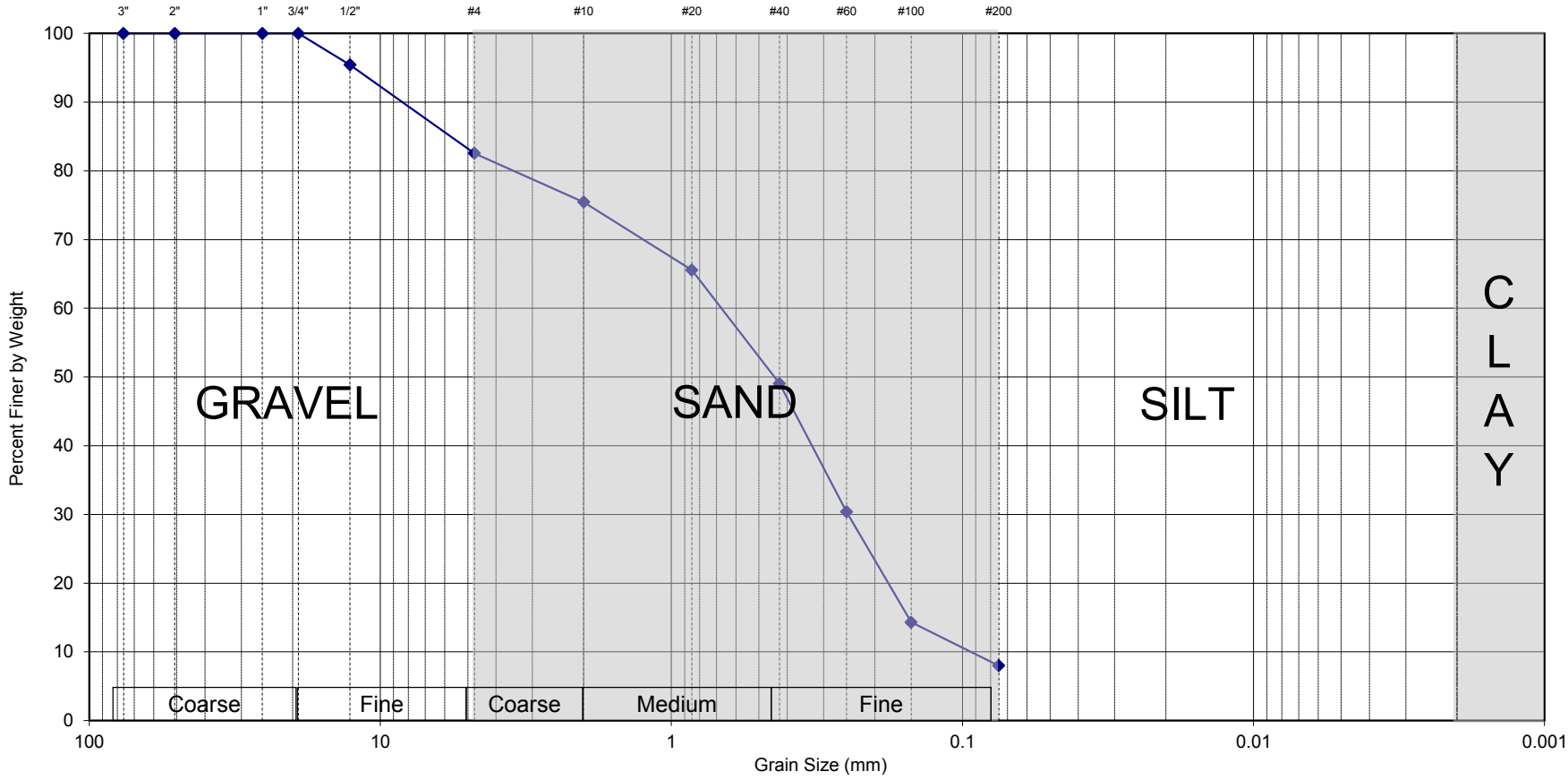

Gravel	Sand	Fines
17.5%	74.6%	8.0%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
22	PB-8	S-2	4-6'	Gray-brown f-c SAND, little fine Gravel, trace Silt (SP-SM)				

Sieve Size	% Passing
¾"	100.0
½"	95.4
#4	82.5
#10	75.4
#20	65.6
#40	49.0
#60	30.4
#100	14.3
#200	8.0

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Reviewed By
Project No. 74-13-0003.23
Assigned By David D'Angelo
Project Manager David D'Angelo
Date 10/4/2014
Date Reviewed 10/4/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
PB-9	S-1	1-3	23				17.1											Gray-brown f-m SAND, little Silt, trace Gravel (SM)
PB-9	S-2	3-5	24				10.8											Dark brown f-c SAND and fine GRAVEL, little Silt (SW-SM)

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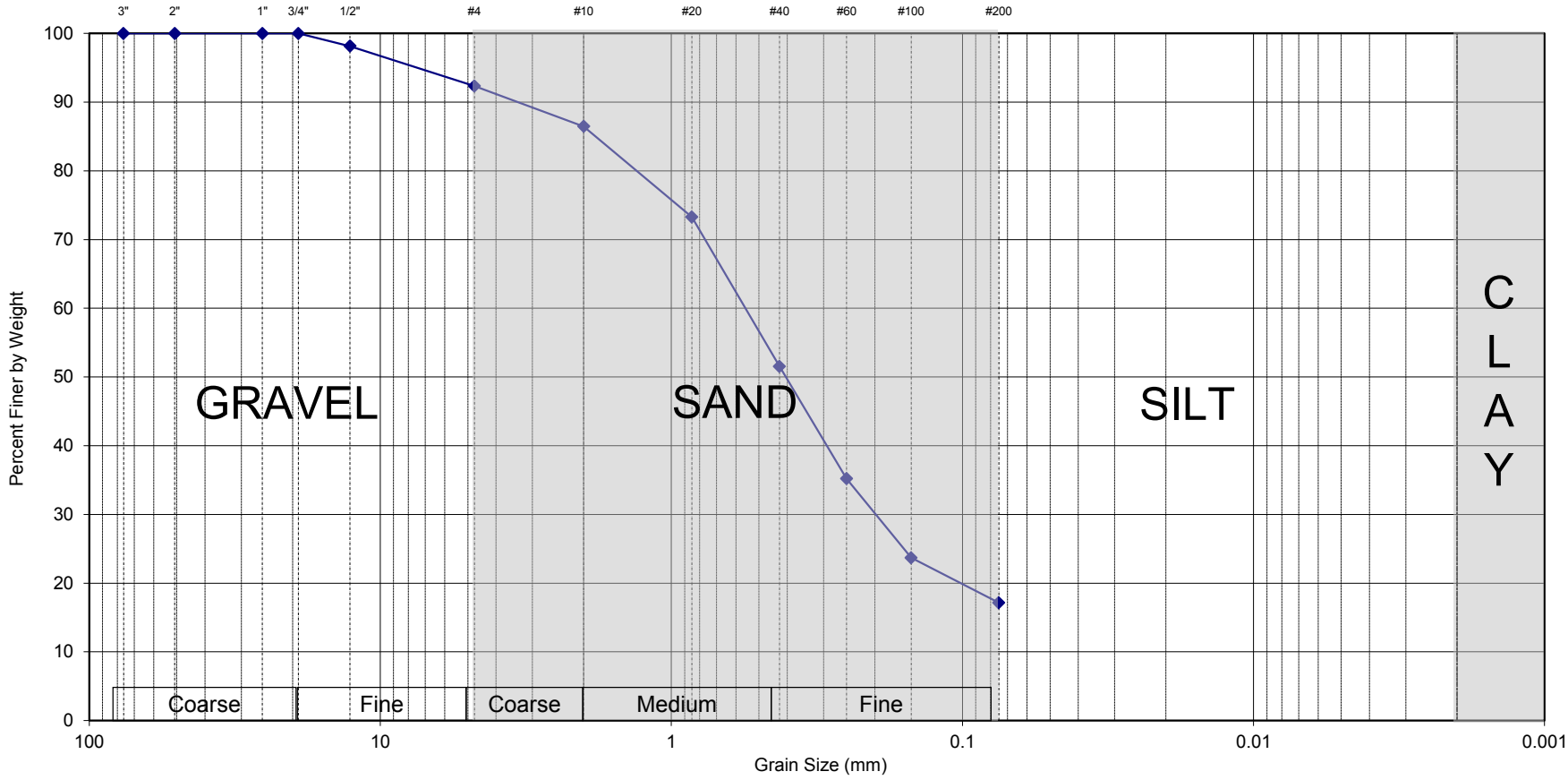

Gravel	Sand	Fines
7.7%	75.2%	17.1%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
23	PB-9	S-1	1-3'	Gray-brown f-m SAND, little Silt, trace Gravel (SM)				

Sieve Size	% Passing
¾"	100.0
½"	98.1
#4	92.3
#10	86.5
#20	73.3
#40	51.5
#60	35.2
#100	23.7
#200	17.1

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Union Square Utility and Roadway Improvements
Somerville, MA
Thielsch CTS Project # 74-14-0003.23c

Tested by: LM/MS Date: 10/1/14
Reviewed by: MBP Date: 10/4/14

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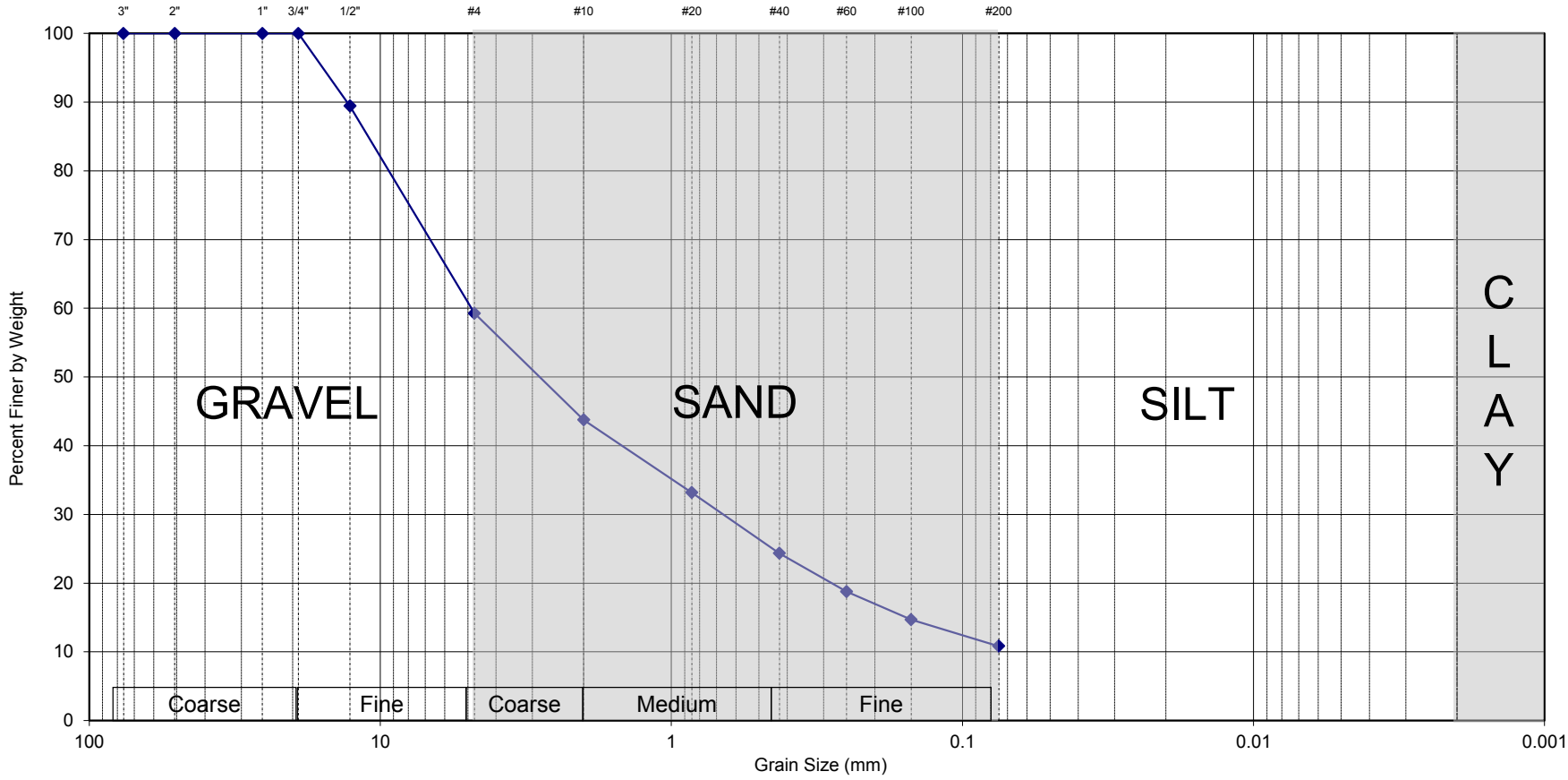

Gravel	Sand	Fines
40.7%	48.4%	10.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
24	PB-9	S-2	3-5'	Dark brown f-c SAND and fine GRAVEL, little Silt (SW-SM)				

Sieve Size	% Passing
¾"	100.0
½"	89.4
#4	59.3
#10	43.8
#20	33.2
#40	24.3
#60	18.8
#100	14.7
#200	10.8

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Somerville, MA
Thielsch CTS Project # 74-14-0003.23c

Tested by: LM/MS Date: 10/1/14
Reviewed by: MBP Date: 10/4/14

LABORATORY TESTING DATA SHEET

Project Name: Union Square Utility and Roadway Improvements
Project Location: Somerville, MA
Reviewed By:
Project No.: 74-13-0003.23
Assigned By: David D'Angelo
Project Manager: David D'Angelo
Date: 10/4/2014
Date Reviewed: 10/4/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
PB-10	G-1	0.8-6	25				8.6											Brown f-c SAND, some f-c Gravel, trace Silt (SP-SM)
PB-10	S-1	6-8	26				4.2											Brown f-c SAND,trace Gravel, trace Silt (SP)

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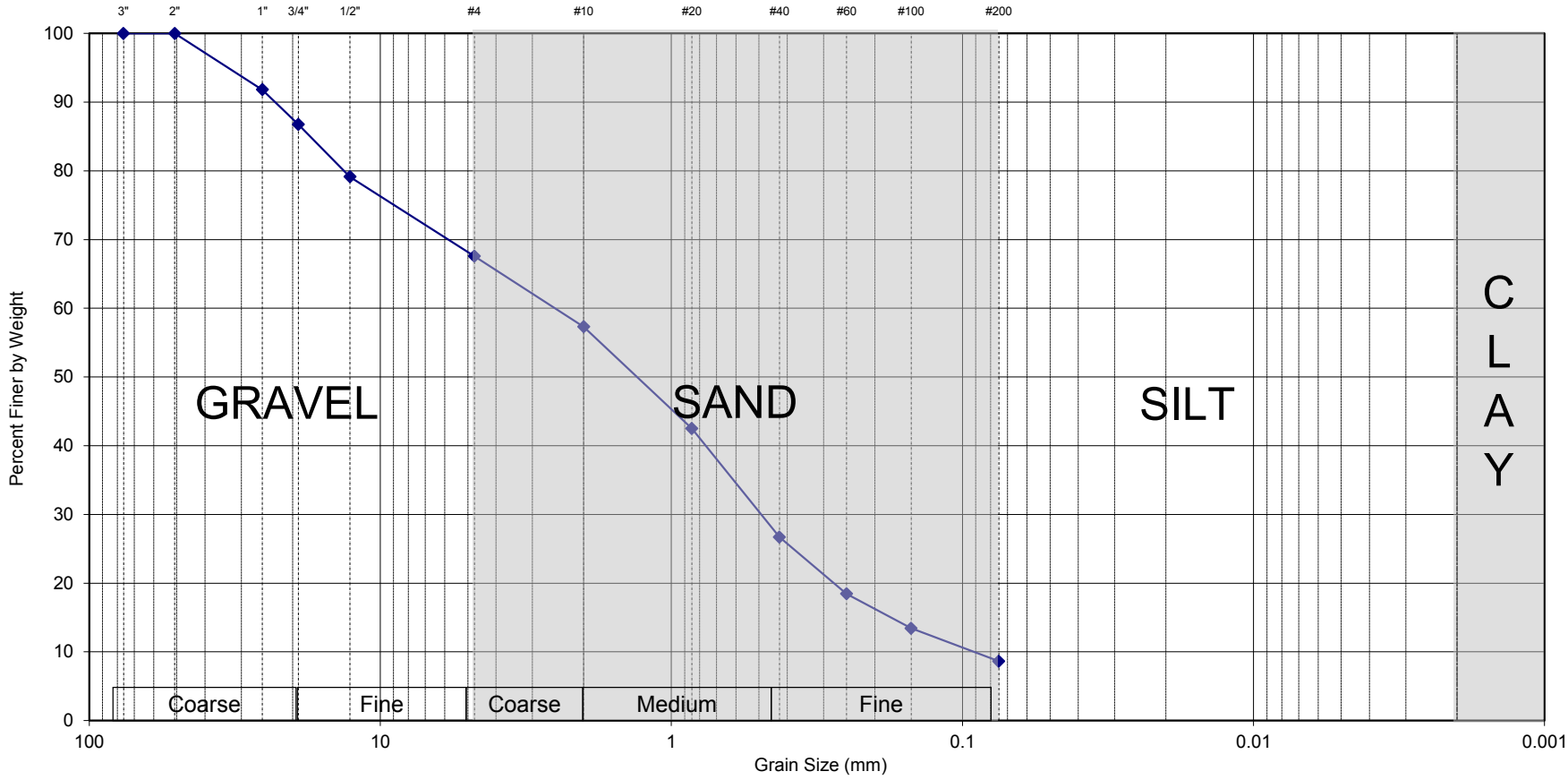

Gravel	Sand	Fines
32.4%	59.0%	8.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
25	PB-10	G-1	0.8-6'	Brown f-c SAND, some f-c Gravel, trace Silt (SP-SM)				

Sieve Size	% Passing
¾"	86.7
½"	79.1
#4	67.6
#10	57.3
#20	42.5
#40	26.7
#60	18.4
#100	13.4
#200	8.6

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Somerville, MA
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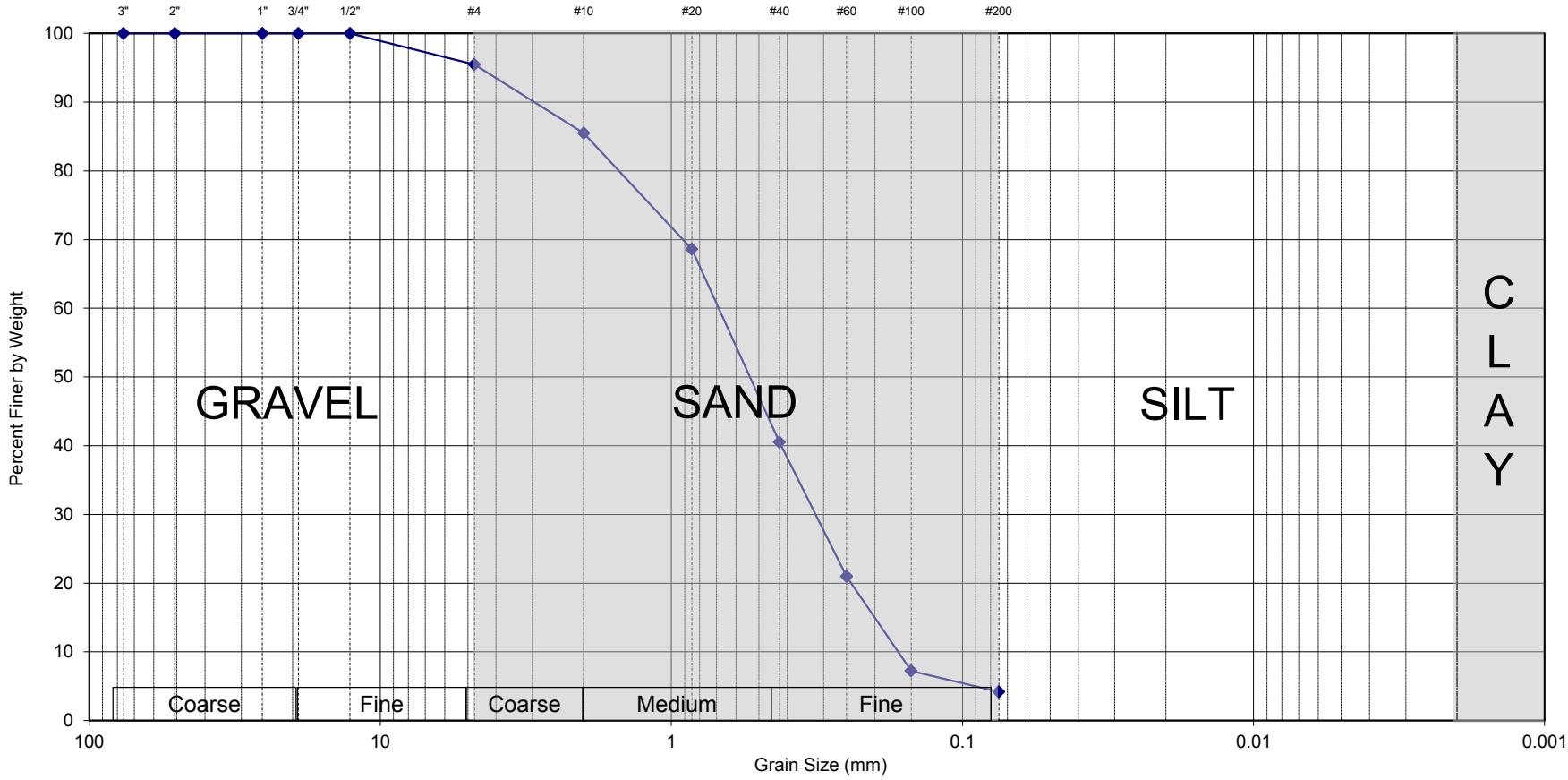

Gravel	Sand	Fines
4.5%	91.3%	4.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
26	PB-10	S-1	6-8'	Brown f-c SAND,trace Gravel, trace Silt (SP)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	95.5
#10	85.5
#20	68.6
#40	40.5
#60	21.0
#100	7.2
#200	4.2

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Union Square Utility and Roadway Improvements
Somerville, MA
Thielsch CTS Project # 74-14-0003.23c

Tested by: LM/MS Date: 10/1/14
Reviewed by: MBP Date: 10/4/14

ATTACHMENT B – ENVIRONMENTAL SITE ASSESSMENT REPORTS

Limited Soil Sampling Investigation

Union Square Utilities and Roadway Improvements Project
Washington Street and Somerville Avenue
Somerville, Massachusetts

December 9, 2014

PEER Project No. 5559

Prepared for:
City of Somerville
Somerville, Massachusetts

Prepared through:
Parsons Brinckerhoff
Boston, Massachusetts

Prepared by:
PEER Consultants, P.C.
Burlington, Massachusetts

PEER
CONSULTANTS, P.C.

Est. 1978

99 South Bedford Street, Suite 200 • Burlington, MA 01803
Phone: 781-238-8880 • Fax: 781-238-8884

Engineers • Scientists • Planners

December 9, 2014

Parsons Brinckerhoff
75 Arlington Street
Boston, MA 02116

Attn: Ms. Rachel Burckhardt

Re: Limited Soil Sampling Investigation
Union Square Utilities and Roadway Improvements Project
Washington Street and Somerville Avenue
Somerville, Middlesex County, Massachusetts
PEER Project No. 5559

Dear Ms. Burckhardt:

PEER Consultants, P.C. (PEER) is pleased to submit our report of Limited Soil Sampling Investigation (LSSI) activities completed at the site referenced above. The report presents data from field activities that included the completion of 10 combined geotechnical/environmental borings and the collection of multiple soil samples for chemical analysis. The activities were completed to pre-characterize the soil within the Union Square area as part of the Union Square Utilities and Roadway Improvements Project.

PEER appreciates this opportunity to provide environmental support services to Parsons Brinckerhoff. Should you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,
PEER Consultants, P.C.

David Gorden, CPSS | CWS
Environmental Scientist

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ACKNOWLEDGEMENTS

This report to the City of Somerville has been prepared by PEER Consultants P.C. for Parsons Brinckerhoff. Parsons Brinckerhoff is the lead firm of the Union Square Utilities and Roadway Improvements Project. This report has been prepared by Mr. David Gorden, who serves as the PEER Project Manager for the project. This report has been reviewed by Mr. Kenneth Menzies, Licensed Site Professional.

LIMITED SOIL SAMPLING INVESTIGATION
UNION SQUARE UTILITIES & ROADWAY IMPROVEMENTS PROJECT
SOMERVILLE, MASSACHUSETTS

PEER Project No. 5559
December 9, 2014

1.0 INTRODUCTION

The site location is depicted on Figure 1 within Appendix A, which was reproduced from a portion of the Boston North, Massachusetts USGS 7.5-minute series topographic maps. The Union Square Utilities & Roadway Improvements project area is centered on Union Square and extends roughly in a narrow quadrilateral of 4,000 LF by 400 LF (Figure 1). The corridor is bounded on the east and west by McGrath Highway and Dane Street, respectively. The approximately linear corridor is centered on Somerville Avenue. The main utility corridor extends along Somerville Avenue from Webster Street to Medford Street on the eastern half of the project area.

PEER previously performed a Limited Environmental Site Analysis of the property for Parsons Brinckerhoff (PB) (Project No. 5559, report dated November 15, 2013). Based on the findings of this limited analysis, PEER concluded that during any Phase II investigation, it may be appropriate to collect and analyze soil samples along utility line sections which are likely to be replaced, and which are within 0.25-miles of sources that are ranked as a High Potential for Impact.

2.0 APPROACH

PEER's Limited Soil Sampling Investigation (LSSI) was undertaken in response to the findings in the limited ESA. The LSSI was conducted to assess for potential contaminants in soil that may impact the Union Square Utilities and Roadway Improvements Project and may necessitate the need to pre-characterize excess soil that may be excavated and possibly require off-site disposal to a licensed facility. The approach was not intended to identify every chemical possibly associated with the site. In addition, geotechnical boring locations, from which PEER collected environmental samples, were pre-selected by PB in advance, and may not represent soil conditions within the entire utility corridor.

PEER conducted the fieldwork under a soil sampling plan proposal developed for this project, and based soil sample collection depths on the proposed utility replacement work zones. Work was performed using United States Environmental Protection Agency (USEPA) modified Level D work attire.

From August 4, 2014 through August 19, 2014, PEER collected environmental soil samples from 10 boring locations from within this corridor. Borings were developed by either using a vacuum excavator in areas of dense existing utilities and/or by a truck-mounted Diedrich D-50 drill rig. Soil samples were collected by using a clean sample collection tool from within the bore hole, or by obtaining a representative quantity of soil directly from the split spoon.

Upon removal of the sample from the borehole or the split spoon, PEER placed the soil into a sealable plastic bag, and then collected a grab sample for volatile organic compounds (VOCs). PEER homogenized the remainder of the soil within a bag before collecting a composite sample for the remaining analyses. After packaging each sample in laboratory-provided containers, PEER recorded the sample time on each container label in permanent ink and placed the filled containers in an ice-filled cooler for transport to ESS Laboratory, a National Environmental Laboratory Accreditation Conference laboratory, in Cranston, Rhode Island.

PEER submitted the following samples for laboratory analysis:

- Soil samples PB-1 (6.5-8.5'), PB-2 (10-12'), PB-3 (1-7'), PB-4 (8.5-9.5'), PB-5 (1-3'), PB-7 (1-7'), PB-8 (4-6'), PB-9 (5-7'), and PB-10 (1-5') were submitted for laboratory analysis for VOCs by EPA Method 5035/8260B, and
- Soil samples PB-1 (0.5-12.5'), PB-2 (2-14'), PB-3 (1-13'), PB-4 (1.5-13.5'), PB-5 (1-13'), PB-7 (1-13'), PB-8 (2-6'), PB-9 (1-9'), and PB-10 (1-9') were submitted for laboratory analysis for polychlorinated biphenyls (PCBs) by EPA Method 8082A, semivolatile organic compounds (SVOCs) by EPA Method 8270D, conductivity, extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH) by MADEP Methods, and total metals by EPA Method 6010C, 7010, or 7471A.

At the completion of field activities, with the exception of three borings, which were developed into groundwater monitoring wells, PB abandoned the borings and placed the excess soil back into the borehole, or into a 55-gallon drum, which was removed and properly disposed of by Enpro Services, Inc. of Salisbury, MA.

2.1 Limitations

PEER's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time. PEER makes no warranties, either express or implied, regarding the findings, conclusions, or recommendations. Please note that PEER does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of the report. These LSSI services were performed in accordance with the scope of work agreed with you, our client, as reflected in our proposal and were not restricted by ASTM E1903-11.

Findings, conclusions, and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, non-detectable, or not present during these services. We cannot represent that the site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this LSSI. Subsurface conditions may vary from those encountered at specific locations during surveys, tests, assessments, investigations, or exploratory services. The data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

3.0 FINDINGS

3.1 Geology/Hydrogeology

In general, surface soil types were consistent with urban fill, soils that have been excavated or filled by anthropogenic means. The following field textural analysis and groundwater depths were as determined by PB. The following information was noted for each of the 10 borings:

- PB-1; sand and gravel to sand to clay to an end of boring depth of 27 feet.
  - Groundwater encountered at 12.9 feet below ground surface.
- PB-2; sand to organic silt to sand to clay to an end of boring depth of 32 feet.
  - Groundwater encountered at 10 feet below ground surface.
  - Buried wetland/peat soil at 8 feet.
- PB-3; sand to gravel to clay at depths to an end of boring depth of 27 feet.
  - Groundwater encountered at 9 feet below ground surface.
- PB-4; sand to sand and silt to clay to an end of boring depth of 32 feet.
  - Groundwater encountered at 9 feet below ground surface.
  - Slight aromatic hydrocarbon odor from 7.5 to 9.5 feet.
- PB-5; sand to sand and silt to clay to an end of boring depth of 32 feet.
  - Groundwater encountered at 9 feet below ground surface.
- PB-6; sand and gravel to sand to wood to sand to clay to an end of boring depth of 31 feet.
  - Note: Due to the presence of wooden board fill from approximately 7 to 20 feet, this PB boring location was not sampled as part of this LSSI. Groundwater encountered at 9.5 feet below ground surface.
- PB-7; sand to sand and silt to sand to silt to sand to an end of boring depth of 32 feet.
  - Groundwater encountered at 14 feet below ground surface.
- PB-8; sand to clay to silt and sand to sand and silt to silt to an end of boring depth of 32 feet.
  - Groundwater encountered at 13.5 feet below ground surface.
  - Slight aromatic hydrocarbon odor from 2 to 6 feet.
- PB-9; sand to gravel to sand to clay to silt to an end of boring depth of 20 feet.
  - Groundwater encountered at 13.5 feet below ground surface.

- Slight aromatic hydrocarbon odor in soil from 1 to 7 feet.

- PB-10; sand to clay to silt to an end of boring depth of 25 feet. Groundwater not encountered.

3.2 Analytical Results

For the purpose of determining whether a notification obligation exists under 310 CMR 40.0315, measured concentrations of any oil or hazardous material listed at 310 CMR 40.1600 were compared to the Reportable Concentration (RC) value in the reporting category that best characterizes the current use of the site under evaluation, as described below:

(a) Reporting Category RCS-1. Reporting category RCS-1 shall be applied to all soil samples obtained:

1. at or within 500 feet of a residential dwelling, a residentially-zoned property, school, playground, recreational area or park; or
2. within the geographic boundaries of a groundwater resource area categorized as RCGW-1 in 310 CMR 40.0362(1)(a).

(b) Reporting Category RCS-2. Reporting category RCS-2 shall be applied to all soil samples that are not obtained from category RCS-1 areas.

For the purpose of this investigation, since soil samples were obtained within 500 feet of a residential dwelling, they were compared to Massachusetts Contingency Plan RC S-1 criteria.

In addition, in preparation for any soil materials that would need to be disposed of off site, analytical results were compared to MADEP's COMM-97-001 Policy, the Reuse and Disposal of Contaminated Soil at Massachusetts Landfills.

A summary of the laboratory analytical data is presented in Appendix B and the full laboratory analytical report and chain-of-custody record are attached in Appendix C. The following sections describe the results of the soil testing.

3.2.1 Soil Sample Results

The soil samples which were collected for VOCs had at least one detectable VOC for the intervals sampled except for PB-7 (1-7'), which had no detectable levels of VOCs. Concentrations of volatile oil and hazardous materials did not exceed RC S-1 criteria in any of the nine samples collected. In samples PB-4 and PB-9, concentrations of 1,1,2,2-Tetrachloroethane; 1,4-Dioxane; cis-1,3-Dichloropropene; Dibromochloromethane; Methylene Chloride; and trans-1,3-Dichloropropene were not detected. However, due to likely matrix interferences within samples from PB-4 and PB-9, the method detection limit (MDL) of the sample was raised, and the MDL did not achieve / could not be lowered to below the RC criteria.

PCB concentrations were not detected in any of the soil samples analyzed as part of this project. The MDLs were all less than the RC values for S-1 and S-2 soils.

The SVOC, benzo(a)pyrene, was detected at a concentration of 0.231 milligrams per kilogram (mg/kg) in sample PB-2 (2-14'). In addition, the SVOC, chrysene, was detected at a concentration of 0.203 mg/kg in sample PB-9 (1-9'). SVOC concentrations were not detected in any of the other soil samples analyzed as part of this project. The MDLs were all less than the RC values for S-1 and S-2 soils.

The EPH, C11-C22 aromatics was detected at a concentration of 85.3 mg/kg in sample PB-4 (1.5-13.5') and 53.5 mg/kg in sample PB-9 (1-9'). In addition, the EPH, C9-C18 aliphatics was detected at a concentration of 468 mg/kg in sample PB-4 (1.5-13.5') and 42.2 mg/kg in sample PB-9 (1-9'). EPH concentrations were not detected in any of the other soil samples analyzed as part of this project. The MDLs were all less than the RC values for S-1 and S-2 soils.

The VPH, benzene (1.01 mg/kg), naphthalene (0.26 mg/kg), and toluene (0.41 mg/kg) were detected in PB-9 (1-9'). In addition, naphthalene was detected at a concentration of 2.04 mg/kg and C9-C10 aromatics were detected at a concentration of 100 mg/kg in PB-4 (1.5-13.5'). This C9-C10 aromatics concentration of 100 mg/kg is equal to the RC S-1 criteria of 100 mg/kg. VPH concentrations were not detected in any of the other soil samples analyzed as part of this project. The MDLs were all less than the RC values for S-1 and S-2 soils.

At least one metal was detected in each of the nine soil samples analyzed. Concentrations of metals did not exceed the RC S-1 or S-2 criteria in any of the samples analyzed. Antimony, cadmium, selenium, silver, and thallium were not detected in any soil sample analyzed. In addition, the MDLs were all less than the RC values for S-1 and S-2 soils.

3.2.2 Soil Disposal Parameters Sample Results

The analytical results were compared to Massachusetts Department of Environmental Protection (MADEP) Policy # COMM-97-001, Reuse and Disposal of Contaminated Soil at Massachusetts Landfills, and the Massachusetts Contingency Plan (MCP) Reporting Category RCS-1. For the purpose of determining whether a notification obligation exists under 310 CMR 40.0315, measured concentrations of any oil or hazardous material listed at 310 CMR 40.1600 shall be compared to the Reportable Concentration value in the reporting category that best characterizes the current use of the site under evaluation. In the case of Reporting Category RCS-1, reporting category RCS-1 shall be applied to all soil samples obtained:

1. at or within 500 feet of a residential dwelling, a residentially-zoned property, school, playground, recreational area or park; or
2. within the geographic boundaries of a groundwater resource area categorized as RCGW-1 in 310 CMR 40.0362(1)(a).

In the case of Reporting Category RCS-2, reporting category RCS-2 shall be applied to all soil samples that are not obtained from category RCS-1 areas. In addition, reporting category RCS-1 shall be selected whenever and wherever reasonable doubts exist over the selection of the appropriate soil Reportable Concentration category.

None of the concentrations of contaminants analyzed for as part of this investigation in the soil for samples PB-1 through PB-5 and PB-7 through PB10 exceeded MADEP Policy #COMM-97-001 for acceptance and use at a Massachusetts lined landfills.

MCP reporting category RCS-1 applies to soil samples. For this project, soil samples were collected below the pavement of the public way, and the MCP reporting category RCS-1 is used for comparison purposes. Of the analytes sampled within the nine soil sample locations, only one compound, C9-C10 aromatics (100 mg/kg), at location PB-4, was detected at a concentration equal to or above the RCS-1 reporting category of 100 mg/kg.

Several properties along the corridor as well as properties upgradient, crossgradient, and nearby to PB-4 are listed on environmental database reports for concerns related to oil and/or hazardous materials.

These include 223 Washington Street, 231 Washington Street, @Washington Street/Bonner Avenue, and 236 Washington Street.

4.0 CONCLUSIONS

Based on the approach described in this report and subject to the limitations described herein, PEER concludes the following.

- None of the concentrations of contaminants analyzed as part of this investigation in the soil for samples PB-1 through PB-5 and PB-7 through PB10 exceeded MADEP Policy #COMM-97-001 for acceptance and use at a Massachusetts lined landfills.

- None of the concentrations of contaminants analyzed as part of this investigation in the soil for samples PB-1 through PB-5 and PB-7 through PB10 exceeded MCP reporting category RCS-1, except for C9-C10 aromatics (100 mg/kg), at location PB-4, which was detected at a concentration equal to the RCS-1 reporting category of 100 mg/kg.

- Several properties along the corridor as well as properties upgradient, crossgradient, and nearby to PB-4 are listed on environmental database reports for concerns related to oil and/or hazardous materials.

- Soil from borings PB-4 and PB-9 contained a slight aromatic hydrocarbon odor.

5.0 DISCUSSION

Based on the results of the soil sampling activities, it appears that excavated soil in many areas may be re-used on site. However, soils with a contaminant concentration within reporting category RCS-1 (within 500 feet of a residential dwelling, a residentially-zoned property, school, playground, recreational area or park), or the potential for structurally unsuitable soils, or soils in excess of the volume needed for reuse, would preclude the re-use of soil on site, and necessitate off-site disposal, preferably at a Massachusetts lined landfill.

Therefore, if surplus soil requires off-site disposal to a licensed facility, PEER suggests obtaining approvals from a Massachusetts lined landfill, or similar licensed landfill, prior to initiation of construction activities. In this manner, excavated soil above the groundwater table may be "live-loaded" and shipped off site, thereby minimizing the need for extensive stockpiling of excavated soil, which in turn, may impact the construction schedule.

PEER determined that, according to MADEP, there were 21 lined landfills, and two unlined landfills listed as active for Massachusetts. Of these lined landfills, only Bourne, Dartmouth, and Southbridge indicated that they were accepting materials, dependent on acceptance criteria. Tipping fees ranged from $16-40/ton at these locations, which did not include acceptance review fees. In addition, Waste Management, who manages six of the landfills, indicated that they were also accepting materials at either their Middleborough or Taunton locations, dependent on acceptance criteria. Tipping fees at these locations were $20/ton, plus landfill fees (10% environmental fee, a 9.21% fuel fee, and a 2.1% regulatory recovery fee).

PEER also identified that a landfill in adjoining states to Massachusetts, such as Connecticut, was willing to accept non-hazardous out of state waste, but generally had additional fees or submission requirements in order to receive disposal approval. Tipping fees ranged from $35/ton for soil to $40/ton for sediment at these locations, which did not include other imposed fees.

One compound, C9-C10 aromatics (100 mg/kg), at location PB-4, was detected at a concentration equal to the RCS-1 reporting category of 100 mg/kg. Soil within boring PB-4 and PB-9 had a slight aromatic hydrocarbon odor. It's likely that other areas within the corridor that are near known (or unknown) release sites may have elevated levels of contaminants. PEER recommends providing MADEP a Downgradient Property Status (DPS) Submittal for this release at PB-4. The DPS submittal is for properties that have been affected by contamination from an upgradient or upstream source and may not be able to meet the requirements of the MCP because they do not control the source of contamination.

In addition, PEER recommends that an environmental monitor be present during the Union Square Utilities & Roadway Improvements project in order to monitor and assist with soil management during construction activities.

In summary, pre-characterization soil sampling has been completed for the proposed Union Square Utilities & Roadway Improvements project. Should soil need to be removed from the site in excess of the quantities proposed by Somerville, or from different areas than the currently proposed locations of sampling, additional soil characterization may be required.

APPENDIX A
FIGURE 1 – USGS TOPOGRAPHIC MAP

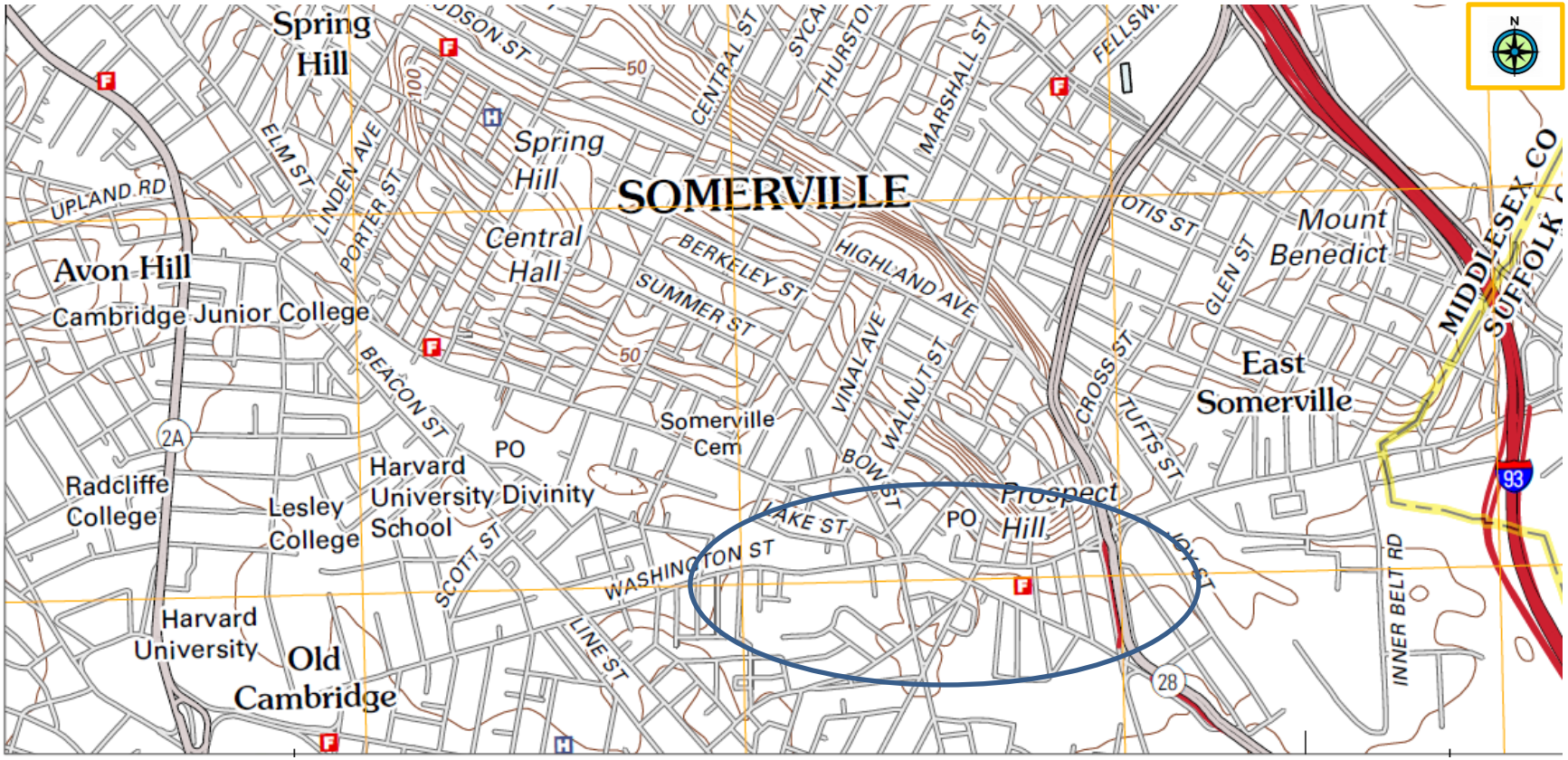

Figure 1 – USGS Topographic Map

Boston North, MA (2012), 1:24,000

Union Square
Somerville, Massachusetts

APPENDIX B
ANALYTICAL SUMMARY TABLES

Table 1
Volatile Organic Compounds
Union Square - Somerville, MA

Client Sample No.				PB-1		PB-2		PB-3		PB-4		PB-5		PB-7		PB-8		PB-9		PB-10	
Client Sample Depth				6.5-8.5'		10-12'		1-7'		8.5-9.5'		1-3'		1-7'		4-6'		5-7'		1-5'	
Sample Date				08/18/2014		08/12/2014		08/07/2014		08/13/2014		08/07/2014		08/07/2014		08/14/2014		08/11/2014		08/07/2014	
Lab Sample ID	2014-RCS1	2014-RCS2	Units	1408387-01		1408202-04		1408144-05		1408317-01		1408144-02		1408144-01		1408317-04		1408202-03		1408144-04	
5035/8260B VOCs																					
1,1,1,2-Tetrachloroethane	0.1	0.1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.122	U	0.005	U	0.005	U	0.005	U	0.108	U	0.005	U
1,1,1-Trichloroethane	30	600	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,1,2,2-Tetrachloroethane	0.005	0.02	mg/kg dry	0.002	U	0.002	U	0.002	U	0.061	U	0.002	U	0.002	U	0.002	U	0.054	U	0.002	U
1,1,2-Trichloroethane	0.1	2	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,1-Dichloroethane	0.4	9	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,1-Dichloroethene	3	40	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,1-Dichloropropene	NA	NA	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,2,3-Trichlorobenzene	NA	NA	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,2,3-Trichloropropane	100	1,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,2,4-Trichlorobenzene	2	6	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,2,4-Trimethylbenzene	1,000	10,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.07		0.005	U	0.005	U	0.005	U	0.241		0.005	U
1,2-Dibromo-3-Chloropropane	10	100	mg/kg dry	0.005	U	0.004	U	0.004	U	0.244	U	0.005	U	0.005	U	0.005	U	0.216	U	0.005	U
1,2-Dibromoethane	0.1	0.1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,2-Dichlorobenzene	9	100	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,2-Dichloroethane	0.1	0.1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,2-Dichloropropane	0.1	0.1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,3,5-Trimethylbenzene	10	100	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.066		0.005	U
1,3-Dichlorobenzene	3	200	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,3-Dichloropropane	500	5,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,4-Dichlorobenzene	0.7	1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
1,4-Dioxane	0.2	6	mg/kg dry	0.103	U	0.086	U	0.088	U	6.1	U	0.094	U	0.09	U	0.091	U	5.39	U	0.092	U
2,2-Dichloropropane	NA	NA	mg/kg dry	0.005	U	0.004	U	0.004	U	0.122	U	0.005	U	0.005	U	0.005	U	0.108	U	0.005	U
2-Butanone	4	50	mg/kg dry	0.01	U	0.009		0.009	U	0.244	U	0.009	U	0.009	U	0.009	U	0.216	U	0.009	U
2-Chlorotoluene	100	1,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
2-Hexanone	100	1,000	mg/kg dry	0.01	U	0.009	U	0.009	U	0.244	U	0.009	U	0.009	U	0.009	U	0.216	U	0.009	U
4-Chlorotoluene	NA	NA	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
4-Isopropyltoluene	100	500	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
4-Methyl-2-Pentanone	0.4	50	mg/kg dry	0.01	U	0.009	U	0.009	U	0.244	U	0.009	U	0.009	U	0.009	U	0.216	U	0.009	U
Acetone	6	50	mg/kg dry	0.013		0.074		0.009	U	0.298	B	0.019		0.009	U	0.036		0.216	U	0.026	
Benzene	2	200	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	1.68		0.005	U
Bromobenzene	100	1,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Bromochloromethane	NA	NA	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Bromodichloromethane	0.1	0.1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Bromoform	0.1	1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Bromomethane	0.5	0.5	mg/kg dry	0.01	U	0.009	U	0.009	U	0.122	U	0.009	U	0.009	U	0.009	U	0.108	U	0.009	U
Carbon Disulfide	100	1,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Carbon Tetrachloride	5	5	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Chlorobenzene	1	3	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Chloroethane	100	1,000	mg/kg dry	0.01	U	0.009	U	0.009	U	0.122	U	0.009	U	0.009	U	0.009	U	0.108	U	0.009	U
Chloroform	0.2	0.2	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Chloromethane	100	1,000	mg/kg dry	0.01	U	0.009	U	0.009	U	0.122	U	0.009	U	0.009	U	0.009	U	0.108	U	0.009	U
cis-1,2-Dichloroethene	0.1	0.1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
cis-1,3-Dichloropropene	0.01	0.1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Dibromochloromethane	0.005	0.03	mg/kg dry	0.002	U	0.002	U	0.002	U	0.061	U	0.002	U	0.002	U	0.002	U	0.054	U	0.002	U
Dibromomethane	500	5000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Dichlorodifluoromethane	1,000	10,000	mg/kg dry	0.01	U	0.009	U	0.009	U	0.061	U	0.009	U	0.009	U	0.009	U	0.054	U	0.009	U
Diethyl Ether	100	1,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Di-isopropyl ether	100	1,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Ethyl tertiary-butyl ether	NA	NA	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Ethylbenzene	40	1,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.123		0.005	U
Hexachlorobutadiene	30	100	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Isopropylbenzene	1,000	10,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.139		0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Methyl tert-Butyl Ether	0.1	100	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Methylene Chloride	0.1	4	mg/kg dry	0.01	U	0.009	U	0.009	U	0.244	U	0.009	U	0.009	U	0.009	U	0.216	U	0.009	U
Naphthalene	4	20	mg/kg dry	0.005	U	0.004	U	0.004	U	1.48		0.005	U	0.005	U	0.005	U	0.208		0.005	U
n-Butylbenzene	100	500	mg/kg dry	0.005	U	0.004	U	0.004	U	3.8		0.005	U	0.005	U	0.005	U	0.063		0.005	U
n-Propylbenzene	100	1,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.351		0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
sec-Butylbenzene	100	500	mg/kg dry	0.005	U	0.004	U	0.004	U	2.88		0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Styrene	3	4	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
tert-Butylbenzene	100	1,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.315		0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Tertiary-amyl methyl ether	NA	NA	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Tetrachloroethene	1	10	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Tetrahydrofuran	500	5,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.244	U	0.005	U	0.005	U	0.005	U	0.216	U	0.005	U
Toluene	30	1,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.654		0.005	U
trans-1,2-Dichloroethene	1	1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
trans-1,3-Dichloropropene	0.01	0.1	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Trichloroethene	0.3	0.3	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Trichlorofluoromethane	1,000	10,000	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.054	U	0.005	U
Vinyl Chloride	0.7	0.7	mg/kg dry	0.01	U	0.009	U	0.009	U	0.061	U	0.009	U	0.009	U	0.009	U	0.054	U	0.009	U
Xylene O	100	100	mg/kg dry	0.005	U	0.004	U	0.004	U	0.061	U	0.005	U	0.005	U	0.005	U	0.109		0.005	U
Xylene P,M	100	100	mg/kg dry	0.01	U	0.009	U	0.009	U	0.122	U	0.009	U	0.009	U	0.009	U	0.339		0.009	U
Xylenes (Total)	100	100	mg/kg dry	0.01	U	0.009	U	0.009	U	0.122	U, D	0.009	U	0.009	U	0.009	U	0.447	D	0.009	U

Table 2
Polychlorinated Biphenyls
Union Square - Somerville, MA

Client Sample No.				PB-1		PB-2		PB-3		PB-4		PB-5		PB-7		PB-8		PB-9		PB-10	
Client Sample Depth				0.5-12.5'		2-14'		1-13'		1.5-13.5'		1-13'		1-13'		2-6'		1-9'		1-9'	
Sample Date				08/18/2014		08/12/2014		08/19/2014		08/13/2014		08/07/2014		08/08/2014		08/14/2014		08/11/2014		08/15/2014	
Lab Sample ID	2014-RCS1	2014-RCS2	Units	1408387-02		1408202-05		1408387-03		1408317-02		1408144-03		1408202-01		1408317-03		1408202-02		1408349-01	
8082A PCBs																					
Aroclor 1016	1	4	mg/kg dry	0.053	U	0.062	U	0.056	U	0.057	U	0.054	U	0.053	U	0.054	U	0.054	U	0.054	U
Aroclor 1221	1	4	mg/kg dry	0.053	U	0.062	U	0.056	U	0.057	U	0.054	U	0.053	U	0.054	U	0.054	U	0.054	U
Aroclor 1232	1	4	mg/kg dry	0.053	U	0.062	U	0.056	U	0.057	U	0.054	U	0.053	U	0.054	U	0.054	U	0.054	U
Aroclor 1242	1	4	mg/kg dry	0.053	U	0.062	U	0.056	U	0.057	U	0.054	U	0.053	U	0.054	U	0.054	U	0.054	U
Aroclor 1248	1	4	mg/kg dry	0.053	U	0.062	U	0.056	U	0.057	U	0.054	U	0.053	U	0.054	U	0.054	U	0.054	U
Aroclor 1254	1	4	mg/kg dry	0.053	U	0.062	U	0.056	U	0.057	U	0.054	U	0.053	U	0.054	U	0.054	U	0.054	U
Aroclor 1260	1	4	mg/kg dry	0.053	U	0.062	U	0.056	U	0.057	U	0.054	U	0.053	U	0.054	U	0.054	U	0.054	U
Aroclor 1262	1	4	mg/kg dry	0.053	U	0.062	U	0.056	U	0.057	U	0.054	U	0.053	U	0.054	U	0.054	U	0.054	U
Aroclor 1268	1	4	mg/kg dry	0.053	U	0.062	U	0.056	U	0.057	U	0.054	U	0.053	U	0.054	U	0.054	U	0.054	U

Table 3
Semivolatile Organic Compounds
Union Square - Somerville, MA

Client Sample No.				PB-1		PB-2		PB-3		PB-4		PB-5		PB-7		PB-8		PB-9		PB-10	
Client Sample Depth				0.5-12.5'		2-14'		1-13'		1.5-13.5'		1-13'		1-13'		2-6'		1-9'		1-9'	
Sample Date				08/18/2014		08/12/2014		08/19/2014		08/13/2014		08/07/2014		08/08/2014		08/14/2014		08/11/2014		08/15/2014	
Lab Sample ID	2014-RCS1	2014-RCS2	Units	1408387-02		1408202-05		1408387-03		1408317-02		1408144-03		1408202-01		1408317-03		1408202-02		1408349-01	
8270D SVOCs																					
1,2,4-Trichlorobenzene	2	6	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
1,2-Dichlorobenzene	9	100	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
1,3-Dichlorobenzene	3	200	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
1,4-Dichlorobenzene	0.7	1	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2,4,5-Trichlorophenol	4	600	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2,4,6-Trichlorophenol	0.7	20	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2,4-Dichlorophenol	0.7	40	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2,4-Dimethylphenol	0.7	100	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2,4-Dinitrophenol	3	50	mg/kg dry	1.8	U	2.19	U	1.93	U	1.89	U	1.92	U	1.76	U	1.79	U	1.89	U	1.82	U
2,4-Dinitrotoluene	0.7	10	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2,6-Dinitrotoluene	100	1,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2-Chloronaphthalene	1,000	10,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2-Chlorophenol	0.7	100	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2-Methylnaphthalene	0.7	80	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2-Methylphenol	500	5,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
2-Nitrophenol	100	1,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
3,3´-Dichlorobenzidine	3	20	mg/kg dry	0.719	U	0.876	U	0.773	U	0.757	U	0.767	U	0.705	U	0.717	U	0.755	U	0.727	U
3+4-Methylphenol	500	5,000	mg/kg dry	0.719	U	0.876	U	0.773	U	0.757	U	0.767	U	0.705	U	0.717	U	0.755	U	0.727	U
4-Bromophenyl-phenylether	100	1,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
4-Chloroaniline	1	3	mg/kg dry	0.719	U	0.876	U	0.773	U	0.757	U	0.767	U	0.705	U	0.717	U	0.755	U	0.727	U
4-Nitrophenol	100	1,000	mg/kg dry	1.8	U	2.19	U	1.93	U	1.89	U	1.92	U	1.76	U	1.79	U	1.89	U	1.82	U
Acenaphthene	4	3,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Acenaphthylene	1	10	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Acetophenone	1,000	10,000	mg/kg dry	0.719	U	0.876	U	0.773	U	0.757	U	0.767	U	0.705	U	0.717	U	0.755	U	0.727	U
Aniline	1,000	10,000	mg/kg dry	1.8	U	2.19	U	1.93	U	1.89	U	1.92	U	1.76	U	1.79	U	1.89	U	1.82	U
Anthracene	1,000	3,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Azobenzene	50	500	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Benzo(a)anthracene	7	40	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Benzo(a)pyrene	2	7	mg/kg dry	0.18	U	0.231		0.193	U	0.189	U	0.192	U	0.176	U	0.179	U	0.189	U	0.182	U
Benzo(b)fluoranthene	7	40	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Benzo(g,h,i)perylene	1,000	3,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Benzo(k)fluoranthene	70	400	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
bis(2-Chloroethoxy)methane	500	5,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
bis(2-Chloroethyl)ether	0.7	0.7	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
bis(2-chloroisopropyl)Ether	0.7	0.7	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
bis(2-Ethylhexyl)phthalate	90	600	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Butylbenzylphthalate	100	1,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Chrysene	70	400	mg/kg dry	0.18	U	0.219	U	0.193	U	0.189	U	0.192	U	0.176	U	0.179	U	0.203		0.182	U
Dibenzo(a,h)Anthracene	0.7	4	mg/kg dry	0.18	U	0.219	U	0.193	U	0.189	U	0.192	U	0.176	U	0.179	U	0.189	U	0.182	U
Dibenzofuran	100	1,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Diethylphthalate	10	200	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Dimethylphthalate	0.7	50	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Di-n-butylphthalate	50	500	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Di-n-octylphthalate	1,000	10,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Fluoranthene	1,000	3,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Fluorene	1,000	3,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Hexachlorobenzene	0.7	0.8	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Hexachlorobutadiene	30	100	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Hexachloroethane	0.7	3	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Indeno(1,2,3-cd)Pyrene	7	40	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Isophorone	100	1,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Naphthalene	4	20	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Nitrobenzene	500	5,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
N-Nitrosodimethylamine	50	500	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Pentachlorophenol	3	10	mg/kg dry	1.8	U	2.19	U	1.93	U	1.89	U	1.92	U	1.76	U	1.79	U	1.89	U	1.82	U
Phenanthrene	10	1,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Phenol	1	20	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U
Pyrene	1,000	3,000	mg/kg dry	0.359	U	0.438	U	0.386	U	0.378	U	0.383	U	0.352	U	0.358	U	0.377	U	0.363	U

Table 4

Extractable Petroluem Hydrocarbons / Volatile Petroleum Hydrocarbons

Union Square - Somerville, MA

Client Sample No.				PB-1		PB-2		PB-3		PB-4		PB-5		PB-7		PB-8		PB-9		PB-10	
Client Sample Depth				0.5-12.5'		2-14'		1-13'		1.5-13.5'		1-13'		1-13'		2-6'		1-9'		1-9'	
Sample Date				08/18/2014		08/12/2014		08/19/2014		08/13/2014		08/07/2014		08/08/2014		08/14/2014		08/11/2014		08/15/2014	
Lab Sample ID	2014-RCS1	2014-RCS2	Units	1408387-02		1408202-05		1408387-03		1408317-02		1408144-03		1408202-01		1408317-03		1408202-02		1408349-01	
Classical Chemistry																					
Conductivity	NA	NA	umhos/cm	197	WL	552	WL	1,490	WL	1,320	WL	1,350	WL	552	WL	1,360	WL	1,000	WL	312	WL
MADEP- EPH																					
C11-C22 Aromatics 1,2	1,000	3,000	mg/kg dry	16.2	U	19.6	U	17.1	U	85.3		17	U	16.5	U	16	U	53.5		16.6	U
C11-C22 Unadjusted Aromatics 1	1,000	3,000	mg/kg dry	16.2	U	19.6	U	17.1	U	85.3		17	U	16.5	U	16	U	53.5		16.6	U
C19-C36 Aliphatics 1	3,000	5,000	mg/kg dry	16.2	U	19.6	U	17.1	U	16.9	U	17	U	16.5	U	16	U	173		16.6	U
C9-C18 Aliphatics 1	1,000	3,000	mg/kg dry	16.2	U	19.6	U	17.1	U	468		17	U	16.5	U	16	U	42.2		16.6	U
MADEP- VPH																					
1:1 Methanol/Soil Ratio %D	*NA*	*NA*	*%*	*5*		*6*		*4*		*51*		*21*		*17*		*8*		*15*		*18*	
Benzene	2	200	mg/kg dry	0.22	U	0.33	U	0.26	U	0.18	U	0.21	U	0.2	U	0.22	U	1.01		0.19	U
C5-C8 Aliphatics 1,2	100	500	mg/kg dry	11.1	U, D	16.6	U, D	13.2	U, D	9.13	U, D	10.4	U, D	10.1	U, D	10.8	U, D	11.1	U, D	9.74	U, D
C9-C10 Aromatics	100	500	mg/kg dry	11.1	U	16.6	U	13.2	U	**100**		10.4	U	10.1	U	10.8	U	11.1	U	9.74	U
C9-C12 Aliphatics 2,3	1,000	3,000	mg/kg dry	11.1	U, D	16.6	U, D	13.2	U, D	163	D	10.4	U, D	10.1	U, D	10.8	U, D	11.1	U, D	9.74	U, D
Ethylbenzene	40	1,000	mg/kg dry	0.22	U	0.33	U	0.26	U	0.18	U	0.21	U	0.2	U	0.22	U	0.22	U	0.19	U
Methyl tert-Butyl Ether	0.1	100	mg/kg dry	0.06	U	0.08	U	0.07	U	0.05	U	0.05	U	0.05	U	0.05	U	0.06	U	0.05	U
Naphthalene	4	20	mg/kg dry	0.22	U	0.33	U	0.26	U	2.04		0.21	U	0.2	U	0.22	U	0.26		0.19	U
Toluene	30	1,000	mg/kg dry	0.22	U	0.33	U	0.26	U	0.18	U	0.21	U	0.2	U	0.22	U	0.41		0.19	U
Xylene O	100	100	mg/kg dry	0.22	U	0.33	U	0.26	U	0.18	U	0.21	U	0.2	U	0.22	U	0.22	U	0.19	U
Xylene P,M	100	100	mg/kg dry	0.44	U	0.66	U	0.53	U	0.37	U	0.42	U	0.4	U	0.43	U	0.45	U	0.39	U

Table 5
Total Metals
Union Square, Somerville, MA

Client Sample No.				PB-1		PB-2		PB-3		PB-4		PB-5		PB-7		PB-8		PB-9		PB-10	
Client Sample Depth				0.5-12.5'		2-14'		1-13'		1.5-13.5'		1-13'		1-13'		2-6'		1-9'		1-9'	
Sample Date				08/18/2014		08/12/2014		08/19/2014		08/13/2014		08/07/2014		08/08/2014		08/14/2014		08/11/2014		08/15/2014	
Lab Sample ID	2014-RCS1	2014-RCS2	Units	1408387-02		1408202-05		1408387-03		1408317-02		1408144-03		1408202-01		1408317-03		1408202-02		1408349-01	
Total Metals																					
Antimony	20	30	mg/kg dry	3.9	U	5.9	U	4.6	U	5.3	U	3.2	U	4.7	U	4.7	U	4.7	U	4.9	U
Arsenic	20	20	mg/kg dry	4.2		3.8		3.5		3.4		2.8		3.2		3.6		4.6		3.1	
Barium	1,000	3,000	mg/kg dry	11.7		13.3		14.4		12.1		8.2		10.2		12.1		20.9		13.3	
Beryllium	90	200	mg/kg dry	0.18		0.3		0.17		0.23		0.18		0.18		0.26		0.25		0.16	
Cadmium	70	100	mg/kg dry	0.39	U	0.59	U	0.46	U	0.53	U	0.32	U	0.47	U	0.47	U	0.47	U	0.49	U
Chromium	100	200	mg/kg dry	8.9		11.2		7.2		8.5		10.9		9.1		8		15.5		8	
Lead	200	600	mg/kg dry	9		11.5		6.9		6.7		3.2	U	4.7	U	7.1		15		4.9	U
Mercury	20	30	mg/kg dry	0.165		0.038		0.037	U	0.028	U	0.01	U	0.029	U	0.035	U	0.044		0.027	U
Nickel	600	1,000	mg/kg dry	7.5		7.9		7.5		7.6		5.6		7.2		6.8		12.3		6.7	
Selenium	400	700	mg/kg dry	1.96	U, D	2.94	U, D	2.32	U, D	0.53	U, D	1.59	U, D	2.35	U, D	0.47	U, D	2.36	U, D	2.43	U, D
Silver	100	200	mg/kg dry	0.39	U	0.59	U	0.46	U	0.53	U	0.32	U	0.47	U	0.47	U	0.47	U	0.49	U
Thallium	8	60	mg/kg dry	0.98	U, D	1.47	U, D	1.16	U, D	0.53	U, D	0.8	U, D	1.17	U, D	0.47	U, D	1.18	U, D	1.21	U, D
Vanadium	400	700	mg/kg dry	12.4		16.5		11.7		12.9		9.7		13.7		14		30.6		10.6	
Zinc	1,000	3,000	mg/kg dry	21.3		22.7		16.7		19.3		12.6		14.8		18.9		126		12.8	

APPENDIX C
ANALYTICAL REPORT AND CHAIN OF CUSTODY

CERTIFICATE OF ANALYSIS

David Gorden
PEER Consultants, P.C.
99 S. Bedford Street
Burlington, MA 01803

RE: Union Square (5559)
ESS Laboratory Work Order Number: 1408144

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 2:49 pm, Aug 18, 2014

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

SAMPLE RECEIPT

The following samples were received on August 07, 2014 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has performed and reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

For EPH soil samples, the aromatic range results have been corrected for identified cartridge contaminant in accordance with the CAM protocol.

Percent solid jars for samples 1408144-01, 1408144-04, and 1408144-05 were received on August 08, 2014
Percent solid for sample 1408144-02 was taken from sample 1408144-03 per client's request.

Lab Number	Sample Name	Matrix	Analysis
1408144-01	PB-7 1-7ft	Soil	8260B Low
1408144-02	PB-5 1-3ft	Soil	8260B Low
1408144-03	PB-5 1-13ft	Soil	6010C, 7010, 7471B, 8082A, 8270D, 9050A, EPH8270, MADEP-EPH, MADEP-VPH
1408144-04	PB-10 1-5ft	Soil	8260B Low
1408144-05	PB-3 1-7ft	Soil	8260B Low

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

PROJECT NARRATIVE

8270D Semi-Volatile Organic Compounds

CXH0104-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (110% @ 80-120%), Pentachlorophenol (99% @ 80-120%)

CXH0104-CCV1 **Continuing Calibration recovery is above upper control limit (C+).**
Di-n-octylphthalate (121% @ 80-120%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1408144-01 through 1408144-05**

Matrices: ( ) Ground Water/Surface Water (X) Soil/Sediment ( ) Drinking Water ( ) Air ( ) Other:_____

CAM Protocol (check all that apply below):

(X) 8260 VOC CAM II A	(X) 7470/7471 Hg CAM III B	( ) MassDEP VPH CAM IV A	( ) 8081 Pesticides CAM V B	( ) 7196 Hex Cr CAM VI B	( ) MassDEP APH CAM IX A
(X) 8270 SVOC CAM II B	(X) 7010 Metals CAM III C	(X) MassDEP EPH CAM IV B	( ) 8151 Herbicides CAM V C	( ) 8330 Explosives CAM VIII A	( ) TO-15 VOC CAM IX B
(X) 6010 Metals CAM III A	( ) 6020 Metals CAM III D	(X) 8082 PCB CAM V A	( ) 6860 Perchlorate CAM VIII B	( ) 9014 Total Cyanide/PAC CAM VI A	

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes (X) No ( )
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	Yes (X) No ( )
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	Yes (X) No ( )
D	Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (X) No ( )
E	a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	Yes (X) No ( )
	b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes ( ) No ( )
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	Yes (X) No ( )

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?	Yes (X) No ( )*
	***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**	
H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes ( ) No (X)*
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes (X) No ( )*

****All negative responses must be addressed in an attached laboratory narrative.***

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Laurel Stoddard Date: August 18, 2014

Printed Name: Laurel Stoddard Position: Laboratory Director

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-7 1-7ft
Date Sampled: 08/07/14 10:00
Percent Solids: 96
Initial Volume: 5.8
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,1,1-Trichloroethane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,1,2,2-Tetrachloroethane	ND (0.0018)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,1,2-Trichloroethane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,1-Dichloroethane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,1-Dichloroethene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,1-Dichloropropene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,2,3-Trichlorobenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,2,3-Trichloropropane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,2,4-Trichlorobenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,2,4-Trimethylbenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,2-Dibromo-3-Chloropropane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,2-Dibromoethane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,2-Dichlorobenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,2-Dichloroethane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,2-Dichloropropane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,3,5-Trimethylbenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,3-Dichlorobenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,3-Dichloropropane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,4-Dichlorobenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
1,4-Dioxane	ND (0.0895)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
2,2-Dichloropropane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
2-Butanone	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
2-Chlorotoluene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
2-Hexanone	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
4-Chlorotoluene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
4-Isopropyltoluene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
4-Methyl-2-Pentanone	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Acetone	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Benzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Bromobenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Bromochloromethane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-7 1-7ft
Date Sampled: 08/07/14 10:00
Percent Solids: 96
Initial Volume: 5.8
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Bromoform	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Bromomethane	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Carbon Disulfide	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Carbon Tetrachloride	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Chlorobenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Chloroethane	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Chloroform	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Chloromethane	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
cis-1,2-Dichloroethene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
cis-1,3-Dichloropropene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Dibromochloromethane	ND (0.0018)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Dibromomethane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Dichlorodifluoromethane	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Diethyl Ether	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Di-isopropyl ether	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Ethyl tertiary-butyl ether	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Ethylbenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Hexachlorobutadiene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Isopropylbenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Methyl tert-Butyl Ether	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Methylene Chloride	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Naphthalene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
n-Butylbenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
n-Propylbenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
sec-Butylbenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Styrene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
tert-Butylbenzene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Tertiary-amyl methyl ether	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Tetrachloroethene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Tetrahydrofuran	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Toluene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-7 1-7ft
Date Sampled: 08/07/14 10:00
Percent Solids: 96
Initial Volume: 5.8
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
trans-1,2-Dichloroethene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
trans-1,3-Dichloropropene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Trichloroethene	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Trichlorofluoromethane	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Vinyl Chloride	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Xylene O	ND (0.0045)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Xylene P,M	ND (0.0089)		8260B Low		1	08/14/14 17:28	CXH0151	CH41425
Xylenes (Total)	ND (0.0089)		8260B Low		1	08/14/14 17:28		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*116 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*100 %*		*70-130*
Surrogate: Dibromofluoromethane	*98 %*		*70-130*
Surrogate: Toluene-d8	*96 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-3ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89
Initial Volume: 6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,1,1-Trichloroethane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,1,2,2-Tetrachloroethane	ND (0.0019)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,1,2-Trichloroethane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,1-Dichloroethane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,1-Dichloroethene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,1-Dichloropropene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,2,3-Trichlorobenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,2,3-Trichloropropane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,2,4-Trichlorobenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,2,4-Trimethylbenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,2-Dibromo-3-Chloropropane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,2-Dibromoethane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,2-Dichlorobenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,2-Dichloroethane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,2-Dichloropropane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,3,5-Trimethylbenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,3-Dichlorobenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,3-Dichloropropane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,4-Dichlorobenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
1,4-Dioxane	ND (0.0936)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
2,2-Dichloropropane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
2-Butanone	ND (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
2-Chlorotoluene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
2-Hexanone	ND (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
4-Chlorotoluene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
4-Isopropyltoluene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
4-Methyl-2-Pentanone	ND (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Acetone	**0.0187** (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Benzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Bromobenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Bromochloromethane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-3ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89
Initial Volume: 6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Bromoform	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Bromomethane	ND (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Carbon Disulfide	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Carbon Tetrachloride	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Chlorobenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Chloroethane	ND (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Chloroform	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Chloromethane	ND (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
cis-1,2-Dichloroethene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
cis-1,3-Dichloropropene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Dibromochloromethane	ND (0.0019)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Dibromomethane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Dichlorodifluoromethane	ND (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Diethyl Ether	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Di-isopropyl ether	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Ethyl tertiary-butyl ether	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Ethylbenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Hexachlorobutadiene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Isopropylbenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Methyl tert-Butyl Ether	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Methylene Chloride	ND (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Naphthalene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
n-Butylbenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
n-Propylbenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
sec-Butylbenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Styrene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
tert-Butylbenzene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Tertiary-amyl methyl ether	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Tetrachloroethene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Tetrahydrofuran	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Toluene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-3ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89
Initial Volume: 6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
trans-1,2-Dichloroethene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
trans-1,3-Dichloropropene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Trichloroethene	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Trichlorofluoromethane	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Vinyl Chloride	ND (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Xylene O	ND (0.0047)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Xylene P,M	ND (0.0094)		8260B Low		1	08/14/14 17:56	CXH0151	CH41425
Xylenes (Total)	ND (0.0094)		8260B Low		1	08/14/14 17:56		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*116 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*98 %*		*70-130*
Surrogate: Dibromofluoromethane	*98 %*		*70-130*
Surrogate: Toluene-d8	*97 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-13ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-03
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (3.2)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302
Arsenic	**2.8** (1.6)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302
Barium	**8.2** (1.6)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302
Beryllium	**0.18** (0.07)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302
Cadmium	ND (0.32)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302
Chromium	**10.9** (0.6)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302
Lead	ND (3.2)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302
Mercury	ND (0.010)		7471B		1	KJK	08/13/14 16:40	2.21	40	CH41306
Nickel	**5.6** (1.6)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302
Selenium	ND (1.59)		7010		5	KJK	08/15/14 3:58	3.51	100	CH41302
Silver	ND (0.32)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302
Thallium	ND (0.80)		7010		5	KJK	08/15/14 0:09	3.51	100	CH41302
Vanadium	**9.7** (0.6)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302
Zinc	**12.6** (1.6)		6010C		1	KJK	08/13/14 18:45	3.51	100	CH41302

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-13ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89
Initial Volume: 20.7
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JXS
Prepared: 8/8/14 18:00
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.0540)		8082A		1	08/11/14 12:50		CH40803
Aroclor 1221	ND (0.0540)		8082A		1	08/11/14 12:50		CH40803
Aroclor 1232	ND (0.0540)		8082A		1	08/11/14 12:50		CH40803
Aroclor 1242	ND (0.0540)		8082A		1	08/11/14 12:50		CH40803
Aroclor 1248	ND (0.0540)		8082A		1	08/11/14 12:50		CH40803
Aroclor 1254	ND (0.0540)		8082A		1	08/11/14 12:50		CH40803
Aroclor 1260	ND (0.0540)		8082A		1	08/11/14 12:50		CH40803
Aroclor 1262	ND (0.0540)		8082A		1	08/11/14 12:50		CH40803
Aroclor 1268	ND (0.0540)		8082A		1	08/11/14 12:50		CH40803

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*83 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*84 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*81 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*90 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-13ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89
Initial Volume: 14.6
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/12/14 9:30

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
1,2-Dichlorobenzene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
1,3-Dichlorobenzene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
1,4-Dichlorobenzene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2,4,5-Trichlorophenol	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2,4,6-Trichlorophenol	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2,4-Dichlorophenol	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2,4-Dimethylphenol	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2,4-Dinitrophenol	ND (1.92)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2,4-Dinitrotoluene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2,6-Dinitrotoluene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2-Chloronaphthalene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2-Chlorophenol	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2-Methylnaphthalene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2-Methylphenol	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
2-Nitrophenol	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
3,3´-Dichlorobenzidine	ND (0.767)		8270D		1	08/12/14 18:09	CXH0104	CH41206
3+4-Methylphenol	ND (0.767)		8270D		1	08/12/14 18:09	CXH0104	CH41206
4-Bromophenyl-phenylether	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
4-Chloroaniline	ND (0.767)		8270D		1	08/12/14 18:09	CXH0104	CH41206
4-Nitrophenol	ND (1.92)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Acenaphthene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Acenaphthylene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Acetophenone	ND (0.767)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Aniline	ND (1.92)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Anthracene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Azobenzene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Benzo(a)anthracene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Benzo(a)pyrene	ND (0.192)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Benzo(b)fluoranthene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Benzo(g,h,i)perylene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Benzo(k)fluoranthene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-13ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89
Initial Volume: 14.6
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/12/14 9:30

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
bis(2-Chloroethoxy)methane	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
bis(2-Chloroethyl)ether	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
bis(2-chloroisopropyl)Ether	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
bis(2-Ethylhexyl)phthalate	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Butylbenzylphthalate	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Chrysene	ND (0.192)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Dibenzo(a,h)Anthracene	ND (0.192)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Dibenzofuran	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Diethylphthalate	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Dimethylphthalate	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Di-n-butylphthalate	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Di-n-octylphthalate	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Fluoranthene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Fluorene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Hexachlorobenzene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Hexachlorobutadiene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Hexachloroethane	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Indeno(1,2,3-cd)Pyrene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Isophorone	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Naphthalene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Nitrobenzene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
N-Nitrosodimethylamine	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Pentachlorophenol	ND (1.92)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Phenanthrene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Phenol	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206
Pyrene	ND (0.383)		8270D		1	08/12/14 18:09	CXH0104	CH41206

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*68 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*88 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*68 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*71 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-13ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89
Initial Volume: 14.6
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/12/14 9:30

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		*64 %*		*30-130*				
Surrogate: Nitrobenzene-d5		*69 %*		*30-130*				
Surrogate: Phenol-d6		*74 %*		*30-130*				
Surrogate: p-Terphenyl-d14		*104 %*		*30-130*				

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-13ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-03
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 1350** (5)		9050A		1	JLK	08/14/14 12:26	umhos/cm	CH41416

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-13ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89
Initial Volume: 24.7
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-03
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/11/14 16:58

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (17.0)		MADEP-EPH		1	DPS	08/15/14 2:42	CXH0145	CH41105
C19-C36 Aliphatics1	ND (17.0)		MADEP-EPH		1	DPS	08/15/14 2:42	CXH0145	CH41105
C11-C22 Unadjusted Aromatics1	ND (17.0)		EPH8270		1	VSC	08/12/14 20:33	CXH0106	CH41105
C11-C22 Aromatics1,2	ND (17.0)		EPH8270			VSC	08/12/14 20:33		[CALC]

	%Recovery	*Qualifier*	*Limits*
Surrogate: 1-Chlorooctadecane	*78 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*92 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*85 %*		*40-140*
Surrogate: O-Terphenyl	*71 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-5 1-13ft
Date Sampled: 08/07/14 11:00
Percent Solids: 89
Initial Volume: 18.2
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (10.4)		MADEP-VPH		1	08/15/14 23:46	CXH0188	CH41601
C5-C8 Aliphatics1,2	ND (10.4)		MADEP-VPH		1	08/15/14 23:46		[CALC]
C9-C12 Aliphatics2,3	ND (10.4)		MADEP-VPH		1	08/15/14 23:46		[CALC]
Benzene	ND (0.21)		MADEP-VPH		1	08/15/14 23:46	CXH0188	CH41601
Ethylbenzene	ND (0.21)		MADEP-VPH		1	08/15/14 23:46	CXH0188	CH41601
Methyl tert-Butyl Ether	ND (0.05)		MADEP-VPH		1	08/15/14 23:46	CXH0188	CH41601
Naphthalene	ND (0.21)		MADEP-VPH		1	08/15/14 23:46	CXH0188	CH41601
Toluene	ND (0.21)		MADEP-VPH		1	08/15/14 23:46	CXH0188	CH41601
Xylene O	ND (0.21)		MADEP-VPH		1	08/15/14 23:46	CXH0188	CH41601
Xylene P,M	ND (0.42)		MADEP-VPH		1	08/15/14 23:46	CXH0188	CH41601
1:1 Methanol/Soil Ratio %D	**21** (N/A)		MADEP-VPH			08/15/14 0:00		CH41601
Preservative:	**MeOH - covered**		MADEP-VPH					CH41601

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*110 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*110 %*		*70-130*
Surrogate: Trifluorotoluene - FID	*99 %*		*70-130*
Surrogate: Trifluorotoluene - PID	*100 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-10 1-5ft
Date Sampled: 08/07/14 12:00
Percent Solids: 88
Initial Volume: 6.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,1,1-Trichloroethane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,1,2,2-Tetrachloroethane	ND (0.0018)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,1,2-Trichloroethane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,1-Dichloroethane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,1-Dichloroethene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,1-Dichloropropene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,2,3-Trichlorobenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,2,3-Trichloropropane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,2,4-Trichlorobenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,2,4-Trimethylbenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,2-Dibromo-3-Chloropropane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,2-Dibromoethane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,2-Dichlorobenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,2-Dichloroethane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,2-Dichloropropane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,3,5-Trimethylbenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,3-Dichlorobenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,3-Dichloropropane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,4-Dichlorobenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
1,4-Dioxane	ND (0.0920)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
2,2-Dichloropropane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
2-Butanone	ND (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
2-Chlorotoluene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
2-Hexanone	ND (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
4-Chlorotoluene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
4-Isopropyltoluene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
4-Methyl-2-Pentanone	ND (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Acetone	**0.0264** (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Benzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Bromobenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Bromochloromethane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-10 1-5ft
Date Sampled: 08/07/14 12:00
Percent Solids: 88
Initial Volume: 6.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Bromoform	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Bromomethane	ND (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Carbon Disulfide	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Carbon Tetrachloride	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Chlorobenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Chloroethane	ND (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Chloroform	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Chloromethane	ND (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
cis-1,2-Dichloroethene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
cis-1,3-Dichloropropene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Dibromochloromethane	ND (0.0018)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Dibromomethane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Dichlorodifluoromethane	ND (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Diethyl Ether	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Di-isopropyl ether	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Ethyl tertiary-butyl ether	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Ethylbenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Hexachlorobutadiene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Isopropylbenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Methyl tert-Butyl Ether	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Methylene Chloride	ND (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Naphthalene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
n-Butylbenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
n-Propylbenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
sec-Butylbenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Styrene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
tert-Butylbenzene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Tertiary-amyl methyl ether	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Tetrachloroethene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Tetrahydrofuran	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Toluene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-10 1-5ft
Date Sampled: 08/07/14 12:00
Percent Solids: 88
Initial Volume: 6.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
trans-1,2-Dichloroethene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
trans-1,3-Dichloropropene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Trichloroethene	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Trichlorofluoromethane	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Vinyl Chloride	ND (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Xylene O	ND (0.0046)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Xylene P,M	ND (0.0092)		8260B Low		1	08/14/14 18:24	CXH0151	CH41425
Xylenes (Total)	ND (0.0092)		8260B Low		1	08/14/14 18:24		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*113 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*99 %*		*70-130*
Surrogate: Dibromofluoromethane	*98 %*		*70-130*
Surrogate: Toluene-d8	*96 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-3 1-7ft
Date Sampled: 08/07/14 13:00
Percent Solids: 90
Initial Volume: 6.3
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,1,1-Trichloroethane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,1,2,2-Tetrachloroethane	ND (0.0018)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,1,2-Trichloroethane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,1-Dichloroethane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,1-Dichloroethene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,1-Dichloropropene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,2,3-Trichlorobenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,2,3-Trichloropropane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,2,4-Trichlorobenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,2,4-Trimethylbenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,2-Dibromo-3-Chloropropane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,2-Dibromoethane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,2-Dichlorobenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,2-Dichloroethane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,2-Dichloropropane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,3,5-Trimethylbenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,3-Dichlorobenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,3-Dichloropropane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,4-Dichlorobenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
1,4-Dioxane	ND (0.0880)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
2,2-Dichloropropane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
2-Butanone	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
2-Chlorotoluene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
2-Hexanone	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
4-Chlorotoluene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
4-Isopropyltoluene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
4-Methyl-2-Pentanone	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Acetone	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Benzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Bromobenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Bromochloromethane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-3 1-7ft
Date Sampled: 08/07/14 13:00
Percent Solids: 90
Initial Volume: 6.3
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Bromoform	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Bromomethane	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Carbon Disulfide	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Carbon Tetrachloride	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Chlorobenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Chloroethane	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Chloroform	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Chloromethane	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
cis-1,2-Dichloroethene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
cis-1,3-Dichloropropene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Dibromochloromethane	ND (0.0018)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Dibromomethane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Dichlorodifluoromethane	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Diethyl Ether	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Di-isopropyl ether	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Ethyl tertiary-butyl ether	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Ethylbenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Hexachlorobutadiene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Isopropylbenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Methyl tert-Butyl Ether	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Methylene Chloride	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Naphthalene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
n-Butylbenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
n-Propylbenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
sec-Butylbenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Styrene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
tert-Butylbenzene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Tertiary-amyl methyl ether	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Tetrachloroethene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Tetrahydrofuran	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Toluene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB-3 1-7ft
Date Sampled: 08/07/14 13:00
Percent Solids: 90
Initial Volume: 6.3
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408144
ESS Laboratory Sample ID: 1408144-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
trans-1,2-Dichloroethene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
trans-1,3-Dichloropropene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Trichloroethene	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Trichlorofluoromethane	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Vinyl Chloride	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Xylene O	ND (0.0044)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Xylene P,M	ND (0.0088)		8260B Low		1	08/14/14 18:53	CXH0151	CH41425
Xylenes (Total)	ND (0.0088)		8260B Low		1	08/14/14 18:53		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*117 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*96 %*		*70-130*
Surrogate: Dibromofluoromethane	*98 %*		*70-130*
Surrogate: Toluene-d8	*97 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Total Metals

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch CH41302 - 3050B										
Blank										
Antimony	ND	5.0	mg/kg wet							
Arsenic	ND	2.5	mg/kg wet							
Barium	ND	2.5	mg/kg wet							
Beryllium	ND	0.11	mg/kg wet							
Cadmium	ND	0.50	mg/kg wet							
Chromium	ND	1.0	mg/kg wet							
Lead	ND	5.0	mg/kg wet							
Nickel	ND	2.5	mg/kg wet							
Selenium	ND	2.50	mg/kg wet							
Silver	ND	0.50	mg/kg wet							
Thallium	ND	1.25	mg/kg wet							
Vanadium	ND	1.0	mg/kg wet							
Zinc	ND	2.5	mg/kg wet							
LCS										
Antimony	144	16.7	mg/kg wet	129.0		112	80-120			
Arsenic	85.7	8.3	mg/kg wet	88.40		97	80-120			
Barium	197	8.3	mg/kg wet	210.0		94	80-120			
Beryllium	54.3	0.37	mg/kg wet	55.80		97	80-120			
Cadmium	131	1.67	mg/kg wet	143.0		91	80-120			
Chromium	83.3	3.3	mg/kg wet	86.80		96	80-120			
Lead	96.4	16.7	mg/kg wet	97.90		98	80-120			
Nickel	240	8.3	mg/kg wet	236.0		102	80-120			
Selenium	122	83.3	mg/kg wet	127.0		96	80-120			
Silver	63.4	1.67	mg/kg wet	66.20		96	80-120			
Thallium	138	41.7	mg/kg wet	140.0		98	80-120			
Vanadium	151	3.3	mg/kg wet	157.0		96	80-120			
Zinc	119	8.3	mg/kg wet	130.0		91	80-120			
LCS Dup										
Antimony	140	16.7	mg/kg wet	129.0		108	80-120	3	20	
Arsenic	79.8	8.3	mg/kg wet	88.40		90	80-120	7	20	
Barium	186	8.3	mg/kg wet	210.0		88	80-120	6	20	
Beryllium	51.3	0.37	mg/kg wet	55.80		92	80-120	6	20	
Cadmium	124	1.67	mg/kg wet	143.0		87	80-120	5	20	
Chromium	79.2	3.3	mg/kg wet	86.80		91	80-120	5	20	
Lead	92.1	16.7	mg/kg wet	97.90		94	80-120	5	20	
Nickel	230	8.3	mg/kg wet	236.0		97	80-120	4	20	
Selenium	118	83.3	mg/kg wet	127.0		93	80-120	4	20	
Silver	59.6	1.67	mg/kg wet	66.20		90	80-120	6	20	
Thallium	128	41.7	mg/kg wet	140.0		91	80-120	7	20	
Vanadium	145	3.3	mg/kg wet	157.0		92	80-120	4	20	
Zinc	112	8.3	mg/kg wet	130.0		86	80-120	5	20	
Batch CH41306 - 7471A										
Blank										

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CH41306 - 7471A										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	7.89	1.41	mg/kg wet	9.030		87	80-120			
LCS Dup										
Mercury	8.93	1.65	mg/kg wet	9.030		99	80-120	12	20	
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
Blank										
1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet							
1,1,1-Trichloroethane	ND	0.0050	mg/kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0020	mg/kg wet							
1,1,2-Trichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethene	ND	0.0050	mg/kg wet							
1,1-Dichloropropene	ND	0.0050	mg/kg wet							
1,2,3-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,3-Trichloropropane	ND	0.0050	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,4-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,2-Dibromo-3-Chloropropane	ND	0.0050	mg/kg wet							
1,2-Dibromoethane	ND	0.0050	mg/kg wet							
1,2-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,2-Dichloroethane	ND	0.0050	mg/kg wet							
1,2-Dichloropropane	ND	0.0050	mg/kg wet							
1,3,5-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,3-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,3-Dichloropropane	ND	0.0050	mg/kg wet							
1,4-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,4-Dioxane	ND	0.100	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0100	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0100	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0100	mg/kg wet							
Acetone	ND	0.0100	mg/kg wet							
Benzene	ND	0.0050	mg/kg wet							
Bromobenzene	ND	0.0050	mg/kg wet							
Bromochloromethane	ND	0.0050	mg/kg wet							
Bromodichloromethane	ND	0.0050	mg/kg wet							
Bromoform	ND	0.0050	mg/kg wet							
Bromomethane	ND	0.0100	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
Carbon Disulfide	ND	0.0050	mg/kg wet							
Carbon Tetrachloride	ND	0.0050	mg/kg wet							
Chlorobenzene	ND	0.0050	mg/kg wet							
Chloroethane	ND	0.0100	mg/kg wet							
Chloroform	ND	0.0050	mg/kg wet							
Chloromethane	ND	0.0100	mg/kg wet							
cis-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Dibromochloromethane	ND	0.0020	mg/kg wet							
Dibromomethane	ND	0.0050	mg/kg wet							
Dichlorodifluoromethane	ND	0.0100	mg/kg wet							
Diethyl Ether	ND	0.0050	mg/kg wet							
Di-isopropyl ether	ND	0.0050	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.0050	mg/kg wet							
Ethylbenzene	ND	0.0050	mg/kg wet							
Hexachlorobutadiene	ND	0.0050	mg/kg wet							
Isopropylbenzene	ND	0.0050	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.0050	mg/kg wet							
Methylene Chloride	ND	0.0100	mg/kg wet							
Naphthalene	ND	0.0050	mg/kg wet							
n-Butylbenzene	ND	0.0050	mg/kg wet							
n-Propylbenzene	ND	0.0050	mg/kg wet							
sec-Butylbenzene	ND	0.0050	mg/kg wet							
Styrene	ND	0.0050	mg/kg wet							
tert-Butylbenzene	ND	0.0050	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.0050	mg/kg wet							
Tetrachloroethene	ND	0.0050	mg/kg wet							
Tetrahydrofuran	ND	0.0050	mg/kg wet							
Toluene	ND	0.0050	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
trans-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Trichloroethene	ND	0.0050	mg/kg wet							
Trichlorofluoromethane	ND	0.0050	mg/kg wet							
Vinyl Chloride	ND	0.0100	mg/kg wet							
Xylene O	ND	0.0050	mg/kg wet							
Xylene P,M	ND	0.0100	mg/kg wet							
Surrogate: 1,2-Dichloroethane-d4	*0.0552*		mg/kg wet	*0.05000*		*110*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0482*		mg/kg wet	*0.05000*		*96*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0475*		mg/kg wet	*0.05000*		*95*	*70-130*			
Surrogate: Toluene-d8	*0.0489*		mg/kg wet	*0.05000*		*98*	*70-130*			
LCS										
1,1,1,2-Tetrachloroethane	0.0520	0.0050	mg/kg wet	0.05000		104	70-130			
1,1,1-Trichloroethane	0.0559	0.0050	mg/kg wet	0.05000		112	70-130			
1,1,2,2-Tetrachloroethane	0.0535	0.0020	mg/kg wet	0.05000		107	70-130			
1,1,2-Trichloroethane	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
1,1-Dichloroethane	0.0570	0.0050	mg/kg wet	0.05000		114	70-130			
1,1-Dichloroethene	0.0546	0.0050	mg/kg wet	0.05000		109	70-130			
1,1-Dichloropropene	0.0600	0.0050	mg/kg wet	0.05000		120	70-130			
1,2,3-Trichlorobenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
1,2,3-Trichloropropane	0.0564	0.0050	mg/kg wet	0.05000		113	70-130			
1,2,4-Trichlorobenzene	0.0526	0.0050	mg/kg wet	0.05000		105	70-130			
1,2,4-Trimethylbenzene	0.0543	0.0050	mg/kg wet	0.05000		109	70-130			
1,2-Dibromo-3-Chloropropane	0.0494	0.0050	mg/kg wet	0.05000		99	70-130			
1,2-Dibromoethane	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
1,2-Dichlorobenzene	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
1,2-Dichloroethane	0.0549	0.0050	mg/kg wet	0.05000		110	70-130			
1,2-Dichloropropane	0.0575	0.0050	mg/kg wet	0.05000		115	70-130			
1,3,5-Trimethylbenzene	0.0568	0.0050	mg/kg wet	0.05000		114	70-130			
1,3-Dichlorobenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
1,3-Dichloropropane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130			
1,4-Dichlorobenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130			
1,4-Dioxane	1.02	0.100	mg/kg wet	1.000		102	70-130			
2,2-Dichloropropane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130			
2-Butanone	0.322	0.0100	mg/kg wet	0.2500		129	70-130			
2-Chlorotoluene	0.0536	0.0050	mg/kg wet	0.05000		107	70-130			
2-Hexanone	0.301	0.0100	mg/kg wet	0.2500		121	70-130			
4-Chlorotoluene	0.0543	0.0050	mg/kg wet	0.05000		109	70-130			
4-Isopropyltoluene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
4-Methyl-2-Pentanone	0.299	0.0100	mg/kg wet	0.2500		120	70-130			
Acetone	0.308	0.0100	mg/kg wet	0.2500		123	70-130			
Benzene	0.0573	0.0050	mg/kg wet	0.05000		115	70-130			
Bromobenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Bromochloromethane	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
Bromodichloromethane	0.0567	0.0050	mg/kg wet	0.05000		113	70-130			
Bromoform	0.0431	0.0050	mg/kg wet	0.05000		86	70-130			
Bromomethane	0.0633	0.0100	mg/kg wet	0.05000		127	70-130			
Carbon Disulfide	0.0574	0.0050	mg/kg wet	0.05000		115	70-130			
Carbon Tetrachloride	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
Chlorobenzene	0.0507	0.0050	mg/kg wet	0.05000		101	70-130			
Chloroethane	0.0517	0.0100	mg/kg wet	0.05000		103	70-130			
Chloroform	0.0555	0.0050	mg/kg wet	0.05000		111	70-130			
Chloromethane	0.0585	0.0100	mg/kg wet	0.05000		117	70-130			
cis-1,2-Dichloroethene	0.0539	0.0050	mg/kg wet	0.05000		108	70-130			
cis-1,3-Dichloropropene	0.0565	0.0050	mg/kg wet	0.05000		113	70-130			
Dibromochloromethane	0.0454	0.0020	mg/kg wet	0.05000		91	70-130			
Dibromomethane	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
Dichlorodifluoromethane	0.0410	0.0100	mg/kg wet	0.05000		82	70-130			
Diethyl Ether	0.0581	0.0050	mg/kg wet	0.05000		116	70-130			
Di-isopropyl ether	0.0615	0.0050	mg/kg wet	0.05000		123	70-130			
Ethyl tertiary-butyl ether	0.0573	0.0050	mg/kg wet	0.05000		115	70-130			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
Ethylbenzene	0.0548	0.0050	mg/kg wet	0.05000		110	70-130			
Hexachlorobutadiene	0.0559	0.0050	mg/kg wet	0.05000		112	70-130			
Isopropylbenzene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Methyl tert-Butyl Ether	0.0530	0.0050	mg/kg wet	0.05000		106	70-130			
Methylene Chloride	0.0574	0.0100	mg/kg wet	0.05000		115	70-130			
Naphthalene	0.0486	0.0050	mg/kg wet	0.05000		97	70-130			
n-Butylbenzene	0.0575	0.0050	mg/kg wet	0.05000		115	70-130			
n-Propylbenzene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
sec-Butylbenzene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
Styrene	0.0552	0.0050	mg/kg wet	0.05000		110	70-130			
tert-Butylbenzene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
Tertiary-amyl methyl ether	0.0518	0.0050	mg/kg wet	0.05000		104	70-130			
Tetrachloroethene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130			
Tetrahydrofuran	0.0586	0.0050	mg/kg wet	0.05000		117	70-130			
Toluene	0.0555	0.0050	mg/kg wet	0.05000		111	70-130			
trans-1,2-Dichloroethene	0.0547	0.0050	mg/kg wet	0.05000		109	70-130			
trans-1,3-Dichloropropene	0.0471	0.0050	mg/kg wet	0.05000		94	70-130			
Trichloroethene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Trichlorofluoromethane	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Vinyl Chloride	0.0634	0.0100	mg/kg wet	0.05000		127	70-130			
Xylene O	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
Xylene P,M	0.104	0.0100	mg/kg wet	0.1000		104	70-130			
Surrogate: 1,2-Dichloroethane-d4	*0.0601*		mg/kg wet	*0.05000*		*120*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0553*		mg/kg wet	*0.05000*		*111*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0556*		mg/kg wet	*0.05000*		*111*	*70-130*			
Surrogate: Toluene-d8	*0.0536*		mg/kg wet	*0.05000*		*107*	*70-130*			
LCS Dup										
1,1,1,2-Tetrachloroethane	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	2	25	
1,1,1-Trichloroethane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130	0.7	25	
1,1,2,2-Tetrachloroethane	0.0556	0.0020	mg/kg wet	0.05000		111	70-130	4	25	
1,1,2-Trichloroethane	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	3	25	
1,1-Dichloroethane	0.0591	0.0050	mg/kg wet	0.05000		118	70-130	4	25	
1,1-Dichloroethene	0.0552	0.0050	mg/kg wet	0.05000		110	70-130	1	25	
1,1-Dichloropropene	0.0598	0.0050	mg/kg wet	0.05000		120	70-130	0.3	25	
1,2,3-Trichlorobenzene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	3	25	
1,2,3-Trichloropropane	0.0578	0.0050	mg/kg wet	0.05000		116	70-130	3	25	
1,2,4-Trichlorobenzene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	4	25	
1,2,4-Trimethylbenzene	0.0560	0.0050	mg/kg wet	0.05000		112	70-130	3	25	
1,2-Dibromo-3-Chloropropane	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	7	25	
1,2-Dibromoethane	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	1	25	
1,2-Dichlorobenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	2	25	
1,2-Dichloroethane	0.0547	0.0050	mg/kg wet	0.05000		109	70-130	0.3	25	
1,2-Dichloropropane	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	0.5	25	
1,3,5-Trimethylbenzene	0.0585	0.0050	mg/kg wet	0.05000		117	70-130	3	25	
1,3-Dichlorobenzene	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	2	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
1,3-Dichloropropane	0.0576	0.0050	mg/kg wet	0.05000		115	70-130	2	25	
1,4-Dichlorobenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	1	25	
1,4-Dioxane	1.09	0.100	mg/kg wet	1.000		109	70-130	7	20	
2,2-Dichloropropane	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	2	25	
2-Butanone	0.298	0.0100	mg/kg wet	0.2500		119	70-130	8	25	
2-Chlorotoluene	0.0548	0.0050	mg/kg wet	0.05000		110	70-130	2	25	
2-Hexanone	0.305	0.0100	mg/kg wet	0.2500		122	70-130	1	25	
4-Chlorotoluene	0.0566	0.0050	mg/kg wet	0.05000		113	70-130	4	25	
4-Isopropyltoluene	0.0558	0.0050	mg/kg wet	0.05000		112	70-130	3	25	
4-Methyl-2-Pentanone	0.301	0.0100	mg/kg wet	0.2500		120	70-130	0.6	25	
Acetone	0.304	0.0100	mg/kg wet	0.2500		122	70-130	1	25	
Benzene	0.0579	0.0050	mg/kg wet	0.05000		116	70-130	1	25	
Bromobenzene	0.0541	0.0050	mg/kg wet	0.05000		108	70-130	3	25	
Bromochloromethane	0.0507	0.0050	mg/kg wet	0.05000		101	70-130	0.5	25	
Bromodichloromethane	0.0579	0.0050	mg/kg wet	0.05000		116	70-130	2	25	
Bromoform	0.0450	0.0050	mg/kg wet	0.05000		90	70-130	4	25	
Bromomethane	0.0634	0.0100	mg/kg wet	0.05000		127	70-130	0.2	25	
Carbon Disulfide	0.0574	0.0050	mg/kg wet	0.05000		115	70-130	0.1	25	
Carbon Tetrachloride	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	0.4	25	
Chlorobenzene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130	3	25	
Chloroethane	0.0513	0.0100	mg/kg wet	0.05000		103	70-130	0.8	25	
Chloroform	0.0563	0.0050	mg/kg wet	0.05000		113	70-130	1	25	
Chloromethane	0.0589	0.0100	mg/kg wet	0.05000		118	70-130	0.7	25	
cis-1,2-Dichloroethene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	2	25	
cis-1,3-Dichloropropene	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	2	25	
Dibromochloromethane	0.0473	0.0020	mg/kg wet	0.05000		95	70-130	4	25	
Dibromomethane	0.0543	0.0050	mg/kg wet	0.05000		109	70-130	2	25	
Dichlorodifluoromethane	0.0407	0.0100	mg/kg wet	0.05000		81	70-130	0.7	25	
Diethyl Ether	0.0593	0.0050	mg/kg wet	0.05000		119	70-130	2	25	
Di-isopropyl ether	0.0618	0.0050	mg/kg wet	0.05000		124	70-130	0.5	25	
Ethyl tertiary-butyl ether	0.0578	0.0050	mg/kg wet	0.05000		116	70-130	0.9	25	
Ethylbenzene	0.0560	0.0050	mg/kg wet	0.05000		112	70-130	2	25	
Hexachlorobutadiene	0.0580	0.0050	mg/kg wet	0.05000		116	70-130	4	25	
Isopropylbenzene	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	3	25	
Methyl tert-Butyl Ether	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	2	25	
Methylene Chloride	0.0602	0.0100	mg/kg wet	0.05000		120	70-130	5	25	
Naphthalene	0.0509	0.0050	mg/kg wet	0.05000		102	70-130	5	25	
n-Butylbenzene	0.0586	0.0050	mg/kg wet	0.05000		117	70-130	2	25	
n-Propylbenzene	0.0556	0.0050	mg/kg wet	0.05000		111	70-130	4	25	
sec-Butylbenzene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	3	25	
Styrene	0.0568	0.0050	mg/kg wet	0.05000		114	70-130	3	25	
tert-Butylbenzene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	2	25	
Tertiary-amyl methyl ether	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	3	25	
Tetrachloroethene	0.0507	0.0050	mg/kg wet	0.05000		101	70-130	0.7	25	
Tetrahydrofuran	0.0585	0.0050	mg/kg wet	0.05000		117	70-130	0.1	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
Toluene	0.0564	0.0050	mg/kg wet	0.05000		113	70-130	2	25	
trans-1,2-Dichloroethene	0.0552	0.0050	mg/kg wet	0.05000		110	70-130	0.9	25	
trans-1,3-Dichloropropene	0.0483	0.0050	mg/kg wet	0.05000		97	70-130	3	25	
Trichloroethene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	1	25	
Trichlorofluoromethane	0.0516	0.0050	mg/kg wet	0.05000		103	70-130	1	25	
Vinyl Chloride	0.0623	0.0100	mg/kg wet	0.05000		125	70-130	2	25	
Xylene O	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	1	25	
Xylene P,M	0.106	0.0100	mg/kg wet	0.1000		106	70-130	2	25	
Surrogate: 1,2-Dichloroethane-d4	*0.0588*		mg/kg wet	*0.05000*		*118*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0548*		mg/kg wet	*0.05000*		*110*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0569*		mg/kg wet	*0.05000*		*114*	*70-130*			
Surrogate: Toluene-d8	*0.0537*		mg/kg wet	*0.05000*		*107*	*70-130*			
8082A Polychlorinated Biphenyls (PCB)										
Batch CH40803 - 3540C										
Blank										
Aroclor 1016	ND	0.0500	mg/kg wet							
Aroclor 1221	ND	0.0500	mg/kg wet							
Aroclor 1232	ND	0.0500	mg/kg wet							
Aroclor 1242	ND	0.0500	mg/kg wet							
Aroclor 1248	ND	0.0500	mg/kg wet							
Aroclor 1254	ND	0.0500	mg/kg wet							
Aroclor 1260	ND	0.0500	mg/kg wet							
Aroclor 1262	ND	0.0500	mg/kg wet							
Aroclor 1268	ND	0.0500	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0202*		mg/kg wet	*0.02500*		*81*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0200*		mg/kg wet	*0.02500*		*80*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0227*		mg/kg wet	*0.02500*		*91*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0216*		mg/kg wet	*0.02500*		*86*	*30-150*			
LCS										
Aroclor 1016	0.530	0.0500	mg/kg wet	0.5000		106	40-140			
Aroclor 1260	0.490	0.0500	mg/kg wet	0.5000		98	40-140			
Surrogate: Decachlorobiphenyl	*0.0221*		mg/kg wet	*0.02500*		*88*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0231*		mg/kg wet	*0.02500*		*92*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0244*		mg/kg wet	*0.02500*		*98*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0246*		mg/kg wet	*0.02500*		*99*	*30-150*			
LCS Dup										
Aroclor 1016	0.481	0.0500	mg/kg wet	0.5000		96	40-140	10	30	
Aroclor 1260	0.468	0.0500	mg/kg wet	0.5000		94	40-140	4	30	
Surrogate: Decachlorobiphenyl	*0.0211*		mg/kg wet	*0.02500*		*85*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0209*		mg/kg wet	*0.02500*		*84*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0223*		mg/kg wet	*0.02500*		*89*	*30-150*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8082A Polychlorinated Biphenyls (PCB)										
Batch CH40803 - 3540C										
Surrogate: Tetrachloro-m-xylene [2C]	*0.0230*		mg/kg wet	*0.02500*		*92*	*30-150*			
8270D Semi-Volatile Organic Compounds										
Batch CH41206 - 3546										
Blank										
1,2,4-Trichlorobenzene	ND	0.333	mg/kg wet							
1,2-Dichlorobenzene	ND	0.333	mg/kg wet							
1,3-Dichlorobenzene	ND	0.333	mg/kg wet							
1,4-Dichlorobenzene	ND	0.333	mg/kg wet							
2,4,5-Trichlorophenol	ND	0.333	mg/kg wet							
2,4,6-Trichlorophenol	ND	0.333	mg/kg wet							
2,4-Dichlorophenol	ND	0.333	mg/kg wet							
2,4-Dimethylphenol	ND	0.333	mg/kg wet							
2,4-Dinitrophenol	ND	1.67	mg/kg wet							
2,4-Dinitrotoluene	ND	0.333	mg/kg wet							
2,6-Dinitrotoluene	ND	0.333	mg/kg wet							
2-Chloronaphthalene	ND	0.333	mg/kg wet							
2-Chlorophenol	ND	0.333	mg/kg wet							
2-Methylnaphthalene	ND	0.333	mg/kg wet							
2-Methylphenol	ND	0.333	mg/kg wet							
2-Nitrophenol	ND	0.333	mg/kg wet							
3,3´-Dichlorobenzidine	ND	0.667	mg/kg wet							
3+4-Methylphenol	ND	0.667	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet							
4-Chloroaniline	ND	0.667	mg/kg wet							
4-Nitrophenol	ND	1.67	mg/kg wet							
Acenaphthene	ND	0.333	mg/kg wet							
Acenaphthylene	ND	0.333	mg/kg wet							
Acetophenone	ND	0.667	mg/kg wet							
Aniline	ND	1.67	mg/kg wet							
Anthracene	ND	0.333	mg/kg wet							
Azobenzene	ND	0.333	mg/kg wet							
Benzo(a)anthracene	ND	0.333	mg/kg wet							
Benzo(a)pyrene	ND	0.167	mg/kg wet							
Benzo(b)fluoranthene	ND	0.333	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.333	mg/kg wet							
Benzo(k)fluoranthene	ND	0.333	mg/kg wet							
bis(2-Chloroethoxy)methane	ND	0.333	mg/kg wet							
bis(2-Chloroethyl)ether	ND	0.333	mg/kg wet							
bis(2-chloroisopropyl)Ether	ND	0.333	mg/kg wet							
bis(2-Ethylhexyl)phthalate	ND	0.333	mg/kg wet							
Butylbenzylphthalate	ND	0.333	mg/kg wet							
Chrysene	ND	0.167	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.167	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41206 - 3546										
Dibenzofuran	ND	0.333	mg/kg wet							
Diethylphthalate	ND	0.333	mg/kg wet							
Dimethylphthalate	ND	0.333	mg/kg wet							
Di-n-butylphthalate	ND	0.333	mg/kg wet							
Di-n-octylphthalate	ND	0.333	mg/kg wet							
Fluoranthene	ND	0.333	mg/kg wet							
Fluorene	ND	0.333	mg/kg wet							
Hexachlorobenzene	ND	0.333	mg/kg wet							
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachloroethane	ND	0.333	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.333	mg/kg wet							
Isophorone	ND	0.333	mg/kg wet							
Naphthalene	ND	0.333	mg/kg wet							
Nitrobenzene	ND	0.333	mg/kg wet							
N-Nitrosodimethylamine	ND	0.333	mg/kg wet							
Pentachlorophenol	ND	1.67	mg/kg wet							
Phenanthrene	ND	0.333	mg/kg wet							
Phenol	ND	0.333	mg/kg wet							
Pyrene	ND	0.333	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	*2.59*		mg/kg wet	*3.333*		*78*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.56*		mg/kg wet	*5.000*		*91*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.77*		mg/kg wet	*5.000*		*75*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.66*		mg/kg wet	*3.333*		*80*	*30-130*			
Surrogate: 2-Fluorophenol	*3.67*		mg/kg wet	*5.000*		*73*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.61*		mg/kg wet	*3.333*		*78*	*30-130*			
Surrogate: Phenol-d6	*4.02*		mg/kg wet	*5.000*		*80*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.48*		mg/kg wet	*3.333*		*104*	*30-130*			
LCS										
1,2,4-Trichlorobenzene	2.72	0.333	mg/kg wet	3.333		82	40-140			
1,2-Dichlorobenzene	2.65	0.333	mg/kg wet	3.333		80	40-140			
1,3-Dichlorobenzene	2.58	0.333	mg/kg wet	3.333		77	40-140			
1,4-Dichlorobenzene	2.61	0.333	mg/kg wet	3.333		78	40-140			
2,4,5-Trichlorophenol	3.22	0.333	mg/kg wet	3.333		97	30-130			
2,4,6-Trichlorophenol	3.30	0.333	mg/kg wet	3.333		99	30-130			
2,4-Dichlorophenol	2.96	0.333	mg/kg wet	3.333		89	30-130			
2,4-Dimethylphenol	2.98	0.333	mg/kg wet	3.333		89	30-130			
2,4-Dinitrophenol	3.10	1.67	mg/kg wet	3.333		93	30-130			
2,4-Dinitrotoluene	3.19	0.333	mg/kg wet	3.333		96	40-140			
2,6-Dinitrotoluene	3.09	0.333	mg/kg wet	3.333		93	40-140			
2-Chloronaphthalene	2.58	0.333	mg/kg wet	3.333		78	40-140			
2-Chlorophenol	2.82	0.333	mg/kg wet	3.333		85	30-130			
2-Methylnaphthalene	2.84	0.333	mg/kg wet	3.333		85	40-140			
2-Methylphenol	2.98	0.333	mg/kg wet	3.333		89	30-130			
2-Nitrophenol	3.23	0.333	mg/kg wet	3.333		97	30-130			
3,3´-Dichlorobenzidine	2.65	0.667	mg/kg wet	3.333		80	40-140			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41206 - 3546										
3+4-Methylphenol	5.91	0.667	mg/kg wet	6.667		89	30-130			
4-Bromophenyl-phenylether	2.69	0.333	mg/kg wet	3.333		81	40-140			
4-Chloroaniline	2.11	0.667	mg/kg wet	3.333		63	40-140			
4-Nitrophenol	2.97	1.67	mg/kg wet	3.333		89	30-130			
Acenaphthene	2.78	0.333	mg/kg wet	3.333		84	40-140			
Acenaphthylene	2.74	0.333	mg/kg wet	3.333		82	40-140			
Acetophenone	2.77	0.667	mg/kg wet	3.333		83	40-140			
Aniline	2.12	1.67	mg/kg wet	3.333		64	40-140			
Anthracene	2.69	0.333	mg/kg wet	3.333		81	40-140			
Azobenzene	2.70	0.333	mg/kg wet	3.333		81	40-140			
Benzo(a)anthracene	2.90	0.333	mg/kg wet	3.333		87	40-140			
Benzo(a)pyrene	2.60	0.167	mg/kg wet	3.333		78	40-140			
Benzo(b)fluoranthene	2.87	0.333	mg/kg wet	3.333		86	40-140			
Benzo(g,h,i)perylene	2.87	0.333	mg/kg wet	3.333		86	40-140			
Benzo(k)fluoranthene	2.78	0.333	mg/kg wet	3.333		83	40-140			
bis(2-Chloroethoxy)methane	2.81	0.333	mg/kg wet	3.333		84	40-140			
bis(2-Chloroethyl)ether	2.86	0.333	mg/kg wet	3.333		86	40-140			
bis(2-chloroisopropyl)Ether	2.76	0.333	mg/kg wet	3.333		83	40-140			
bis(2-Ethylhexyl)phthalate	3.33	0.333	mg/kg wet	3.333		100	40-140			
Butylbenzylphthalate	3.22	0.333	mg/kg wet	3.333		97	40-140			
Chrysene	2.89	0.167	mg/kg wet	3.333		87	40-140			
Dibenzo(a,h)Anthracene	2.96	0.167	mg/kg wet	3.333		89	40-140			
Dibenzofuran	2.87	0.333	mg/kg wet	3.333		86	40-140			
Diethylphthalate	3.02	0.333	mg/kg wet	3.333		91	40-140			
Dimethylphthalate	2.86	0.333	mg/kg wet	3.333		86	40-140			
Di-n-butylphthalate	2.81	0.333	mg/kg wet	3.333		84	40-140			
Di-n-octylphthalate	3.32	0.333	mg/kg wet	3.333		100	40-140			
Fluoranthene	2.91	0.333	mg/kg wet	3.333		87	40-140			
Fluorene	2.84	0.333	mg/kg wet	3.333		85	40-140			
Hexachlorobenzene	2.69	0.333	mg/kg wet	3.333		81	40-140			
Hexachlorobutadiene	2.60	0.333	mg/kg wet	3.333		78	40-140			
Hexachloroethane	2.82	0.333	mg/kg wet	3.333		85	40-140			
Indeno(1,2,3-cd)Pyrene	2.89	0.333	mg/kg wet	3.333		87	40-140			
Isophorone	2.65	0.333	mg/kg wet	3.333		80	40-140			
Naphthalene	2.83	0.333	mg/kg wet	3.333		85	40-140			
Nitrobenzene	2.76	0.333	mg/kg wet	3.333		83	40-140			
N-Nitrosodimethylamine	2.81	0.333	mg/kg wet	3.333		84	40-140			
Pentachlorophenol	2.99	1.67	mg/kg wet	3.333		90	30-130			
Phenanthrene	2.62	0.333	mg/kg wet	3.333		79	40-140			
Phenol	2.65	0.333	mg/kg wet	3.333		80	30-130			
Pyrene	2.84	0.333	mg/kg wet	3.333		85	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*2.79*		mg/kg wet	*3.333*		*84*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.76*		mg/kg wet	*5.000*		*95*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*4.02*		mg/kg wet	*5.000*		*80*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.92*		mg/kg wet	*3.333*		*88*	*30-130*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41206 - 3546										
Surrogate: 2-Fluorophenol	*3.95*		mg/kg wet	*5.000*		*79*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.81*		mg/kg wet	*3.333*		*84*	*30-130*			
Surrogate: Phenol-d6	*4.31*		mg/kg wet	*5.000*		*86*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.14*		mg/kg wet	*3.333*		*94*	*30-130*			
LCS Dup										
1,2,4-Trichlorobenzene	2.56	0.333	mg/kg wet	3.333		77	40-140	6	30	
1,2-Dichlorobenzene	2.44	0.333	mg/kg wet	3.333		73	40-140	8	30	
1,3-Dichlorobenzene	2.37	0.333	mg/kg wet	3.333		71	40-140	9	30	
1,4-Dichlorobenzene	2.40	0.333	mg/kg wet	3.333		72	40-140	8	30	
2,4,5-Trichlorophenol	2.99	0.333	mg/kg wet	3.333		90	30-130	7	30	
2,4,6-Trichlorophenol	3.01	0.333	mg/kg wet	3.333		90	30-130	9	30	
2,4-Dichlorophenol	2.72	0.333	mg/kg wet	3.333		82	30-130	8	30	
2,4-Dimethylphenol	2.76	0.333	mg/kg wet	3.333		83	30-130	8	30	
2,4-Dinitrophenol	3.06	1.67	mg/kg wet	3.333		92	30-130	1	30	
2,4-Dinitrotoluene	3.06	0.333	mg/kg wet	3.333		92	40-140	4	30	
2,6-Dinitrotoluene	2.90	0.333	mg/kg wet	3.333		87	40-140	6	30	
2-Chloronaphthalene	2.27	0.333	mg/kg wet	3.333		68	40-140	13	30	
2-Chlorophenol	2.61	0.333	mg/kg wet	3.333		78	30-130	8	30	
2-Methylnaphthalene	2.63	0.333	mg/kg wet	3.333		79	40-140	7	30	
2-Methylphenol	2.76	0.333	mg/kg wet	3.333		83	30-130	8	30	
2-Nitrophenol	2.92	0.333	mg/kg wet	3.333		88	30-130	10	30	
3,3´-Dichlorobenzidine	2.66	0.667	mg/kg wet	3.333		80	40-140	0.5	30	
3+4-Methylphenol	5.49	0.667	mg/kg wet	6.667		82	30-130	7	30	
4-Bromophenyl-phenylether	2.56	0.333	mg/kg wet	3.333		77	40-140	5	30	
4-Chloroaniline	2.00	0.667	mg/kg wet	3.333		60	40-140	6	30	
4-Nitrophenol	2.57	1.67	mg/kg wet	3.333		77	30-130	15	30	
Acenaphthene	2.54	0.333	mg/kg wet	3.333		76	40-140	9	30	
Acenaphthylene	2.50	0.333	mg/kg wet	3.333		75	40-140	9	30	
Acetophenone	2.59	0.667	mg/kg wet	3.333		78	40-140	7	30	
Aniline	1.99	1.67	mg/kg wet	3.333		60	40-140	6	30	
Anthracene	2.64	0.333	mg/kg wet	3.333		79	40-140	2	30	
Azobenzene	2.56	0.333	mg/kg wet	3.333		77	40-140	5	30	
Benzo(a)anthracene	2.85	0.333	mg/kg wet	3.333		85	40-140	2	30	
Benzo(a)pyrene	2.65	0.167	mg/kg wet	3.333		80	40-140	2	30	
Benzo(b)fluoranthene	2.99	0.333	mg/kg wet	3.333		90	40-140	4	30	
Benzo(g,h,i)perylene	2.94	0.333	mg/kg wet	3.333		88	40-140	3	30	
Benzo(k)fluoranthene	2.75	0.333	mg/kg wet	3.333		82	40-140	0.9	30	
bis(2-Chloroethoxy)methane	2.60	0.333	mg/kg wet	3.333		78	40-140	8	30	
bis(2-Chloroethyl)ether	2.66	0.333	mg/kg wet	3.333		80	40-140	7	30	
bis(2-chloroisopropyl)Ether	2.56	0.333	mg/kg wet	3.333		77	40-140	8	30	
bis(2-Ethylhexyl)phthalate	3.24	0.333	mg/kg wet	3.333		97	40-140	3	30	
Butylbenzylphthalate	3.14	0.333	mg/kg wet	3.333		94	40-140	2	30	
Chrysene	2.80	0.167	mg/kg wet	3.333		84	40-140	3	30	
Dibenzo(a,h)Anthracene	3.05	0.167	mg/kg wet	3.333		91	40-140	3	30	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41206 - 3546										
Dibenzofuran	2.64	0.333	mg/kg wet	3.333		79	40-140	8	30	
Diethylphthalate	2.90	0.333	mg/kg wet	3.333		87	40-140	4	30	
Dimethylphthalate	2.67	0.333	mg/kg wet	3.333		80	40-140	7	30	
Di-n-butylphthalate	2.78	0.333	mg/kg wet	3.333		83	40-140	1	30	
Di-n-octylphthalate	3.35	0.333	mg/kg wet	3.333		100	40-140	1	30	
Fluoranthene	2.85	0.333	mg/kg wet	3.333		85	40-140	2	30	
Fluorene	2.64	0.333	mg/kg wet	3.333		79	40-140	7	30	
Hexachlorobenzene	2.60	0.333	mg/kg wet	3.333		78	40-140	3	30	
Hexachlorobutadiene	2.36	0.333	mg/kg wet	3.333		71	40-140	10	30	
Hexachloroethane	2.60	0.333	mg/kg wet	3.333		78	40-140	8	30	
Indeno(1,2,3-cd)Pyrene	2.98	0.333	mg/kg wet	3.333		89	40-140	3	30	
Isophorone	2.46	0.333	mg/kg wet	3.333		74	40-140	8	30	
Naphthalene	2.57	0.333	mg/kg wet	3.333		77	40-140	10	30	
Nitrobenzene	2.48	0.333	mg/kg wet	3.333		75	40-140	10	30	
N-Nitrosodimethylamine	2.52	0.333	mg/kg wet	3.333		76	40-140	11	30	
Pentachlorophenol	3.07	1.67	mg/kg wet	3.333		92	30-130	3	30	
Phenanthrene	2.57	0.333	mg/kg wet	3.333		77	40-140	2	30	
Phenol	2.45	0.333	mg/kg wet	3.333		74	30-130	8	30	
Pyrene	2.83	0.333	mg/kg wet	3.333		85	40-140	0.4	30	
Surrogate: 1,2-Dichlorobenzene-d4	*2.44*		mg/kg wet	*3.333*		*73*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.48*		mg/kg wet	*5.000*		*90*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.59*		mg/kg wet	*5.000*		*72*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.57*		mg/kg wet	*3.333*		*77*	*30-130*			
Surrogate: 2-Fluorophenol	*3.51*		mg/kg wet	*5.000*		*70*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.47*		mg/kg wet	*3.333*		*74*	*30-130*			
Surrogate: Phenol-d6	*3.86*		mg/kg wet	*5.000*		*77*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.99*		mg/kg wet	*3.333*		*90*	*30-130*			
Classical Chemistry										
Batch CH41416 - General Preparation										
Blank										
Conductivity	ND	5	umhos/cm							
LCS										
Conductivity	1380		umhos/cm	1411		98	90-110			
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41105 - 3546										
Blank										
C19-C36 Aliphatics1	ND	15.0	mg/kg wet							
C9-C18 Aliphatics1	ND	15.0	mg/kg wet							
Decane (C10)	ND	0.5	mg/kg wet							
Docosane (C22)	ND	0.5	mg/kg wet							
Dodecane (C12)	ND	0.5	mg/kg wet							
Eicosane (C20)	ND	0.5	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41105 - 3546										
Hexacosane (C26)	ND	0.5	mg/kg wet							
Hexadecane (C16)	ND	0.5	mg/kg wet							
Hexatriacontane (C36)	ND	0.5	mg/kg wet							
Nonadecane (C19)	ND	0.5	mg/kg wet							
Nonane (C9)	ND	0.5	mg/kg wet							
Octacosane (C28)	ND	0.5	mg/kg wet							
Octadecane (C18)	ND	0.5	mg/kg wet							
Tetracosane (C24)	ND	0.5	mg/kg wet							
Tetradecane (C14)	ND	0.5	mg/kg wet							
Triacontane (C30)	ND	0.5	mg/kg wet							
Surrogate: 1-Chlorooctadecane	*1.68*		mg/kg wet	*2.000*		*84*	*40-140*			
Blank										
2-Methylnaphthalene	ND	0.20	mg/kg wet							
Acenaphthene	ND	0.40	mg/kg wet							
Acenaphthylene	ND	0.20	mg/kg wet							
Anthracene	ND	0.40	mg/kg wet							
Benzo(a)anthracene	ND	0.40	mg/kg wet							
Benzo(a)pyrene	ND	0.40	mg/kg wet							
Benzo(b)fluoranthene	ND	0.40	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.40	mg/kg wet							
Benzo(k)fluoranthene	ND	0.40	mg/kg wet							
C11-C22 Unadjusted Aromatics1	ND	15.0	mg/kg wet							
Chrysene	ND	0.40	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.20	mg/kg wet							
Fluoranthene	ND	0.40	mg/kg wet							
Fluorene	ND	0.40	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.40	mg/kg wet							
Naphthalene	ND	0.40	mg/kg wet							
Phenanthrene	ND	0.40	mg/kg wet							
Pyrene	ND	0.40	mg/kg wet							
Surrogate: 2-Bromonaphthalene	*1.74*		mg/kg wet	*2.000*		*87*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.62*		mg/kg wet	*2.000*		*81*	*40-140*			
Surrogate: O-Terphenyl	*1.45*		mg/kg wet	*2.000*		*73*	*40-140*			
LCS										
C19-C36 Aliphatics1	13.0	15.0	mg/kg wet	16.00		81	40-140			
C9-C18 Aliphatics1	7.9	15.0	mg/kg wet	12.00		66	40-140			
Decane (C10)	0.9	0.5	mg/kg wet	2.000		45	40-140			
Docosane (C22)	1.4	0.5	mg/kg wet	2.000		72	40-140			
Dodecane (C12)	0.9	0.5	mg/kg wet	2.000		47	40-140			
Eicosane (C20)	1.4	0.5	mg/kg wet	2.000		70	40-140			
Hexacosane (C26)	1.4	0.5	mg/kg wet	2.000		70	40-140			
Hexadecane (C16)	1.2	0.5	mg/kg wet	2.000		62	40-140			
Hexatriacontane (C36)	1.5	0.5	mg/kg wet	2.000		74	40-140			
Nonadecane (C19)	1.4	0.5	mg/kg wet	2.000		69	40-140			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41105 - 3546										
Nonane (C9)	0.7	0.5	mg/kg wet	2.000		35	30-140			
Octacosane (C28)	1.4	0.5	mg/kg wet	2.000		69	40-140			
Octadecane (C18)	1.3	0.5	mg/kg wet	2.000		67	40-140			
Tetracosane (C24)	1.4	0.5	mg/kg wet	2.000		72	40-140			
Tetradecane (C14)	1.1	0.5	mg/kg wet	2.000		54	40-140			
Triacontane (C30)	1.4	0.5	mg/kg wet	2.000		69	40-140			
Surrogate: 1-Chlorooctadecane	*1.12*		mg/kg wet	*2.000*		*56*	*40-140*			
LCS										
2-Methylnaphthalene	1.27	0.20	mg/kg wet	2.000		64	40-140			
Acenaphthene	1.33	0.40	mg/kg wet	2.000		67	40-140			
Acenaphthylene	1.34	0.20	mg/kg wet	2.000		67	40-140			
Anthracene	1.35	0.40	mg/kg wet	2.000		68	40-140			
Benzo(a)anthracene	1.43	0.40	mg/kg wet	2.000		71	40-140			
Benzo(a)pyrene	1.58	0.40	mg/kg wet	2.000		79	40-140			
Benzo(b)fluoranthene	1.41	0.40	mg/kg wet	2.000		71	40-140			
Benzo(g,h,i)perylene	1.48	0.40	mg/kg wet	2.000		74	40-140			
Benzo(k)fluoranthene	1.37	0.40	mg/kg wet	2.000		69	40-140			
C11-C22 Unadjusted Aromatics1	30.6	15.0	mg/kg wet	34.00		90	40-140			
Chrysene	1.36	0.40	mg/kg wet	2.000		68	40-140			
Dibenzo(a,h)Anthracene	1.42	0.20	mg/kg wet	2.000		71	40-140			
Fluoranthene	1.40	0.40	mg/kg wet	2.000		70	40-140			
Fluorene	1.44	0.40	mg/kg wet	2.000		72	40-140			
Indeno(1,2,3-cd)Pyrene	1.50	0.40	mg/kg wet	2.000		75	40-140			
Naphthalene	1.20	0.40	mg/kg wet	2.000		60	40-140			
Phenanthrene	1.42	0.40	mg/kg wet	2.000		71	40-140			
Pyrene	1.41	0.40	mg/kg wet	2.000		71	40-140			
Surrogate: 2-Bromonaphthalene	*1.90*		mg/kg wet	*2.000*		*95*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.88*		mg/kg wet	*2.000*		*94*	*40-140*			
Surrogate: O-Terphenyl	*1.29*		mg/kg wet	*2.000*		*65*	*40-140*			
LCS										
2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			
LCS Dup										
C19-C36 Aliphatics1	16.8	15.0	mg/kg wet	16.00		105	40-140	25	25	
C9-C18 Aliphatics1	9.7	15.0	mg/kg wet	12.00		81	40-140	21	25	
Decane (C10)	1.0	0.5	mg/kg wet	2.000		49	40-140	9	25	
Docosane (C22)	1.7	0.5	mg/kg wet	2.000		84	40-140	14	25	
Dodecane (C12)	1.1	0.5	mg/kg wet	2.000		54	40-140	14	25	
Eicosane (C20)	1.6	0.5	mg/kg wet	2.000		81	40-140	14	25	
Hexacosane (C26)	1.6	0.5	mg/kg wet	2.000		80	40-140	14	25	
Hexadecane (C16)	1.4	0.5	mg/kg wet	2.000		72	40-140	14	25	
Hexatriacontane (C36)	1.7	0.5	mg/kg wet	2.000		84	40-140	12	25	
Nonadecane (C19)	1.6	0.5	mg/kg wet	2.000		80	40-140	15	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41105 - 3546										
Nonane (C9)	0.8	0.5	mg/kg wet	2.000		38	30-140	7	25	
Octacosane (C28)	1.6	0.5	mg/kg wet	2.000		78	40-140	12	25	
Octadecane (C18)	1.6	0.5	mg/kg wet	2.000		78	40-140	14	25	
Tetracosane (C24)	1.7	0.5	mg/kg wet	2.000		84	40-140	15	25	
Tetradecane (C14)	1.2	0.5	mg/kg wet	2.000		62	40-140	14	25	
Triacontane (C30)	1.6	0.5	mg/kg wet	2.000		78	40-140	12	25	
Surrogate: 1-Chlorooctadecane	*1.37*		mg/kg wet	*2.000*		*68*	*40-140*			
LCS Dup										
2-Methylnaphthalene	1.27	0.20	mg/kg wet	2.000		63	40-140	0.3	20	
Acenaphthene	1.35	0.40	mg/kg wet	2.000		67	40-140	1	20	
Acenaphthylene	1.36	0.20	mg/kg wet	2.000		68	40-140	1	20	
Anthracene	1.36	0.40	mg/kg wet	2.000		68	40-140	0.6	20	
Benzo(a)anthracene	1.44	0.40	mg/kg wet	2.000		72	40-140	0.7	20	
Benzo(a)pyrene	1.61	0.40	mg/kg wet	2.000		80	40-140	2	20	
Benzo(b)fluoranthene	1.42	0.40	mg/kg wet	2.000		71	40-140	0.3	20	
Benzo(g,h,i)perylene	1.48	0.40	mg/kg wet	2.000		74	40-140	0.3	20	
Benzo(k)fluoranthene	1.38	0.40	mg/kg wet	2.000		69	40-140	0.4	20	
C11-C22 Unadjusted Aromatics1	31.2	15.0	mg/kg wet	34.00		92	40-140	2	25	
Chrysene	1.37	0.40	mg/kg wet	2.000		68	40-140	0.8	20	
Dibenzo(a,h)Anthracene	1.44	0.20	mg/kg wet	2.000		72	40-140	1	20	
Fluoranthene	1.44	0.40	mg/kg wet	2.000		72	40-140	3	20	
Fluorene	1.44	0.40	mg/kg wet	2.000		72	40-140	0.03	20	
Indeno(1,2,3-cd)Pyrene	1.50	0.40	mg/kg wet	2.000		75	40-140	0.4	20	
Naphthalene	1.20	0.40	mg/kg wet	2.000		60	40-140	0.4	20	
Phenanthrene	1.45	0.40	mg/kg wet	2.000		73	40-140	2	20	
Pyrene	1.46	0.40	mg/kg wet	2.000		73	40-140	3	20	
Surrogate: 2-Bromonaphthalene	*1.97*		mg/kg wet	*2.000*		*98*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.92*		mg/kg wet	*2.000*		*96*	*40-140*			
Surrogate: O-Terphenyl	*1.27*		mg/kg wet	*2.000*		*63*	*40-140*			
LCS Dup										
2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH41601 - 5035										
Blank										
1,2,4-Trimethylbenzene	ND	0.20	mg/kg wet							
2,2,4-Trimethylpentane	ND	5.00	mg/kg wet							
2-Methylpentane	ND	5.00	mg/kg wet							
Benzene	ND	0.20	mg/kg wet							
C5-C8 Unadjusted Aliphatics	ND	10.0	mg/kg wet							
C9-C10 Aromatics	ND	10.0	mg/kg wet							
C9-C12 Unadjusted Aliphatics	ND	10.0	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch CH41601 - 5035										
Ethylbenzene	ND	0.20	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.05	mg/kg wet							
Naphthalene	ND	0.20	mg/kg wet							
n-Butylcyclohexane	ND	5.00	mg/kg wet							
n-Decane	ND	5.00	mg/kg wet							
Nonane (C9)	ND	5.00	mg/kg wet							
Pentane	ND	5.00	mg/kg wet							
Toluene	ND	0.20	mg/kg wet							
Xylene O	ND	0.20	mg/kg wet							
Xylene P,M	ND	0.40	mg/kg wet							
Surrogate: 2,5-Dibromotoluene - FID	*6.26*		mg/kg wet	*5.000*		*125*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*6.33*		mg/kg wet	*5.000*		*127*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.69*		mg/kg wet	*5.333*		*88*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.77*		mg/kg wet	*5.333*		*89*	*70-130*			
LCS										
1,2,4-Trimethylbenzene	10.0	0.20	mg/kg wet	10.00		100	70-130			
2,2,4-Trimethylpentane	14.1	5.00	mg/kg wet	15.00		94	70-130			
2-Methylpentane	16.4	5.00	mg/kg wet	15.00		109	70-130			
Benzene	4.84	0.20	mg/kg wet	5.000		97	70-130			
C5-C8 Unadjusted Aliphatics	44.3	10.0	mg/kg wet	40.00		111	70-130			
C9-C10 Aromatics	9.47	10.0	mg/kg wet	10.00		95	70-130			
C9-C12 Unadjusted Aliphatics	24.1	10.0	mg/kg wet	30.00		80	70-130			
Ethylbenzene	4.91	0.20	mg/kg wet	5.000		98	70-130			
Methyl tert-Butyl Ether	14.8	0.05	mg/kg wet	15.00		99	70-130			
Naphthalene	9.06	0.20	mg/kg wet	10.00		91	70-130			
n-Butylcyclohexane	7.30	5.00	mg/kg wet	10.00		73	70-130			
n-Decane	8.29	5.00	mg/kg wet	10.00		83	70-130			
Nonane (C9)	7.58	5.00	mg/kg wet	10.00		76	30-130			
Pentane	12.2	5.00	mg/kg wet	10.00		122	70-130			
Toluene	14.9	0.20	mg/kg wet	15.00		99	70-130			
Xylene O	9.89	0.20	mg/kg wet	10.00		99	70-130			
Xylene P,M	20.1	0.40	mg/kg wet	20.00		100	70-130			
Surrogate: 2,5-Dibromotoluene - FID	*5.32*		mg/kg wet	*5.000*		*106*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.37*		mg/kg wet	*5.000*		*107*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.87*		mg/kg wet	*5.333*		*91*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.94*		mg/kg wet	*5.333*		*93*	*70-130*			
LCS Dup										
1,2,4-Trimethylbenzene	10.2	0.20	mg/kg wet	10.00		102	70-130	2	25	
2,2,4-Trimethylpentane	16.7	5.00	mg/kg wet	15.00		111	70-130	17	25	
2-Methylpentane	15.8	5.00	mg/kg wet	15.00		105	70-130	4	25	
Benzene	4.83	0.20	mg/kg wet	5.000		97	70-130	0.3	25	
C5-C8 Unadjusted Aliphatics	46.4	10.0	mg/kg wet	40.00		116	70-130	5	25	
C9-C10 Aromatics	9.65	10.0	mg/kg wet	10.00		96	70-130	2	25	
C9-C12 Unadjusted Aliphatics	24.7	10.0	mg/kg wet	30.00		82	70-130	3	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH41601 - 5035										
Ethylbenzene	4.87	0.20	mg/kg wet	5.000		97	70-130	0.8	25	
Methyl tert-Butyl Ether	14.9	0.05	mg/kg wet	15.00		99	70-130	1	25	
Naphthalene	9.74	0.20	mg/kg wet	10.00		97	70-130	7	25	
n-Butylcyclohexane	7.43	5.00	mg/kg wet	10.00		74	70-130	2	25	
n-Decane	8.27	5.00	mg/kg wet	10.00		83	70-130	0.1	25	
Nonane (C9)	8.08	5.00	mg/kg wet	10.00		81	30-130	6	25	
Pentane	11.9	5.00	mg/kg wet	10.00		119	70-130	2	25	
Toluene	14.9	0.20	mg/kg wet	15.00		99	70-130	0.02	25	
Xylene O	9.85	0.20	mg/kg wet	10.00		99	70-130	0.4	25	
Xylene P,M	19.9	0.40	mg/kg wet	20.00		100	70-130	0.8	25	
Surrogate: 2,5-Dibromotoluene - FID	*5.47*		mg/kg wet	*5.000*		*109*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.50*		mg/kg wet	*5.000*		*110*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.81*		mg/kg wet	*5.333*		*90*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.90*		mg/kg wet	*5.333*		*92*	*70-130*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

Notes and Definitions

Z-04	MeOH - covered
WL	Results obtained from a deionized water leach of the sample.
U	Analyte included in the analysis, but not detected
Q	Calibration required quadratic regression (Q).
D	Diluted.
C+	Continuing Calibration recovery is above upper control limit (C+).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408144

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)
A2LA Accredited: Testing Cert# 2864.01
http://www.a2la.org/scopepdf/2864-01.pdf

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002
http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01
Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)
http://www.A2LA.org/dirsearchnew/newsearch.cfm

CPSC ID# 1141
Lead Paint, Lead in Children's Metals Jewelry
http://www.cpsc.gov/cgi-bin/labapplist.aspx

Sample and Cooler Receipt Checklist

Client: PEER Consultants
Client Project ID: _____
Shipped/Delivered Via: ESS Courier

ESS Project ID: 14080144
Date Project Due: ~~8/14/2014~~ 8/18/14 MS 8/8/14
Days For Project: 5 Day

Items to be checked upon receipt:

1. Air Bill Manifest Present?	* No	10. Are the samples properly preserved?	Yes
Air No.:		11. Proper sample containers used?	Yes
2. Were Custody Seals Present?	No	12. Any air bubbles in the VOA vials?	N/A
3. Were Custody Seals Intact?	N/A	13. Holding times exceeded?	No
4. Is Radiation count < 100 CPM?	Yes	14. Sufficient sample volumes?	Yes
5. Is a cooler present?	Yes	15. Any Subcontracting needed?	No
Cooler Temp: **4.8**		16. Are ESS labels on correct containers?	Yes No
Iced With: **Ice**		17. Were samples received intact?	Yes No
6. Was COC included with samples?	Yes	ESS Sample IDs: _____	
7. Was COC signed and dated by client?	Yes	Sub Lab: _____	
8. Does the COC match the sample	Yes	Analysis: _____	
9. Is COC complete and correct?	Yes	TAT: _____	

18. Was there need to call project manager to discuss status? If yes, please explain.
Added sample for %D solid on # 1, 4+5. No additional sample for #2 PB-5 like PSR states MB 8/18/14

Who was called?:_____ By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	40 ml - VOA	1	MeOH
1	Yes	40 ml - VOA	2	other
1	Yes	8 oz Soil Jar	1	NP
2	Yes	40 ml - VOA	1	MeOH
2	Yes	40 ml - VOA	2	other
3	Yes	40 ml - VOA	1	MeOH
3	Yes	8 oz Soil Jar	2	NP
4	Yes	40 ml - VOA	1	MeOH
4	Yes	40 ml - VOA	2	other
4	Yes	8 oz Soil Jar	1	NP
5	Yes	40 ml - VOA	1	MeOH
5	Yes	40 ml - VOA	2	other
5	Yes	8 oz Soil Jar	1	NP

Completed By: _____ Date/Time: 8/18/14 1807
Reviewed By: _____ Date/Time: 8/8/14 1814

Sample and Cooler Receipt Checklist

Client: PEER Consultants
Client Project ID: _____
Shipped/Delivered Via: ESS Courier

ESS Project ID: 14080144
Date Project Due: ~~8/14/14~~ 8/8/14 8/15/14 MB 8/7/14
Days For Project: 5 Day

Items to be checked upon receipt:

1. Air Bill Manifest Present?	* No	10. Are the samples properly preserved?	Yes
Air No.:		11. Proper sample containers used?	Yes
2. Were Custody Seals Present?	No	12. Any air bubbles in the VOA vials?	N/A
3. Were Custody Seals Intact?	N/A	13. Holding times exceeded?	No
4. Is Radiation count < 100 CPM?	Yes	14. Sufficient sample volumes?	Yes
5. Is a cooler present?	Yes	15. Any Subcontracting needed?	No
Cooler Temp: **4.8**		16. Are ESS labels on correct containers?	Yes|No
Iced With: **Ice**		17. Were samples received intact?	Yes|No
6. Was COC included with samples?	Yes	ESS Sample IDs:	
7. Was COC signed and dated by client?	Yes	Sub Lab:	
8. Does the COC match the sample	Yes	Analysis:	
9. Is COC complete and correct?	Yes	TAT:	

18. Was there need to call project manager to discuss status? If yes, please explain.

COC = PB-5 8/7/14 1100
11 vials frozen @ 1512 rec'd 2-40ml MeOH PB-5 8/7/14 @ 1100
MB 8/7/14 2-40ml H2O ~~8/8~~ 8/7/14 PB-5 8/7/14 @ 1100
1-40ml H2O PB-5 8/7/14 @ 1000 → sample pr as PB 7b/6 of ti MB 8/7/14

Who was called?: _____ By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	40 ml - VOA	1	MeOH
1	Yes	40 ml - VOA	2	other
2	Yes	40 ml - VOA	1	MeOH
2	Yes	40 ml - VOA	2	other
3	Yes	40 ml - VOA	1	MeOH
3	Yes	8 oz Soil Jar	2	NP
4	Yes	40 ml - VOA	1	MeOH
4	Yes	40 ml - VOA	2	other
5	Yes	40 ml - VOA	1	MeOH
5	Yes	40 ml - VOA	2	other

Completed By: _____ Date/Time: 8/7/14 1553
Reviewed By: _____ Date/Time: 8/7/14 1856

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time: ✓ Standard Other ____
If faster than 5 days, prior approval by laboratory is required # ____

~~State~~ where samples were collected from:
(MA) RI CT NH NJ NY ME Other ____

Is this project for any of the following:
MA-MCP Navy USACE Other ____

Reporting Limits: comm-97 and mcps-1

ESS LAB PROJECT ID: 14048144

Electronic Deliverable: Yes ✓ No ____

Format: Excel ✓ Access ____ PDF ✓ Other ____

Co. Name	Project #	Project Name (20 Char. or less)
PEER Consultants	5559	Union Square

Contact Person	Address
Dave Gorden	99 S Bedford st suite 200

City	State	Zip	PO#
Burlington	MA	01803	5559

Telephone #	Fax #	Email Address
7812388880	781238-8884	gorderdepeercpc.com

ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (20 Char. or less)	Pres Code	Number of Containers	Type of Containers	Write Required Analysis: VOC hi	VOC lo	VPH	EPH PCB SVOC Cond metals											
1	8/7/14	1000		✓	S	PB-7 (1-7')	6/9	3	V	✓	✓													
2	8/7/14	1100		✓	S	PB-5 (1-3')	6/9	3	V	✓	✓													
3	8/7/14	1100		✓	S	PB-5 (1-13')	6/1	3	V/G			✓	✓											
4	8/7/14	1200		✓	S	PB-10 (1-5')	6/9	3	V	✓	✓													
5	8/7/14	1300		✓	S	PB-3 (1-7')	6/9	3	V	✓	✓													

Container Type: P-Poly G-Glass S-Sterile V-VOA
Matrix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters

Cooler Present ✓ Yes ___ No
Seals Intact ___ Yes ___ No NA: ✓
Cooler Temp: 4.8 Ice Kit

Internal Use Only
[✓] Pickup
[ ] Technicians ____

Preservation Code 1- NP, 2- HCl, 3- H_2SO_4, 4- HNO_3, 5- NaOH, 6- MeOH, 7- Asorbic Acid, 8- ZnAct, 9- H_2O

Sampled by: Dave Gorden

Comments: VOC/VPH Septums were failing * verify intact

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	8/7/14 1300 1400	[signature]	8/7/14 1130	[signature]	8/7/14 1455	[signature]	8/7/14 1544
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

*By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VII A

Please fax all changes to Chain of Custody in writing.

1 (White) Lab Copy 2 (Yellow) Client Receipt

10/26/04 A

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time ✓ Standard Other _____
If faster than 5 days, prior approval by laboratory is required # _____

State where samples were collected from:
MA RI CT NH NJ NY ME Other _____

Is this project for any of the following:
MA-MCP Navy USACE Other _____

Reporting Limits: comm-97 mcp rcs-1

ESS LAB PROJECT ID: 14081144

Electronic Deliverable Yes ✓ No ____

Format: Excel ✓ Access ___ PDF ✓ Other _____

Co. Name	Project #	Project Name (20 Char. or less)
PEER Consultants	5559	Union Square

Contact Person	Address
Dave Gorden	99 S. Bedford St Suite 200

City	State	Zip	PO#
Burlington	MA	01803	5559

Telephone #	Fax #	Email Address
7812388880	7812388884	gorden@peercpc.com

ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (20 Char. or less)	Pres Code	Number of Containers	Type of Containers	Write Required Analysis: % solids
1	8/7/14	1000		✓	S	PB-7	1	1	G	✓
4	8/7/14	1200		✓	S	PB-10	1	1	G	✓
5	8/7/14	1300		✓	S	PB-3	1	1	G	✓

Container Type: P-Poly G-Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters

Cooler Present ✓ Yes ___ No Internal Use Only

Seals Intact ___ Yes ___ No NA: ___ [ ] Pickup

Cooler Temp 3.3 KT [ ] Technicians ____

Preservation Code 1- NP, 2- HCl, 3- H_2SO_4, 4- HNO_3, 5- NaOH, 6- MeOH, 7- Asorbic Acid, 8- ZnAct, 9- _____

Sampled by: dave gorden

Comments: * % solids for samples delivered to lab 8/7/14

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
	1955 8/8/14		8/8/14 1054		8/11 1740		8/8/14 1802
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

*By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VII A

Please fax all changes to Chain of Custody in writing.

1 (White) Lab Copy 2 (Yellow) Client Receipt

10/26/04 A

CERTIFICATE OF ANALYSIS

David Gorden
PEER Consultants, P.C.
99 S. Bedford Street
Burlington, MA 01803

RE: Union Square (5559)
ESS Laboratory Work Order Number: 1408202

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 2:05 pm, Aug 19, 2014

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

SAMPLE RECEIPT

The following samples were received on August 12, 2014 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has performed and reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

For EPH soil samples, the aromatic range results have been corrected for identified cartridge contaminant in accordance with the CAM protocol.

Percent solid for samples 1408202-03 was taken from sample1408202-02 and 1408202-04 was taken from 1408202-05 per client's request.

The ending CCV for the Aromatic fraction of the EPH analysis associated with sample 1408202-02 exhibited compounds exceeding greater than 25% Difference. The sample was re-analyzed with similar results, and both sets of analyses are included in this report.

Lab Number	Sample Name	Matrix	Analysis
1408202-01	PB 7 1-13ft	Soil	6010C, 7010, 7471B, 8082A, 8270D, 9050A, EPH8270, MADEP-EPH, MADEP-VPH
1408202-02	PB 9 1-9ft	Soil	6010C, 7010, 7471B, 8082A, 8270D, 9050A, EPH8270, MADEP-EPH, MADEP-VPH
1408202-03	PB 9 5-7ft	Soil	8260B
1408202-04	PB 2 10-12ft	Soil	8260B Low
1408202-05	PB 2 2-14ft	Soil	6010C, 7010, 7471B, 8082A, 8270D, 9050A, EPH8270, MADEP-EPH, MADEP-VPH

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

PROJECT NARRATIVE

8270D Semi-Volatile Organic Compounds

CXH0123-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (63% @ 80-120%), Pentachlorophenol (94% @ 80-120%)

CXH0123-CCV1 **Continuing Calibration recovery is above upper control limit (C+).**
Butylbenzylphthalate (122% @ 80-120%), Di-n-octylphthalate (121% @ 80-120%)

CXH0123-CCV1 **Continuing Calibration recovery is below lower control limit (C-).**
2,4-Dinitrophenol (63% @ 80-120%)

CXH0124-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (85% @ 80-120%)

CXH0124-CCV1 **Continuing Calibration recovery is below lower control limit (C-).**
N-Nitrosodimethylamine (73% @ 80-120%)

CXH0128-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (75% @ 80-120%), Pentachlorophenol (88% @ 80-120%)

CXH0128-CCV1 **Continuing Calibration recovery is below lower control limit (C-).**
2,4-Dinitrophenol (75% @ 80-120%)

MADEP-EPH Extractable Petroleum Hydrocarbons

CXH0165-CCV2 **Continuing Calibration recovery is below lower control limit (C-).**
Benzo(a)pyrene (69% @ 80-120%), Benzo(b)fluoranthene (79% @ 80-120%), Benzo(g,h,i)perylene (34% @ 80-120%), Benzo(k)fluoranthene (79% @ 80-120%), Dibenzo(a,h)Anthracene (42% @ 80-120%), Indeno(1,2,3-cd)Pyrene (40% @ 80-120%)

CXH0172-CCV2 **Continuing Calibration recovery is below lower control limit (C-).**
Benzo(a)pyrene (60% @ 80-120%), Benzo(b)fluoranthene (73% @ 80-120%), Benzo(g,h,i)perylene (24% @ 80-120%), Benzo(k)fluoranthene (72% @ 80-120%), Dibenzo(a,h)Anthracene (30% @ 80-120%), Indeno(1,2,3-cd)Pyrene (29% @ 80-120%)

Total Metals

CH41502-BS1 **Blank Spike recovery is below lower control limit (B-).**
Thallium (75% @ 79-121%)

No other observations noted.

End of Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

DATA USABILITY LINKS

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1408202-01 through 1408202-05**

Matrices: ( ) Ground Water/Surface Water ( ) Soil/Sediment ( ) Drinking Water ( ) Air ( ) Other:_____

CAM Protocol (check all that apply below):

( ) 8260 VOC CAM II A	( ) 7470/7471 Hg CAM III B	( ) MassDEP VPH CAM IV A	( ) 8081 Pesticides CAM V B	( ) 7196 Hex Cr CAM VI B	( ) MassDEP APH CAM IX A
( ) 8270 SVOC CAM II B	( ) 7010 Metals CAM III C	( ) MassDEP EPH CAM IV B	( ) 8151 Herbicides CAM V C	( ) 8330 Explosives CAM VIII A	( ) TO-15 VOC CAM IX B
( ) 6010 Metals CAM III A	( ) 6020 Metals CAM III D	( ) 8082 PCB CAM V A	( ) 6860 Perchlorate CAM VIII B	( ) 9014 Total Cyanide/PAC CAM VI A	

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes ( ) No ( )
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	Yes ( ) No ( )
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	Yes ( ) No ( )
D	Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes ( ) No ( )
E	a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes ( ) No ( ) Yes ( ) No ( )
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	Yes ( ) No ( )

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)? ***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**	Yes ( ) No ( )*
H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes ( ) No ( )*
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes ( ) No ( )*

All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ Date: August 19, 2014

Printed Name: Laurel Stoddard Position: Laboratory Director

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 7 1-13ft
Date Sampled: 08/08/14 12:05
Percent Solids: 92

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (4.7)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502
Arsenic	**3.2** (2.3)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502
Barium	**10.2** (2.3)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502
Beryllium	**0.18** (0.10)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502
Cadmium	ND (0.47)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502
Chromium	**9.1** (0.9)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502
Lead	ND (4.7)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502
Mercury	ND (0.029)		7471B		1	NAR	08/15/14 13:31	0.75	40	CH41501
Nickel	**7.2** (2.3)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502
Selenium	ND (2.35)		7010		5	KJK	08/15/14 19:34	2.31	100	CH41502
Silver	ND (0.47)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502
Thallium	ND (1.17)		7010		5	KJK	08/16/14 1:09	2.31	100	CH41502
Vanadium	**13.7** (0.9)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502
Zinc	**14.8** (2.3)		6010C		1	KJK	08/15/14 16:40	2.31	100	CH41502

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 7 1-13ft
Date Sampled: 08/08/14 12:05
Percent Solids: 92
Initial Volume: 20.6
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JXS
Prepared: 8/13/14 16:00
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.0527)		8082A		1	08/14/14 10:49		CH41205
Aroclor 1221	ND (0.0527)		8082A		1	08/14/14 10:49		CH41205
Aroclor 1232	ND (0.0527)		8082A		1	08/14/14 10:49		CH41205
Aroclor 1242	ND (0.0527)		8082A		1	08/14/14 10:49		CH41205
Aroclor 1248	ND (0.0527)		8082A		1	08/14/14 10:49		CH41205
Aroclor 1254	ND (0.0527)		8082A		1	08/14/14 10:49		CH41205
Aroclor 1260	ND (0.0527)		8082A		1	08/14/14 10:49		CH41205
Aroclor 1262	ND (0.0527)		8082A		1	08/14/14 10:49		CH41205
Aroclor 1268	ND (0.0527)		8082A		1	08/14/14 10:49		CH41205

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*86 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*77 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*91 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*88 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 7 1-13ft
Date Sampled: 08/08/14 12:05
Percent Solids: 92
Initial Volume: 15.4
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/13/14 11:56

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
1,2-Dichlorobenzene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
1,3-Dichlorobenzene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
1,4-Dichlorobenzene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2,4,5-Trichlorophenol	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2,4,6-Trichlorophenol	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2,4-Dichlorophenol	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2,4-Dimethylphenol	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2,4-Dinitrophenol	ND (1.76)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2,4-Dinitrotoluene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2,6-Dinitrotoluene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2-Chloronaphthalene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2-Chlorophenol	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2-Methylnaphthalene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2-Methylphenol	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
2-Nitrophenol	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
3,3´-Dichlorobenzidine	ND (0.705)		8270D		1	08/13/14 16:37	CXH0124	CH41207
3+4-Methylphenol	ND (0.705)		8270D		1	08/13/14 16:37	CXH0124	CH41207
4-Bromophenyl-phenylether	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
4-Chloroaniline	ND (0.705)		8270D		1	08/13/14 16:37	CXH0124	CH41207
4-Nitrophenol	ND (1.76)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Acenaphthene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Acenaphthylene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Acetophenone	ND (0.705)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Aniline	ND (1.76)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Anthracene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Azobenzene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Benzo(a)anthracene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Benzo(a)pyrene	ND (0.176)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Benzo(b)fluoranthene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Benzo(g,h,i)perylene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Benzo(k)fluoranthene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 7 1-13ft
Date Sampled: 08/08/14 12:05
Percent Solids: 92
Initial Volume: 15.4
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/13/14 11:56

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
bis(2-Chloroethoxy)methane	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
bis(2-Chloroethyl)ether	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
bis(2-chloroisopropyl)Ether	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
bis(2-Ethylhexyl)phthalate	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Butylbenzylphthalate	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Chrysene	ND (0.176)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Dibenzo(a,h)Anthracene	ND (0.176)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Dibenzofuran	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Diethylphthalate	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Dimethylphthalate	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Di-n-butylphthalate	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Di-n-octylphthalate	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Fluoranthene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Fluorene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Hexachlorobenzene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Hexachlorobutadiene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Hexachloroethane	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Indeno(1,2,3-cd)Pyrene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Isophorone	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Naphthalene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Nitrobenzene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
N-Nitrosodimethylamine	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Pentachlorophenol	ND (1.76)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Phenanthrene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Phenol	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207
Pyrene	ND (0.352)		8270D		1	08/13/14 16:37	CXH0124	CH41207

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*68 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*83 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*70 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*79 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 7 1-13ft
Date Sampled: 08/08/14 12:05
Percent Solids: 92
Initial Volume: 15.4
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/13/14 11:56

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		*68 %*		*30-130*				
Surrogate: Nitrobenzene-d5		*73 %*		*30-130*				
Surrogate: Phenol-d6		*71 %*		*30-130*				
Surrogate: p-Terphenyl-d14		*86 %*		*30-130*				

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 7 1-13ft
Date Sampled: 08/08/14 12:05
Percent Solids: 92

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-01
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 552** (5)		9050A		1	JLK	08/14/14 12:26	umhos/cm	CH41416

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 7 1-13ft
Date Sampled: 08/08/14 12:05
Percent Solids: 92
Initial Volume: 24.6
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-01
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/14/14 14:15

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (16.5)		MADEP-EPH		1	DPS	08/15/14 17:01	CXH0145	CH41403
C19-C36 Aliphatics1	ND (16.5)		MADEP-EPH		1	DPS	08/15/14 17:01	CXH0145	CH41403
C11-C22 Unadjusted Aromatics1	ND (16.5)		EPH8270		1	VSC	08/14/14 23:16	CXH0198	CH41403
C11-C22 Aromatics1,2	ND (16.5)		EPH8270			VSC	08/14/14 23:16		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*85 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*107 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*107 %*		*40-140*
Surrogate: O-Terphenyl	*88 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 7 1-13ft
Date Sampled: 08/08/14 12:05
Percent Solids: 92
Initial Volume: 17.6
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (10.1)		MADEP-VPH		1	08/16/14 2:38	CXH0188	CH41601
C5-C8 Aliphatics1,2	ND (10.1)		MADEP-VPH		1	08/16/14 2:38		[CALC]
C9-C12 Aliphatics2,3	ND (10.1)		MADEP-VPH		1	08/16/14 2:38		[CALC]
Benzene	ND (0.20)		MADEP-VPH		1	08/16/14 2:38	CXH0188	CH41601
Ethylbenzene	ND (0.20)		MADEP-VPH		1	08/16/14 2:38	CXH0188	CH41601
Methyl tert-Butyl Ether	ND (0.05)		MADEP-VPH		1	08/16/14 2:38	CXH0188	CH41601
Naphthalene	ND (0.20)		MADEP-VPH		1	08/16/14 2:38	CXH0188	CH41601
Toluene	ND (0.20)		MADEP-VPH		1	08/16/14 2:38	CXH0188	CH41601
Xylene O	ND (0.20)		MADEP-VPH		1	08/16/14 2:38	CXH0188	CH41601
Xylene P,M	ND (0.40)		MADEP-VPH		1	08/16/14 2:38	CXH0188	CH41601
1:1 Methanol/Soil Ratio %D	**17** (N/A)		MADEP-VPH			08/16/14 0:00		CH41601
Preservative:	**MeOH - covered**		MADEP-VPH					CH41601

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*120 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*120 %*		*70-130*
Surrogate: Trifluorotoluene - FID	*88 %*		*70-130*
Surrogate: Trifluorotoluene - PID	*90 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 1-9ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (4.7)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502
Arsenic	**4.6** (2.4)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502
Barium	**20.9** (2.4)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502
Beryllium	**0.25** (0.10)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502
Cadmium	ND (0.47)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502
Chromium	**15.5** (0.9)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502
Lead	**15.0** (4.7)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502
Mercury	**0.044** (0.031)		7471B		1	NAR	08/15/14 13:34	0.73	40	CH41501
Nickel	**12.3** (2.4)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502
Selenium	ND (2.36)		7010		5	KJK	08/15/14 19:39	2.4	100	CH41502
Silver	ND (0.47)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502
Thallium	ND (1.18)		7010		5	KJK	08/16/14 1:15	2.4	100	CH41502
Vanadium	**30.6** (0.9)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502
Zinc	**126** (2.4)		6010C		1	KJK	08/15/14 16:44	2.4	100	CH41502

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 1-9ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88
Initial Volume: 20.8
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: ML
Prepared: 8/12/14 18:00
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.0544)		8082A		1	08/15/14 18:43		CH41829
Aroclor 1221	ND (0.0544)		8082A		1	08/15/14 18:43		CH41829
Aroclor 1232	ND (0.0544)		8082A		1	08/15/14 18:43		CH41829
Aroclor 1242	ND (0.0544)		8082A		1	08/15/14 18:43		CH41829
Aroclor 1248	ND (0.0544)		8082A		1	08/15/14 18:43		CH41829
Aroclor 1254	ND (0.0544)		8082A		1	08/15/14 18:43		CH41829
Aroclor 1260	ND (0.0544)		8082A		1	08/15/14 18:43		CH41829
Aroclor 1262	ND (0.0544)		8082A		1	08/15/14 18:43		CH41829
Aroclor 1268	ND (0.0544)		8082A		1	08/15/14 18:43		CH41829

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*62 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*58 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*74 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*74 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 1-9ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88
Initial Volume: 15
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/13/14 11:56

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
1,2-Dichlorobenzene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
1,3-Dichlorobenzene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
1,4-Dichlorobenzene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2,4,5-Trichlorophenol	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2,4,6-Trichlorophenol	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2,4-Dichlorophenol	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2,4-Dimethylphenol	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2,4-Dinitrophenol	ND (1.89)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2,4-Dinitrotoluene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2,6-Dinitrotoluene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2-Chloronaphthalene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2-Chlorophenol	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2-Methylnaphthalene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2-Methylphenol	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
2-Nitrophenol	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
3,3´-Dichlorobenzidine	ND (0.755)		8270D		1	08/13/14 23:45	CXH0128	CH41207
3+4-Methylphenol	ND (0.755)		8270D		1	08/13/14 23:45	CXH0128	CH41207
4-Bromophenyl-phenylether	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
4-Chloroaniline	ND (0.755)		8270D		1	08/13/14 23:45	CXH0128	CH41207
4-Nitrophenol	ND (1.89)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Acenaphthene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Acenaphthylene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Acetophenone	ND (0.755)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Aniline	ND (1.89)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Anthracene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Azobenzene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Benzo(a)anthracene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Benzo(a)pyrene	ND (0.189)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Benzo(b)fluoranthene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Benzo(g,h,i)perylene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Benzo(k)fluoranthene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 1-9ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88
Initial Volume: 15
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/13/14 11:56

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
bis(2-Chloroethoxy)methane	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
bis(2-Chloroethyl)ether	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
bis(2-chloroisopropyl)Ether	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
bis(2-Ethylhexyl)phthalate	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Butylbenzylphthalate	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Chrysene	**0.203** (0.189)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Dibenzo(a,h)Anthracene	ND (0.189)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Dibenzofuran	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Diethylphthalate	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Dimethylphthalate	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Di-n-butylphthalate	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Di-n-octylphthalate	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Fluoranthene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Fluorene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Hexachlorobenzene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Hexachlorobutadiene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Hexachloroethane	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Indeno(1,2,3-cd)Pyrene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Isophorone	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Naphthalene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Nitrobenzene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
N-Nitrosodimethylamine	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Pentachlorophenol	ND (1.89)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Phenanthrene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Phenol	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207
Pyrene	ND (0.377)		8270D		1	08/13/14 23:45	CXH0128	CH41207

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*65 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*90 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*65 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*65 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 1-9ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88
Initial Volume: 15
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/13/14 11:56

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		*62 %*		*30-130*				
Surrogate: Nitrobenzene-d5		*64 %*		*30-130*				
Surrogate: Phenol-d6		*70 %*		*30-130*				
Surrogate: p-Terphenyl-d14		*78 %*		*30-130*				

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 1-9ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-02
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 1000** (5)		9050A		1	JLK	08/14/14 12:26	umhos/cm	CH41416

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 1-9ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88
Initial Volume: 24.5
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-02
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/14/14 14:15

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	**42.2** (17.3)		MADEP-EPH		1	DPS	08/15/14 17:52	CXH0145	CH41403
C19-C36 Aliphatics1	**173** (17.3)		MADEP-EPH		1	DPS	08/15/14 17:52	CXH0145	CH41403
C11-C22 Unadjusted Aromatics1	**53.5** (17.3)		EPH8270		1	VSC	08/14/14 19:57	CXH0165	CH41403
C11-C22 Aromatics1,2	**53.5** (17.3)		EPH8270			VSC	08/14/14 19:57		[CALC]

	%Recovery	*Qualifier*	*Limits*
Surrogate: 1-Chlorooctadecane	*73 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*96 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*88 %*		*40-140*
Surrogate: O-Terphenyl	*67 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 1-9ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88
Initial Volume: 17.3
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (11.1)		MADEP-VPH		1	08/16/14 3:12	CXH0188	CH41601
C5-C8 Aliphatics1,2	ND (11.1)		MADEP-VPH		1	08/16/14 3:12		[CALC]
C9-C12 Aliphatics2,3	ND (11.1)		MADEP-VPH		1	08/16/14 3:12		[CALC]
Benzene	**1.01** (0.22)		MADEP-VPH		1	08/16/14 3:12	CXH0188	CH41601
Ethylbenzene	ND (0.22)		MADEP-VPH		1	08/16/14 3:12	CXH0188	CH41601
Methyl tert-Butyl Ether	ND (0.06)		MADEP-VPH		1	08/16/14 3:12	CXH0188	CH41601
Naphthalene	**0.26** (0.22)		MADEP-VPH		1	08/16/14 3:12	CXH0188	CH41601
Toluene	**0.41** (0.22)		MADEP-VPH		1	08/16/14 3:12	CXH0188	CH41601
Xylene O	ND (0.22)		MADEP-VPH		1	08/16/14 3:12	CXH0188	CH41601
Xylene P,M	ND (0.45)		MADEP-VPH		1	08/16/14 3:12	CXH0188	CH41601
1:1 Methanol/Soil Ratio %D	**15** (N/A)		MADEP-VPH			08/16/14 0:00		CH41601
Preservative:	**MeOH - covered**		MADEP-VPH					CH41601

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*121 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*122 %*		*70-130*
Surrogate: Trifluorotoluene - FID	*89 %*		*70-130*
Surrogate: Trifluorotoluene - PID	*91 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 1-9ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88
Initial Volume: 24.5
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-02RE1
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/14/14 14:15

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C11-C22 Unadjusted Aromatics1	**59.2** (17.3)		EPH8270		1	VSC	08/15/14 16:18	CXH0172	CH41403
C11-C22 Aromatics1,2	**59.2** (17.3)		EPH8270			VSC	08/15/14 16:18		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 2-Bromonaphthalene	*92 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*86 %*		*40-140*
Surrogate: O-Terphenyl	*67 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 5-7ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88
Initial Volume: 18.1
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.108)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,1,1-Trichloroethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,1,2,2-Tetrachloroethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,1,2-Trichloroethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,1-Dichloroethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,1-Dichloroethene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,1-Dichloropropene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,2,3-Trichlorobenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,2,3-Trichloropropane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,2,4-Trichlorobenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,2,4-Trimethylbenzene	**0.241** (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,2-Dibromo-3-Chloropropane	ND (0.216)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,2-Dibromoethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,2-Dichlorobenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,2-Dichloroethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,2-Dichloropropane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,3,5-Trimethylbenzene	**0.0658** (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,3-Dichlorobenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,3-Dichloropropane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,4-Dichlorobenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
1,4-Dioxane - Screen	ND (5.39)		8260B		1	08/15/14 17:15	CXH0180	CH41530
2,2-Dichloropropane	ND (0.108)		8260B		1	08/15/14 17:15	CXH0180	CH41530
2-Butanone	ND (0.216)		8260B		1	08/15/14 17:15	CXH0180	CH41530
2-Chlorotoluene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
2-Hexanone	ND (0.216)		8260B		1	08/15/14 17:15	CXH0180	CH41530
4-Chlorotoluene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
4-Isopropyltoluene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
4-Methyl-2-Pentanone	ND (0.216)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Acetone	ND (0.216)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Benzene	**1.68** (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Bromobenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Bromochloromethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 5-7ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88
Initial Volume: 18.1
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Bromoform	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Bromomethane	ND (0.108)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Carbon Disulfide	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Carbon Tetrachloride	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Chlorobenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Chloroethane	ND (0.108)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Chloroform	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Chloromethane	ND (0.108)		8260B		1	08/15/14 17:15	CXH0180	CH41530
cis-1,2-Dichloroethene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
cis-1,3-Dichloropropene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Dibromochloromethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Dibromomethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Dichlorodifluoromethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Diethyl Ether	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Di-isopropyl ether	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Ethyl tertiary-butyl ether	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Ethylbenzene	**0.123** (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Hexachlorobutadiene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Isopropylbenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Methyl tert-Butyl Ether	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Methylene Chloride	ND (0.216)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Naphthalene	**0.208** (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
n-Butylbenzene	**0.0625** (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
n-Propylbenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
sec-Butylbenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Styrene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
tert-Butylbenzene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Tertiary-amyl methyl ether	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Tetrachloroethene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Tetrahydrofuran	ND (0.216)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Toluene	**0.654** (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 9 5-7ft
Date Sampled: 08/11/14 13:00
Percent Solids: 88
Initial Volume: 18.1
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
trans-1,2-Dichloroethene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
trans-1,3-Dichloropropene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Trichloroethene	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Trichlorofluoromethane	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Vinyl Chloride	ND (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Xylene O	**0.109** (0.0539)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Xylene P,M	**0.339** (0.108)		8260B		1	08/15/14 17:15	CXH0180	CH41530
Xylenes (Total)	**0.447** (0.108)		8260B		1	08/15/14 17:15		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*81 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*86 %*		*70-130*
Surrogate: Dibromofluoromethane	*87 %*		*70-130*
Surrogate: Toluene-d8	*88 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 10-12ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,1,1-Trichloroethane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,1,2,2-Tetrachloroethane	ND (0.0017)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,1,2-Trichloroethane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,1-Dichloroethane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,1-Dichloroethene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,1-Dichloropropene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,2,3-Trichlorobenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,2,3-Trichloropropane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,2,4-Trichlorobenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,2,4-Trimethylbenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,2-Dibromo-3-Chloropropane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,2-Dibromoethane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,2-Dichlorobenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,2-Dichloroethane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,2-Dichloropropane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,3,5-Trimethylbenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,3-Dichlorobenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,3-Dichloropropane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,4-Dichlorobenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
1,4-Dioxane	ND (0.0855)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
2,2-Dichloropropane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
2-Butanone	**0.0093** (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
2-Chlorotoluene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
2-Hexanone	ND (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
4-Chlorotoluene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
4-Isopropyltoluene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
4-Methyl-2-Pentanone	ND (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Acetone	**0.0742** (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Benzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Bromobenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Bromochloromethane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 10-12ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Bromoform	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Bromomethane	ND (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Carbon Disulfide	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Carbon Tetrachloride	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Chlorobenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Chloroethane	ND (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Chloroform	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Chloromethane	ND (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
cis-1,2-Dichloroethene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
cis-1,3-Dichloropropene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Dibromochloromethane	ND (0.0017)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Dibromomethane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Dichlorodifluoromethane	ND (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Diethyl Ether	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Di-isopropyl ether	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Ethyl tertiary-butyl ether	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Ethylbenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Hexachlorobutadiene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Isopropylbenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Methyl tert-Butyl Ether	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Methylene Chloride	ND (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Naphthalene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
n-Butylbenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
n-Propylbenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
sec-Butylbenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Styrene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
tert-Butylbenzene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Tertiary-amyl methyl ether	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Tetrachloroethene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Tetrahydrofuran	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Toluene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 10-12ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
trans-1,2-Dichloroethene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
trans-1,3-Dichloropropene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Trichloroethene	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Trichlorofluoromethane	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Vinyl Chloride	ND (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Xylene O	ND (0.0043)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Xylene P,M	ND (0.0085)		8260B Low		1	08/14/14 20:46	CXH0151	CH41425
Xylenes (Total)	ND (0.0085)		8260B Low		1	08/14/14 20:46		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*113 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*85 %*		*70-130*
Surrogate: Dibromofluoromethane	*97 %*		*70-130*
Surrogate: Toluene-d8	*104 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 2-14ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-05
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (5.9)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502
Arsenic	**3.8** (2.9)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502
Barium	**13.3** (2.9)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502
Beryllium	**0.30** (0.13)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502
Cadmium	ND (0.59)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502
Chromium	**11.2** (1.2)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502
Lead	**11.5** (5.9)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502
Mercury	**0.038** (0.033)		7471B		1	NAR	08/15/14 13:37	0.78	40	CH41501
Nickel	**7.9** (2.9)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502
Selenium	ND (2.94)		7010		5	KJK	08/15/14 19:45	2.19	100	CH41502
Silver	ND (0.59)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502
Thallium	ND (1.47)		7010		5	KJK	08/16/14 1:21	2.19	100	CH41502
Vanadium	**16.5** (1.2)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502
Zinc	**22.7** (2.9)		6010C		1	KJK	08/15/14 16:48	2.19	100	CH41502

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 2-14ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78
Initial Volume: 20.9
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JXS
Prepared: 8/13/14 16:00
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.0616)		8082A		1	08/14/14 11:27		CH41205
Aroclor 1221	ND (0.0616)		8082A		1	08/14/14 11:27		CH41205
Aroclor 1232	ND (0.0616)		8082A		1	08/14/14 11:27		CH41205
Aroclor 1242	ND (0.0616)		8082A		1	08/14/14 11:27		CH41205
Aroclor 1248	ND (0.0616)		8082A		1	08/14/14 11:27		CH41205
Aroclor 1254	ND (0.0616)		8082A		1	08/14/14 11:27		CH41205
Aroclor 1260	ND (0.0616)		8082A		1	08/14/14 11:27		CH41205
Aroclor 1262	ND (0.0616)		8082A		1	08/14/14 11:27		CH41205
Aroclor 1268	ND (0.0616)		8082A		1	08/14/14 11:27		CH41205

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*80 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*76 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*96 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*92 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 2-14ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/13/14 11:56

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
1,2-Dichlorobenzene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
1,3-Dichlorobenzene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
1,4-Dichlorobenzene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2,4,5-Trichlorophenol	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2,4,6-Trichlorophenol	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2,4-Dichlorophenol	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2,4-Dimethylphenol	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2,4-Dinitrophenol	ND (2.19)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2,4-Dinitrotoluene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2,6-Dinitrotoluene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2-Chloronaphthalene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2-Chlorophenol	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2-Methylnaphthalene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2-Methylphenol	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
2-Nitrophenol	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
3,3´-Dichlorobenzidine	ND (0.876)		8270D		1	08/13/14 17:13	CXH0124	CH41207
3+4-Methylphenol	ND (0.876)		8270D		1	08/13/14 17:13	CXH0124	CH41207
4-Bromophenyl-phenylether	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
4-Chloroaniline	ND (0.876)		8270D		1	08/13/14 17:13	CXH0124	CH41207
4-Nitrophenol	ND (2.19)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Acenaphthene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Acenaphthylene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Acetophenone	ND (0.876)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Aniline	ND (2.19)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Anthracene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Azobenzene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Benzo(a)anthracene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Benzo(a)pyrene	**0.231** (0.219)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Benzo(b)fluoranthene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Benzo(g,h,i)perylene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Benzo(k)fluoranthene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 2-14ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/13/14 11:56

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
bis(2-Chloroethoxy)methane	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
bis(2-Chloroethyl)ether	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
bis(2-chloroisopropyl)Ether	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
bis(2-Ethylhexyl)phthalate	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Butylbenzylphthalate	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Chrysene	**0.219** (0.219)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Dibenzo(a,h)Anthracene	ND (0.219)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Dibenzofuran	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Diethylphthalate	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Dimethylphthalate	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Di-n-butylphthalate	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Di-n-octylphthalate	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Fluoranthene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Fluorene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Hexachlorobenzene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Hexachlorobutadiene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Hexachloroethane	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Indeno(1,2,3-cd)Pyrene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Isophorone	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Naphthalene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Nitrobenzene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
N-Nitrosodimethylamine	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Pentachlorophenol	ND (2.19)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Phenanthrene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Phenol	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207
Pyrene	ND (0.438)		8270D		1	08/13/14 17:13	CXH0124	CH41207

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*74 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*87 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*77 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*87 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 2-14ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/13/14 11:56

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		*75 %*		*30-130*				
Surrogate: Nitrobenzene-d5		*76 %*		*30-130*				
Surrogate: Phenol-d6		*78 %*		*30-130*				
Surrogate: p-Terphenyl-d14		*84 %*		*30-130*				

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 2-14ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-05
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 552** (5)		9050A		1	JLK	08/14/14 12:26	umhos/cm	CH41416

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 2-14ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78
Initial Volume: 24.6
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-05
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/14/14 14:15

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (19.6)		MADEP-EPH		1	DPS	08/15/14 18:43	CXH0145	CH41403
C19-C36 Aliphatics1	ND (19.6)		MADEP-EPH		1	DPS	08/15/14 18:43	CXH0145	CH41403
C11-C22 Unadjusted Aromatics1	ND (19.6)		EPH8270		1	VSC	08/15/14 14:43	CXH0171	CH41403
C11-C22 Aromatics1,2	ND (19.6)		EPH8270			VSC	08/15/14 14:43		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*80 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*97 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*92 %*		*40-140*
Surrogate: O-Terphenyl	*78 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB 2 2-14ft
Date Sampled: 08/12/14 12:33
Percent Solids: 78
Initial Volume: 14.1
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408202
ESS Laboratory Sample ID: 1408202-05
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (16.6)		MADEP-VPH		1	08/16/14 3:46	CXH0188	CH41601
C5-C8 Aliphatics1,2	ND (16.6)		MADEP-VPH		1	08/16/14 3:46		[CALC]
C9-C12 Aliphatics2,3	ND (16.6)		MADEP-VPH		1	08/16/14 3:46		[CALC]
Benzene	ND (0.33)		MADEP-VPH		1	08/16/14 3:46	CXH0188	CH41601
Ethylbenzene	ND (0.33)		MADEP-VPH		1	08/16/14 3:46	CXH0188	CH41601
Methyl tert-Butyl Ether	ND (0.08)		MADEP-VPH		1	08/16/14 3:46	CXH0188	CH41601
Naphthalene	ND (0.33)		MADEP-VPH		1	08/16/14 3:46	CXH0188	CH41601
Toluene	ND (0.33)		MADEP-VPH		1	08/16/14 3:46	CXH0188	CH41601
Xylene O	ND (0.33)		MADEP-VPH		1	08/16/14 3:46	CXH0188	CH41601
Xylene P,M	ND (0.66)		MADEP-VPH		1	08/16/14 3:46	CXH0188	CH41601
1:1 Methanol/Soil Ratio %D	**6** (N/A)		MADEP-VPH			08/16/14 0:00		CH41601
Preservative:	**MeOH - covered**		MADEP-VPH					CH41601

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*97 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*98 %*		*70-130*
Surrogate: Trifluorotoluene - FID	*82 %*		*70-130*
Surrogate: Trifluorotoluene - PID	*85 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CH41501 - 7471A										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	8.12	1.65	mg/kg wet	8.370		97	80-120			
LCS Dup										
Mercury	8.30	1.50	mg/kg wet	8.370		99	80-120	2	20	
Reference										
Mercury	9.33	1.60	mg/kg wet	8.370		111	71-128			
Reference										
Mercury	8.28	1.43	mg/kg wet	8.370		99	71-128			
Reference										
Mercury	8.34	1.48	mg/kg wet	8.370		100	71-128			
Reference										
Mercury	7.87	1.55	mg/kg wet	8.370		94	71-128			
Batch CH41502 - 3050B										
Blank										
Antimony	ND	5.0	mg/kg wet							
Arsenic	ND	2.5	mg/kg wet							
Barium	ND	2.5	mg/kg wet							
Beryllium	ND	0.11	mg/kg wet							
Cadmium	ND	0.50	mg/kg wet							
Chromium	ND	1.0	mg/kg wet							
Lead	ND	5.0	mg/kg wet							
Nickel	ND	2.5	mg/kg wet							
Selenium	ND	0.50	mg/kg wet							
Silver	ND	0.50	mg/kg wet							
Thallium	ND	0.25	mg/kg wet							
Vanadium	ND	1.0	mg/kg wet							
Zinc	ND	2.5	mg/kg wet							
LCS										
Antimony	102	14.3	mg/kg wet	94.00		108	5-212			
Arsenic	100	7.1	mg/kg wet	113.0		89	80-120			
Barium	136	7.1	mg/kg wet	155.0		88	80-120			
Beryllium	95.8	0.31	mg/kg wet	109.0		88	80-120			
Cadmium	57.3	1.43	mg/kg wet	67.50		85	80-120			
Chromium	151	2.9	mg/kg wet	164.0		92	80-120			
Lead	79.9	14.3	mg/kg wet	90.10		89	80-120			
Nickel	81.2	7.1	mg/kg wet	89.30		91	80-120			
Selenium	123	71.4	mg/kg wet	156.0		79	78-122			
Silver	47.2	1.43	mg/kg wet	52.60		90	80-120			
Thallium	87.0	35.7	mg/kg wet	116.0		75	79-121			B-
Vanadium	71.0	2.9	mg/kg wet	73.00		97	80-120			
Zinc	147	7.1	mg/kg wet	168.0		87	80-120			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CH41502 - 3050B										
LCS Dup										
Antimony	99.9	13.2	mg/kg wet	94.00		106	5-212	2	20	
Arsenic	102	6.6	mg/kg wet	113.0		91	80-120	2	20	
Barium	143	6.6	mg/kg wet	155.0		92	80-120	5	20	
Beryllium	96.2	0.29	mg/kg wet	109.0		88	80-120	0.4	20	
Cadmium	57.8	1.32	mg/kg wet	67.50		86	80-120	0.9	20	
Chromium	152	2.6	mg/kg wet	164.0		93	80-120	0.6	20	
Lead	81.7	13.2	mg/kg wet	90.10		91	80-120	2	20	
Nickel	81.8	6.6	mg/kg wet	89.30		92	80-120	0.8	20	
Selenium	123	65.8	mg/kg wet	156.0		79	78-122	0.3	20	
Silver	48.2	1.32	mg/kg wet	52.60		92	80-120	2	20	
Thallium	91.5	32.9	mg/kg wet	116.0		79	79-121	5	20	
Vanadium	73.3	2.6	mg/kg wet	73.00		100	80-120	3	20	
Zinc	152	6.6	mg/kg wet	168.0		90	80-120	4	20	
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
Blank										
1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet							
1,1,1-Trichloroethane	ND	0.0050	mg/kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0020	mg/kg wet							
1,1,2-Trichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethene	ND	0.0050	mg/kg wet							
1,1-Dichloropropene	ND	0.0050	mg/kg wet							
1,2,3-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,3-Trichloropropane	ND	0.0050	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,4-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,2-Dibromo-3-Chloropropane	ND	0.0050	mg/kg wet							
1,2-Dibromoethane	ND	0.0050	mg/kg wet							
1,2-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,2-Dichloroethane	ND	0.0050	mg/kg wet							
1,2-Dichloropropane	ND	0.0050	mg/kg wet							
1,3,5-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,3-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,3-Dichloropropane	ND	0.0050	mg/kg wet							
1,4-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,4-Dioxane	ND	0.100	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0100	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0100	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
4-Methyl-2-Pentanone	ND	0.0100	mg/kg wet							
Acetone	ND	0.0100	mg/kg wet							
Benzene	ND	0.0050	mg/kg wet							
Bromobenzene	ND	0.0050	mg/kg wet							
Bromochloromethane	ND	0.0050	mg/kg wet							
Bromodichloromethane	ND	0.0050	mg/kg wet							
Bromoform	ND	0.0050	mg/kg wet							
Bromomethane	ND	0.0100	mg/kg wet							
Carbon Disulfide	ND	0.0050	mg/kg wet							
Carbon Tetrachloride	ND	0.0050	mg/kg wet							
Chlorobenzene	ND	0.0050	mg/kg wet							
Chloroethane	ND	0.0100	mg/kg wet							
Chloroform	ND	0.0050	mg/kg wet							
Chloromethane	ND	0.0100	mg/kg wet							
cis-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Dibromochloromethane	ND	0.0020	mg/kg wet							
Dibromomethane	ND	0.0050	mg/kg wet							
Dichlorodifluoromethane	ND	0.0100	mg/kg wet							
Diethyl Ether	ND	0.0050	mg/kg wet							
Di-isopropyl ether	ND	0.0050	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.0050	mg/kg wet							
Ethylbenzene	ND	0.0050	mg/kg wet							
Hexachlorobutadiene	ND	0.0050	mg/kg wet							
Isopropylbenzene	ND	0.0050	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.0050	mg/kg wet							
Methylene Chloride	ND	0.0100	mg/kg wet							
Naphthalene	ND	0.0050	mg/kg wet							
n-Butylbenzene	ND	0.0050	mg/kg wet							
n-Propylbenzene	ND	0.0050	mg/kg wet							
sec-Butylbenzene	ND	0.0050	mg/kg wet							
Styrene	ND	0.0050	mg/kg wet							
tert-Butylbenzene	ND	0.0050	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.0050	mg/kg wet							
Tetrachloroethene	ND	0.0050	mg/kg wet							
Tetrahydrofuran	ND	0.0050	mg/kg wet							
Toluene	ND	0.0050	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
trans-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Trichloroethene	ND	0.0050	mg/kg wet							
Trichlorofluoromethane	ND	0.0050	mg/kg wet							
Vinyl Chloride	ND	0.0100	mg/kg wet							
Xylene O	ND	0.0050	mg/kg wet							
Xylene P,M	ND	0.0100	mg/kg wet							
Surrogate: 1,2-Dichloroethane-d4	*0.0552*		mg/kg wet	*0.05000*		*110*	*70-130*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
Surrogate: 4-Bromofluorobenzene	*0.0482*		mg/kg wet	*0.05000*		*96*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0475*		mg/kg wet	*0.05000*		*95*	*70-130*			
Surrogate: Toluene-d8	*0.0489*		mg/kg wet	*0.05000*		*98*	*70-130*			
LCS										
1,1,1,2-Tetrachloroethane	0.0520	0.0050	mg/kg wet	0.05000		104	70-130			
1,1,1-Trichloroethane	0.0559	0.0050	mg/kg wet	0.05000		112	70-130			
1,1,2,2-Tetrachloroethane	0.0535	0.0020	mg/kg wet	0.05000		107	70-130			
1,1,2-Trichloroethane	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
1,1-Dichloroethane	0.0570	0.0050	mg/kg wet	0.05000		114	70-130			
1,1-Dichloroethene	0.0546	0.0050	mg/kg wet	0.05000		109	70-130			
1,1-Dichloropropene	0.0600	0.0050	mg/kg wet	0.05000		120	70-130			
1,2,3-Trichlorobenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
1,2,3-Trichloropropane	0.0564	0.0050	mg/kg wet	0.05000		113	70-130			
1,2,4-Trichlorobenzene	0.0526	0.0050	mg/kg wet	0.05000		105	70-130			
1,2,4-Trimethylbenzene	0.0543	0.0050	mg/kg wet	0.05000		109	70-130			
1,2-Dibromo-3-Chloropropane	0.0494	0.0050	mg/kg wet	0.05000		99	70-130			
1,2-Dibromoethane	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
1,2-Dichlorobenzene	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
1,2-Dichloroethane	0.0549	0.0050	mg/kg wet	0.05000		110	70-130			
1,2-Dichloropropane	0.0575	0.0050	mg/kg wet	0.05000		115	70-130			
1,3,5-Trimethylbenzene	0.0568	0.0050	mg/kg wet	0.05000		114	70-130			
1,3-Dichlorobenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
1,3-Dichloropropane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130			
1,4-Dichlorobenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130			
1,4-Dioxane	1.02	0.100	mg/kg wet	1.000		102	70-130			
2,2-Dichloropropane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130			
2-Butanone	0.322	0.0100	mg/kg wet	0.2500		129	70-130			
2-Chlorotoluene	0.0536	0.0050	mg/kg wet	0.05000		107	70-130			
2-Hexanone	0.301	0.0100	mg/kg wet	0.2500		121	70-130			
4-Chlorotoluene	0.0543	0.0050	mg/kg wet	0.05000		109	70-130			
4-Isopropyltoluene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
4-Methyl-2-Pentanone	0.299	0.0100	mg/kg wet	0.2500		120	70-130			
Acetone	0.308	0.0100	mg/kg wet	0.2500		123	70-130			
Benzene	0.0573	0.0050	mg/kg wet	0.05000		115	70-130			
Bromobenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Bromochloromethane	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
Bromodichloromethane	0.0567	0.0050	mg/kg wet	0.05000		113	70-130			
Bromoform	0.0431	0.0050	mg/kg wet	0.05000		86	70-130			
Bromomethane	0.0633	0.0100	mg/kg wet	0.05000		127	70-130			
Carbon Disulfide	0.0574	0.0050	mg/kg wet	0.05000		115	70-130			
Carbon Tetrachloride	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
Chlorobenzene	0.0507	0.0050	mg/kg wet	0.05000		101	70-130			
Chloroethane	0.0517	0.0100	mg/kg wet	0.05000		103	70-130			
Chloroform	0.0555	0.0050	mg/kg wet	0.05000		111	70-130			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
Chloromethane	0.0585	0.0100	mg/kg wet	0.05000		117	70-130			
cis-1,2-Dichloroethene	0.0539	0.0050	mg/kg wet	0.05000		108	70-130			
cis-1,3-Dichloropropene	0.0565	0.0050	mg/kg wet	0.05000		113	70-130			
Dibromochloromethane	0.0454	0.0020	mg/kg wet	0.05000		91	70-130			
Dibromomethane	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
Dichlorodifluoromethane	0.0410	0.0100	mg/kg wet	0.05000		82	70-130			
Diethyl Ether	0.0581	0.0050	mg/kg wet	0.05000		116	70-130			
Di-isopropyl ether	0.0615	0.0050	mg/kg wet	0.05000		123	70-130			
Ethyl tertiary-butyl ether	0.0573	0.0050	mg/kg wet	0.05000		115	70-130			
Ethylbenzene	0.0548	0.0050	mg/kg wet	0.05000		110	70-130			
Hexachlorobutadiene	0.0559	0.0050	mg/kg wet	0.05000		112	70-130			
Isopropylbenzene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Methyl tert-Butyl Ether	0.0530	0.0050	mg/kg wet	0.05000		106	70-130			
Methylene Chloride	0.0574	0.0100	mg/kg wet	0.05000		115	70-130			
Naphthalene	0.0486	0.0050	mg/kg wet	0.05000		97	70-130			
n-Butylbenzene	0.0575	0.0050	mg/kg wet	0.05000		115	70-130			
n-Propylbenzene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
sec-Butylbenzene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
Styrene	0.0552	0.0050	mg/kg wet	0.05000		110	70-130			
tert-Butylbenzene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
Tertiary-amyl methyl ether	0.0518	0.0050	mg/kg wet	0.05000		104	70-130			
Tetrachloroethene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130			
Tetrahydrofuran	0.0586	0.0050	mg/kg wet	0.05000		117	70-130			
Toluene	0.0555	0.0050	mg/kg wet	0.05000		111	70-130			
trans-1,2-Dichloroethene	0.0547	0.0050	mg/kg wet	0.05000		109	70-130			
trans-1,3-Dichloropropene	0.0471	0.0050	mg/kg wet	0.05000		94	70-130			
Trichloroethene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Trichlorofluoromethane	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Vinyl Chloride	0.0634	0.0100	mg/kg wet	0.05000		127	70-130			
Xylene O	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
Xylene P,M	0.104	0.0100	mg/kg wet	0.1000		104	70-130			
Surrogate: 1,2-Dichloroethane-d4	*0.0601*		mg/kg wet	*0.05000*		*120*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0553*		mg/kg wet	*0.05000*		*111*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0556*		mg/kg wet	*0.05000*		*111*	*70-130*			
Surrogate: Toluene-d8	*0.0536*		mg/kg wet	*0.05000*		*107*	*70-130*			
LCS Dup										
1,1,1,2-Tetrachloroethane	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	2	25	
1,1,1-Trichloroethane	0.0563	0.0050	mg/kg wet	0.05000		113	70-130	0.7	25	
1,1,2,2-Tetrachloroethane	0.0556	0.0020	mg/kg wet	0.05000		111	70-130	4	25	
1,1,2-Trichloroethane	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	3	25	
1,1-Dichloroethane	0.0591	0.0050	mg/kg wet	0.05000		118	70-130	4	25	
1,1-Dichloroethene	0.0552	0.0050	mg/kg wet	0.05000		110	70-130	1	25	
1,1-Dichloropropene	0.0598	0.0050	mg/kg wet	0.05000		120	70-130	0.3	25	
1,2,3-Trichlorobenzene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	3	25	
1,2,3-Trichloropropane	0.0578	0.0050	mg/kg wet	0.05000		116	70-130	3	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
1,2,4-Trichlorobenzene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	4	25	
1,2,4-Trimethylbenzene	0.0560	0.0050	mg/kg wet	0.05000		112	70-130	3	25	
1,2-Dibromo-3-Chloropropane	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	7	25	
1,2-Dibromoethane	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	1	25	
1,2-Dichlorobenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	2	25	
1,2-Dichloroethane	0.0547	0.0050	mg/kg wet	0.05000		109	70-130	0.3	25	
1,2-Dichloropropane	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	0.5	25	
1,3,5-Trimethylbenzene	0.0585	0.0050	mg/kg wet	0.05000		117	70-130	3	25	
1,3-Dichlorobenzene	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	2	25	
1,3-Dichloropropane	0.0576	0.0050	mg/kg wet	0.05000		115	70-130	2	25	
1,4-Dichlorobenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	1	25	
1,4-Dioxane	1.09	0.100	mg/kg wet	1.000		109	70-130	7	20	
2,2-Dichloropropane	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	2	25	
2-Butanone	0.298	0.0100	mg/kg wet	0.2500		119	70-130	8	25	
2-Chlorotoluene	0.0548	0.0050	mg/kg wet	0.05000		110	70-130	2	25	
2-Hexanone	0.305	0.0100	mg/kg wet	0.2500		122	70-130	1	25	
4-Chlorotoluene	0.0566	0.0050	mg/kg wet	0.05000		113	70-130	4	25	
4-Isopropyltoluene	0.0558	0.0050	mg/kg wet	0.05000		112	70-130	3	25	
4-Methyl-2-Pentanone	0.301	0.0100	mg/kg wet	0.2500		120	70-130	0.6	25	
Acetone	0.304	0.0100	mg/kg wet	0.2500		122	70-130	1	25	
Benzene	0.0579	0.0050	mg/kg wet	0.05000		116	70-130	1	25	
Bromobenzene	0.0541	0.0050	mg/kg wet	0.05000		108	70-130	3	25	
Bromochloromethane	0.0507	0.0050	mg/kg wet	0.05000		101	70-130	0.5	25	
Bromodichloromethane	0.0579	0.0050	mg/kg wet	0.05000		116	70-130	2	25	
Bromoform	0.0450	0.0050	mg/kg wet	0.05000		90	70-130	4	25	
Bromomethane	0.0634	0.0100	mg/kg wet	0.05000		127	70-130	0.2	25	
Carbon Disulfide	0.0574	0.0050	mg/kg wet	0.05000		115	70-130	0.1	25	
Carbon Tetrachloride	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	0.4	25	
Chlorobenzene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130	3	25	
Chloroethane	0.0513	0.0100	mg/kg wet	0.05000		103	70-130	0.8	25	
Chloroform	0.0563	0.0050	mg/kg wet	0.05000		113	70-130	1	25	
Chloromethane	0.0589	0.0100	mg/kg wet	0.05000		118	70-130	0.7	25	
cis-1,2-Dichloroethene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	2	25	
cis-1,3-Dichloropropene	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	2	25	
Dibromochloromethane	0.0473	0.0020	mg/kg wet	0.05000		95	70-130	4	25	
Dibromomethane	0.0543	0.0050	mg/kg wet	0.05000		109	70-130	2	25	
Dichlorodifluoromethane	0.0407	0.0100	mg/kg wet	0.05000		81	70-130	0.7	25	
Diethyl Ether	0.0593	0.0050	mg/kg wet	0.05000		119	70-130	2	25	
Di-isopropyl ether	0.0618	0.0050	mg/kg wet	0.05000		124	70-130	0.5	25	
Ethyl tertiary-butyl ether	0.0578	0.0050	mg/kg wet	0.05000		116	70-130	0.9	25	
Ethylbenzene	0.0560	0.0050	mg/kg wet	0.05000		112	70-130	2	25	
Hexachlorobutadiene	0.0580	0.0050	mg/kg wet	0.05000		116	70-130	4	25	
Isopropylbenzene	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	3	25	
Methyl tert-Butyl Ether	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	2	25	
Methylene Chloride	0.0602	0.0100	mg/kg wet	0.05000		120	70-130	5	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH41425 - 5035										
Naphthalene	0.0509	0.0050	mg/kg wet	0.05000		102	70-130	5	25	
n-Butylbenzene	0.0586	0.0050	mg/kg wet	0.05000		117	70-130	2	25	
n-Propylbenzene	0.0556	0.0050	mg/kg wet	0.05000		111	70-130	4	25	
sec-Butylbenzene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	3	25	
Styrene	0.0568	0.0050	mg/kg wet	0.05000		114	70-130	3	25	
tert-Butylbenzene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	2	25	
Tertiary-amyl methyl ether	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	3	25	
Tetrachloroethene	0.0507	0.0050	mg/kg wet	0.05000		101	70-130	0.7	25	
Tetrahydrofuran	0.0585	0.0050	mg/kg wet	0.05000		117	70-130	0.1	25	
Toluene	0.0564	0.0050	mg/kg wet	0.05000		113	70-130	2	25	
trans-1,2-Dichloroethene	0.0552	0.0050	mg/kg wet	0.05000		110	70-130	0.9	25	
trans-1,3-Dichloropropene	0.0483	0.0050	mg/kg wet	0.05000		97	70-130	3	25	
Trichloroethene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	1	25	
Trichlorofluoromethane	0.0516	0.0050	mg/kg wet	0.05000		103	70-130	1	25	
Vinyl Chloride	0.0623	0.0100	mg/kg wet	0.05000		125	70-130	2	25	
Xylene O	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	1	25	
Xylene P,M	0.106	0.0100	mg/kg wet	0.1000		106	70-130	2	25	
Surrogate: 1,2-Dichloroethane-d4	*0.0588*		mg/kg wet	*0.05000*		*118*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0548*		mg/kg wet	*0.05000*		*110*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0569*		mg/kg wet	*0.05000*		*114*	*70-130*			
Surrogate: Toluene-d8	*0.0537*		mg/kg wet	*0.05000*		*107*	*70-130*			
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH41530 - 5035										
Blank										
1,1,1,2-Tetrachloroethane	ND	0.100	mg/kg wet							
1,1,1-Trichloroethane	ND	0.0500	mg/kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0500	mg/kg wet							
1,1,2-Trichloroethane	ND	0.0500	mg/kg wet							
1,1-Dichloroethane	ND	0.0500	mg/kg wet							
1,1-Dichloroethene	ND	0.0500	mg/kg wet							
1,1-Dichloropropene	ND	0.0500	mg/kg wet							
1,2,3-Trichlorobenzene	ND	0.0500	mg/kg wet							
1,2,3-Trichloropropane	ND	0.0500	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.0500	mg/kg wet							
1,2,4-Trimethylbenzene	ND	0.0500	mg/kg wet							
1,2-Dibromo-3-Chloropropane	ND	0.200	mg/kg wet							
1,2-Dibromoethane	ND	0.0500	mg/kg wet							
1,2-Dichlorobenzene	ND	0.0500	mg/kg wet							
1,2-Dichloroethane	ND	0.0500	mg/kg wet							
1,2-Dichloropropane	ND	0.0500	mg/kg wet							
1,3,5-Trimethylbenzene	ND	0.0500	mg/kg wet							
1,3-Dichlorobenzene	ND	0.0500	mg/kg wet							
1,3-Dichloropropane	ND	0.0500	mg/kg wet							
1,4-Dichlorobenzene	ND	0.0500	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH41530 - 5035										
1,4-Dioxane - Screen	ND	5.00	mg/kg wet							
2,2-Dichloropropane	ND	0.100	mg/kg wet							
2-Butanone	ND	0.200	mg/kg wet							
2-Chlorotoluene	ND	0.0500	mg/kg wet							
2-Hexanone	ND	0.200	mg/kg wet							
4-Chlorotoluene	ND	0.0500	mg/kg wet							
4-Isopropyltoluene	ND	0.0500	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.200	mg/kg wet							
Acetone	0.228	0.200	mg/kg wet							
Benzene	ND	0.0500	mg/kg wet							
Bromobenzene	ND	0.0500	mg/kg wet							
Bromochloromethane	ND	0.0500	mg/kg wet							
Bromodichloromethane	ND	0.0500	mg/kg wet							
Bromoform	ND	0.0500	mg/kg wet							
Bromomethane	ND	0.100	mg/kg wet							
Carbon Disulfide	ND	0.0500	mg/kg wet							
Carbon Tetrachloride	ND	0.0500	mg/kg wet							
Chlorobenzene	ND	0.0500	mg/kg wet							
Chloroethane	ND	0.100	mg/kg wet							
Chloroform	ND	0.0500	mg/kg wet							
Chloromethane	ND	0.100	mg/kg wet							
cis-1,2-Dichloroethene	ND	0.0500	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.0500	mg/kg wet							
Dibromochloromethane	ND	0.0500	mg/kg wet							
Dibromomethane	ND	0.0500	mg/kg wet							
Dichlorodifluoromethane	ND	0.0500	mg/kg wet							
Diethyl Ether	ND	0.0500	mg/kg wet							
Di-isopropyl ether	ND	0.0500	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.0500	mg/kg wet							
Ethylbenzene	ND	0.0500	mg/kg wet							
Hexachlorobutadiene	ND	0.0500	mg/kg wet							
Isopropylbenzene	ND	0.0500	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.0500	mg/kg wet							
Methylene Chloride	ND	0.200	mg/kg wet							
Naphthalene	ND	0.0500	mg/kg wet							
n-Butylbenzene	ND	0.0500	mg/kg wet							
n-Propylbenzene	ND	0.0500	mg/kg wet							
sec-Butylbenzene	ND	0.0500	mg/kg wet							
Styrene	ND	0.0500	mg/kg wet							
tert-Butylbenzene	ND	0.0500	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.0500	mg/kg wet							
Tetrachloroethene	ND	0.0500	mg/kg wet							
Tetrahydrofuran	ND	0.200	mg/kg wet							
Toluene	ND	0.0500	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.0500	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH41530 - 5035										
trans-1,3-Dichloropropene	ND	0.0500	mg/kg wet							
Trichloroethene	ND	0.0500	mg/kg wet							
Trichlorofluoromethane	ND	0.0500	mg/kg wet							
Vinyl Chloride	ND	0.0500	mg/kg wet							
Xylene O	ND	0.0500	mg/kg wet							
Xylene P,M	ND	0.100	mg/kg wet							
Surrogate: 1,2-Dichloroethane-d4	*2.46*		mg/kg wet	*2.500*		*98*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*2.59*		mg/kg wet	*2.500*		*104*	*70-130*			
Surrogate: Dibromofluoromethane	*2.60*		mg/kg wet	*2.500*		*104*	*70-130*			
Surrogate: Toluene-d8	*2.60*		mg/kg wet	*2.500*		*104*	*70-130*			
LCS										
1,1,1,2-Tetrachloroethane	2.48	0.100	mg/kg wet	2.500		99	70-130			
1,1,1-Trichloroethane	2.42	0.0500	mg/kg wet	2.500		97	70-130			
1,1,2,2-Tetrachloroethane	2.50	0.0500	mg/kg wet	2.500		100	70-130			
1,1,2-Trichloroethane	2.34	0.0500	mg/kg wet	2.500		94	70-130			
1,1-Dichloroethane	2.38	0.0500	mg/kg wet	2.500		95	70-130			
1,1-Dichloroethene	2.44	0.0500	mg/kg wet	2.500		98	70-130			
1,1-Dichloropropene	2.54	0.0500	mg/kg wet	2.500		102	70-130			
1,2,3-Trichlorobenzene	2.51	0.0500	mg/kg wet	2.500		100	70-130			
1,2,3-Trichloropropane	2.56	0.0500	mg/kg wet	2.500		103	70-130			
1,2,4-Trichlorobenzene	2.55	0.0500	mg/kg wet	2.500		102	70-130			
1,2,4-Trimethylbenzene	2.48	0.0500	mg/kg wet	2.500		99	70-130			
1,2-Dibromo-3-Chloropropane	2.53	0.200	mg/kg wet	2.500		101	70-130			
1,2-Dibromoethane	2.53	0.0500	mg/kg wet	2.500		101	70-130			
1,2-Dichlorobenzene	2.41	0.0500	mg/kg wet	2.500		96	70-130			
1,2-Dichloroethane	2.40	0.0500	mg/kg wet	2.500		96	70-130			
1,2-Dichloropropane	2.41	0.0500	mg/kg wet	2.500		97	70-130			
1,3,5-Trimethylbenzene	2.57	0.0500	mg/kg wet	2.500		103	70-130			
1,3-Dichlorobenzene	2.47	0.0500	mg/kg wet	2.500		99	70-130			
1,3-Dichloropropane	2.56	0.0500	mg/kg wet	2.500		102	70-130			
1,4-Dichlorobenzene	2.46	0.0500	mg/kg wet	2.500		98	70-130			
1,4-Dioxane - Screen	59.3	5.00	mg/kg wet	50.00		119	44-241			
2,2-Dichloropropane	2.60	0.100	mg/kg wet	2.500		104	70-130			
2-Butanone	11.7	0.200	mg/kg wet	12.50		94	70-130			
2-Chlorotoluene	2.36	0.0500	mg/kg wet	2.500		94	70-130			
2-Hexanone	12.1	0.200	mg/kg wet	12.50		96	70-130			
4-Chlorotoluene	2.47	0.0500	mg/kg wet	2.500		99	70-130			
4-Isopropyltoluene	2.53	0.0500	mg/kg wet	2.500		101	70-130			
4-Methyl-2-Pentanone	12.0	0.200	mg/kg wet	12.50		96	70-130			
Acetone	11.8	0.200	mg/kg wet	12.50		94	70-130			
Benzene	2.51	0.0500	mg/kg wet	2.500		100	70-130			
Bromobenzene	2.54	0.0500	mg/kg wet	2.500		102	70-130			
Bromochloromethane	2.52	0.0500	mg/kg wet	2.500		101	70-130			
Bromodichloromethane	2.44	0.0500	mg/kg wet	2.500		97	70-130			
Bromoform	2.70	0.0500	mg/kg wet	2.500		108	70-130			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH41530 - 5035										
Bromomethane	2.58	0.100	mg/kg wet	2.500		103	70-130			
Carbon Disulfide	2.51	0.0500	mg/kg wet	2.500		100	70-130			
Carbon Tetrachloride	2.45	0.0500	mg/kg wet	2.500		98	70-130			
Chlorobenzene	2.46	0.0500	mg/kg wet	2.500		98	70-130			
Chloroethane	2.11	0.100	mg/kg wet	2.500		85	70-130			
Chloroform	2.38	0.0500	mg/kg wet	2.500		95	70-130			
Chloromethane	2.11	0.100	mg/kg wet	2.500		84	70-130			
cis-1,2-Dichloroethene	2.44	0.0500	mg/kg wet	2.500		98	70-130			
cis-1,3-Dichloropropene	2.61	0.0500	mg/kg wet	2.500		105	70-130			
Dibromochloromethane	2.66	0.0500	mg/kg wet	2.500		106	70-130			
Dibromomethane	2.45	0.0500	mg/kg wet	2.500		98	70-130			
Dichlorodifluoromethane	1.88	0.0500	mg/kg wet	2.500		75	70-130			
Diethyl Ether	2.36	0.0500	mg/kg wet	2.500		94	70-130			
Di-isopropyl ether	2.41	0.0500	mg/kg wet	2.500		96	70-130			
Ethyl tertiary-butyl ether	2.52	0.0500	mg/kg wet	2.500		101	70-130			
Ethylbenzene	2.60	0.0500	mg/kg wet	2.500		104	70-130			
Hexachlorobutadiene	2.63	0.0500	mg/kg wet	2.500		105	70-130			
Isopropylbenzene	2.42	0.0500	mg/kg wet	2.500		97	70-130			
Methyl tert-Butyl Ether	2.48	0.0500	mg/kg wet	2.500		99	70-130			
Methylene Chloride	2.35	0.200	mg/kg wet	2.500		94	70-130			
Naphthalene	2.22	0.0500	mg/kg wet	2.500		89	70-130			
n-Butylbenzene	2.50	0.0500	mg/kg wet	2.500		100	70-130			
n-Propylbenzene	2.45	0.0500	mg/kg wet	2.500		98	70-130			
sec-Butylbenzene	2.46	0.0500	mg/kg wet	2.500		98	70-130			
Styrene	2.62	0.0500	mg/kg wet	2.500		105	70-130			
tert-Butylbenzene	2.57	0.0500	mg/kg wet	2.500		103	70-130			
Tertiary-amyl methyl ether	2.45	0.0500	mg/kg wet	2.500		98	70-130			
Tetrachloroethene	2.29	0.0500	mg/kg wet	2.500		92	70-130			
Tetrahydrofuran	2.44	0.200	mg/kg wet	2.500		98	70-130			
Toluene	2.58	0.0500	mg/kg wet	2.500		103	70-130			
trans-1,2-Dichloroethene	2.38	0.0500	mg/kg wet	2.500		95	70-130			
trans-1,3-Dichloropropene	2.37	0.0500	mg/kg wet	2.500		95	70-130			
Trichloroethene	2.53	0.0500	mg/kg wet	2.500		101	70-130			
Trichlorofluoromethane	2.06	0.0500	mg/kg wet	2.500		83	70-130			
Vinyl Chloride	2.53	0.0500	mg/kg wet	2.500		101	70-130			
Xylene O	2.52	0.0500	mg/kg wet	2.500		101	70-130			
Xylene P,M	5.10	0.100	mg/kg wet	5.000		102	70-130			
Surrogate: 1,2-Dichloroethane-d4	*2.13*		mg/kg wet	*2.500*		*85*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*2.28*		mg/kg wet	*2.500*		*91*	*70-130*			
Surrogate: Dibromofluoromethane	*2.22*		mg/kg wet	*2.500*		*89*	*70-130*			
Surrogate: Toluene-d8	*2.29*		mg/kg wet	*2.500*		*92*	*70-130*			
LCS Dup										
1,1,1,2-Tetrachloroethane	2.46	0.100	mg/kg wet	2.500		98	70-130	0.9	25	
1,1,1-Trichloroethane	2.43	0.0500	mg/kg wet	2.500		97	70-130	0.3	25	
1,1,2,2-Tetrachloroethane	2.48	0.0500	mg/kg wet	2.500		99	70-130	0.6	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH41530 - 5035										
1,1,2-Trichloroethane	2.34	0.0500	mg/kg wet	2.500		94	70-130	0	25	
1,1-Dichloroethane	2.39	0.0500	mg/kg wet	2.500		96	70-130	0.5	25	
1,1-Dichloroethene	2.45	0.0500	mg/kg wet	2.500		98	70-130	0.3	25	
1,1-Dichloropropene	2.55	0.0500	mg/kg wet	2.500		102	70-130	0.2	25	
1,2,3-Trichlorobenzene	2.55	0.0500	mg/kg wet	2.500		102	70-130	2	25	
1,2,3-Trichloropropane	2.45	0.0500	mg/kg wet	2.500		98	70-130	4	25	
1,2,4-Trichlorobenzene	2.56	0.0500	mg/kg wet	2.500		103	70-130	0.5	25	
1,2,4-Trimethylbenzene	2.50	0.0500	mg/kg wet	2.500		100	70-130	1	25	
1,2-Dibromo-3-Chloropropane	2.56	0.200	mg/kg wet	2.500		103	70-130	1	25	
1,2-Dibromoethane	2.52	0.0500	mg/kg wet	2.500		101	70-130	0.4	25	
1,2-Dichlorobenzene	2.44	0.0500	mg/kg wet	2.500		98	70-130	1	25	
1,2-Dichloroethane	2.38	0.0500	mg/kg wet	2.500		95	70-130	0.8	25	
1,2-Dichloropropane	2.40	0.0500	mg/kg wet	2.500		96	70-130	0.5	25	
1,3,5-Trimethylbenzene	2.61	0.0500	mg/kg wet	2.500		104	70-130	1	25	
1,3-Dichlorobenzene	2.46	0.0500	mg/kg wet	2.500		98	70-130	0.5	25	
1,3-Dichloropropane	2.56	0.0500	mg/kg wet	2.500		102	70-130	0.08	25	
1,4-Dichlorobenzene	2.54	0.0500	mg/kg wet	2.500		101	70-130	3	25	
1,4-Dioxane - Screen	60.7	5.00	mg/kg wet	50.00		121	44-241	2	200	
2,2-Dichloropropane	2.59	0.100	mg/kg wet	2.500		104	70-130	0.5	25	
2-Butanone	11.9	0.200	mg/kg wet	12.50		95	70-130	1	25	
2-Chlorotoluene	2.62	0.0500	mg/kg wet	2.500		105	70-130	10	25	
2-Hexanone	12.1	0.200	mg/kg wet	12.50		97	70-130	0.7	25	
4-Chlorotoluene	2.48	0.0500	mg/kg wet	2.500		99	70-130	0.3	25	
4-Isopropyltoluene	2.55	0.0500	mg/kg wet	2.500		102	70-130	0.7	25	
4-Methyl-2-Pentanone	12.1	0.200	mg/kg wet	12.50		97	70-130	1	25	
Acetone	12.0	0.200	mg/kg wet	12.50		96	70-130	2	25	
Benzene	2.50	0.0500	mg/kg wet	2.500		100	70-130	0.5	25	
Bromobenzene	2.58	0.0500	mg/kg wet	2.500		103	70-130	1	25	
Bromochloromethane	2.51	0.0500	mg/kg wet	2.500		100	70-130	0.2	25	
Bromodichloromethane	2.44	0.0500	mg/kg wet	2.500		98	70-130	0.2	25	
Bromoform	2.72	0.0500	mg/kg wet	2.500		109	70-130	0.7	25	
Bromomethane	2.54	0.100	mg/kg wet	2.500		102	70-130	1	25	
Carbon Disulfide	2.53	0.0500	mg/kg wet	2.500		101	70-130	0.7	25	
Carbon Tetrachloride	2.46	0.0500	mg/kg wet	2.500		99	70-130	0.6	25	
Chlorobenzene	2.47	0.0500	mg/kg wet	2.500		99	70-130	0.4	25	
Chloroethane	2.03	0.100	mg/kg wet	2.500		81	70-130	4	25	
Chloroform	2.39	0.0500	mg/kg wet	2.500		96	70-130	0.3	25	
Chloromethane	2.12	0.100	mg/kg wet	2.500		85	70-130	0.5	25	
cis-1,2-Dichloroethene	2.46	0.0500	mg/kg wet	2.500		99	70-130	0.8	25	
cis-1,3-Dichloropropene	2.60	0.0500	mg/kg wet	2.500		104	70-130	0.3	25	
Dibromochloromethane	2.65	0.0500	mg/kg wet	2.500		106	70-130	0.4	25	
Dibromomethane	2.46	0.0500	mg/kg wet	2.500		98	70-130	0.2	25	
Dichlorodifluoromethane	1.89	0.0500	mg/kg wet	2.500		76	70-130	0.3	25	
Diethyl Ether	2.37	0.0500	mg/kg wet	2.500		95	70-130	0.4	25	
Di-isopropyl ether	2.40	0.0500	mg/kg wet	2.500		96	70-130	0.2	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH41530 - 5035										
Ethyl tertiary-butyl ether	2.52	0.0500	mg/kg wet	2.500		101	70-130	0.04	25	
Ethylbenzene	2.59	0.0500	mg/kg wet	2.500		104	70-130	0.2	25	
Hexachlorobutadiene	2.75	0.0500	mg/kg wet	2.500		110	70-130	4	25	
Isopropylbenzene	2.45	0.0500	mg/kg wet	2.500		98	70-130	1	25	
Methyl tert-Butyl Ether	2.45	0.0500	mg/kg wet	2.500		98	70-130	0.9	25	
Methylene Chloride	2.36	0.200	mg/kg wet	2.500		94	70-130	0.6	25	
Naphthalene	2.28	0.0500	mg/kg wet	2.500		91	70-130	2	25	
n-Butylbenzene	2.52	0.0500	mg/kg wet	2.500		101	70-130	0.6	25	
n-Propylbenzene	2.33	0.0500	mg/kg wet	2.500		93	70-130	5	25	
sec-Butylbenzene	2.46	0.0500	mg/kg wet	2.500		98	70-130	0	25	
Styrene	2.58	0.0500	mg/kg wet	2.500		103	70-130	1	25	
tert-Butylbenzene	2.62	0.0500	mg/kg wet	2.500		105	70-130	2	25	
Tertiary-amyl methyl ether	2.45	0.0500	mg/kg wet	2.500		98	70-130	0.08	25	
Tetrachloroethene	2.29	0.0500	mg/kg wet	2.500		91	70-130	0.09	25	
Tetrahydrofuran	2.55	0.200	mg/kg wet	2.500		102	70-130	5	25	
Toluene	2.59	0.0500	mg/kg wet	2.500		104	70-130	0.5	25	
trans-1,2-Dichloroethene	2.39	0.0500	mg/kg wet	2.500		96	70-130	0.3	25	
trans-1,3-Dichloropropene	2.40	0.0500	mg/kg wet	2.500		96	70-130	1	25	
Trichloroethene	2.56	0.0500	mg/kg wet	2.500		103	70-130	1	25	
Trichlorofluoromethane	2.01	0.0500	mg/kg wet	2.500		80	70-130	3	25	
Vinyl Chloride	2.55	0.0500	mg/kg wet	2.500		102	70-130	0.9	25	
Xylene O	2.50	0.0500	mg/kg wet	2.500		100	70-130	0.8	25	
Xylene P,M	5.09	0.100	mg/kg wet	5.000		102	70-130	0.08	25	
Surrogate: 1,2-Dichloroethane-d4	*2.14*		mg/kg wet	*2.500*		*86*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*2.33*		mg/kg wet	*2.500*		*93*	*70-130*			
Surrogate: Dibromofluoromethane	*2.22*		mg/kg wet	*2.500*		*89*	*70-130*			
Surrogate: Toluene-d8	*2.29*		mg/kg wet	*2.500*		*92*	*70-130*			
8082A Polychlorinated Biphenyls (PCB)										
Batch CH41205 - 3540C										
Blank										
Aroclor 1016	ND	0.0500	mg/kg wet							
Aroclor 1221	ND	0.0500	mg/kg wet							
Aroclor 1232	ND	0.0500	mg/kg wet							
Aroclor 1242	ND	0.0500	mg/kg wet							
Aroclor 1248	ND	0.0500	mg/kg wet							
Aroclor 1254	ND	0.0500	mg/kg wet							
Aroclor 1260	ND	0.0500	mg/kg wet							
Aroclor 1262	ND	0.0500	mg/kg wet							
Aroclor 1268	ND	0.0500	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0216*		mg/kg wet	*0.02500*		*87*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0213*		mg/kg wet	*0.02500*		*85*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0190*		mg/kg wet	*0.02500*		*76*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0210*		mg/kg wet	*0.02500*		*84*	*30-150*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8082A Polychlorinated Biphenyls (PCB)										
Batch CH41205 - 3540C										
LCS										
Aroclor 1016	0.517	0.0500	mg/kg wet	0.5000		103	40-140			
Aroclor 1260	0.496	0.0500	mg/kg wet	0.5000		99	40-140			
Surrogate: Decachlorobiphenyl	*0.0215*		mg/kg wet	*0.02500*		*86*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0214*		mg/kg wet	*0.02500*		*86*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0217*		mg/kg wet	*0.02500*		*87*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0227*		mg/kg wet	*0.02500*		*91*	*30-150*			
LCS Dup										
Aroclor 1016	0.537	0.0500	mg/kg wet	0.5000		107	40-140	4	30	
Aroclor 1260	0.522	0.0500	mg/kg wet	0.5000		104	40-140	5	30	
Surrogate: Decachlorobiphenyl	*0.0227*		mg/kg wet	*0.02500*		*91*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0221*		mg/kg wet	*0.02500*		*88*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0223*		mg/kg wet	*0.02500*		*89*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0232*		mg/kg wet	*0.02500*		*93*	*30-150*			
Batch CH41829 - 3540C										
Blank										
Aroclor 1016	ND	0.0500	mg/kg wet							
Aroclor 1221	ND	0.0500	mg/kg wet							
Aroclor 1232	ND	0.0500	mg/kg wet							
Aroclor 1242	ND	0.0500	mg/kg wet							
Aroclor 1248	ND	0.0500	mg/kg wet							
Aroclor 1254	ND	0.0500	mg/kg wet							
Aroclor 1260	ND	0.0500	mg/kg wet							
Aroclor 1262	ND	0.0500	mg/kg wet							
Aroclor 1268	ND	0.0500	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0194*		mg/kg wet	*0.02500*		*78*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0186*		mg/kg wet	*0.02500*		*74*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0189*		mg/kg wet	*0.02500*		*76*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0201*		mg/kg wet	*0.02500*		*81*	*30-150*			
LCS										
Aroclor 1016	0.575	0.0500	mg/kg wet	0.5000		115	40-140			
Aroclor 1260	0.536	0.0500	mg/kg wet	0.5000		107	40-140			
Surrogate: Decachlorobiphenyl	*0.0217*		mg/kg wet	*0.02500*		*87*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0218*		mg/kg wet	*0.02500*		*87*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0237*		mg/kg wet	*0.02500*		*95*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0245*		mg/kg wet	*0.02500*		*98*	*30-150*			
LCS Dup										
Aroclor 1016	0.566	0.0500	mg/kg wet	0.5000		113	40-140	2	30	
Aroclor 1260	0.533	0.0500	mg/kg wet	0.5000		107	40-140	0.5	30	
Surrogate: Decachlorobiphenyl	*0.0219*		mg/kg wet	*0.02500*		*88*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0220*		mg/kg wet	*0.02500*		*88*	*30-150*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8082A Polychlorinated Biphenyls (PCB)										
Batch CH41829 - 3540C										
Surrogate: Tetrachloro-m-xylene	*0.0230*		mg/kg wet	*0.02500*		*92*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0241*		mg/kg wet	*0.02500*		*96*	*30-150*			
8270D Semi-Volatile Organic Compounds										
Batch CH41207 - 3546										
Blank										
1,2,4-Trichlorobenzene	ND	0.333	mg/kg wet							
1,2-Dichlorobenzene	ND	0.333	mg/kg wet							
1,3-Dichlorobenzene	ND	0.333	mg/kg wet							
1,4-Dichlorobenzene	ND	0.333	mg/kg wet							
2,4,5-Trichlorophenol	ND	0.333	mg/kg wet							
2,4,6-Trichlorophenol	ND	0.333	mg/kg wet							
2,4-Dichlorophenol	ND	0.333	mg/kg wet							
2,4-Dimethylphenol	ND	0.333	mg/kg wet							
2,4-Dinitrophenol	ND	1.67	mg/kg wet							
2,4-Dinitrotoluene	ND	0.333	mg/kg wet							
2,6-Dinitrotoluene	ND	0.333	mg/kg wet							
2-Chloronaphthalene	ND	0.333	mg/kg wet							
2-Chlorophenol	ND	0.333	mg/kg wet							
2-Methylnaphthalene	ND	0.333	mg/kg wet							
2-Methylphenol	ND	0.333	mg/kg wet							
2-Nitrophenol	ND	0.333	mg/kg wet							
3,3´-Dichlorobenzidine	ND	0.667	mg/kg wet							
3+4-Methylphenol	ND	0.667	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet							
4-Chloroaniline	ND	0.667	mg/kg wet							
4-Nitrophenol	ND	1.67	mg/kg wet							
Acenaphthene	ND	0.333	mg/kg wet							
Acenaphthylene	ND	0.333	mg/kg wet							
Acetophenone	ND	0.667	mg/kg wet							
Aniline	ND	1.67	mg/kg wet							
Anthracene	ND	0.333	mg/kg wet							
Azobenzene	ND	0.333	mg/kg wet							
Benzo(a)anthracene	ND	0.333	mg/kg wet							
Benzo(a)pyrene	ND	0.167	mg/kg wet							
Benzo(b)fluoranthene	ND	0.333	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.333	mg/kg wet							
Benzo(k)fluoranthene	ND	0.333	mg/kg wet							
bis(2-Chloroethoxy)methane	ND	0.333	mg/kg wet							
bis(2-Chloroethyl)ether	ND	0.333	mg/kg wet							
bis(2-chloroisopropyl)Ether	ND	0.333	mg/kg wet							
bis(2-Ethylhexyl)phthalate	ND	0.333	mg/kg wet							
Butylbenzylphthalate	ND	0.333	mg/kg wet							
Chrysene	ND	0.167	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41207 - 3546										
Dibenzo(a,h)Anthracene	ND	0.167	mg/kg wet							
Dibenzofuran	ND	0.333	mg/kg wet							
Diethylphthalate	ND	0.333	mg/kg wet							
Dimethylphthalate	ND	0.333	mg/kg wet							
Di-n-butylphthalate	ND	0.333	mg/kg wet							
Di-n-octylphthalate	ND	0.333	mg/kg wet							
Fluoranthene	ND	0.333	mg/kg wet							
Fluorene	ND	0.333	mg/kg wet							
Hexachlorobenzene	ND	0.333	mg/kg wet							
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachloroethane	ND	0.333	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.333	mg/kg wet							
Isophorone	ND	0.333	mg/kg wet							
Naphthalene	ND	0.333	mg/kg wet							
Nitrobenzene	ND	0.333	mg/kg wet							
N-Nitrosodimethylamine	ND	0.333	mg/kg wet							
Pentachlorophenol	ND	1.67	mg/kg wet							
Phenanthrene	ND	0.333	mg/kg wet							
Phenol	ND	0.333	mg/kg wet							
Pyrene	ND	0.333	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	*2.59*		mg/kg wet	*3.333*		*78*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.06*		mg/kg wet	*5.000*		*81*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.74*		mg/kg wet	*5.000*		*75*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.68*		mg/kg wet	*3.333*		*80*	*30-130*			
Surrogate: 2-Fluorophenol	*3.61*		mg/kg wet	*5.000*		*72*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.49*		mg/kg wet	*3.333*		*75*	*30-130*			
Surrogate: Phenol-d6	*3.91*		mg/kg wet	*5.000*		*78*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.43*		mg/kg wet	*3.333*		*103*	*30-130*			
LCS										
1,2,4-Trichlorobenzene	2.33	0.333	mg/kg wet	3.333		70	40-140			
1,2-Dichlorobenzene	2.28	0.333	mg/kg wet	3.333		68	40-140			
1,3-Dichlorobenzene	2.26	0.333	mg/kg wet	3.333		68	40-140			
1,4-Dichlorobenzene	2.28	0.333	mg/kg wet	3.333		68	40-140			
2,4,5-Trichlorophenol	2.68	0.333	mg/kg wet	3.333		80	30-130			
2,4,6-Trichlorophenol	2.72	0.333	mg/kg wet	3.333		81	30-130			
2,4-Dichlorophenol	2.52	0.333	mg/kg wet	3.333		75	30-130			
2,4-Dimethylphenol	2.55	0.333	mg/kg wet	3.333		77	30-130			
2,4-Dinitrophenol	1.88	1.67	mg/kg wet	3.333		56	30-130			
2,4-Dinitrotoluene	2.86	0.333	mg/kg wet	3.333		86	40-140			
2,6-Dinitrotoluene	2.65	0.333	mg/kg wet	3.333		80	40-140			
2-Chloronaphthalene	2.06	0.333	mg/kg wet	3.333		62	40-140			
2-Chlorophenol	2.36	0.333	mg/kg wet	3.333		71	30-130			
2-Methylnaphthalene	2.39	0.333	mg/kg wet	3.333		72	40-140			
2-Methylphenol	2.44	0.333	mg/kg wet	3.333		73	30-130			
2-Nitrophenol	2.76	0.333	mg/kg wet	3.333		83	30-130			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41207 - 3546										
3,3´-Dichlorobenzidine	2.71	0.667	mg/kg wet	3.333		81	40-140			
3+4-Methylphenol	4.86	0.667	mg/kg wet	6.667		73	30-130			
4-Bromophenyl-phenylether	2.48	0.333	mg/kg wet	3.333		75	40-140			
4-Chloroaniline	1.79	0.667	mg/kg wet	3.333		54	40-140			
4-Nitrophenol	2.13	1.67	mg/kg wet	3.333		64	30-130			
Acenaphthene	2.32	0.333	mg/kg wet	3.333		69	40-140			
Acenaphthylene	2.28	0.333	mg/kg wet	3.333		68	40-140			
Acetophenone	2.29	0.667	mg/kg wet	3.333		69	40-140			
Aniline	1.78	1.67	mg/kg wet	3.333		53	40-140			
Anthracene	2.56	0.333	mg/kg wet	3.333		77	40-140			
Azobenzene	2.49	0.333	mg/kg wet	3.333		75	40-140			
Benzo(a)anthracene	2.84	0.333	mg/kg wet	3.333		85	40-140			
Benzo(a)pyrene	2.55	0.167	mg/kg wet	3.333		76	40-140			
Benzo(b)fluoranthene	2.87	0.333	mg/kg wet	3.333		86	40-140			
Benzo(g,h,i)perylene	2.88	0.333	mg/kg wet	3.333		87	40-140			
Benzo(k)fluoranthene	2.74	0.333	mg/kg wet	3.333		82	40-140			
bis(2-Chloroethoxy)methane	2.36	0.333	mg/kg wet	3.333		71	40-140			
bis(2-Chloroethyl)ether	2.37	0.333	mg/kg wet	3.333		71	40-140			
bis(2-chloroisopropyl)Ether	2.28	0.333	mg/kg wet	3.333		68	40-140			
bis(2-Ethylhexyl)phthalate	3.25	0.333	mg/kg wet	3.333		97	40-140			
Butylbenzylphthalate	3.22	0.333	mg/kg wet	3.333		97	40-140			
Chrysene	2.84	0.167	mg/kg wet	3.333		85	40-140			
Dibenzo(a,h)Anthracene	2.97	0.167	mg/kg wet	3.333		89	40-140			
Dibenzofuran	2.40	0.333	mg/kg wet	3.333		72	40-140			
Diethylphthalate	2.58	0.333	mg/kg wet	3.333		77	40-140			
Dimethylphthalate	2.41	0.333	mg/kg wet	3.333		72	40-140			
Di-n-butylphthalate	2.73	0.333	mg/kg wet	3.333		82	40-140			
Di-n-octylphthalate	3.34	0.333	mg/kg wet	3.333		100	40-140			
Fluoranthene	2.78	0.333	mg/kg wet	3.333		83	40-140			
Fluorene	2.40	0.333	mg/kg wet	3.333		72	40-140			
Hexachlorobenzene	2.56	0.333	mg/kg wet	3.333		77	40-140			
Hexachlorobutadiene	2.24	0.333	mg/kg wet	3.333		67	40-140			
Hexachloroethane	2.43	0.333	mg/kg wet	3.333		73	40-140			
Indeno(1,2,3-cd)Pyrene	2.88	0.333	mg/kg wet	3.333		86	40-140			
Isophorone	2.25	0.333	mg/kg wet	3.333		68	40-140			
Naphthalene	2.38	0.333	mg/kg wet	3.333		72	40-140			
Nitrobenzene	2.30	0.333	mg/kg wet	3.333		69	40-140			
N-Nitrosodimethylamine	1.88	0.333	mg/kg wet	3.333		57	40-140			
Pentachlorophenol	2.78	1.67	mg/kg wet	3.333		83	30-130			
Phenanthrene	2.51	0.333	mg/kg wet	3.333		75	40-140			
Phenol	2.20	0.333	mg/kg wet	3.333		66	30-130			
Pyrene	2.93	0.333	mg/kg wet	3.333		88	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*2.36*		mg/kg wet	*3.333*		*71*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.32*		mg/kg wet	*5.000*		*86*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.28*		mg/kg wet	*5.000*		*66*	*30-130*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41207 - 3546										
Surrogate: 2-Fluorobiphenyl	*2.41*		mg/kg wet	*3.333*		*72*	*30-130*			
Surrogate: 2-Fluorophenol	*3.28*		mg/kg wet	*5.000*		*66*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.33*		mg/kg wet	*3.333*		*70*	*30-130*			
Surrogate: Phenol-d6	*3.55*		mg/kg wet	*5.000*		*71*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.17*		mg/kg wet	*3.333*		*95*	*30-130*			
LCS Dup										
1,2,4-Trichlorobenzene	2.28	0.333	mg/kg wet	3.333		68	40-140	2	30	
1,2-Dichlorobenzene	2.17	0.333	mg/kg wet	3.333		65	40-140	5	30	
1,3-Dichlorobenzene	2.15	0.333	mg/kg wet	3.333		65	40-140	5	30	
1,4-Dichlorobenzene	2.16	0.333	mg/kg wet	3.333		65	40-140	5	30	
2,4,5-Trichlorophenol	2.47	0.333	mg/kg wet	3.333		74	30-130	8	30	
2,4,6-Trichlorophenol	2.52	0.333	mg/kg wet	3.333		76	30-130	7	30	
2,4-Dichlorophenol	2.38	0.333	mg/kg wet	3.333		72	30-130	5	30	
2,4-Dimethylphenol	2.42	0.333	mg/kg wet	3.333		73	30-130	5	30	
2,4-Dinitrophenol	1.74	1.67	mg/kg wet	3.333		52	30-130	7	30	
2,4-Dinitrotoluene	2.60	0.333	mg/kg wet	3.333		78	40-140	10	30	
2,6-Dinitrotoluene	2.46	0.333	mg/kg wet	3.333		74	40-140	8	30	
2-Chloronaphthalene	1.90	0.333	mg/kg wet	3.333		57	40-140	8	30	
2-Chlorophenol	2.21	0.333	mg/kg wet	3.333		66	30-130	7	30	
2-Methylnaphthalene	2.28	0.333	mg/kg wet	3.333		68	40-140	5	30	
2-Methylphenol	2.32	0.333	mg/kg wet	3.333		70	30-130	5	30	
2-Nitrophenol	2.53	0.333	mg/kg wet	3.333		76	30-130	9	30	
3,3´-Dichlorobenzidine	2.61	0.667	mg/kg wet	3.333		78	40-140	4	30	
3+4-Methylphenol	4.65	0.667	mg/kg wet	6.667		70	30-130	4	30	
4-Bromophenyl-phenylether	2.42	0.333	mg/kg wet	3.333		73	40-140	2	30	
4-Chloroaniline	1.70	0.667	mg/kg wet	3.333		51	40-140	5	30	
4-Nitrophenol	1.95	1.67	mg/kg wet	3.333		59	30-130	9	30	
Acenaphthene	2.15	0.333	mg/kg wet	3.333		65	40-140	7	30	
Acenaphthylene	2.12	0.333	mg/kg wet	3.333		64	40-140	7	30	
Acetophenone	2.19	0.667	mg/kg wet	3.333		66	40-140	5	30	
Aniline	1.70	1.67	mg/kg wet	3.333		51	40-140	4	30	
Anthracene	2.48	0.333	mg/kg wet	3.333		75	40-140	3	30	
Azobenzene	2.44	0.333	mg/kg wet	3.333		73	40-140	2	30	
Benzo(a)anthracene	2.68	0.333	mg/kg wet	3.333		81	40-140	6	30	
Benzo(a)pyrene	2.43	0.167	mg/kg wet	3.333		73	40-140	5	30	
Benzo(b)fluoranthene	2.68	0.333	mg/kg wet	3.333		80	40-140	7	30	
Benzo(g,h,i)perylene	2.72	0.333	mg/kg wet	3.333		82	40-140	6	30	
Benzo(k)fluoranthene	2.61	0.333	mg/kg wet	3.333		78	40-140	5	30	
bis(2-Chloroethoxy)methane	2.26	0.333	mg/kg wet	3.333		68	40-140	5	30	
bis(2-Chloroethyl)ether	2.24	0.333	mg/kg wet	3.333		67	40-140	6	30	
bis(2-chloroisopropyl)Ether	2.18	0.333	mg/kg wet	3.333		65	40-140	5	30	
bis(2-Ethylhexyl)phthalate	3.04	0.333	mg/kg wet	3.333		91	40-140	6	30	
Butylbenzylphthalate	3.04	0.333	mg/kg wet	3.333		91	40-140	6	30	
Chrysene	2.70	0.167	mg/kg wet	3.333		81	40-140	5	30	
Dibenzo(a,h)Anthracene	2.80	0.167	mg/kg wet	3.333		84	40-140	6	30	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41207 - 3546										
Dibenzofuran	2.22	0.333	mg/kg wet	3.333		66	40-140	8	30	
Diethylphthalate	2.47	0.333	mg/kg wet	3.333		74	40-140	4	30	
Dimethylphthalate	2.24	0.333	mg/kg wet	3.333		67	40-140	7	30	
Di-n-butylphthalate	2.58	0.333	mg/kg wet	3.333		77	40-140	5	30	
Di-n-octylphthalate	3.09	0.333	mg/kg wet	3.333		93	40-140	8	30	
Fluoranthene	2.60	0.333	mg/kg wet	3.333		78	40-140	7	30	
Fluorene	2.22	0.333	mg/kg wet	3.333		67	40-140	8	30	
Hexachlorobenzene	2.49	0.333	mg/kg wet	3.333		75	40-140	3	30	
Hexachlorobutadiene	2.14	0.333	mg/kg wet	3.333		64	40-140	5	30	
Hexachloroethane	2.31	0.333	mg/kg wet	3.333		69	40-140	5	30	
Indeno(1,2,3-cd)Pyrene	2.72	0.333	mg/kg wet	3.333		82	40-140	6	30	
Isophorone	2.13	0.333	mg/kg wet	3.333		64	40-140	6	30	
Naphthalene	2.28	0.333	mg/kg wet	3.333		69	40-140	4	30	
Nitrobenzene	2.19	0.333	mg/kg wet	3.333		66	40-140	5	30	
N-Nitrosodimethylamine	2.36	0.333	mg/kg wet	3.333		71	40-140	22	30	
Pentachlorophenol	2.51	1.67	mg/kg wet	3.333		75	30-130	10	30	
Phenanthrene	2.41	0.333	mg/kg wet	3.333		72	40-140	4	30	
Phenol	2.08	0.333	mg/kg wet	3.333		63	30-130	5	30	
Pyrene	2.80	0.333	mg/kg wet	3.333		84	40-140	5	30	
Surrogate: 1,2-Dichlorobenzene-d4	*2.32*		mg/kg wet	*3.333*		*70*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.30*		mg/kg wet	*5.000*		*86*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.22*		mg/kg wet	*5.000*		*64*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.33*		mg/kg wet	*3.333*		*70*	*30-130*			
Surrogate: 2-Fluorophenol	*3.22*		mg/kg wet	*5.000*		*64*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.29*		mg/kg wet	*3.333*		*69*	*30-130*			
Surrogate: Phenol-d6	*3.47*		mg/kg wet	*5.000*		*69*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.14*		mg/kg wet	*3.333*		*94*	*30-130*			
Classical Chemistry										
Batch CH41416 - General Preparation										
Blank										
Conductivity	ND	5	umhos/cm							
LCS										
Conductivity	1380		umhos/cm	1411		98	90-110			
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41403 - 3546										
Blank										
C19-C36 Aliphatics1	ND	15.0	mg/kg wet							
C9-C18 Aliphatics1	ND	15.0	mg/kg wet							
Decane (C10)	ND	0.5	mg/kg wet							
Docosane (C22)	ND	0.5	mg/kg wet							
Dodecane (C12)	ND	0.5	mg/kg wet							
Eicosane (C20)	ND	0.5	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41403 - 3546										
Hexacosane (C26)	ND	0.5	mg/kg wet							
Hexadecane (C16)	ND	0.5	mg/kg wet							
Hexatriacontane (C36)	ND	0.5	mg/kg wet							
Nonadecane (C19)	ND	0.5	mg/kg wet							
Nonane (C9)	ND	0.5	mg/kg wet							
Octacosane (C28)	ND	0.5	mg/kg wet							
Octadecane (C18)	ND	0.5	mg/kg wet							
Tetracosane (C24)	ND	0.5	mg/kg wet							
Tetradecane (C14)	ND	0.5	mg/kg wet							
Triacontane (C30)	ND	0.5	mg/kg wet							
Surrogate: 1-Chlorooctadecane	*1.64*		mg/kg wet	*2.000*		*82*	*40-140*			
Blank										
2-Methylnaphthalene	ND	0.20	mg/kg wet							
Acenaphthene	ND	0.40	mg/kg wet							
Acenaphthylene	ND	0.20	mg/kg wet							
Anthracene	ND	0.40	mg/kg wet							
Benzo(a)anthracene	ND	0.40	mg/kg wet							
Benzo(a)pyrene	ND	0.40	mg/kg wet							
Benzo(b)fluoranthene	ND	0.40	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.40	mg/kg wet							
Benzo(k)fluoranthene	ND	0.40	mg/kg wet							
C11-C22 Unadjusted Aromatics1	ND	15.0	mg/kg wet							
Chrysene	ND	0.40	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.20	mg/kg wet							
Fluoranthene	ND	0.40	mg/kg wet							
Fluorene	ND	0.40	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.40	mg/kg wet							
Naphthalene	ND	0.40	mg/kg wet							
Phenanthrene	ND	0.40	mg/kg wet							
Pyrene	ND	0.40	mg/kg wet							
Surrogate: 2-Bromonaphthalene	*2.05*		mg/kg wet	*2.000*		*102*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*2.01*		mg/kg wet	*2.000*		*101*	*40-140*			
Surrogate: O-Terphenyl	*1.54*		mg/kg wet	*2.000*		*77*	*40-140*			
LCS										
C19-C36 Aliphatics1	19.2	15.0	mg/kg wet	16.00		120	40-140			
C9-C18 Aliphatics1	12.0	15.0	mg/kg wet	12.00		100	40-140			
Decane (C10)	1.2	0.5	mg/kg wet	2.000		61	40-140			
Docosane (C22)	1.9	0.5	mg/kg wet	2.000		93	40-140			
Dodecane (C12)	1.3	0.5	mg/kg wet	2.000		67	40-140			
Eicosane (C20)	1.8	0.5	mg/kg wet	2.000		90	40-140			
Hexacosane (C26)	1.8	0.5	mg/kg wet	2.000		89	40-140			
Hexadecane (C16)	1.7	0.5	mg/kg wet	2.000		85	40-140			
Hexatriacontane (C36)	1.8	0.5	mg/kg wet	2.000		92	40-140			
Nonadecane (C19)	1.8	0.5	mg/kg wet	2.000		90	40-140			

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41403 - 3546										
Nonane (C9)	0.9	0.5	mg/kg wet	2.000		46	30-140			
Octacosane (C28)	1.7	0.5	mg/kg wet	2.000		86	40-140			
Octadecane (C18)	1.8	0.5	mg/kg wet	2.000		89	40-140			
Tetracosane (C24)	1.9	0.5	mg/kg wet	2.000		93	40-140			
Tetradecane (C14)	1.5	0.5	mg/kg wet	2.000		76	40-140			
Triacontane (C30)	1.7	0.5	mg/kg wet	2.000		86	40-140			
Surrogate: 1-Chlorooctadecane	*1.61*		mg/kg wet	*2.000*		*81*	*40-140*			
LCS										
2-Methylnaphthalene	1.61	0.20	mg/kg wet	2.000		81	40-140			
Acenaphthene	1.56	0.40	mg/kg wet	2.000		78	40-140			
Acenaphthylene	1.65	0.20	mg/kg wet	2.000		83	40-140			
Anthracene	1.71	0.40	mg/kg wet	2.000		85	40-140			
Benzo(a)anthracene	1.91	0.40	mg/kg wet	2.000		96	40-140			
Benzo(a)pyrene	2.15	0.40	mg/kg wet	2.000		108	40-140			
Benzo(b)fluoranthene	1.96	0.40	mg/kg wet	2.000		98	40-140			
Benzo(g,h,i)perylene	2.11	0.40	mg/kg wet	2.000		106	40-140			
Benzo(k)fluoranthene	1.86	0.40	mg/kg wet	2.000		93	40-140			
C11-C22 Unadjusted Aromatics1	39.5	15.0	mg/kg wet	34.00		116	40-140			
Chrysene	1.87	0.40	mg/kg wet	2.000		94	40-140			
Dibenzo(a,h)Anthracene	2.10	0.20	mg/kg wet	2.000		105	40-140			
Fluoranthene	1.88	0.40	mg/kg wet	2.000		94	40-140			
Fluorene	1.68	0.40	mg/kg wet	2.000		84	40-140			
Indeno(1,2,3-cd)Pyrene	2.19	0.40	mg/kg wet	2.000		110	40-140			
Naphthalene	1.55	0.40	mg/kg wet	2.000		77	40-140			
Phenanthrene	1.73	0.40	mg/kg wet	2.000		87	40-140			
Pyrene	1.88	0.40	mg/kg wet	2.000		94	40-140			
Surrogate: 2-Bromonaphthalene	*1.86*		mg/kg wet	*2.000*		*93*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*2.05*		mg/kg wet	*2.000*		*103*	*40-140*			
Surrogate: O-Terphenyl	*1.63*		mg/kg wet	*2.000*		*81*	*40-140*			
LCS										
2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			
LCS Dup										
C19-C36 Aliphatics1	18.9	15.0	mg/kg wet	16.00		118	40-140	2	25	
C9-C18 Aliphatics1	11.9	15.0	mg/kg wet	12.00		99	40-140	0.7	25	
Decane (C10)	1.2	0.5	mg/kg wet	2.000		62	40-140	0.2	25	
Docosane (C22)	1.9	0.5	mg/kg wet	2.000		95	40-140	2	25	
Dodecane (C12)	1.4	0.5	mg/kg wet	2.000		68	40-140	1	25	
Eicosane (C20)	1.8	0.5	mg/kg wet	2.000		92	40-140	3	25	
Hexacosane (C26)	1.8	0.5	mg/kg wet	2.000		91	40-140	3	25	
Hexadecane (C16)	1.8	0.5	mg/kg wet	2.000		88	40-140	3	25	
Hexatriacontane (C36)	1.9	0.5	mg/kg wet	2.000		95	40-140	2	25	
Nonadecane (C19)	1.8	0.5	mg/kg wet	2.000		92	40-140	2	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408202

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41403 - 3546										
Nonane (C9)	0.9	0.5	mg/kg wet	2.000		46	30-140	0.3	25	
Octacosane (C28)	1.8	0.5	mg/kg wet	2.000		89	40-140	3	25	
Octadecane (C18)	1.8	0.5	mg/kg wet	2.000		91	40-140	2	25	
Tetracosane (C24)	1.9	0.5	mg/kg wet	2.000		94	40-140	0.3	25	
Tetradecane (C14)	1.6	0.5	mg/kg wet	2.000		78	40-140	3	25	
Triacontane (C30)	1.8	0.5	mg/kg wet	2.000		88	40-140	3	25	
Surrogate: 1-Chlorooctadecane	*1.64*		mg/kg wet	*2.000*		*82*	*40-140*			
LCS Dup										
2-Methylnaphthalene	1.73	0.20	mg/kg wet	2.000		87	40-140	7	20	
Acenaphthene	1.62	0.40	mg/kg wet	2.000		81	40-140	4	20	
Acenaphthylene	1.73	0.20	mg/kg wet	2.000		87	40-140	5	20	
Anthracene	1.76	0.40	mg/kg wet	2.000		88	40-140	3	20	
Benzo(a)anthracene	1.97	0.40	mg/kg wet	2.000		98	40-140	3	20	
Benzo(a)pyrene	2.20	0.40	mg/kg wet	2.000		110	40-140	2	20	
Benzo(b)fluoranthene	2.03	0.40	mg/kg wet	2.000		102	40-140	4	20	
Benzo(g,h,i)perylene	2.12	0.40	mg/kg wet	2.000		106	40-140	0.3	20	
Benzo(k)fluoranthene	1.93	0.40	mg/kg wet	2.000		97	40-140	4	20	
C11-C22 Unadjusted Aromatics1	41.3	15.0	mg/kg wet	34.00		122	40-140	4	25	
Chrysene	1.92	0.40	mg/kg wet	2.000		96	40-140	2	20	
Dibenzo(a,h)Anthracene	2.10	0.20	mg/kg wet	2.000		105	40-140	0.08	20	
Fluoranthene	1.91	0.40	mg/kg wet	2.000		96	40-140	2	20	
Fluorene	1.71	0.40	mg/kg wet	2.000		86	40-140	2	20	
Indeno(1,2,3-cd)Pyrene	2.19	0.40	mg/kg wet	2.000		109	40-140	0.3	20	
Naphthalene	1.65	0.40	mg/kg wet	2.000		82	40-140	6	20	
Phenanthrene	1.80	0.40	mg/kg wet	2.000		90	40-140	4	20	
Pyrene	1.92	0.40	mg/kg wet	2.000		96	40-140	2	20	
Surrogate: 2-Bromonaphthalene	*1.94*		mg/kg wet	*2.000*		*97*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*2.10*		mg/kg wet	*2.000*		*105*	*40-140*			
Surrogate: O-Terphenyl	*1.65*		mg/kg wet	*2.000*		*82*	*40-140*			
LCS Dup										
2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH41601 - 5035										
Blank										
1,2,4-Trimethylbenzene	ND	0.20	mg/kg wet							
2,2,4-Trimethylpentane	ND	5.00	mg/kg wet							
2-Methylpentane	ND	5.00	mg/kg wet							
Benzene	ND	0.20	mg/kg wet							
C5-C8 Unadjusted Aliphatics	ND	10.0	mg/kg wet							
C9-C10 Aromatics	ND	10.0	mg/kg wet							
C9-C12 Unadjusted Aliphatics	ND	10.0	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch CH41601 - 5035										
Ethylbenzene	ND	0.20	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.05	mg/kg wet							
Naphthalene	ND	0.20	mg/kg wet							
n-Butylcyclohexane	ND	5.00	mg/kg wet							
n-Decane	ND	5.00	mg/kg wet							
Nonane (C9)	ND	5.00	mg/kg wet							
Pentane	ND	5.00	mg/kg wet							
Toluene	ND	0.20	mg/kg wet							
Xylene O	ND	0.20	mg/kg wet							
Xylene P,M	ND	0.40	mg/kg wet							
Surrogate: 2,5-Dibromotoluene - FID	*6.26*		mg/kg wet	*5.000*		*125*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*6.33*		mg/kg wet	*5.000*		*127*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.69*		mg/kg wet	*5.333*		*88*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.77*		mg/kg wet	*5.333*		*89*	*70-130*			
LCS										
1,2,4-Trimethylbenzene	10.0	0.20	mg/kg wet	10.00		100	70-130			
2,2,4-Trimethylpentane	14.1	5.00	mg/kg wet	15.00		94	70-130			
2-Methylpentane	16.4	5.00	mg/kg wet	15.00		109	70-130			
Benzene	4.84	0.20	mg/kg wet	5.000		97	70-130			
C5-C8 Unadjusted Aliphatics	44.3	10.0	mg/kg wet	40.00		111	70-130			
C9-C10 Aromatics	9.47	10.0	mg/kg wet	10.00		95	70-130			
C9-C12 Unadjusted Aliphatics	24.1	10.0	mg/kg wet	30.00		80	70-130			
Ethylbenzene	4.91	0.20	mg/kg wet	5.000		98	70-130			
Methyl tert-Butyl Ether	14.8	0.05	mg/kg wet	15.00		99	70-130			
Naphthalene	9.06	0.20	mg/kg wet	10.00		91	70-130			
n-Butylcyclohexane	7.30	5.00	mg/kg wet	10.00		73	70-130			
n-Decane	8.29	5.00	mg/kg wet	10.00		83	70-130			
Nonane (C9)	7.58	5.00	mg/kg wet	10.00		76	30-130			
Pentane	12.2	5.00	mg/kg wet	10.00		122	70-130			
Toluene	14.9	0.20	mg/kg wet	15.00		99	70-130			
Xylene O	9.89	0.20	mg/kg wet	10.00		99	70-130			
Xylene P,M	20.1	0.40	mg/kg wet	20.00		100	70-130			
Surrogate: 2,5-Dibromotoluene - FID	*5.32*		mg/kg wet	*5.000*		*106*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.37*		mg/kg wet	*5.000*		*107*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.87*		mg/kg wet	*5.333*		*91*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.94*		mg/kg wet	*5.333*		*93*	*70-130*			
LCS Dup										
1,2,4-Trimethylbenzene	10.2	0.20	mg/kg wet	10.00		102	70-130	2	25	
2,2,4-Trimethylpentane	16.7	5.00	mg/kg wet	15.00		111	70-130	17	25	
2-Methylpentane	15.8	5.00	mg/kg wet	15.00		105	70-130	4	25	
Benzene	4.83	0.20	mg/kg wet	5.000		97	70-130	0.3	25	
C5-C8 Unadjusted Aliphatics	46.4	10.0	mg/kg wet	40.00		116	70-130	5	25	
C9-C10 Aromatics	9.65	10.0	mg/kg wet	10.00		96	70-130	2	25	
C9-C12 Unadjusted Aliphatics	24.7	10.0	mg/kg wet	30.00		82	70-130	3	25	

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH41601 - 5035										
Ethylbenzene	4.87	0.20	mg/kg wet	5.000		97	70-130	0.8	25	
Methyl tert-Butyl Ether	14.9	0.05	mg/kg wet	15.00		99	70-130	1	25	
Naphthalene	9.74	0.20	mg/kg wet	10.00		97	70-130	7	25	
n-Butylcyclohexane	7.43	5.00	mg/kg wet	10.00		74	70-130	2	25	
n-Decane	8.27	5.00	mg/kg wet	10.00		83	70-130	0.1	25	
Nonane (C9)	8.08	5.00	mg/kg wet	10.00		81	30-130	6	25	
Pentane	11.9	5.00	mg/kg wet	10.00		119	70-130	2	25	
Toluene	14.9	0.20	mg/kg wet	15.00		99	70-130	0.02	25	
Xylene O	9.85	0.20	mg/kg wet	10.00		99	70-130	0.4	25	
Xylene P,M	19.9	0.40	mg/kg wet	20.00		100	70-130	0.8	25	
Surrogate: 2,5-Dibromotoluene - FID	*5.47*		mg/kg wet	*5.000*		*109*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.50*		mg/kg wet	*5.000*		*110*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.81*		mg/kg wet	*5.333*		*90*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.90*		mg/kg wet	*5.333*		*92*	*70-130*			

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Notes and Definitions

Z-04	MeOH - covered
WL	Results obtained from a deionized water leach of the sample.
U	Analyte included in the analysis, but not detected
Q	Calibration required quadratic regression (Q).
D	Diluted.
C+	Continuing Calibration recovery is above upper control limit (C+).
C-	Continuing Calibration recovery is below lower control limit (C-).
B-	Blank Spike recovery is below lower control limit (B-).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report

CERTIFICATE OF ANALYSIS

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ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)
A2LA Accredited: Testing Cert# 2864.01
http://www.a2la.org/scopepdf/2864-01.pdf

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002
http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01
Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)
http://www.A2LA.org/dirsearchnew/newsearch.cfm

CPSC ID# 1141
Lead Paint, Lead in Children's Metals Jewelry
http://www.cpsc.gov/cgi-bin/labapplist.aspx

Sample and Cooler Receipt Checklist

Client: PEER Consultants
Client Project ID: _____
Shipped/Delivered Via: ESS Courier

ESS Project ID: 14080202
Date Project Due: 8/19/2014
Days For Project: 5 Day

Items to be checked upon receipt:

1. Air Bill Manifest Present?	* No	10. Are the samples properly preserved?	Yes
Air No.:		11. Proper sample containers used?	Yes
2. Were Custody Seals Present?	No	12. Any air bubbles in the VOA vials?	N/A
3. Were Custody Seals Intact?	N/A	13. Holding times exceeded?	No
4. Is Radiation count < 100 CPM?	Yes	14. Sufficient sample volumes?	Yes
5. Is a cooler present?	Yes	15. Any Subcontracting needed?	No
Cooler Temp: **1.3**		16. Are ESS labels on correct containers?	Yes | No
Iced With: **Ice**		17. Were samples received intact?	Yes | No
6. Was COC included with samples?	Yes	ESS Sample IDs:	_____
7. Was COC signed and dated by client?	Yes	Sub Lab:	_____
8. Does the COC match the sample	Yes	Analysis:	_____
9. Is COC complete and correct?	Yes	TAT:	_____

18. Was there need to call project manager to discuss status? If yes, please explain.

Liquids Frozen @ 1827 MB 8/12/14

DID NOT receive % Solids jars for PB 9 5-7' and PB 2 10-12' MB 8/12/14

Who was called?:_____ By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	40 ml - VOA	1	MeOH
1	Yes	8 oz Soil Jar	2	NP
2	Yes	40 ml - VOA	1	MeOH
2	Yes	8 oz Soil Jar	2	NP
3	Yes	40 ml - VOA	1	MeOH
3	Yes	40 ml - VOA	2	other
4	Yes	40 ml - VOA	1	MeOH
4	Yes	40 ml - VOA	2	other
5	Yes	40 ml - VOA	1	MeOH
5	Yes	8 oz Soil Jar	2	NP

Completed By: _____ Date/Time: 8/12/14 1818
Reviewed By: _____ Date/Time: 8/12/14 1824

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time ✓ Standard Other ____
If faster than 5 days, prior approval by laboratory is required # ____

State where samples were collected from:
(MA) RI CT NH NJ NY ME Other ____

Is this project for any of the following:
MA-MCP Navy USACE Other ____

Reporting Limits: comm-97 / mcp S-1

ESS LAB PROJECT ID: 1408202

Electronic Deliverable Yes ✓ No ____
Format: Excel ✓ Access ____ PDF ✓ Other ____

Co. Name	Project #	Project Name (20 Char. or less)
PEER Consultants	5559	Union Square

Contact Person	Address
Dave Gorden	99 S Bedford St Suite 200

City	State	Zip	PO#
Burlington	MA	01803	5559

Telephone #	Fax #	Email Address
7812388880	7812388884	gorden@peercpc.com

ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (20 Char. or less)	Pres Code	Number of Containers	Type of Containers	Write Required Analysis: VOC hi	VOC lo	VPH	EPH PCB SVOC metals cond											
1	8/8/14	1205		✓	S	PB 7 1-13'	6/1	3	G/V			✓	✓											
2	8/11/14	1300		✓	S	PB 9 1-9'	6/1	3	G/V			✓	✓											
3	8/11/14	1300		✓	S	PB 9 5-7'	6/9	3	V	✓	✓													
4	8/12/14	1233		✓	S	PB 2 10-12'	6/9	3	V	✓	✓													
5	8/12/14	1233		✓	S	PB 2 2-14'	6/1	3	G/V			✓	✓											

Container Type: P-Poly G-Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters

Cooler Present ___ Yes ___ No Internal Use Only

Seals Intact ___ Yes ___ No NA: ___ [ ] Pickup

Cooler Temp: 1.3 Ice klt [ ] Technicians ____

Preservation Code 1- NP, 2- HCl, 3- H_2SO_4, 4- HNO_3, 5- NaOH, 6- MeOH, 7- Asorbic Acid, 8- ZnAct, 9- H_2O

Sampled by: Dave Gorden

Comments:

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
	8/12/14 1409		8/12/14 1409		8/12/14 1650		8/12/14 1815
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

*By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VII A

Please fax all changes to Chain of Custody in writing.

1 (White) Lab Copy 2 (Yellow) Client Receipt

10/26/04 A

CERTIFICATE OF ANALYSIS

David Gorden
PEER Consultants, P.C.
99 S. Bedford Street
Burlington, MA 01803

RE: Union Square (5559)
ESS Laboratory Work Order Number: 1408317

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 12:56 pm, Aug 22, 2014

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408317

SAMPLE RECEIPT

The following samples were received on August 14, 2014 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has performed and reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

For EPH soil samples, the aromatic range results have been corrected for identified cartridge contaminant in accordance with the CAM protocol.

Lab Number	Sample Name	Matrix	Analysis
1408317-01	PB4 8.5-9.5ft	Soil	8260B
1408317-02	PB4 1.5-13.5ft	Soil	6010C, 6020A, 7471B, 8082A, 8270D, 9050A, EPH8270, MADEP-EPH, MADEP-VPH
1408317-03	PB8 2-6ft	Soil	6010C, 6020A, 7471B, 8082A, 8270D, 9050A, EPH8270, MADEP-EPH, MADEP-VPH
1408317-04	PB8 4-6ft	Soil	8260B Low

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408317

PROJECT NARRATIVE

5035/8260B Volatile Organic Compounds / Low Level

CH42130-BS1 **Blank Spike recovery is above upper control limit (B+).**
Tetrahydrofuran (141% @ 70-130%)

CH42130-BSD1 **Blank Spike recovery is above upper control limit (B+).**
Acetone (132% @ 70-130%), Tetrahydrofuran (136% @ 70-130%)

5035/8260B Volatile Organic Compounds / Methanol

1408317-01 **Present in Method Blank (B).**
Acetone

8270D Semi-Volatile Organic Compounds

CXH0201-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (92% @ 80-120%), bis(2-Ethylhexyl)phthalate (88% @ 80-120%)

CXH0201-CCV1 **Continuing Calibration recovery is below lower control limit (C-).**
3,3´-Dichlorobenzidine (79% @ 80-120%)

MADEP-VPH Volatile Petroleum Hydrocarbon

1408317-02 **Surrogate recovery(ies) outside of criteria due to matrix (UCM/coelution/matrix is present) (SM).**
2,5-Dibromotoluene - FID (164% @ 70-130%), 2,5-Dibromotoluene - PID (145% @ 70-130%), Trifluorotoluene - FID (132% @ 70-130%), Trifluorotoluene - PID (136% @ 70-130%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408317

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408317

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1408317-01 through 1408317-04**

Matrices: ( ) Ground Water/Surface Water (X) Soil/Sediment ( ) Drinking Water ( ) Air ( ) Other:_____

CAM Protocol (check all that apply below):

(X) 8260 VOC CAM II A	(X) 7470/7471 Hg CAM III B	(X) MassDEP VPH CAM IV A	( ) 8081 Pesticides CAM V B	( ) 7196 Hex Cr CAM VI B	( ) MassDEP APH CAM IX A
(X) 8270 SVOC CAM II B	( ) 7010 Metals CAM III C	(X) MassDEP EPH CAM IV B	( ) 8151 Herbicides CAM V C	( ) 8330 Explosives CAM VIII A	( ) TO-15 VOC CAM IX B
(X) 6010 Metals CAM III A	(X) 6020 Metals CAM III D	(X) 8082 PCB CAM V A	( ) 6860 Perchlorate CAM VIII B	( ) 9014 Total Cyanide/PAC CAM VI A	

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes (X) No ( )
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	Yes (X) No ( )
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	Yes (X) No ( )
D	Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (X) No ( )
E	a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	Yes (X) No ( )
	b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes ( ) No ( )
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	Yes (X) No ( )

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?	Yes (X) No ( )*
	***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**	
H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes ( ) No (X)*
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes (X) No ( )*

All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ Date: August 22, 2014

Printed Name: Laurel Stoddard Position: Laboratory Director

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 8.5-9.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87
Initial Volume: 16.1
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.122)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,1,1-Trichloroethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,1,2,2-Tetrachloroethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,1,2-Trichloroethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,1-Dichloroethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,1-Dichloroethene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,1-Dichloropropene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,2,3-Trichlorobenzene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,2,3-Trichloropropane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,2,4-Trichlorobenzene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,2,4-Trimethylbenzene	**0.0696** (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,2-Dibromo-3-Chloropropane	ND (0.244)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,2-Dibromoethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,2-Dichlorobenzene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,2-Dichloroethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,2-Dichloropropane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,3,5-Trimethylbenzene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,3-Dichlorobenzene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,3-Dichloropropane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,4-Dichlorobenzene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
1,4-Dioxane - Screen	ND (6.10)		8260B		1	08/21/14 15:07	CXH0251	CH42135
2,2-Dichloropropane	ND (0.122)		8260B		1	08/21/14 15:07	CXH0251	CH42135
2-Butanone	ND (0.244)		8260B		1	08/21/14 15:07	CXH0251	CH42135
2-Chlorotoluene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
2-Hexanone	ND (0.244)		8260B		1	08/21/14 15:07	CXH0251	CH42135
4-Chlorotoluene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
4-Isopropyltoluene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
4-Methyl-2-Pentanone	ND (0.244)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Acetone	**B 0.298** (0.244)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Benzene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Bromobenzene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Bromochloromethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 8.5-9.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87
Initial Volume: 16.1
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Bromoform	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Bromomethane	ND (0.122)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Carbon Disulfide	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Carbon Tetrachloride	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Chlorobenzene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Chloroethane	ND (0.122)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Chloroform	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Chloromethane	ND (0.122)		8260B		1	08/21/14 15:07	CXH0251	CH42135
cis-1,2-Dichloroethene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
cis-1,3-Dichloropropene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Dibromochloromethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Dibromomethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Dichlorodifluoromethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Diethyl Ether	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Di-isopropyl ether	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Ethyl tertiary-butyl ether	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Ethylbenzene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Hexachlorobutadiene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Isopropylbenzene	**0.139** (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Methyl tert-Butyl Ether	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Methylene Chloride	ND (0.244)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Naphthalene	**1.48** (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
n-Butylbenzene	**3.80** (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
n-Propylbenzene	**0.351** (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
sec-Butylbenzene	**2.88** (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Styrene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
tert-Butylbenzene	**0.315** (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Tertiary-amyl methyl ether	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Tetrachloroethene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Tetrahydrofuran	ND (0.244)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Toluene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 8.5-9.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87
Initial Volume: 16.1
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
trans-1,2-Dichloroethene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
trans-1,3-Dichloropropene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Trichloroethene	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Trichlorofluoromethane	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Vinyl Chloride	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Xylene O	ND (0.0610)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Xylene P,M	ND (0.122)		8260B		1	08/21/14 15:07	CXH0251	CH42135
Xylenes (Total)	ND (0.122)		8260B		1	08/21/14 15:07		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*98 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*94 %*		*70-130*
Surrogate: Dibromofluoromethane	*103 %*		*70-130*
Surrogate: Toluene-d8	*100 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 1.5-13.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (5.3)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904
Arsenic	**3.4** (2.7)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904
Barium	**12.1** (2.7)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904
Beryllium	**0.23** (0.12)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904
Cadmium	ND (0.53)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904
Chromium	**8.5** (1.1)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904
Lead	**6.7** (5.3)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904
Mercury	ND (0.028)		7471B		1	BJV	08/19/14 13:19	0.81	40	CH41905
Nickel	**7.6** (2.7)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904
Selenium	ND (0.53)		6020A		50	JP	08/20/14 23:02	2.15	100	CH41904
Silver	ND (0.53)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904
Thallium	ND (0.53)		6020A		50	JP	08/20/14 23:02	2.15	100	CH41904
Vanadium	**12.9** (1.1)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904
Zinc	**19.3** (2.7)		6010C		1	KJK	08/19/14 16:01	2.15	100	CH41904

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 1.5-13.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87
Initial Volume: 20.2
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JXS
Prepared: 8/15/14 11:15
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.0569)		8082A		1	08/18/14 23:21		CH41504
Aroclor 1221	ND (0.0569)		8082A		1	08/18/14 23:21		CH41504
Aroclor 1232	ND (0.0569)		8082A		1	08/18/14 23:21		CH41504
Aroclor 1242	ND (0.0569)		8082A		1	08/18/14 23:21		CH41504
Aroclor 1248	ND (0.0569)		8082A		1	08/18/14 23:21		CH41504
Aroclor 1254	ND (0.0569)		8082A		1	08/18/14 23:21		CH41504
Aroclor 1260	ND (0.0569)		8082A		1	08/18/14 23:21		CH41504
Aroclor 1262	ND (0.0569)		8082A		1	08/18/14 23:21		CH41504
Aroclor 1268	ND (0.0569)		8082A		1	08/18/14 23:21		CH41504

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*83 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*86 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*83 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*80 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 1.5-13.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87
Initial Volume: 15.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/15/14 11:25

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
1,2-Dichlorobenzene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
1,3-Dichlorobenzene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
1,4-Dichlorobenzene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2,4,5-Trichlorophenol	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2,4,6-Trichlorophenol	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2,4-Dichlorophenol	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2,4-Dimethylphenol	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2,4-Dinitrophenol	ND (1.89)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2,4-Dinitrotoluene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2,6-Dinitrotoluene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2-Chloronaphthalene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2-Chlorophenol	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2-Methylnaphthalene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2-Methylphenol	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
2-Nitrophenol	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
3,3´-Dichlorobenzidine	ND (0.757)		8270D		1	08/15/14 23:06	CXH0182	CH41405
3+4-Methylphenol	ND (0.757)		8270D		1	08/15/14 23:06	CXH0182	CH41405
4-Bromophenyl-phenylether	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
4-Chloroaniline	ND (0.757)		8270D		1	08/15/14 23:06	CXH0182	CH41405
4-Nitrophenol	ND (1.89)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Acenaphthene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Acenaphthylene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Acetophenone	ND (0.757)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Aniline	ND (1.89)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Anthracene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Azobenzene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Benzo(a)anthracene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Benzo(a)pyrene	ND (0.189)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Benzo(b)fluoranthene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Benzo(g,h,i)perylene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Benzo(k)fluoranthene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 1.5-13.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87
Initial Volume: 15.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/15/14 11:25

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
bis(2-Chloroethoxy)methane	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
bis(2-Chloroethyl)ether	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
bis(2-chloroisopropyl)Ether	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
bis(2-Ethylhexyl)phthalate	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Butylbenzylphthalate	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Chrysene	ND (0.189)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Dibenzo(a,h)Anthracene	ND (0.189)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Dibenzofuran	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Diethylphthalate	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Dimethylphthalate	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Di-n-butylphthalate	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Di-n-octylphthalate	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Fluoranthene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Fluorene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Hexachlorobenzene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Hexachlorobutadiene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Hexachloroethane	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Indeno(1,2,3-cd)Pyrene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Isophorone	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Naphthalene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Nitrobenzene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
N-Nitrosodimethylamine	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Pentachlorophenol	ND (1.89)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Phenanthrene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Phenol	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405
Pyrene	ND (0.378)		8270D		1	08/15/14 23:06	CXH0182	CH41405

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*58 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*82 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*55 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*70 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 1.5-13.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87
Initial Volume: 15.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/15/14 11:25

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		*56 %*		*30-130*				
Surrogate: Nitrobenzene-d5		*97 %*		*30-130*				
Surrogate: Phenol-d6		*57 %*		*30-130*				
Surrogate: p-Terphenyl-d14		*79 %*		*30-130*				

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 1.5-13.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-02
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 1320** (5)		9050A		1	EEM	08/18/14 10:35	umhos/cm	CH41805

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 1.5-13.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87
Initial Volume: 25.5
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-02
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/15/14 11:25

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	**468** (16.9)		MADEP-EPH		1	DPS	08/18/14 13:09	CXH0192	CH41403
C19-C36 Aliphatics1	ND (16.9)		MADEP-EPH		1	DPS	08/18/14 13:09	CXH0192	CH41403
C11-C22 Unadjusted Aromatics1	**85.3** (16.9)		EPH8270		1	VSC	08/15/14 16:32	CXH0171	CH41403
C11-C22 Aromatics1,2	**85.3** (16.9)		EPH8270			VSC	08/15/14 16:32		[CALC]

	%Recovery	*Qualifier*	*Limits*
Surrogate: 1-Chlorooctadecane	*70 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*80 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*91 %*		*40-140*
Surrogate: O-Terphenyl	*76 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB4 1.5-13.5ft
Date Sampled: 08/13/14 13:00
Percent Solids: 87
Initial Volume: 22.6
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: NMS

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	**100** (9.13)		MADEP-VPH		1	08/19/14 19:36	CXH0223	CH42029
C5-C8 Aliphatics1,2	ND (9.13)		MADEP-VPH		1	08/19/14 19:36		[CALC]
C9-C12 Aliphatics2,3	**163** (9.13)		MADEP-VPH		1	08/19/14 19:36		[CALC]
Benzene	ND (0.18)		MADEP-VPH		1	08/19/14 19:36	CXH0223	CH42029
Ethylbenzene	ND (0.18)		MADEP-VPH		1	08/19/14 19:36	CXH0223	CH42029
Methyl tert-Butyl Ether	ND (0.05)		MADEP-VPH		1	08/19/14 19:36	CXH0223	CH42029
Naphthalene	**2.04** (0.18)		MADEP-VPH		1	08/19/14 19:36	CXH0223	CH42029
Toluene	ND (0.18)		MADEP-VPH		1	08/19/14 19:36	CXH0223	CH42029
Xylene O	ND (0.18)		MADEP-VPH		1	08/19/14 19:36	CXH0223	CH42029
Xylene P,M	ND (0.37)		MADEP-VPH		1	08/19/14 19:36	CXH0223	CH42029
1:1 Methanol/Soil Ratio %D	**51** (N/A)		MADEP-VPH			08/19/14 0:00		CH42029
Preservative:	**MeOH - covered**		MADEP-VPH					CH42029

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*164 %*	*SM*	*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*145 %*	*SM*	*70-130*
Surrogate: Trifluorotoluene - FID	*132 %*	*SM*	*70-130*
Surrogate: Trifluorotoluene - PID	*136 %*	*SM*	*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 2-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-03
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (4.7)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904
Arsenic	**3.6** (2.3)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904
Barium	**12.1** (2.3)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904
Beryllium	**0.26** (0.10)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904
Cadmium	ND (0.47)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904
Chromium	**8.0** (0.9)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904
Lead	**7.1** (4.7)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904
Mercury	ND (0.035)		7471B		1	BJV	08/19/14 13:38	0.62	40	CH41905
Nickel	**6.8** (2.3)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904
Selenium	ND (0.47)		6020A		50	JP	08/20/14 23:43	2.31	100	CH41904
Silver	ND (0.47)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904
Thallium	ND (0.47)		6020A		50	JP	08/20/14 23:43	2.31	100	CH41904
Vanadium	**14.0** (0.9)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904
Zinc	**18.9** (2.3)		6010C		1	KJK	08/19/14 16:20	2.31	100	CH41904

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 2-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92
Initial Volume: 20.1
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: JXS
Prepared: 8/15/14 11:15
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.0538)		8082A		1	08/18/14 23:40		CH41504
Aroclor 1221	ND (0.0538)		8082A		1	08/18/14 23:40		CH41504
Aroclor 1232	ND (0.0538)		8082A		1	08/18/14 23:40		CH41504
Aroclor 1242	ND (0.0538)		8082A		1	08/18/14 23:40		CH41504
Aroclor 1248	ND (0.0538)		8082A		1	08/18/14 23:40		CH41504
Aroclor 1254	ND (0.0538)		8082A		1	08/18/14 23:40		CH41504
Aroclor 1260	ND (0.0538)		8082A		1	08/18/14 23:40		CH41504
Aroclor 1262	ND (0.0538)		8082A		1	08/18/14 23:40		CH41504
Aroclor 1268	ND (0.0538)		8082A		1	08/18/14 23:40		CH41504

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*84 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*85 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*104 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*107 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 2-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92
Initial Volume: 15.1
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/15/14 11:25

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
1,2-Dichlorobenzene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
1,3-Dichlorobenzene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
1,4-Dichlorobenzene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2,4,5-Trichlorophenol	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2,4,6-Trichlorophenol	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2,4-Dichlorophenol	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2,4-Dimethylphenol	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2,4-Dinitrophenol	ND (1.79)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2,4-Dinitrotoluene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2,6-Dinitrotoluene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2-Chloronaphthalene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2-Chlorophenol	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2-Methylnaphthalene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2-Methylphenol	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
2-Nitrophenol	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
3,3´-Dichlorobenzidine	ND (0.717)		8270D		1	08/15/14 23:38	CXH0182	CH41405
3+4-Methylphenol	ND (0.717)		8270D		1	08/15/14 23:38	CXH0182	CH41405
4-Bromophenyl-phenylether	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
4-Chloroaniline	ND (0.717)		8270D		1	08/15/14 23:38	CXH0182	CH41405
4-Nitrophenol	ND (1.79)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Acenaphthene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Acenaphthylene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Acetophenone	ND (0.717)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Aniline	ND (1.79)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Anthracene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Azobenzene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Benzo(a)anthracene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Benzo(a)pyrene	ND (0.179)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Benzo(b)fluoranthene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Benzo(g,h,i)perylene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Benzo(k)fluoranthene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 2-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92
Initial Volume: 15.1
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/15/14 11:25

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
bis(2-Chloroethoxy)methane	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
bis(2-Chloroethyl)ether	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
bis(2-chloroisopropyl)Ether	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
bis(2-Ethylhexyl)phthalate	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Butylbenzylphthalate	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Chrysene	ND (0.179)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Dibenzo(a,h)Anthracene	ND (0.179)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Dibenzofuran	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Diethylphthalate	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Dimethylphthalate	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Di-n-butylphthalate	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Di-n-octylphthalate	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Fluoranthene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Fluorene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Hexachlorobenzene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Hexachlorobutadiene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Hexachloroethane	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Indeno(1,2,3-cd)Pyrene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Isophorone	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Naphthalene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Nitrobenzene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
N-Nitrosodimethylamine	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Pentachlorophenol	ND (1.79)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Phenanthrene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Phenol	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405
Pyrene	ND (0.358)		8270D		1	08/15/14 23:38	CXH0182	CH41405

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*69 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*93 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*64 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*70 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 2-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92
Initial Volume: 15.1
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/15/14 11:25

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		*65 %*		*30-130*				
Surrogate: Nitrobenzene-d5		*62 %*		*30-130*				
Surrogate: Phenol-d6		*68 %*		*30-130*				
Surrogate: p-Terphenyl-d14		*82 %*		*30-130*				

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 2-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-03
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 1360** (5)		9050A		1	EEM	08/18/14 10:35	umhos/cm	CH41805

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 2-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92
Initial Volume: 25.3
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-03
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/15/14 11:25

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (16.0)		MADEP-EPH		1	DPS	08/18/14 14:00	CXH0192	CH41403
C19-C36 Aliphatics1	ND (16.0)		MADEP-EPH		1	DPS	08/18/14 14:00	CXH0192	CH41403
C11-C22 Unadjusted Aromatics1	ND (16.0)		EPH8270		1	VSC	08/15/14 17:09	CXH0171	CH41403
C11-C22 Aromatics1,2	ND (16.0)		EPH8270			VSC	08/15/14 17:09		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*71 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*93 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*87 %*		*40-140*
Surrogate: O-Terphenyl	*66 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 2-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92
Initial Volume: 16.2
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: NMS

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (10.8)		MADEP-VPH		1	08/19/14 19:02	CXH0223	CH42029
C5-C8 Aliphatics1,2	ND (10.8)		MADEP-VPH		1	08/19/14 19:02		[CALC]
C9-C12 Aliphatics2,3	ND (10.8)		MADEP-VPH		1	08/19/14 19:02		[CALC]
Benzene	ND (0.22)		MADEP-VPH		1	08/19/14 19:02	CXH0223	CH42029
Ethylbenzene	ND (0.22)		MADEP-VPH		1	08/19/14 19:02	CXH0223	CH42029
Methyl tert-Butyl Ether	ND (0.05)		MADEP-VPH		1	08/19/14 19:02	CXH0223	CH42029
Naphthalene	ND (0.22)		MADEP-VPH		1	08/19/14 19:02	CXH0223	CH42029
Toluene	ND (0.22)		MADEP-VPH		1	08/19/14 19:02	CXH0223	CH42029
Xylene O	ND (0.22)		MADEP-VPH		1	08/19/14 19:02	CXH0223	CH42029
Xylene P,M	ND (0.43)		MADEP-VPH		1	08/19/14 19:02	CXH0223	CH42029
1:1 Methanol/Soil Ratio %D	**8** (N/A)		MADEP-VPH			08/19/14 0:00		CH42029
Preservative:	**MeOH - covered**		MADEP-VPH					CH42029

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*112 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*113 %*		*70-130*
Surrogate: Trifluorotoluene - FID	*105 %*		*70-130*
Surrogate: Trifluorotoluene - PID	*107 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 4-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92
Initial Volume: 6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,1,1-Trichloroethane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,1,2,2-Tetrachloroethane	ND (0.0018)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,1,2-Trichloroethane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,1-Dichloroethane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,1-Dichloroethene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,1-Dichloropropene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,2,3-Trichlorobenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,2,3-Trichloropropane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,2,4-Trichlorobenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,2,4-Trimethylbenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,2-Dibromo-3-Chloropropane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,2-Dibromoethane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,2-Dichlorobenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,2-Dichloroethane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,2-Dichloropropane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,3,5-Trimethylbenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,3-Dichlorobenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,3-Dichloropropane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,4-Dichlorobenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
1,4-Dioxane	ND (0.0906)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
2,2-Dichloropropane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
2-Butanone	ND (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
2-Chlorotoluene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
2-Hexanone	ND (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
4-Chlorotoluene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
4-Isopropyltoluene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
4-Methyl-2-Pentanone	ND (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Acetone	**0.0359** (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Benzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Bromobenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Bromochloromethane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 4-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92
Initial Volume: 6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Bromoform	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Bromomethane	ND (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Carbon Disulfide	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Carbon Tetrachloride	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Chlorobenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Chloroethane	ND (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Chloroform	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Chloromethane	ND (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
cis-1,2-Dichloroethene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
cis-1,3-Dichloropropene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Dibromochloromethane	ND (0.0018)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Dibromomethane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Dichlorodifluoromethane	ND (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Diethyl Ether	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Di-isopropyl ether	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Ethyl tertiary-butyl ether	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Ethylbenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Hexachlorobutadiene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Isopropylbenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Methyl tert-Butyl Ether	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Methylene Chloride	ND (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Naphthalene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
n-Butylbenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
n-Propylbenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
sec-Butylbenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Styrene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
tert-Butylbenzene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Tertiary-amyl methyl ether	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Tetrachloroethene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Tetrahydrofuran	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Toluene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB8 4-6ft
Date Sampled: 08/14/14 12:11
Percent Solids: 92
Initial Volume: 6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408317
ESS Laboratory Sample ID: 1408317-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
trans-1,2-Dichloroethene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
trans-1,3-Dichloropropene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Trichloroethene	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Trichlorofluoromethane	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Vinyl Chloride	ND (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Xylene O	ND (0.0045)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Xylene P,M	ND (0.0091)		8260B Low		1	08/21/14 13:11	CXH0248	CH42130
Xylenes (Total)	ND (0.0091)		8260B Low		1	08/21/14 13:11		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*109 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*111 %*		*70-130*
Surrogate: Dibromofluoromethane	*104 %*		*70-130*
Surrogate: Toluene-d8	*112 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Total Metals

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch CH41904 - 3050B										
Blank										
Antimony	ND	5.0	mg/kg wet							
Arsenic	ND	2.5	mg/kg wet							
Barium	ND	2.5	mg/kg wet							
Beryllium	ND	0.11	mg/kg wet							
Cadmium	ND	0.50	mg/kg wet							
Chromium	ND	1.0	mg/kg wet							
Lead	ND	5.0	mg/kg wet							
Nickel	ND	2.5	mg/kg wet							
Selenium	ND	0.50	mg/kg wet							
Silver	ND	0.50	mg/kg wet							
Thallium	ND	0.50	mg/kg wet							
Vanadium	ND	1.0	mg/kg wet							
Zinc	ND	2.5	mg/kg wet							
LCS										
Antimony	82.0	15.9	mg/kg wet	94.00		87	80-120			
Arsenic	106	7.9	mg/kg wet	113.0		94	80-120			
Barium	143	7.9	mg/kg wet	155.0		93	80-120			
Beryllium	101	0.35	mg/kg wet	109.0		93	80-120			
Cadmium	59.8	1.59	mg/kg wet	67.50		89	80-120			
Chromium	150	3.2	mg/kg wet	164.0		91	80-120			
Lead	83.7	15.9	mg/kg wet	90.10		93	80-120			
Nickel	84.2	7.9	mg/kg wet	89.30		94	80-120			
Selenium	135	1.59	mg/kg wet	156.0		86	80-120			
Silver	50.0	1.59	mg/kg wet	52.60		95	80-120			
Thallium	109	1.59	mg/kg wet	116.0		94	80-120			
Vanadium	65.0	3.2	mg/kg wet	73.00		89	80-120			
Zinc	153	7.9	mg/kg wet	168.0		91	80-120			
LCS Dup										
Antimony	82.7	14.3	mg/kg wet	94.00		88	80-120	0.8	20	
Arsenic	95.8	7.1	mg/kg wet	113.0		85	80-120	10	20	
Barium	130	7.1	mg/kg wet	155.0		84	80-120	9	20	
Beryllium	92.3	0.31	mg/kg wet	109.0		85	80-120	9	20	
Cadmium	55.3	1.43	mg/kg wet	67.50		82	80-120	8	20	
Chromium	140	2.9	mg/kg wet	164.0		86	80-120	6	20	
Lead	75.5	14.3	mg/kg wet	90.10		84	80-120	10	20	
Nickel	80.3	7.1	mg/kg wet	89.30		90	80-120	5	20	
Selenium	129	1.43	mg/kg wet	156.0		83	80-120	4	30	
Silver	45.1	1.43	mg/kg wet	52.60		86	80-120	10	20	
Thallium	106	1.43	mg/kg wet	116.0		91	80-120	3	30	
Vanadium	60.1	2.9	mg/kg wet	73.00		82	80-120	8	20	
Zinc	140	7.1	mg/kg wet	168.0		83	80-120	9	20	
Batch CH41905 - 7471A										
Blank										

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CH41905 - 7471A										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	6.98	1.46	mg/kg wet	8.370		83	80-120			
LCS Dup										
Mercury	7.38	1.46	mg/kg wet	8.370		88	80-120	6	20	
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
Blank										
1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet							
1,1,1-Trichloroethane	ND	0.0050	mg/kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0020	mg/kg wet							
1,1,2-Trichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethene	ND	0.0050	mg/kg wet							
1,1-Dichloropropene	ND	0.0050	mg/kg wet							
1,2,3-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,3-Trichloropropane	ND	0.0050	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,4-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,2-Dibromo-3-Chloropropane	ND	0.0050	mg/kg wet							
1,2-Dibromoethane	ND	0.0050	mg/kg wet							
1,2-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,2-Dichloroethane	ND	0.0050	mg/kg wet							
1,2-Dichloropropane	ND	0.0050	mg/kg wet							
1,3,5-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,3-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,3-Dichloropropane	ND	0.0050	mg/kg wet							
1,4-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,4-Dioxane	ND	0.100	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0100	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0100	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0100	mg/kg wet							
Acetone	ND	0.0100	mg/kg wet							
Benzene	ND	0.0050	mg/kg wet							
Bromobenzene	ND	0.0050	mg/kg wet							
Bromochloromethane	ND	0.0050	mg/kg wet							
Bromodichloromethane	ND	0.0050	mg/kg wet							
Bromoform	ND	0.0050	mg/kg wet							
Bromomethane	ND	0.0100	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
Carbon Disulfide	ND	0.0050	mg/kg wet							
Carbon Tetrachloride	ND	0.0050	mg/kg wet							
Chlorobenzene	ND	0.0050	mg/kg wet							
Chloroethane	ND	0.0100	mg/kg wet							
Chloroform	ND	0.0050	mg/kg wet							
Chloromethane	ND	0.0100	mg/kg wet							
cis-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Dibromochloromethane	ND	0.0020	mg/kg wet							
Dibromomethane	ND	0.0050	mg/kg wet							
Dichlorodifluoromethane	ND	0.0100	mg/kg wet							
Diethyl Ether	ND	0.0050	mg/kg wet							
Di-isopropyl ether	ND	0.0050	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.0050	mg/kg wet							
Ethylbenzene	ND	0.0050	mg/kg wet							
Hexachlorobutadiene	ND	0.0050	mg/kg wet							
Isopropylbenzene	ND	0.0050	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.0050	mg/kg wet							
Methylene Chloride	ND	0.0100	mg/kg wet							
Naphthalene	ND	0.0050	mg/kg wet							
n-Butylbenzene	ND	0.0050	mg/kg wet							
n-Propylbenzene	ND	0.0050	mg/kg wet							
sec-Butylbenzene	ND	0.0050	mg/kg wet							
Styrene	ND	0.0050	mg/kg wet							
tert-Butylbenzene	ND	0.0050	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.0050	mg/kg wet							
Tetrachloroethene	ND	0.0050	mg/kg wet							
Tetrahydrofuran	ND	0.0050	mg/kg wet							
Toluene	ND	0.0050	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
trans-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Trichloroethene	ND	0.0050	mg/kg wet							
Trichlorofluoromethane	ND	0.0050	mg/kg wet							
Vinyl Chloride	ND	0.0100	mg/kg wet							
Xylene O	ND	0.0050	mg/kg wet							
Xylene P,M	ND	0.0100	mg/kg wet							
Surrogate: 1,2-Dichloroethane-d4	*0.0516*		mg/kg wet	*0.05000*		*103*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0544*		mg/kg wet	*0.05000*		*109*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0533*		mg/kg wet	*0.05000*		*107*	*70-130*			
Surrogate: Toluene-d8	*0.0548*		mg/kg wet	*0.05000*		*110*	*70-130*			
LCS										
1,1,1,2-Tetrachloroethane	0.0455	0.0050	mg/kg wet	0.05000		91	70-130			
1,1,1-Trichloroethane	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
1,1,2,2-Tetrachloroethane	0.0568	0.0020	mg/kg wet	0.05000		114	70-130			
1,1,2-Trichloroethane	0.0505	0.0050	mg/kg wet	0.05000		101	70-130			

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
1,1-Dichloroethane	0.0517	0.0050	mg/kg wet	0.05000		103	70-130			
1,1-Dichloroethene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
1,1-Dichloropropene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130			
1,2,3-Trichlorobenzene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
1,2,3-Trichloropropane	0.0536	0.0050	mg/kg wet	0.05000		107	70-130			
1,2,4-Trichlorobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
1,2,4-Trimethylbenzene	0.0568	0.0050	mg/kg wet	0.05000		114	70-130			
1,2-Dibromo-3-Chloropropane	0.0627	0.0050	mg/kg wet	0.05000		125	70-130			
1,2-Dibromoethane	0.0489	0.0050	mg/kg wet	0.05000		98	70-130			
1,2-Dichlorobenzene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			
1,2-Dichloroethane	0.0523	0.0050	mg/kg wet	0.05000		105	70-130			
1,2-Dichloropropane	0.0480	0.0050	mg/kg wet	0.05000		96	70-130			
1,3,5-Trimethylbenzene	0.0604	0.0050	mg/kg wet	0.05000		121	70-130			
1,3-Dichlorobenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
1,3-Dichloropropane	0.0463	0.0050	mg/kg wet	0.05000		93	70-130			
1,4-Dichlorobenzene	0.0490	0.0050	mg/kg wet	0.05000		98	70-130			
1,4-Dioxane	1.25	0.100	mg/kg wet	1.000		125	70-130			
2,2-Dichloropropane	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
2-Butanone	0.214	0.0100	mg/kg wet	0.2500		85	70-130			
2-Chlorotoluene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
2-Hexanone	0.288	0.0100	mg/kg wet	0.2500		115	70-130			
4-Chlorotoluene	0.0615	0.0050	mg/kg wet	0.05000		123	70-130			
4-Isopropyltoluene	0.0571	0.0050	mg/kg wet	0.05000		114	70-130			
4-Methyl-2-Pentanone	0.301	0.0100	mg/kg wet	0.2500		120	70-130			
Acetone	0.320	0.0100	mg/kg wet	0.2500		128	70-130			
Benzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Bromobenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
Bromochloromethane	0.0545	0.0050	mg/kg wet	0.05000		109	70-130			
Bromodichloromethane	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
Bromoform	0.0479	0.0050	mg/kg wet	0.05000		96	70-130			
Bromomethane	0.0548	0.0100	mg/kg wet	0.05000		110	70-130			
Carbon Disulfide	0.0632	0.0050	mg/kg wet	0.05000		126	70-130			
Carbon Tetrachloride	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
Chlorobenzene	0.0495	0.0050	mg/kg wet	0.05000		99	70-130			
Chloroethane	0.0537	0.0100	mg/kg wet	0.05000		107	70-130			
Chloroform	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Chloromethane	0.0618	0.0100	mg/kg wet	0.05000		124	70-130			
cis-1,2-Dichloroethene	0.0499	0.0050	mg/kg wet	0.05000		100	70-130			
cis-1,3-Dichloropropene	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
Dibromochloromethane	0.0467	0.0020	mg/kg wet	0.05000		93	70-130			
Dibromomethane	0.0595	0.0050	mg/kg wet	0.05000		119	70-130			
Dichlorodifluoromethane	0.0644	0.0100	mg/kg wet	0.05000		129	70-130			
Diethyl Ether	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
Di-isopropyl ether	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
Ethyl tertiary-butyl ether	0.0451	0.0050	mg/kg wet	0.05000		90	70-130			

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
Ethylbenzene	0.0553	0.0050	mg/kg wet	0.05000		111	70-130			
Hexachlorobutadiene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Isopropylbenzene	0.0564	0.0050	mg/kg wet	0.05000		113	70-130			
Methyl tert-Butyl Ether	0.0488	0.0050	mg/kg wet	0.05000		98	70-130			
Methylene Chloride	0.0586	0.0100	mg/kg wet	0.05000		117	70-130			
Naphthalene	0.0458	0.0050	mg/kg wet	0.05000		92	70-130			
n-Butylbenzene	0.0573	0.0050	mg/kg wet	0.05000		115	70-130			
n-Propylbenzene	0.0567	0.0050	mg/kg wet	0.05000		113	70-130			
sec-Butylbenzene	0.0559	0.0050	mg/kg wet	0.05000		112	70-130			
Styrene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
tert-Butylbenzene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130			
Tertiary-amyl methyl ether	0.0490	0.0050	mg/kg wet	0.05000		98	70-130			
Tetrachloroethene	0.0436	0.0050	mg/kg wet	0.05000		87	70-130			
Tetrahydrofuran	0.0703	0.0050	mg/kg wet	0.05000		141	70-130			B+
Toluene	0.0588	0.0050	mg/kg wet	0.05000		118	70-130			
trans-1,2-Dichloroethene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
trans-1,3-Dichloropropene	0.0465	0.0050	mg/kg wet	0.05000		93	70-130			
Trichloroethene	0.0491	0.0050	mg/kg wet	0.05000		98	70-130			
Trichlorofluoromethane	0.0492	0.0050	mg/kg wet	0.05000		98	70-130			
Vinyl Chloride	0.0626	0.0100	mg/kg wet	0.05000		125	70-130			
Xylene O	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Xylene P,M	0.105	0.0100	mg/kg wet	0.1000		105	70-130			
Surrogate: 1,2-Dichloroethane-d4	*0.0561*		mg/kg wet	*0.05000*		*112*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0596*		mg/kg wet	*0.05000*		*119*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0568*		mg/kg wet	*0.05000*		*114*	*70-130*			
Surrogate: Toluene-d8	*0.0525*		mg/kg wet	*0.05000*		*105*	*70-130*			
LCS Dup										
1,1,1,2-Tetrachloroethane	0.0517	0.0050	mg/kg wet	0.05000		103	70-130	13	25	
1,1,1-Trichloroethane	0.0566	0.0050	mg/kg wet	0.05000		113	70-130	9	25	
1,1,2,2-Tetrachloroethane	0.0607	0.0020	mg/kg wet	0.05000		121	70-130	7	25	
1,1,2-Trichloroethane	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	8	25	
1,1-Dichloroethane	0.0568	0.0050	mg/kg wet	0.05000		114	70-130	9	25	
1,1-Dichloroethene	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	6	25	
1,1-Dichloropropene	0.0585	0.0050	mg/kg wet	0.05000		117	70-130	15	25	
1,2,3-Trichlorobenzene	0.0545	0.0050	mg/kg wet	0.05000		109	70-130	5	25	
1,2,3-Trichloropropane	0.0574	0.0050	mg/kg wet	0.05000		115	70-130	7	25	
1,2,4-Trichlorobenzene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130	7	25	
1,2,4-Trimethylbenzene	0.0595	0.0050	mg/kg wet	0.05000		119	70-130	5	25	
1,2-Dibromo-3-Chloropropane	0.0608	0.0050	mg/kg wet	0.05000		122	70-130	3	25	
1,2-Dibromoethane	0.0547	0.0050	mg/kg wet	0.05000		109	70-130	11	25	
1,2-Dichlorobenzene	0.0529	0.0050	mg/kg wet	0.05000		106	70-130	4	25	
1,2-Dichloroethane	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	9	25	
1,2-Dichloropropane	0.0534	0.0050	mg/kg wet	0.05000		107	70-130	11	25	
1,3,5-Trimethylbenzene	0.0625	0.0050	mg/kg wet	0.05000		125	70-130	3	25	
1,3-Dichlorobenzene	0.0569	0.0050	mg/kg wet	0.05000		114	70-130	8	25	

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
1,3-Dichloropropane	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	15	25	
1,4-Dichlorobenzene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	3	25	
1,4-Dioxane	1.22	0.100	mg/kg wet	1.000		122	70-130	3	20	
2,2-Dichloropropane	0.0582	0.0050	mg/kg wet	0.05000		116	70-130	8	25	
2-Butanone	0.257	0.0100	mg/kg wet	0.2500		103	70-130	18	25	
2-Chlorotoluene	0.0568	0.0050	mg/kg wet	0.05000		114	70-130	5	25	
2-Hexanone	0.286	0.0100	mg/kg wet	0.2500		114	70-130	0.5	25	
4-Chlorotoluene	0.0626	0.0050	mg/kg wet	0.05000		125	70-130	2	25	
4-Isopropyltoluene	0.0587	0.0050	mg/kg wet	0.05000		117	70-130	3	25	
4-Methyl-2-Pentanone	0.298	0.0100	mg/kg wet	0.2500		119	70-130	1	25	
Acetone	0.329	0.0100	mg/kg wet	0.2500		132	70-130	3	25	B+
Benzene	0.0590	0.0050	mg/kg wet	0.05000		118	70-130	12	25	
Bromobenzene	0.0553	0.0050	mg/kg wet	0.05000		111	70-130	5	25	
Bromochloromethane	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	2	25	
Bromodichloromethane	0.0535	0.0050	mg/kg wet	0.05000		107	70-130	14	25	
Bromoform	0.0559	0.0050	mg/kg wet	0.05000		112	70-130	15	25	
Bromomethane	0.0598	0.0100	mg/kg wet	0.05000		120	70-130	9	25	
Carbon Disulfide	0.0622	0.0050	mg/kg wet	0.05000		124	70-130	2	25	
Carbon Tetrachloride	0.0603	0.0050	mg/kg wet	0.05000		121	70-130	11	25	
Chlorobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	4	25	
Chloroethane	0.0512	0.0100	mg/kg wet	0.05000		102	70-130	5	25	
Chloroform	0.0584	0.0050	mg/kg wet	0.05000		117	70-130	11	25	
Chloromethane	0.0603	0.0100	mg/kg wet	0.05000		121	70-130	2	25	
cis-1,2-Dichloroethene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	10	25	
cis-1,3-Dichloropropene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130	13	25	
Dibromochloromethane	0.0538	0.0020	mg/kg wet	0.05000		108	70-130	14	25	
Dibromomethane	0.0645	0.0050	mg/kg wet	0.05000		129	70-130	8	25	
Dichlorodifluoromethane	0.0634	0.0100	mg/kg wet	0.05000		127	70-130	2	25	
Diethyl Ether	0.0558	0.0050	mg/kg wet	0.05000		112	70-130	6	25	
Di-isopropyl ether	0.0580	0.0050	mg/kg wet	0.05000		116	70-130	8	25	
Ethyl tertiary-butyl ether	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	18	25	
Ethylbenzene	0.0577	0.0050	mg/kg wet	0.05000		115	70-130	4	25	
Hexachlorobutadiene	0.0557	0.0050	mg/kg wet	0.05000		111	70-130	7	25	
Isopropylbenzene	0.0594	0.0050	mg/kg wet	0.05000		119	70-130	5	25	
Methyl tert-Butyl Ether	0.0546	0.0050	mg/kg wet	0.05000		109	70-130	11	25	
Methylene Chloride	0.0600	0.0100	mg/kg wet	0.05000		120	70-130	2	25	
Naphthalene	0.0467	0.0050	mg/kg wet	0.05000		93	70-130	2	25	
n-Butylbenzene	0.0603	0.0050	mg/kg wet	0.05000		121	70-130	5	25	
n-Propylbenzene	0.0592	0.0050	mg/kg wet	0.05000		118	70-130	4	25	
sec-Butylbenzene	0.0586	0.0050	mg/kg wet	0.05000		117	70-130	5	25	
Styrene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	2	25	
tert-Butylbenzene	0.0588	0.0050	mg/kg wet	0.05000		118	70-130	7	25	
Tertiary-amyl methyl ether	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	10	25	
Tetrachloroethene	0.0466	0.0050	mg/kg wet	0.05000		93	70-130	7	25	
Tetrahydrofuran	0.0681	0.0050	mg/kg wet	0.05000		136	70-130	3	25	B+

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
Toluene	0.0610	0.0050	mg/kg wet	0.05000		122	70-130	4	25	
trans-1,2-Dichloroethene	0.0586	0.0050	mg/kg wet	0.05000		117	70-130	12	25	
trans-1,3-Dichloropropene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	12	25	
Trichloroethene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	9	25	
Trichlorofluoromethane	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	10	25	
Vinyl Chloride	0.0600	0.0100	mg/kg wet	0.05000		120	70-130	4	25	
Xylene O	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	3	25	
Xylene P,M	0.110	0.0100	mg/kg wet	0.1000		110	70-130	4	25	
Surrogate: 1,2-Dichloroethane-d4	*0.0588*		mg/kg wet	*0.05000*		*118*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0580*		mg/kg wet	*0.05000*		*116*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0583*		mg/kg wet	*0.05000*		*117*	*70-130*			
Surrogate: Toluene-d8	*0.0536*		mg/kg wet	*0.05000*		*107*	*70-130*			
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH42135 - 5035										
Blank										
1,1,1,2-Tetrachloroethane	ND	0.100	mg/kg wet							
1,1,1-Trichloroethane	ND	0.0500	mg/kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0500	mg/kg wet							
1,1,2-Trichloroethane	ND	0.0500	mg/kg wet							
1,1-Dichloroethane	ND	0.0500	mg/kg wet							
1,1-Dichloroethene	ND	0.0500	mg/kg wet							
1,1-Dichloropropene	ND	0.0500	mg/kg wet							
1,2,3-Trichlorobenzene	ND	0.0500	mg/kg wet							
1,2,3-Trichloropropane	ND	0.0500	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.0500	mg/kg wet							
1,2,4-Trimethylbenzene	ND	0.0500	mg/kg wet							
1,2-Dibromo-3-Chloropropane	ND	0.200	mg/kg wet							
1,2-Dibromoethane	ND	0.0500	mg/kg wet							
1,2-Dichlorobenzene	ND	0.0500	mg/kg wet							
1,2-Dichloroethane	ND	0.0500	mg/kg wet							
1,2-Dichloropropane	ND	0.0500	mg/kg wet							
1,3,5-Trimethylbenzene	ND	0.0500	mg/kg wet							
1,3-Dichlorobenzene	ND	0.0500	mg/kg wet							
1,3-Dichloropropane	ND	0.0500	mg/kg wet							
1,4-Dichlorobenzene	ND	0.0500	mg/kg wet							
1,4-Dioxane - Screen	ND	5.00	mg/kg wet							
2,2-Dichloropropane	ND	0.100	mg/kg wet							
2-Butanone	ND	0.200	mg/kg wet							
2-Chlorotoluene	ND	0.0500	mg/kg wet							
2-Hexanone	ND	0.200	mg/kg wet							
4-Chlorotoluene	ND	0.0500	mg/kg wet							
4-Isopropyltoluene	ND	0.0500	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.200	mg/kg wet							
Acetone	0.418	0.200	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH42135 - 5035										
Benzene	ND	0.0500	mg/kg wet							
Bromobenzene	ND	0.0500	mg/kg wet							
Bromochloromethane	ND	0.0500	mg/kg wet							
Bromodichloromethane	ND	0.0500	mg/kg wet							
Bromoform	ND	0.0500	mg/kg wet							
Bromomethane	ND	0.100	mg/kg wet							
Carbon Disulfide	ND	0.0500	mg/kg wet							
Carbon Tetrachloride	ND	0.0500	mg/kg wet							
Chlorobenzene	ND	0.0500	mg/kg wet							
Chloroethane	ND	0.100	mg/kg wet							
Chloroform	ND	0.0500	mg/kg wet							
Chloromethane	ND	0.100	mg/kg wet							
cis-1,2-Dichloroethene	ND	0.0500	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.0500	mg/kg wet							
Dibromochloromethane	ND	0.0500	mg/kg wet							
Dibromomethane	ND	0.0500	mg/kg wet							
Dichlorodifluoromethane	ND	0.0500	mg/kg wet							
Diethyl Ether	ND	0.0500	mg/kg wet							
Di-isopropyl ether	ND	0.0500	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.0500	mg/kg wet							
Ethylbenzene	ND	0.0500	mg/kg wet							
Hexachlorobutadiene	ND	0.0500	mg/kg wet							
Isopropylbenzene	ND	0.0500	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.0500	mg/kg wet							
Methylene Chloride	ND	0.200	mg/kg wet							
Naphthalene	ND	0.0500	mg/kg wet							
n-Butylbenzene	ND	0.0500	mg/kg wet							
n-Propylbenzene	ND	0.0500	mg/kg wet							
sec-Butylbenzene	ND	0.0500	mg/kg wet							
Styrene	ND	0.0500	mg/kg wet							
tert-Butylbenzene	ND	0.0500	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.0500	mg/kg wet							
Tetrachloroethene	ND	0.0500	mg/kg wet							
Tetrahydrofuran	ND	0.200	mg/kg wet							
Toluene	ND	0.0500	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.0500	mg/kg wet							
trans-1,3-Dichloropropene	ND	0.0500	mg/kg wet							
Trichloroethene	ND	0.0500	mg/kg wet							
Trichlorofluoromethane	ND	0.0500	mg/kg wet							
Vinyl Chloride	ND	0.0500	mg/kg wet							
Xylene O	ND	0.0500	mg/kg wet							
Xylene P,M	ND	0.100	mg/kg wet							
Surrogate: 1,2-Dichloroethane-d4	*2.28*		mg/kg wet	*2.500*		*91*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*2.45*		mg/kg wet	*2.500*		*98*	*70-130*			
Surrogate: Dibromofluoromethane	*2.36*		mg/kg wet	*2.500*		*94*	*70-130*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH42135 - 5035										
Surrogate: Toluene-d8	*2.45*		mg/kg wet	*2.500*		*98*	*70-130*			
LCS										
1,1,1,2-Tetrachloroethane	2.66	0.100	mg/kg wet	2.500		106	70-130			
1,1,1-Trichloroethane	2.58	0.0500	mg/kg wet	2.500		103	70-130			
1,1,2,2-Tetrachloroethane	2.45	0.0500	mg/kg wet	2.500		98	70-130			
1,1,2-Trichloroethane	2.59	0.0500	mg/kg wet	2.500		104	70-130			
1,1-Dichloroethane	2.18	0.0500	mg/kg wet	2.500		87	70-130			
1,1-Dichloroethene	2.46	0.0500	mg/kg wet	2.500		98	70-130			
1,1-Dichloropropene	2.43	0.0500	mg/kg wet	2.500		97	70-130			
1,2,3-Trichlorobenzene	2.63	0.0500	mg/kg wet	2.500		105	70-130			
1,2,3-Trichloropropane	2.42	0.0500	mg/kg wet	2.500		97	70-130			
1,2,4-Trichlorobenzene	2.64	0.0500	mg/kg wet	2.500		106	70-130			
1,2,4-Trimethylbenzene	2.52	0.0500	mg/kg wet	2.500		101	70-130			
1,2-Dibromo-3-Chloropropane	2.48	0.200	mg/kg wet	2.500		99	70-130			
1,2-Dibromoethane	2.63	0.0500	mg/kg wet	2.500		105	70-130			
1,2-Dichlorobenzene	2.57	0.0500	mg/kg wet	2.500		103	70-130			
1,2-Dichloroethane	2.52	0.0500	mg/kg wet	2.500		101	70-130			
1,2-Dichloropropane	2.25	0.0500	mg/kg wet	2.500		90	70-130			
1,3,5-Trimethylbenzene	2.67	0.0500	mg/kg wet	2.500		107	70-130			
1,3-Dichlorobenzene	2.62	0.0500	mg/kg wet	2.500		105	70-130			
1,3-Dichloropropane	2.58	0.0500	mg/kg wet	2.500		103	70-130			
1,4-Dichlorobenzene	2.65	0.0500	mg/kg wet	2.500		106	70-130			
1,4-Dioxane - Screen	53.1	5.00	mg/kg wet	50.00		106	44-241			
2,2-Dichloropropane	2.71	0.100	mg/kg wet	2.500		108	70-130			
2-Butanone	9.20	0.200	mg/kg wet	12.50		74	70-130			
2-Chlorotoluene	2.59	0.0500	mg/kg wet	2.500		104	70-130			
2-Hexanone	11.1	0.200	mg/kg wet	12.50		89	70-130			
4-Chlorotoluene	2.55	0.0500	mg/kg wet	2.500		102	70-130			
4-Isopropyltoluene	2.63	0.0500	mg/kg wet	2.500		105	70-130			
4-Methyl-2-Pentanone	12.2	0.200	mg/kg wet	12.50		97	70-130			
Acetone	10.7	0.200	mg/kg wet	12.50		86	70-130			
Benzene	2.31	0.0500	mg/kg wet	2.500		92	70-130			
Bromobenzene	2.75	0.0500	mg/kg wet	2.500		110	70-130			
Bromochloromethane	2.61	0.0500	mg/kg wet	2.500		104	70-130			
Bromodichloromethane	2.59	0.0500	mg/kg wet	2.500		103	70-130			
Bromoform	2.90	0.0500	mg/kg wet	2.500		116	70-130			
Bromomethane	2.74	0.100	mg/kg wet	2.500		110	70-130			
Carbon Disulfide	2.31	0.0500	mg/kg wet	2.500		92	70-130			
Carbon Tetrachloride	2.57	0.0500	mg/kg wet	2.500		103	70-130			
Chlorobenzene	2.65	0.0500	mg/kg wet	2.500		106	70-130			
Chloroethane	2.41	0.100	mg/kg wet	2.500		96	70-130			
Chloroform	2.44	0.0500	mg/kg wet	2.500		98	70-130			
Chloromethane	2.60	0.100	mg/kg wet	2.500		104	70-130			
cis-1,2-Dichloroethene	2.43	0.0500	mg/kg wet	2.500		97	70-130			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH42135 - 5035										
cis-1,3-Dichloropropene	2.73	0.0500	mg/kg wet	2.500		109	70-130			
Dibromochloromethane	2.84	0.0500	mg/kg wet	2.500		113	70-130			
Dibromomethane	2.58	0.0500	mg/kg wet	2.500		103	70-130			
Dichlorodifluoromethane	3.00	0.0500	mg/kg wet	2.500		120	70-130			
Diethyl Ether	2.15	0.0500	mg/kg wet	2.500		86	70-130			
Di-isopropyl ether	1.99	0.0500	mg/kg wet	2.500		80	70-130			
Ethyl tertiary-butyl ether	2.24	0.0500	mg/kg wet	2.500		89	70-130			
Ethylbenzene	2.72	0.0500	mg/kg wet	2.500		109	70-130			
Hexachlorobutadiene	2.94	0.0500	mg/kg wet	2.500		117	70-130			
Isopropylbenzene	2.53	0.0500	mg/kg wet	2.500		101	70-130			
Methyl tert-Butyl Ether	2.35	0.0500	mg/kg wet	2.500		94	70-130			
Methylene Chloride	2.27	0.200	mg/kg wet	2.500		91	70-130			
Naphthalene	2.17	0.0500	mg/kg wet	2.500		87	70-130			
n-Butylbenzene	2.51	0.0500	mg/kg wet	2.500		101	70-130			
n-Propylbenzene	2.44	0.0500	mg/kg wet	2.500		98	70-130			
sec-Butylbenzene	2.52	0.0500	mg/kg wet	2.500		101	70-130			
Styrene	2.72	0.0500	mg/kg wet	2.500		109	70-130			
tert-Butylbenzene	2.71	0.0500	mg/kg wet	2.500		109	70-130			
Tertiary-amyl methyl ether	2.22	0.0500	mg/kg wet	2.500		89	70-130			
Tetrachloroethene	2.52	0.0500	mg/kg wet	2.500		101	70-130			
Tetrahydrofuran	1.87	0.200	mg/kg wet	2.500		75	70-130			
Toluene	2.93	0.0500	mg/kg wet	2.500		117	70-130			
trans-1,2-Dichloroethene	2.41	0.0500	mg/kg wet	2.500		97	70-130			
trans-1,3-Dichloropropene	2.66	0.0500	mg/kg wet	2.500		106	70-130			
Trichloroethene	2.60	0.0500	mg/kg wet	2.500		104	70-130			
Trichlorofluoromethane	2.46	0.0500	mg/kg wet	2.500		98	70-130			
Vinyl Chloride	3.01	0.0500	mg/kg wet	2.500		121	70-130			
Xylene O	2.63	0.0500	mg/kg wet	2.500		105	70-130			
Xylene P,M	5.38	0.100	mg/kg wet	5.000		108	70-130			
Surrogate: 1,2-Dichloroethane-d4	*2.44*		mg/kg wet	*2.500*		*98*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*2.66*		mg/kg wet	*2.500*		*107*	*70-130*			
Surrogate: Dibromofluoromethane	*2.51*		mg/kg wet	*2.500*		*100*	*70-130*			
Surrogate: Toluene-d8	*2.67*		mg/kg wet	*2.500*		*107*	*70-130*			
LCS Dup										
1,1,1,2-Tetrachloroethane	2.50	0.100	mg/kg wet	2.500		100	70-130	6	25	
1,1,1-Trichloroethane	2.43	0.0500	mg/kg wet	2.500		97	70-130	6	25	
1,1,2,2-Tetrachloroethane	2.33	0.0500	mg/kg wet	2.500		93	70-130	5	25	
1,1,2-Trichloroethane	2.33	0.0500	mg/kg wet	2.500		93	70-130	11	25	
1,1-Dichloroethane	2.16	0.0500	mg/kg wet	2.500		86	70-130	1	25	
1,1-Dichloroethene	2.33	0.0500	mg/kg wet	2.500		93	70-130	5	25	
1,1-Dichloropropene	2.43	0.0500	mg/kg wet	2.500		97	70-130	0.08	25	
1,2,3-Trichlorobenzene	2.54	0.0500	mg/kg wet	2.500		102	70-130	3	25	
1,2,3-Trichloropropane	2.29	0.0500	mg/kg wet	2.500		92	70-130	5	25	
1,2,4-Trichlorobenzene	2.55	0.0500	mg/kg wet	2.500		102	70-130	4	25	
1,2,4-Trimethylbenzene	2.41	0.0500	mg/kg wet	2.500		96	70-130	5	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH42135 - 5035										
1,2-Dibromo-3-Chloropropane	2.34	0.200	mg/kg wet	2.500		94	70-130	6	25	
1,2-Dibromoethane	2.50	0.0500	mg/kg wet	2.500		100	70-130	5	25	
1,2-Dichlorobenzene	2.42	0.0500	mg/kg wet	2.500		97	70-130	6	25	
1,2-Dichloroethane	2.29	0.0500	mg/kg wet	2.500		92	70-130	10	25	
1,2-Dichloropropane	2.28	0.0500	mg/kg wet	2.500		91	70-130	1	25	
1,3,5-Trimethylbenzene	2.54	0.0500	mg/kg wet	2.500		101	70-130	5	25	
1,3-Dichlorobenzene	2.46	0.0500	mg/kg wet	2.500		98	70-130	6	25	
1,3-Dichloropropane	2.45	0.0500	mg/kg wet	2.500		98	70-130	5	25	
1,4-Dichlorobenzene	2.49	0.0500	mg/kg wet	2.500		100	70-130	6	25	
1,4-Dioxane - Screen	56.3	5.00	mg/kg wet	50.00		113	44-241	6	200	
2,2-Dichloropropane	2.51	0.100	mg/kg wet	2.500		101	70-130	7	25	
2-Butanone	9.52	0.200	mg/kg wet	12.50		76	70-130	3	25	
2-Chlorotoluene	2.43	0.0500	mg/kg wet	2.500		97	70-130	6	25	
2-Hexanone	10.7	0.200	mg/kg wet	12.50		86	70-130	3	25	
4-Chlorotoluene	2.41	0.0500	mg/kg wet	2.500		96	70-130	6	25	
4-Isopropyltoluene	2.49	0.0500	mg/kg wet	2.500		100	70-130	5	25	
4-Methyl-2-Pentanone	11.1	0.200	mg/kg wet	12.50		89	70-130	9	25	
Acetone	10.3	0.200	mg/kg wet	12.50		82	70-130	4	25	
Benzene	2.26	0.0500	mg/kg wet	2.500		91	70-130	2	25	
Bromobenzene	2.59	0.0500	mg/kg wet	2.500		104	70-130	6	25	
Bromochloromethane	2.52	0.0500	mg/kg wet	2.500		101	70-130	3	25	
Bromodichloromethane	2.50	0.0500	mg/kg wet	2.500		100	70-130	4	25	
Bromoform	2.74	0.0500	mg/kg wet	2.500		110	70-130	5	25	
Bromomethane	2.61	0.100	mg/kg wet	2.500		104	70-130	5	25	
Carbon Disulfide	2.22	0.0500	mg/kg wet	2.500		89	70-130	4	25	
Carbon Tetrachloride	2.45	0.0500	mg/kg wet	2.500		98	70-130	5	25	
Chlorobenzene	2.47	0.0500	mg/kg wet	2.500		99	70-130	7	25	
Chloroethane	2.24	0.100	mg/kg wet	2.500		89	70-130	7	25	
Chloroform	2.35	0.0500	mg/kg wet	2.500		94	70-130	4	25	
Chloromethane	2.28	0.100	mg/kg wet	2.500		91	70-130	13	25	
cis-1,2-Dichloroethene	2.34	0.0500	mg/kg wet	2.500		93	70-130	4	25	
cis-1,3-Dichloropropene	2.56	0.0500	mg/kg wet	2.500		102	70-130	7	25	
Dibromochloromethane	2.68	0.0500	mg/kg wet	2.500		107	70-130	6	25	
Dibromomethane	2.50	0.0500	mg/kg wet	2.500		100	70-130	3	25	
Dichlorodifluoromethane	2.62	0.0500	mg/kg wet	2.500		105	70-130	13	25	
Diethyl Ether	2.06	0.0500	mg/kg wet	2.500		82	70-130	4	25	
Di-isopropyl ether	2.02	0.0500	mg/kg wet	2.500		81	70-130	2	25	
Ethyl tertiary-butyl ether	2.17	0.0500	mg/kg wet	2.500		87	70-130	3	25	
Ethylbenzene	2.55	0.0500	mg/kg wet	2.500		102	70-130	7	25	
Hexachlorobutadiene	2.83	0.0500	mg/kg wet	2.500		113	70-130	4	25	
Isopropylbenzene	2.38	0.0500	mg/kg wet	2.500		95	70-130	6	25	
Methyl tert-Butyl Ether	2.20	0.0500	mg/kg wet	2.500		88	70-130	6	25	
Methylene Chloride	2.17	0.200	mg/kg wet	2.500		87	70-130	5	25	
Naphthalene	2.08	0.0500	mg/kg wet	2.500		83	70-130	4	25	
n-Butylbenzene	2.37	0.0500	mg/kg wet	2.500		95	70-130	6	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408317

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Methanol										
Batch CH42135 - 5035										
n-Propylbenzene	2.29	0.0500	mg/kg wet	2.500		92	70-130	6	25	
sec-Butylbenzene	2.40	0.0500	mg/kg wet	2.500		96	70-130	5	25	
Styrene	2.56	0.0500	mg/kg wet	2.500		103	70-130	6	25	
tert-Butylbenzene	2.56	0.0500	mg/kg wet	2.500		102	70-130	6	25	
Tertiary-amyl methyl ether	2.06	0.0500	mg/kg wet	2.500		82	70-130	7	25	
Tetrachloroethene	2.35	0.0500	mg/kg wet	2.500		94	70-130	7	25	
Tetrahydrofuran	2.04	0.200	mg/kg wet	2.500		82	70-130	9	25	
Toluene	2.60	0.0500	mg/kg wet	2.500		104	70-130	12	25	
trans-1,2-Dichloroethene	2.23	0.0500	mg/kg wet	2.500		89	70-130	8	25	
trans-1,3-Dichloropropene	2.36	0.0500	mg/kg wet	2.500		95	70-130	12	25	
Trichloroethene	2.44	0.0500	mg/kg wet	2.500		98	70-130	6	25	
Trichlorofluoromethane	2.16	0.0500	mg/kg wet	2.500		87	70-130	13	25	
Vinyl Chloride	2.68	0.0500	mg/kg wet	2.500		107	70-130	12	25	
Xylene O	2.48	0.0500	mg/kg wet	2.500		99	70-130	6	25	
Xylene P,M	5.07	0.100	mg/kg wet	5.000		101	70-130	6	25	
Surrogate: 1,2-Dichloroethane-d4	*2.29*		mg/kg wet	*2.500*		*92*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*2.49*		mg/kg wet	*2.500*		*100*	*70-130*			
Surrogate: Dibromofluoromethane	*2.44*		mg/kg wet	*2.500*		*98*	*70-130*			
Surrogate: Toluene-d8	*2.48*		mg/kg wet	*2.500*		*99*	*70-130*			
8082A Polychlorinated Biphenyls (PCB)										
Batch CH41504 - 3540C										
Blank										
Aroclor 1016	ND	0.0500	mg/kg wet							
Aroclor 1221	ND	0.0500	mg/kg wet							
Aroclor 1232	ND	0.0500	mg/kg wet							
Aroclor 1242	ND	0.0500	mg/kg wet							
Aroclor 1248	ND	0.0500	mg/kg wet							
Aroclor 1254	ND	0.0500	mg/kg wet							
Aroclor 1260	ND	0.0500	mg/kg wet							
Aroclor 1262	ND	0.0500	mg/kg wet							
Aroclor 1268	ND	0.0500	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0201*		mg/kg wet	*0.02500*		*81*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0205*		mg/kg wet	*0.02500*		*82*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0222*		mg/kg wet	*0.02500*		*89*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0255*		mg/kg wet	*0.02500*		*102*	*30-150*			
LCS										
Aroclor 1016	0.575	0.0500	mg/kg wet	0.5000		115	40-140			
Aroclor 1260	0.518	0.0500	mg/kg wet	0.5000		104	40-140			
Surrogate: Decachlorobiphenyl	*0.0200*		mg/kg wet	*0.02500*		*80*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0205*		mg/kg wet	*0.02500*		*82*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0228*		mg/kg wet	*0.02500*		*91*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0243*		mg/kg wet	*0.02500*		*97*	*30-150*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408317

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8082A Polychlorinated Biphenyls (PCB)										
Batch CH41504 - 3540C										
LCS Dup										
Aroclor 1016	0.575	0.0500	mg/kg wet	0.5000		115	40-140	0.03	30	
Aroclor 1260	0.527	0.0500	mg/kg wet	0.5000		105	40-140	2	30	
Surrogate: Decachlorobiphenyl	*0.0206*		mg/kg wet	*0.02500*		*82*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0212*		mg/kg wet	*0.02500*		*85*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0236*		mg/kg wet	*0.02500*		*94*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0253*		mg/kg wet	*0.02500*		*101*	*30-150*			
8270D Semi-Volatile Organic Compounds										
Batch CH41405 - 3546										
Blank										
1,2,4-Trichlorobenzene	ND	0.333	mg/kg wet							
1,2-Dichlorobenzene	ND	0.333	mg/kg wet							
1,3-Dichlorobenzene	ND	0.333	mg/kg wet							
1,4-Dichlorobenzene	ND	0.333	mg/kg wet							
2,4,5-Trichlorophenol	ND	0.333	mg/kg wet							
2,4,6-Trichlorophenol	ND	0.333	mg/kg wet							
2,4-Dichlorophenol	ND	0.333	mg/kg wet							
2,4-Dimethylphenol	ND	0.333	mg/kg wet							
2,4-Dinitrophenol	ND	1.67	mg/kg wet							
2,4-Dinitrotoluene	ND	0.333	mg/kg wet							
2,6-Dinitrotoluene	ND	0.333	mg/kg wet							
2-Chloronaphthalene	ND	0.333	mg/kg wet							
2-Chlorophenol	ND	0.333	mg/kg wet							
2-Methylnaphthalene	ND	0.333	mg/kg wet							
2-Methylphenol	ND	0.333	mg/kg wet							
2-Nitrophenol	ND	0.333	mg/kg wet							
3,3´-Dichlorobenzidine	ND	0.667	mg/kg wet							
3+4-Methylphenol	ND	0.667	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet							
4-Chloroaniline	ND	0.667	mg/kg wet							
4-Nitrophenol	ND	1.67	mg/kg wet							
Acenaphthene	ND	0.333	mg/kg wet							
Acenaphthylene	ND	0.333	mg/kg wet							
Acetophenone	ND	0.667	mg/kg wet							
Aniline	ND	1.67	mg/kg wet							
Anthracene	ND	0.333	mg/kg wet							
Azobenzene	ND	0.333	mg/kg wet							
Benzo(a)anthracene	ND	0.333	mg/kg wet							
Benzo(a)pyrene	ND	0.167	mg/kg wet							
Benzo(b)fluoranthene	ND	0.333	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.333	mg/kg wet							
Benzo(k)fluoranthene	ND	0.333	mg/kg wet							
bis(2-Chloroethoxy)methane	ND	0.333	mg/kg wet							

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41405 - 3546										
bis(2-Chloroethyl)ether	ND	0.333	mg/kg wet							
bis(2-chloroisopropyl)Ether	ND	0.333	mg/kg wet							
bis(2-Ethylhexyl)phthalate	ND	0.333	mg/kg wet							
Butylbenzylphthalate	ND	0.333	mg/kg wet							
Chrysene	ND	0.167	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.167	mg/kg wet							
Dibenzofuran	ND	0.333	mg/kg wet							
Diethylphthalate	ND	0.333	mg/kg wet							
Dimethylphthalate	ND	0.333	mg/kg wet							
Di-n-butylphthalate	ND	0.333	mg/kg wet							
Di-n-octylphthalate	ND	0.333	mg/kg wet							
Fluoranthene	ND	0.333	mg/kg wet							
Fluorene	ND	0.333	mg/kg wet							
Hexachlorobenzene	ND	0.333	mg/kg wet							
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachloroethane	ND	0.333	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.333	mg/kg wet							
Isophorone	ND	0.333	mg/kg wet							
Naphthalene	ND	0.333	mg/kg wet							
Nitrobenzene	ND	0.333	mg/kg wet							
N-Nitrosodimethylamine	ND	0.333	mg/kg wet							
Pentachlorophenol	ND	1.67	mg/kg wet							
Phenanthrene	ND	0.333	mg/kg wet							
Phenol	ND	0.333	mg/kg wet							
Pyrene	ND	0.333	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	*2.27*		mg/kg wet	*3.333*		*68*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.84*		mg/kg wet	*5.000*		*77*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.19*		mg/kg wet	*5.000*		*64*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.51*		mg/kg wet	*3.333*		*75*	*30-130*			
Surrogate: 2-Fluorophenol	*3.16*		mg/kg wet	*5.000*		*63*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.13*		mg/kg wet	*3.333*		*64*	*30-130*			
Surrogate: Phenol-d6	*3.42*		mg/kg wet	*5.000*		*68*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.67*		mg/kg wet	*3.333*		*80*	*30-130*			
LCS										
1,2,4-Trichlorobenzene	2.15	0.333	mg/kg wet	3.333		65	40-140			
1,2-Dichlorobenzene	2.03	0.333	mg/kg wet	3.333		61	40-140			
1,3-Dichlorobenzene	1.99	0.333	mg/kg wet	3.333		60	40-140			
1,4-Dichlorobenzene	1.99	0.333	mg/kg wet	3.333		60	40-140			
2,4,5-Trichlorophenol	2.62	0.333	mg/kg wet	3.333		79	30-130			
2,4,6-Trichlorophenol	2.48	0.333	mg/kg wet	3.333		74	30-130			
2,4-Dichlorophenol	2.39	0.333	mg/kg wet	3.333		72	30-130			
2,4-Dimethylphenol	2.27	0.333	mg/kg wet	3.333		68	30-130			
2,4-Dinitrophenol	2.46	1.67	mg/kg wet	3.333		74	30-130			
2,4-Dinitrotoluene	2.74	0.333	mg/kg wet	3.333		82	40-140			
2,6-Dinitrotoluene	2.55	0.333	mg/kg wet	3.333		76	40-140			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408317

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41405 - 3546										
2-Chloronaphthalene	2.08	0.333	mg/kg wet	3.333		62	40-140			
2-Chlorophenol	1.97	0.333	mg/kg wet	3.333		59	30-130			
2-Methylnaphthalene	2.41	0.333	mg/kg wet	3.333		72	40-140			
2-Methylphenol	2.22	0.333	mg/kg wet	3.333		67	30-130			
2-Nitrophenol	2.31	0.333	mg/kg wet	3.333		69	30-130			
3,3´-Dichlorobenzidine	2.27	0.667	mg/kg wet	3.333		68	40-140			
3+4-Methylphenol	4.52	0.667	mg/kg wet	6.667		68	30-130			
4-Bromophenyl-phenylether	2.73	0.333	mg/kg wet	3.333		82	40-140			
4-Chloroaniline	1.60	0.667	mg/kg wet	3.333		48	40-140			
4-Nitrophenol	2.73	1.67	mg/kg wet	3.333		82	30-130			
Acenaphthene	2.25	0.333	mg/kg wet	3.333		67	40-140			
Acenaphthylene	2.21	0.333	mg/kg wet	3.333		66	40-140			
Acetophenone	1.97	0.667	mg/kg wet	3.333		59	40-140			
Aniline	1.97	1.67	mg/kg wet	3.333		59	40-140			
Anthracene	2.61	0.333	mg/kg wet	3.333		78	40-140			
Azobenzene	2.51	0.333	mg/kg wet	3.333		75	40-140			
Benzo(a)anthracene	2.40	0.333	mg/kg wet	3.333		72	40-140			
Benzo(a)pyrene	2.36	0.167	mg/kg wet	3.333		71	40-140			
Benzo(b)fluoranthene	2.47	0.333	mg/kg wet	3.333		74	40-140			
Benzo(g,h,i)perylene	2.68	0.333	mg/kg wet	3.333		80	40-140			
Benzo(k)fluoranthene	2.71	0.333	mg/kg wet	3.333		81	40-140			
bis(2-Chloroethoxy)methane	2.19	0.333	mg/kg wet	3.333		66	40-140			
bis(2-Chloroethyl)ether	2.03	0.333	mg/kg wet	3.333		61	40-140			
bis(2-chloroisopropyl)Ether	2.06	0.333	mg/kg wet	3.333		62	40-140			
bis(2-Ethylhexyl)phthalate	2.79	0.333	mg/kg wet	3.333		84	40-140			
Butylbenzylphthalate	2.73	0.333	mg/kg wet	3.333		82	40-140			
Chrysene	2.56	0.167	mg/kg wet	3.333		77	40-140			
Dibenzo(a,h)Anthracene	2.71	0.167	mg/kg wet	3.333		81	40-140			
Dibenzofuran	2.34	0.333	mg/kg wet	3.333		70	40-140			
Diethylphthalate	2.61	0.333	mg/kg wet	3.333		78	40-140			
Dimethylphthalate	2.47	0.333	mg/kg wet	3.333		74	40-140			
Di-n-butylphthalate	2.77	0.333	mg/kg wet	3.333		83	40-140			
Di-n-octylphthalate	2.98	0.333	mg/kg wet	3.333		89	40-140			
Fluoranthene	2.83	0.333	mg/kg wet	3.333		85	40-140			
Fluorene	2.43	0.333	mg/kg wet	3.333		73	40-140			
Hexachlorobenzene	2.63	0.333	mg/kg wet	3.333		79	40-140			
Hexachlorobutadiene	2.06	0.333	mg/kg wet	3.333		62	40-140			
Hexachloroethane	2.07	0.333	mg/kg wet	3.333		62	40-140			
Indeno(1,2,3-cd)Pyrene	2.77	0.333	mg/kg wet	3.333		83	40-140			
Isophorone	2.10	0.333	mg/kg wet	3.333		63	40-140			
Naphthalene	2.15	0.333	mg/kg wet	3.333		65	40-140			
Nitrobenzene	2.07	0.333	mg/kg wet	3.333		62	40-140			
N-Nitrosodimethylamine	1.97	0.333	mg/kg wet	3.333		59	40-140			
Pentachlorophenol	2.98	1.67	mg/kg wet	3.333		89	30-130			
Phenanthrene	2.63	0.333	mg/kg wet	3.333		79	40-140			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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ESS Laboratory Work Order: 1408317

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41405 - 3546										
Phenol	2.43	0.333	mg/kg wet	3.333		73	30-130			
Pyrene	2.69	0.333	mg/kg wet	3.333		81	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*2.22*		mg/kg wet	*3.333*		*67*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.70*		mg/kg wet	*5.000*		*94*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.33*		mg/kg wet	*5.000*		*67*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.58*		mg/kg wet	*3.333*		*77*	*30-130*			
Surrogate: 2-Fluorophenol	*3.23*		mg/kg wet	*5.000*		*65*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.38*		mg/kg wet	*3.333*		*71*	*30-130*			
Surrogate: Phenol-d6	*3.32*		mg/kg wet	*5.000*		*66*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.91*		mg/kg wet	*3.333*		*87*	*30-130*			
LCS Dup										
1,2,4-Trichlorobenzene	2.34	0.333	mg/kg wet	3.333		70	40-140	8	30	
1,2-Dichlorobenzene	2.27	0.333	mg/kg wet	3.333		68	40-140	11	30	
1,3-Dichlorobenzene	2.21	0.333	mg/kg wet	3.333		66	40-140	11	30	
1,4-Dichlorobenzene	2.28	0.333	mg/kg wet	3.333		68	40-140	14	30	
2,4,5-Trichlorophenol	2.64	0.333	mg/kg wet	3.333		79	30-130	0.8	30	
2,4,6-Trichlorophenol	2.65	0.333	mg/kg wet	3.333		79	30-130	7	30	
2,4-Dichlorophenol	2.54	0.333	mg/kg wet	3.333		76	30-130	6	30	
2,4-Dimethylphenol	2.44	0.333	mg/kg wet	3.333		73	30-130	8	30	
2,4-Dinitrophenol	2.47	1.67	mg/kg wet	3.333		74	30-130	0.2	30	
2,4-Dinitrotoluene	2.79	0.333	mg/kg wet	3.333		84	40-140	2	30	
2,6-Dinitrotoluene	2.61	0.333	mg/kg wet	3.333		78	40-140	3	30	
2-Chloronaphthalene	2.22	0.333	mg/kg wet	3.333		67	40-140	7	30	
2-Chlorophenol	2.32	0.333	mg/kg wet	3.333		70	30-130	16	30	
2-Methylnaphthalene	2.65	0.333	mg/kg wet	3.333		80	40-140	9	30	
2-Methylphenol	2.45	0.333	mg/kg wet	3.333		74	30-130	10	30	
2-Nitrophenol	2.65	0.333	mg/kg wet	3.333		80	30-130	14	30	
3,3´-Dichlorobenzidine	2.32	0.667	mg/kg wet	3.333		70	40-140	2	30	
3+4-Methylphenol	4.87	0.667	mg/kg wet	6.667		73	30-130	7	30	
4-Bromophenyl-phenylether	2.65	0.333	mg/kg wet	3.333		79	40-140	3	30	
4-Chloroaniline	1.87	0.667	mg/kg wet	3.333		56	40-140	16	30	
4-Nitrophenol	2.78	1.67	mg/kg wet	3.333		84	30-130	2	30	
Acenaphthene	2.36	0.333	mg/kg wet	3.333		71	40-140	5	30	
Acenaphthylene	2.29	0.333	mg/kg wet	3.333		69	40-140	4	30	
Acetophenone	2.21	0.667	mg/kg wet	3.333		66	40-140	11	30	
Aniline	2.34	1.67	mg/kg wet	3.333		70	40-140	18	30	
Anthracene	2.66	0.333	mg/kg wet	3.333		80	40-140	2	30	
Azobenzene	2.56	0.333	mg/kg wet	3.333		77	40-140	2	30	
Benzo(a)anthracene	2.48	0.333	mg/kg wet	3.333		74	40-140	3	30	
Benzo(a)pyrene	2.48	0.167	mg/kg wet	3.333		74	40-140	5	30	
Benzo(b)fluoranthene	2.71	0.333	mg/kg wet	3.333		81	40-140	9	30	
Benzo(g,h,i)perylene	2.86	0.333	mg/kg wet	3.333		86	40-140	6	30	
Benzo(k)fluoranthene	2.66	0.333	mg/kg wet	3.333		80	40-140	2	30	
bis(2-Chloroethoxy)methane	2.42	0.333	mg/kg wet	3.333		72	40-140	10	30	
bis(2-Chloroethyl)ether	2.34	0.333	mg/kg wet	3.333		70	40-140	14	30	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408317

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41405 - 3546										
bis(2-chloroisopropyl)Ether	2.32	0.333	mg/kg wet	3.333		70	40-140	12	30	
bis(2-Ethylhexyl)phthalate	2.98	0.333	mg/kg wet	3.333		89	40-140	7	30	
Butylbenzylphthalate	2.89	0.333	mg/kg wet	3.333		87	40-140	6	30	
Chrysene	2.70	0.167	mg/kg wet	3.333		81	40-140	5	30	
Dibenzo(a,h)Anthracene	2.88	0.167	mg/kg wet	3.333		86	40-140	6	30	
Dibenzofuran	2.43	0.333	mg/kg wet	3.333		73	40-140	4	30	
Diethylphthalate	2.68	0.333	mg/kg wet	3.333		80	40-140	3	30	
Dimethylphthalate	2.54	0.333	mg/kg wet	3.333		76	40-140	3	30	
Di-n-butylphthalate	2.80	0.333	mg/kg wet	3.333		84	40-140	0.8	30	
Di-n-octylphthalate	3.11	0.333	mg/kg wet	3.333		93	40-140	5	30	
Fluoranthene	2.88	0.333	mg/kg wet	3.333		86	40-140	2	30	
Fluorene	2.47	0.333	mg/kg wet	3.333		74	40-140	2	30	
Hexachlorobenzene	2.67	0.333	mg/kg wet	3.333		80	40-140	1	30	
Hexachlorobutadiene	2.29	0.333	mg/kg wet	3.333		69	40-140	11	30	
Hexachloroethane	2.33	0.333	mg/kg wet	3.333		70	40-140	12	30	
Indeno(1,2,3-cd)Pyrene	2.92	0.333	mg/kg wet	3.333		88	40-140	5	30	
Isophorone	2.25	0.333	mg/kg wet	3.333		68	40-140	7	30	
Naphthalene	2.45	0.333	mg/kg wet	3.333		73	40-140	13	30	
Nitrobenzene	2.42	0.333	mg/kg wet	3.333		73	40-140	15	30	
N-Nitrosodimethylamine	2.18	0.333	mg/kg wet	3.333		65	40-140	10	30	
Pentachlorophenol	3.02	1.67	mg/kg wet	3.333		91	30-130	1	30	
Phenanthrene	2.69	0.333	mg/kg wet	3.333		81	40-140	2	30	
Phenol	2.33	0.333	mg/kg wet	3.333		70	30-130	4	30	
Pyrene	2.84	0.333	mg/kg wet	3.333		85	40-140	5	30	
Surrogate: 1,2-Dichlorobenzene-d4	*2.36*		mg/kg wet	*3.333*		*71*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.57*		mg/kg wet	*5.000*		*91*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*3.40*		mg/kg wet	*5.000*		*68*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.57*		mg/kg wet	*3.333*		*77*	*30-130*			
Surrogate: 2-Fluorophenol	*3.47*		mg/kg wet	*5.000*		*69*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.58*		mg/kg wet	*3.333*		*77*	*30-130*			
Surrogate: Phenol-d6	*3.46*		mg/kg wet	*5.000*		*69*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.91*		mg/kg wet	*3.333*		*87*	*30-130*			
Classical Chemistry										
Batch CH41805 - General Preparation										
Blank										
Conductivity	ND	5	umhos/cm							
LCS										
Conductivity	1390		umhos/cm	1411		98	90-110			
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41403 - 3546										
Blank										
C19-C36 Aliphatics1	ND	15.0	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408317

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41403 - 3546										
C9-C18 Aliphatics1	ND	15.0	mg/kg wet							
Decane (C10)	ND	0.5	mg/kg wet							
Docosane (C22)	ND	0.5	mg/kg wet							
Dodecane (C12)	ND	0.5	mg/kg wet							
Eicosane (C20)	ND	0.5	mg/kg wet							
Hexacosane (C26)	ND	0.5	mg/kg wet							
Hexadecane (C16)	ND	0.5	mg/kg wet							
Hexatriacontane (C36)	ND	0.5	mg/kg wet							
Nonadecane (C19)	ND	0.5	mg/kg wet							
Nonane (C9)	ND	0.5	mg/kg wet							
Octacosane (C28)	ND	0.5	mg/kg wet							
Octadecane (C18)	ND	0.5	mg/kg wet							
Tetracosane (C24)	ND	0.5	mg/kg wet							
Tetradecane (C14)	ND	0.5	mg/kg wet							
Triacontane (C30)	ND	0.5	mg/kg wet							
Surrogate: 1-Chlorooctadecane	*1.64*		mg/kg wet	*2.000*		*82*	*40-140*			
Blank										
2-Methylnaphthalene	ND	0.20	mg/kg wet							
Acenaphthene	ND	0.40	mg/kg wet							
Acenaphthylene	ND	0.20	mg/kg wet							
Anthracene	ND	0.40	mg/kg wet							
Benzo(a)anthracene	ND	0.40	mg/kg wet							
Benzo(a)pyrene	ND	0.40	mg/kg wet							
Benzo(b)fluoranthene	ND	0.40	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.40	mg/kg wet							
Benzo(k)fluoranthene	ND	0.40	mg/kg wet							
C11-C22 Unadjusted Aromatics1	ND	15.0	mg/kg wet							
Chrysene	ND	0.40	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.20	mg/kg wet							
Fluoranthene	ND	0.40	mg/kg wet							
Fluorene	ND	0.40	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.40	mg/kg wet							
Naphthalene	ND	0.40	mg/kg wet							
Phenanthrene	ND	0.40	mg/kg wet							
Pyrene	ND	0.40	mg/kg wet							
Surrogate: 2-Bromonaphthalene	*2.05*		mg/kg wet	*2.000*		*102*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*2.01*		mg/kg wet	*2.000*		*101*	*40-140*			
Surrogate: O-Terphenyl	*1.54*		mg/kg wet	*2.000*		*77*	*40-140*			
LCS										
C19-C36 Aliphatics1	19.2	15.0	mg/kg wet	16.00		120	40-140			
C9-C18 Aliphatics1	12.0	15.0	mg/kg wet	12.00		100	40-140			
Decane (C10)	1.2	0.5	mg/kg wet	2.000		61	40-140			
Docosane (C22)	1.9	0.5	mg/kg wet	2.000		93	40-140			
Dodecane (C12)	1.3	0.5	mg/kg wet	2.000		67	40-140			

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Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41403 - 3546										
Eicosane (C20)	1.8	0.5	mg/kg wet	2.000		90	40-140			
Hexacosane (C26)	1.8	0.5	mg/kg wet	2.000		89	40-140			
Hexadecane (C16)	1.7	0.5	mg/kg wet	2.000		85	40-140			
Hexatriacontane (C36)	1.8	0.5	mg/kg wet	2.000		92	40-140			
Nonadecane (C19)	1.8	0.5	mg/kg wet	2.000		90	40-140			
Nonane (C9)	0.9	0.5	mg/kg wet	2.000		46	30-140			
Octacosane (C28)	1.7	0.5	mg/kg wet	2.000		86	40-140			
Octadecane (C18)	1.8	0.5	mg/kg wet	2.000		89	40-140			
Tetracosane (C24)	1.9	0.5	mg/kg wet	2.000		93	40-140			
Tetradecane (C14)	1.5	0.5	mg/kg wet	2.000		76	40-140			
Triacontane (C30)	1.7	0.5	mg/kg wet	2.000		86	40-140			
Surrogate: 1-Chlorooctadecane	*1.61*		mg/kg wet	*2.000*		*81*	*40-140*			
LCS										
2-Methylnaphthalene	1.61	0.20	mg/kg wet	2.000		81	40-140			
Acenaphthene	1.56	0.40	mg/kg wet	2.000		78	40-140			
Acenaphthylene	1.65	0.20	mg/kg wet	2.000		83	40-140			
Anthracene	1.71	0.40	mg/kg wet	2.000		85	40-140			
Benzo(a)anthracene	1.91	0.40	mg/kg wet	2.000		96	40-140			
Benzo(a)pyrene	2.15	0.40	mg/kg wet	2.000		108	40-140			
Benzo(b)fluoranthene	1.96	0.40	mg/kg wet	2.000		98	40-140			
Benzo(g,h,i)perylene	2.11	0.40	mg/kg wet	2.000		106	40-140			
Benzo(k)fluoranthene	1.86	0.40	mg/kg wet	2.000		93	40-140			
C11-C22 Unadjusted Aromatics1	39.5	15.0	mg/kg wet	34.00		116	40-140			
Chrysene	1.87	0.40	mg/kg wet	2.000		94	40-140			
Dibenzo(a,h)Anthracene	2.10	0.20	mg/kg wet	2.000		105	40-140			
Fluoranthene	1.88	0.40	mg/kg wet	2.000		94	40-140			
Fluorene	1.68	0.40	mg/kg wet	2.000		84	40-140			
Indeno(1,2,3-cd)Pyrene	2.19	0.40	mg/kg wet	2.000		110	40-140			
Naphthalene	1.55	0.40	mg/kg wet	2.000		77	40-140			
Phenanthrene	1.73	0.40	mg/kg wet	2.000		87	40-140			
Pyrene	1.88	0.40	mg/kg wet	2.000		94	40-140			
Surrogate: 2-Bromonaphthalene	*1.86*		mg/kg wet	*2.000*		*93*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*2.05*		mg/kg wet	*2.000*		*103*	*40-140*			
Surrogate: O-Terphenyl	*1.63*		mg/kg wet	*2.000*		*81*	*40-140*			
LCS										
2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			
LCS Dup										
C19-C36 Aliphatics1	18.9	15.0	mg/kg wet	16.00		118	40-140	2	25	
C9-C18 Aliphatics1	11.9	15.0	mg/kg wet	12.00		99	40-140	0.7	25	
Decane (C10)	1.2	0.5	mg/kg wet	2.000		62	40-140	0.2	25	
Docosane (C22)	1.9	0.5	mg/kg wet	2.000		95	40-140	2	25	
Dodecane (C12)	1.4	0.5	mg/kg wet	2.000		68	40-140	1	25	

CERTIFICATE OF ANALYSIS

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ESS Laboratory Work Order: 1408317

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41403 - 3546										
Eicosane (C20)	1.8	0.5	mg/kg wet	2.000		92	40-140	3	25	
Hexacosane (C26)	1.8	0.5	mg/kg wet	2.000		91	40-140	3	25	
Hexadecane (C16)	1.8	0.5	mg/kg wet	2.000		88	40-140	3	25	
Hexatriacontane (C36)	1.9	0.5	mg/kg wet	2.000		95	40-140	2	25	
Nonadecane (C19)	1.8	0.5	mg/kg wet	2.000		92	40-140	2	25	
Nonane (C9)	0.9	0.5	mg/kg wet	2.000		46	30-140	0.3	25	
Octacosane (C28)	1.8	0.5	mg/kg wet	2.000		89	40-140	3	25	
Octadecane (C18)	1.8	0.5	mg/kg wet	2.000		91	40-140	2	25	
Tetracosane (C24)	1.9	0.5	mg/kg wet	2.000		94	40-140	0.3	25	
Tetradecane (C14)	1.6	0.5	mg/kg wet	2.000		78	40-140	3	25	
Triacontane (C30)	1.8	0.5	mg/kg wet	2.000		88	40-140	3	25	
Surrogate: 1-Chlorooctadecane	*1.64*		mg/kg wet	*2.000*		*82*	*40-140*			
LCS Dup										
2-Methylnaphthalene	1.73	0.20	mg/kg wet	2.000		87	40-140	7	20	
Acenaphthene	1.62	0.40	mg/kg wet	2.000		81	40-140	4	20	
Acenaphthylene	1.73	0.20	mg/kg wet	2.000		87	40-140	5	20	
Anthracene	1.76	0.40	mg/kg wet	2.000		88	40-140	3	20	
Benzo(a)anthracene	1.97	0.40	mg/kg wet	2.000		98	40-140	3	20	
Benzo(a)pyrene	2.20	0.40	mg/kg wet	2.000		110	40-140	2	20	
Benzo(b)fluoranthene	2.03	0.40	mg/kg wet	2.000		102	40-140	4	20	
Benzo(g,h,i)perylene	2.12	0.40	mg/kg wet	2.000		106	40-140	0.3	20	
Benzo(k)fluoranthene	1.93	0.40	mg/kg wet	2.000		97	40-140	4	20	
C11-C22 Unadjusted Aromatics1	41.3	15.0	mg/kg wet	34.00		122	40-140	4	25	
Chrysene	1.92	0.40	mg/kg wet	2.000		96	40-140	2	20	
Dibenzo(a,h)Anthracene	2.10	0.20	mg/kg wet	2.000		105	40-140	0.08	20	
Fluoranthene	1.91	0.40	mg/kg wet	2.000		96	40-140	2	20	
Fluorene	1.71	0.40	mg/kg wet	2.000		86	40-140	2	20	
Indeno(1,2,3-cd)Pyrene	2.19	0.40	mg/kg wet	2.000		109	40-140	0.3	20	
Naphthalene	1.65	0.40	mg/kg wet	2.000		82	40-140	6	20	
Phenanthrene	1.80	0.40	mg/kg wet	2.000		90	40-140	4	20	
Pyrene	1.92	0.40	mg/kg wet	2.000		96	40-140	2	20	
Surrogate: 2-Bromonaphthalene	*1.94*		mg/kg wet	*2.000*		*97*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*2.10*		mg/kg wet	*2.000*		*105*	*40-140*			
Surrogate: O-Terphenyl	*1.65*		mg/kg wet	*2.000*		*82*	*40-140*			
LCS Dup										
2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH42029 - 5035										
Blank										
1,2,4-Trimethylbenzene	ND	0.20	mg/kg wet							
2,2,4-Trimethylpentane	ND	5.00	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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ESS Laboratory Work Order: 1408317

Quality Control Data

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch CH42029 - 5035										
2-Methylpentane	ND	5.00	mg/kg wet							
Benzene	ND	0.20	mg/kg wet							
C5-C8 Unadjusted Aliphatics	ND	10.0	mg/kg wet							
C9-C10 Aromatics	ND	10.0	mg/kg wet							
C9-C12 Unadjusted Aliphatics	ND	10.0	mg/kg wet							
Ethylbenzene	ND	0.20	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.05	mg/kg wet							
Naphthalene	ND	0.20	mg/kg wet							
n-Butylcyclohexane	ND	5.00	mg/kg wet							
n-Decane	ND	5.00	mg/kg wet							
Nonane (C9)	ND	5.00	mg/kg wet							
Pentane	ND	5.00	mg/kg wet							
Toluene	ND	0.20	mg/kg wet							
Xylene O	ND	0.20	mg/kg wet							
Xylene P,M	ND	0.40	mg/kg wet							
Surrogate: 2,5-Dibromotoluene - FID	*5.68*		mg/kg wet	*5.000*		*114*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.72*		mg/kg wet	*5.000*		*114*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.31*		mg/kg wet	*5.333*		*81*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.34*		mg/kg wet	*5.333*		*81*	*70-130*			
LCS										
1,2,4-Trimethylbenzene	10.0	0.20	mg/kg wet	10.00		100	70-130			
2,2,4-Trimethylpentane	14.7	5.00	mg/kg wet	15.00		98	70-130			
2-Methylpentane	16.8	5.00	mg/kg wet	15.00		112	70-130			
Benzene	4.96	0.20	mg/kg wet	5.000		99	70-130			
C5-C8 Unadjusted Aliphatics	42.7	10.0	mg/kg wet	40.00		107	70-130			
C9-C10 Aromatics	9.83	10.0	mg/kg wet	10.00		98	70-130			
C9-C12 Unadjusted Aliphatics	25.7	10.0	mg/kg wet	30.00		86	70-130			
Ethylbenzene	5.00	0.20	mg/kg wet	5.000		100	70-130			
Methyl tert-Butyl Ether	15.8	0.05	mg/kg wet	15.00		106	70-130			
Naphthalene	8.88	0.20	mg/kg wet	10.00		89	70-130			
n-Butylcyclohexane	7.75	5.00	mg/kg wet	10.00		77	70-130			
n-Decane	8.84	5.00	mg/kg wet	10.00		88	70-130			
Nonane (C9)	8.09	5.00	mg/kg wet	10.00		81	30-130			
Pentane	11.6	5.00	mg/kg wet	10.00		116	70-130			
Toluene	15.2	0.20	mg/kg wet	15.00		101	70-130			
Xylene O	10.1	0.20	mg/kg wet	10.00		101	70-130			
Xylene P,M	20.5	0.40	mg/kg wet	20.00		102	70-130			
Surrogate: 2,5-Dibromotoluene - FID	*4.94*		mg/kg wet	*5.000*		*99*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.07*		mg/kg wet	*5.000*		*101*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.78*		mg/kg wet	*5.333*		*90*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.96*		mg/kg wet	*5.333*		*93*	*70-130*			
LCS Dup										
1,2,4-Trimethylbenzene	10.4	0.20	mg/kg wet	10.00		104	70-130	4	25	
2,2,4-Trimethylpentane	18.6	5.00	mg/kg wet	15.00		124	70-130	24	25	

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Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH42029 - 5035										
2-Methylpentane	17.4	5.00	mg/kg wet	15.00		116	70-130	3	25	
Benzene	5.12	0.20	mg/kg wet	5.000		102	70-130	3	25	
C5-C8 Unadjusted Aliphatics	47.2	10.0	mg/kg wet	40.00		118	70-130	10	25	
C9-C10 Aromatics	10.3	10.0	mg/kg wet	10.00		103	70-130	5	25	
C9-C12 Unadjusted Aliphatics	28.5	10.0	mg/kg wet	30.00		95	70-130	10	25	
Ethylbenzene	5.12	0.20	mg/kg wet	5.000		102	70-130	2	25	
Methyl tert-Butyl Ether	16.2	0.05	mg/kg wet	15.00		108	70-130	2	25	
Naphthalene	9.79	0.20	mg/kg wet	10.00		98	70-130	10	25	
n-Butylcyclohexane	8.60	5.00	mg/kg wet	10.00		86	70-130	10	25	
n-Decane	9.67	5.00	mg/kg wet	10.00		97	70-130	9	25	
Nonane (C9)	9.31	5.00	mg/kg wet	10.00		93	30-130	14	25	
Pentane	11.9	5.00	mg/kg wet	10.00		119	70-130	2	25	
Toluene	15.7	0.20	mg/kg wet	15.00		104	70-130	3	25	
Xylene O	10.2	0.20	mg/kg wet	10.00		102	70-130	1	25	
Xylene P,M	20.8	0.40	mg/kg wet	20.00		104	70-130	2	25	
Surrogate: 2,5-Dibromotoluene - FID	*5.32*		mg/kg wet	*5.000*		*106*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.39*		mg/kg wet	*5.000*		*108*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.69*		mg/kg wet	*5.333*		*88*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.84*		mg/kg wet	*5.333*		*91*	*70-130*			

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Notes and Definitions

Z-04	MeOH - covered
WL	Results obtained from a deionized water leach of the sample.
U	Analyte included in the analysis, but not detected
SM	Surrogate recovery(ies) outside of criteria due to matrix (UCM/coelution/matrix is present) (SM).
Q	Calibration required quadratic regression (Q).
D	Diluted.
C-	Continuing Calibration recovery is below lower control limit (C-).
B+	Blank Spike recovery is above upper control limit (B+).
B	Present in Method Blank (B).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408317

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)
A2LA Accredited: Testing Cert# 2864.01
http://www.a2la.org/scopepdf/2864-01.pdf

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002
http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01
Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)
http://www.A2LA.org/dirsearchnew/newsearch.cfm

CPSC ID# 1141
Lead Paint, Lead in Children's Metals Jewelry
http://www.cpsc.gov/cgi-bin/labapplist.aspx

Sample and Cooler Receipt Checklist

Client: PEER Consultants
Client Project ID: _____
Shipped/Delivered Via: ESS Courier

ESS Project ID: 14080317
Date Project Due: 8/21/2014
Days For Project: 5 Day

Items to be checked upon receipt:

1. Air Bill Manifest Present?	* No	10. Are the samples properly preserved?	Yes
Air No.:		11. Proper sample containers used?	Yes
2. Were Custody Seals Present?	No	12. Any air bubbles in the VOA vials?	N/A
3. Were Custody Seals Intact?	N/A	13. Holding times exceeded?	No
4. Is Radiation count < 100 CPM?	Yes	14. Sufficient sample volumes?	Yes
5. Is a cooler present?	Yes	15. Any Subcontracting needed?	No
Cooler Temp: **1.9**		16. Are ESS labels on correct containers?	Yes|No
Iced With: **Ice**		17. Were samples received intact?	Yes|No
6. Was COC included with samples?	Yes	ESS Sample IDs:	
7. Was COC signed and dated by client?	Yes	Sub Lab:	
8. Does the COC match the sample	Yes	Analysis:	
9. Is COC complete and correct?	Yes	TAT:	

18. Was there need to call project manager to discuss status? If yes, please explain.
VOA vials frozen @ 1914 MB 8/14/14

Who was called?: _____ By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	40 ml - VOA	1	MeOH
1	Yes	40 ml - VOA	2	other
2	Yes	40 ml - VOA	1	MeOH
2	Yes	8 oz Soil Jar	2	NP
3	Yes	40 ml - VOA	1	MeOH
3	Yes	8 oz Soil Jar	2	NP
4	Yes	40 ml - VOA	1	MeOH
4	Yes	40 ml - VOA	2	other

Completed By: _____ Date/Time: 8/14/14 1914
Reviewed By: _____ Date/Time: 8/15/14 0818

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

Page 1 of 1

Turn Time ✓ Standard Other _____
If faster than 5 days, prior approval by laboratory is required # _____

State where samples were collected from:
(MA) RI CT NH NJ NY ME Other _____

Is this project for any of the following:
MA-MCP Navy USACE Other _____

Reporting Limits: comm97 mcp 5-1

ESS LAB PROJECT ID: 14083 17

Electronic Deliverable Yes ✓ No ___
Format: Excel ✓ Access ___ PDF ✓ Other _____

Co. Name	Project #	Project Name (20 Char. or less)
PEER Consultants	5559	Union Square

Contact Person	Address
Dave Gorden	99 S. Bedford St Suit 200

City	State	Zip	PO#
Burlington	MA	01803	5559

Telephone #	Fax #	Email Address
7812388880	7812388884	gordend@peercpc.com

ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (20 Char. or less)	Pres Code	Number of Containers	Type of Containers	VOC hi	VOC lo	UPH	EPH PCB SVOC metal cond % sol *	Write Required Analysis
1	8-13-14	1300		✓	S	PB4 8.5-9.5'	6/9	3	✓	✓	✓			
2	8-13-14	1300		✓	S	PB4 1.5-13.5'	6/1	3	G/V			✓	✓	
3	8-14-14	1211		✓	S	PB8 2-6'	6/1	3	G/V			✓	✓	
4	8-14-14	1211		✓	S	PB8 4-6'	6/9	3	✓	✓	✓			

Container Type: P-Poly G-Glass S-Sterile V-VOA
Matrix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters

Cooler Present ✓ Yes ___ No
Seals Intact ___ Yes ___ No NA: ✓
Cooler Temp: 1.9 Iced

Internal Use Only
[ ] Pickup
[ ] Technicians ____

Preservation Code 1- NP, 2- HCl, 3- H_2SO_4, 4- HNO_3, 5- NaOH, 6- MeOH, 7- Asorbic Acid, 8- ZnAct, 9- _____

Sampled by: DAVE GORDEN

Comments: * Use soil from amber jars for % solids from the specific sample #.

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	8/14/14 1400			COURIER	8/14/14 1615	[signature]	8/14/14 1615
[signature]	8/14/14 1802	[signature]	8/14/14 1905	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

*By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VII A

Please fax all changes to Chain of Custody in writing.

1 (White) Lab Copy 2 (Yellow) Client Receipt

10/26/04 A

CERTIFICATE OF ANALYSIS

David Gorden
PEER Consultants, P.C.
99 S. Bedford Street
Burlington, MA 01803

RE: Union Square (5559)
ESS Laboratory Work Order Number: 1408349

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 4:32 pm, Aug 25, 2014

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

SAMPLE RECEIPT

The following samples were received on August 18, 2014 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has performed and reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

For EPH soil samples, the aromatic range results have been corrected for identified cartridge contaminant in accordance with the CAM protocol.

Lab Number	Sample Name	Matrix	Analysis
1408349-01	PB10 1-9ft	Soil	6010C, 7010, 7471A, 8082A, 8270D, 9050A, EPH8270, MADEP-EPH, MADEP-VPH

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

PROJECT NARRATIVE

8270D Semi-Volatile Organic Compounds

CXH0191-CCV1 **Continuing Calibration recovery is below lower control limit (C-).**
2,4-Dinitrophenol (75% @ 80-120%), 2-Methylnaphthalene (65% @ 80-120%)

MADEP-EPH Extractable Petroleum Hydrocarbons

CH41908-BSD1 **Blank Spike recovery is above upper control limit (B+).**
C19-C36 Aliphatics1 (144% @ 40-140%)

CH41908-BSD1 **Relative percent difference for duplicate is outside of criteria (D+).**
C19-C36 Aliphatics1 (57%), C9-C18 Aliphatics1 (31%), Docosane (C22) (29%), Eicosane (C20) (27%), Hexacosane (C26) (31%), Hexatriacontane (C36) (28%), Nonadecane (C19) (27%), Octacosane (C28) (29%), Tetracosane (C24) (29%), Triacontane (C30) (29%)

CH41908-BSD2 **Relative percent difference for duplicate is outside of criteria (D+).**
2-Methylnaphthalene (39%), Acenaphthene (29%), Acenaphthylene (30%), Benzo(g,h,i)perylene (54%), C11-C22 Unadjusted Aromatics1 (37%), Dibenzo(a,h)Anthracene (41%), Fluorene (23%), Indeno(1,2,3-cd)Pyrene (42%), Naphthalene (47%)

CXH0227-CCV2 **Continuing Calibration recovery is below lower control limit (C-).**
Benzo(g,h,i)perylene (68% @ 80-120%), Dibenzo(a,h)Anthracene (79% @ 80-120%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1408349-01**

Matrices: ( ) Ground Water/Surface Water (X) Soil/Sediment ( ) Drinking Water ( ) Air ( ) Other:_____

CAM Protocol (check all that apply below):

( ) 8260 VOC CAM II A	(X) 7470/7471 Hg CAM III B	(X) MassDEP VPH CAM IV A	( ) 8081 Pesticides CAM V B	( ) 7196 Hex Cr CAM VI B	( ) MassDEP APH CAM IX A
(X) 8270 SVOC CAM II B	(X) 7010 Metals CAM III C	(X) MassDEP EPH CAM IV B	( ) 8151 Herbicides CAM V C	( ) 8330 Explosives CAM VIII A	( ) TO-15 VOC CAM IX B
(X) 6010 Metals CAM III A	( ) 6020 Metals CAM III D	(X) 8082 PCB CAM V A	( ) 6860 Perchlorate CAM VIII B	( ) 9014 Total Cyanide/PAC CAM VI A	

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes (X) No ( )
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	Yes (X) No ( )
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	Yes (X) No ( )
D	Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (X) No ( )
E	a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	Yes (X) No ( )
	b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes ( ) No ( )
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	Yes (X) No ( )

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?	Yes (X) No ( )*
	***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**	
H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes ( ) No (X)*
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes (X) No ( )*

All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ Date: August 25, 2014

Printed Name: Laurel Stoddard Position: Laboratory Director

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB10 1-9ft
Date Sampled: 08/15/14 14:00
Percent Solids: 94

ESS Laboratory Work Order: 1408349
ESS Laboratory Sample ID: 1408349-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (4.9)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203
Arsenic	**3.1** (2.4)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203
Barium	**13.3** (2.4)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203
Beryllium	**0.16** (0.11)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203
Cadmium	ND (0.49)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203
Chromium	**8.0** (1.0)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203
Lead	ND (4.9)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203
Mercury	ND (0.027)		7471A		1	NAR	08/21/14 16:08	0.79	40	CH42008
Nickel	**6.7** (2.4)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203
Selenium	ND (2.43)		7010		5	KJK	08/22/14 21:15	2.2	100	CH42203
Silver	ND (0.49)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203
Thallium	ND (1.21)		7010		5	SVD	08/25/14 14:44	2.2	100	CH42203
Vanadium	**10.6** (1.0)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203
Zinc	**12.8** (2.4)		6010C		1	KJK	08/22/14 20:41	2.2	100	CH42203

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB10 1-9ft
Date Sampled: 08/15/14 14:00
Percent Solids: 94
Initial Volume: 19.8
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1408349
ESS Laboratory Sample ID: 1408349-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: ML
Prepared: 8/18/14 18:02
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.0540)		8082A		1	08/19/14 14:54		CH41818
Aroclor 1221	ND (0.0540)		8082A		1	08/19/14 14:54		CH41818
Aroclor 1232	ND (0.0540)		8082A		1	08/19/14 14:54		CH41818
Aroclor 1242	ND (0.0540)		8082A		1	08/19/14 14:54		CH41818
Aroclor 1248	ND (0.0540)		8082A		1	08/19/14 14:54		CH41818
Aroclor 1254	ND (0.0540)		8082A		1	08/19/14 14:54		CH41818
Aroclor 1260	ND (0.0540)		8082A		1	08/19/14 14:54		CH41818
Aroclor 1262	ND (0.0540)		8082A		1	08/19/14 14:54		CH41818
Aroclor 1268	ND (0.0540)		8082A		1	08/19/14 14:54		CH41818

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*79 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*87 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*94 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*100 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB10 1-9ft
Date Sampled: 08/15/14 14:00
Percent Solids: 94
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408349
ESS Laboratory Sample ID: 1408349-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/18/14 14:07

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
1,2-Dichlorobenzene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
1,3-Dichlorobenzene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
1,4-Dichlorobenzene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2,4,5-Trichlorophenol	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2,4,6-Trichlorophenol	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2,4-Dichlorophenol	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2,4-Dimethylphenol	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2,4-Dinitrophenol	ND (1.82)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2,4-Dinitrotoluene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2,6-Dinitrotoluene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2-Chloronaphthalene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2-Chlorophenol	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2-Methylnaphthalene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2-Methylphenol	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
2-Nitrophenol	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
3,3´-Dichlorobenzidine	ND (0.727)		8270D		1	08/19/14 15:59	CXH0205	CH41819
3+4-Methylphenol	ND (0.727)		8270D		1	08/19/14 15:59	CXH0205	CH41819
4-Bromophenyl-phenylether	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
4-Chloroaniline	ND (0.727)		8270D		1	08/19/14 15:59	CXH0205	CH41819
4-Nitrophenol	ND (1.82)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Acenaphthene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Acenaphthylene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Acetophenone	ND (0.727)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Aniline	ND (1.82)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Anthracene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Azobenzene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Benzo(a)anthracene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Benzo(a)pyrene	ND (0.182)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Benzo(b)fluoranthene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Benzo(g,h,i)perylene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Benzo(k)fluoranthene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB10 1-9ft
Date Sampled: 08/15/14 14:00
Percent Solids: 94
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408349
ESS Laboratory Sample ID: 1408349-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/18/14 14:07

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
bis(2-Chloroethoxy)methane	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
bis(2-Chloroethyl)ether	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
bis(2-chloroisopropyl)Ether	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
bis(2-Ethylhexyl)phthalate	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Butylbenzylphthalate	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Chrysene	ND (0.182)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Dibenzo(a,h)Anthracene	ND (0.182)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Dibenzofuran	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Diethylphthalate	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Dimethylphthalate	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Di-n-butylphthalate	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Di-n-octylphthalate	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Fluoranthene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Fluorene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Hexachlorobenzene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Hexachlorobutadiene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Hexachloroethane	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Indeno(1,2,3-cd)Pyrene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Isophorone	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Naphthalene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Nitrobenzene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
N-Nitrosodimethylamine	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Pentachlorophenol	ND (1.82)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Phenanthrene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Phenol	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819
Pyrene	ND (0.363)		8270D		1	08/19/14 15:59	CXH0205	CH41819

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*72 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*100 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*70 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*84 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB10 1-9ft
Date Sampled: 08/15/14 14:00
Percent Solids: 94
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408349
ESS Laboratory Sample ID: 1408349-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/18/14 14:07

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		*70 %*		*30-130*				
Surrogate: Nitrobenzene-d5		*71 %*		*30-130*				
Surrogate: Phenol-d6		*78 %*		*30-130*				
Surrogate: p-Terphenyl-d14		*95 %*		*30-130*				

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB10 1-9ft
Date Sampled: 08/15/14 14:00
Percent Solids: 94

ESS Laboratory Work Order: 1408349
ESS Laboratory Sample ID: 1408349-01
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 312** (5)		9050A		1	JLK	08/20/14 15:39	umhos/cm	CH42024

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB10 1-9ft
Date Sampled: 08/15/14 14:00
Percent Solids: 94
Initial Volume: 24.2
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1408349
ESS Laboratory Sample ID: 1408349-01
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/19/14 17:29

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (16.6)		MADEP-EPH		1	VSC	08/20/14 17:27	CXH0226	CH41908
C19-C36 Aliphatics1	ND (16.6)		MADEP-EPH		1	VSC	08/20/14 17:27	CXH0226	CH41908
C11-C22 Unadjusted Aromatics1	ND (16.6)		EPH8270		1	VSC	08/20/14 16:42	CXH0227	CH41908
C11-C22 Aromatics1,2	ND (16.6)		EPH8270			VSC	08/20/14 16:42		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*51 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*98 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*91 %*		*40-140*
Surrogate: O-Terphenyl	*73 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB10 1-9ft
Date Sampled: 08/15/14 14:00
Percent Solids: 94
Initial Volume: 17.7
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408349
ESS Laboratory Sample ID: 1408349-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: NMS

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (9.74)		MADEP-VPH		1	08/19/14 18:27	CXH0223	CH42029
C5-C8 Aliphatics1,2	ND (9.74)		MADEP-VPH		1	08/19/14 18:27		[CALC]
C9-C12 Aliphatics2,3	ND (9.74)		MADEP-VPH		1	08/19/14 18:27		[CALC]
Benzene	ND (0.19)		MADEP-VPH		1	08/19/14 18:27	CXH0223	CH42029
Ethylbenzene	ND (0.19)		MADEP-VPH		1	08/19/14 18:27	CXH0223	CH42029
Methyl tert-Butyl Ether	ND (0.05)		MADEP-VPH		1	08/19/14 18:27	CXH0223	CH42029
Naphthalene	ND (0.19)		MADEP-VPH		1	08/19/14 18:27	CXH0223	CH42029
Toluene	ND (0.19)		MADEP-VPH		1	08/19/14 18:27	CXH0223	CH42029
Xylene O	ND (0.19)		MADEP-VPH		1	08/19/14 18:27	CXH0223	CH42029
Xylene P,M	ND (0.39)		MADEP-VPH		1	08/19/14 18:27	CXH0223	CH42029
1:1 Methanol/Soil Ratio %D	**18** (N/A)		MADEP-VPH			08/19/14 0:00		CH42029
Preservative:	**MeOH - covered**		MADEP-VPH					CH42029

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*113 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*114 %*		*70-130*
Surrogate: Trifluorotoluene - FID	*101 %*		*70-130*
Surrogate: Trifluorotoluene - PID	*102 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CH42008 - 7471A										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	7.86	1.34	mg/kg wet	8.370		94	80-120			
LCS Dup										
Mercury	7.44	1.48	mg/kg wet	8.370		89	80-120	5	20	
Batch CH42203 - 3050B										
Blank										
Antimony	ND	5.0	mg/kg wet							
Arsenic	ND	2.5	mg/kg wet							
Barium	ND	2.5	mg/kg wet							
Beryllium	ND	0.11	mg/kg wet							
Cadmium	ND	0.50	mg/kg wet							
Chromium	ND	1.0	mg/kg wet							
Lead	ND	5.0	mg/kg wet							
Nickel	ND	2.5	mg/kg wet							
Selenium	ND	0.50	mg/kg wet							
Silver	ND	0.50	mg/kg wet							
Thallium	ND	0.25	mg/kg wet							
Vanadium	ND	1.0	mg/kg wet							
Zinc	ND	2.5	mg/kg wet							
LCS										
Antimony	76.6	13.3	mg/kg wet	94.00		81	80-120			
Arsenic	89.9	6.7	mg/kg wet	113.0		80	80-120			
Barium	124	6.7	mg/kg wet	155.0		80	73-127			
Beryllium	86.1	0.29	mg/kg wet	109.0		79	75-125			
Cadmium	50.4	1.33	mg/kg wet	67.50		75	73-127			
Chromium	133	2.7	mg/kg wet	164.0		81	80-120			
Lead	75.2	13.3	mg/kg wet	90.10		83	80-120			
Nickel	73.0	6.7	mg/kg wet	89.30		82	80-120			
Selenium	147	66.7	mg/kg wet	156.0		94	80-120			
Silver	43.0	1.33	mg/kg wet	52.60		82	80-120			
Thallium	96.8	33.3	mg/kg wet	116.0		83	80-120			
Vanadium	57.5	2.7	mg/kg wet	73.00		79	60-140			
Zinc	131	6.7	mg/kg wet	168.0		78	69-132			
LCS Dup										
Antimony	78.1	14.9	mg/kg wet	94.00		83	80-120	2	20	
Arsenic	91.6	7.5	mg/kg wet	113.0		81	80-120	2	20	
Barium	122	7.5	mg/kg wet	155.0		79	73-127	2	20	
Beryllium	87.5	0.33	mg/kg wet	109.0		80	75-125	2	20	
Cadmium	51.6	1.49	mg/kg wet	67.50		77	73-127	2	20	
Chromium	132	3.0	mg/kg wet	164.0		81	80-120	0.3	20	
Lead	75.6	14.9	mg/kg wet	90.10		84	80-120	0.5	20	
Nickel	74.7	7.5	mg/kg wet	89.30		84	80-120	2	20	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CH42203 - 3050B										
Selenium	145	74.6	mg/kg wet	156.0		93	80-120	2	20	
Silver	42.2	1.49	mg/kg wet	52.60		80	80-120	2	20	
Thallium	96.3	37.3	mg/kg wet	116.0		83	80-120	0.6	20	
Vanadium	56.8	3.0	mg/kg wet	73.00		78	60-140	1	20	
Zinc	133	7.5	mg/kg wet	168.0		79	69-132	2	20	
8082A Polychlorinated Biphenyls (PCB)										
Batch CH41818 - 3540C										
Blank										
Aroclor 1016	ND	0.0250	mg/kg wet							
Aroclor 1221	ND	0.0250	mg/kg wet							
Aroclor 1232	ND	0.0250	mg/kg wet							
Aroclor 1242	ND	0.0250	mg/kg wet							
Aroclor 1248	ND	0.0250	mg/kg wet							
Aroclor 1254	ND	0.0250	mg/kg wet							
Aroclor 1260	ND	0.0250	mg/kg wet							
Aroclor 1262	ND	0.0250	mg/kg wet							
Aroclor 1268	ND	0.0250	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0180*		mg/kg wet	*0.02500*		*72*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0189*		mg/kg wet	*0.02500*		*76*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0201*		mg/kg wet	*0.02500*		*80*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0238*		mg/kg wet	*0.02500*		*95*	*30-150*			
LCS										
Aroclor 1016	0.604	0.0250	mg/kg wet	0.5000		121	40-140			
Aroclor 1260	0.551	0.0250	mg/kg wet	0.5000		110	40-140			
Surrogate: Decachlorobiphenyl	*0.0216*		mg/kg wet	*0.02500*		*87*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0223*		mg/kg wet	*0.02500*		*89*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0239*		mg/kg wet	*0.02500*		*96*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0256*		mg/kg wet	*0.02500*		*103*	*30-150*			
LCS Dup										
Aroclor 1016	0.572	0.0250	mg/kg wet	0.5000		114	40-140	6	30	
Aroclor 1260	0.529	0.0250	mg/kg wet	0.5000		106	40-140	4	30	
Surrogate: Decachlorobiphenyl	*0.0202*		mg/kg wet	*0.02500*		*81*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0209*		mg/kg wet	*0.02500*		*83*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0221*		mg/kg wet	*0.02500*		*88*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0235*		mg/kg wet	*0.02500*		*94*	*30-150*			
8270D Semi-Volatile Organic Compounds										
Batch CH41819 - 3546										
Blank										
1,2,4-Trichlorobenzene	ND	0.333	mg/kg wet							
1,2-Dichlorobenzene	ND	0.333	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41819 - 3546										
1,3-Dichlorobenzene	ND	0.333	mg/kg wet							
1,4-Dichlorobenzene	ND	0.333	mg/kg wet							
2,4,5-Trichlorophenol	ND	0.333	mg/kg wet							
2,4,6-Trichlorophenol	ND	0.333	mg/kg wet							
2,4-Dichlorophenol	ND	0.333	mg/kg wet							
2,4-Dimethylphenol	ND	0.333	mg/kg wet							
2,4-Dinitrophenol	ND	1.67	mg/kg wet							
2,4-Dinitrotoluene	ND	0.333	mg/kg wet							
2,6-Dinitrotoluene	ND	0.333	mg/kg wet							
2-Chloronaphthalene	ND	0.333	mg/kg wet							
2-Chlorophenol	ND	0.333	mg/kg wet							
2-Methylnaphthalene	ND	0.333	mg/kg wet							
2-Methylphenol	ND	0.333	mg/kg wet							
2-Nitrophenol	ND	0.333	mg/kg wet							
3,3´-Dichlorobenzidine	ND	0.667	mg/kg wet							
3+4-Methylphenol	ND	0.667	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet							
4-Chloroaniline	ND	0.667	mg/kg wet							
4-Nitrophenol	ND	1.67	mg/kg wet							
Acenaphthene	ND	0.333	mg/kg wet							
Acenaphthylene	ND	0.333	mg/kg wet							
Acetophenone	ND	0.667	mg/kg wet							
Aniline	ND	1.67	mg/kg wet							
Anthracene	ND	0.333	mg/kg wet							
Azobenzene	ND	0.333	mg/kg wet							
Benzo(a)anthracene	ND	0.333	mg/kg wet							
Benzo(a)pyrene	ND	0.167	mg/kg wet							
Benzo(b)fluoranthene	ND	0.333	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.333	mg/kg wet							
Benzo(k)fluoranthene	ND	0.333	mg/kg wet							
bis(2-Chloroethoxy)methane	ND	0.333	mg/kg wet							
bis(2-Chloroethyl)ether	ND	0.333	mg/kg wet							
bis(2-chloroisopropyl)Ether	ND	0.333	mg/kg wet							
bis(2-Ethylhexyl)phthalate	ND	0.333	mg/kg wet							
Butylbenzylphthalate	ND	0.333	mg/kg wet							
Chrysene	ND	0.167	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.167	mg/kg wet							
Dibenzofuran	ND	0.333	mg/kg wet							
Diethylphthalate	ND	0.333	mg/kg wet							
Dimethylphthalate	ND	0.333	mg/kg wet							
Di-n-butylphthalate	ND	0.333	mg/kg wet							
Di-n-octylphthalate	ND	0.333	mg/kg wet							
Fluoranthene	ND	0.333	mg/kg wet							
Fluorene	ND	0.333	mg/kg wet							
Hexachlorobenzene	ND	0.333	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41819 - 3546										
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachloroethane	ND	0.333	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.333	mg/kg wet							
Isophorone	ND	0.333	mg/kg wet							
Naphthalene	ND	0.333	mg/kg wet							
Nitrobenzene	ND	0.333	mg/kg wet							
N-Nitrosodimethylamine	ND	0.333	mg/kg wet							
Pentachlorophenol	ND	1.67	mg/kg wet							
Phenanthrene	ND	0.333	mg/kg wet							
Phenol	ND	0.333	mg/kg wet							
Pyrene	ND	0.333	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	*2.98*		mg/kg wet	*3.333*		*89*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*5.05*		mg/kg wet	*5.000*		*101*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*4.17*		mg/kg wet	*5.000*		*83*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*3.23*		mg/kg wet	*3.333*		*97*	*30-130*			
Surrogate: 2-Fluorophenol	*4.27*		mg/kg wet	*5.000*		*85*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.82*		mg/kg wet	*3.333*		*85*	*30-130*			
Surrogate: Phenol-d6	*4.33*		mg/kg wet	*5.000*		*87*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.31*		mg/kg wet	*3.333*		*99*	*30-130*			
LCS										
1,2,4-Trichlorobenzene	2.89	0.333	mg/kg wet	3.333		87	40-140			
1,2-Dichlorobenzene	2.85	0.333	mg/kg wet	3.333		86	40-140			
1,3-Dichlorobenzene	2.79	0.333	mg/kg wet	3.333		84	40-140			
1,4-Dichlorobenzene	2.69	0.333	mg/kg wet	3.333		81	40-140			
2,4,5-Trichlorophenol	3.13	0.333	mg/kg wet	3.333		94	30-130			
2,4,6-Trichlorophenol	3.17	0.333	mg/kg wet	3.333		95	30-130			
2,4-Dichlorophenol	3.09	0.333	mg/kg wet	3.333		93	30-130			
2,4-Dimethylphenol	2.97	0.333	mg/kg wet	3.333		89	30-130			
2,4-Dinitrophenol	2.46	1.67	mg/kg wet	3.333		74	30-130			
2,4-Dinitrotoluene	2.98	0.333	mg/kg wet	3.333		90	40-140			
2,6-Dinitrotoluene	2.98	0.333	mg/kg wet	3.333		89	40-140			
2-Chloronaphthalene	2.67	0.333	mg/kg wet	3.333		80	40-140			
2-Chlorophenol	2.92	0.333	mg/kg wet	3.333		88	30-130			
2-Methylnaphthalene	3.13	0.333	mg/kg wet	3.333		94	40-140			
2-Methylphenol	3.05	0.333	mg/kg wet	3.333		91	30-130			
2-Nitrophenol	3.19	0.333	mg/kg wet	3.333		96	30-130			
3,3´-Dichlorobenzidine	2.40	0.667	mg/kg wet	3.333		72	40-140			
3+4-Methylphenol	5.19	0.667	mg/kg wet	6.667		78	30-130			
4-Bromophenyl-phenylether	3.06	0.333	mg/kg wet	3.333		92	40-140			
4-Chloroaniline	2.02	0.667	mg/kg wet	3.333		61	40-140			
4-Nitrophenol	3.10	1.67	mg/kg wet	3.333		93	30-130			
Acenaphthene	2.82	0.333	mg/kg wet	3.333		85	40-140			
Acenaphthylene	2.69	0.333	mg/kg wet	3.333		81	40-140			
Acetophenone	2.59	0.667	mg/kg wet	3.333		78	40-140			
Aniline	2.66	1.67	mg/kg wet	3.333		80	40-140			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41819 - 3546										
Anthracene	2.99	0.333	mg/kg wet	3.333		90	40-140			
Azobenzene	3.04	0.333	mg/kg wet	3.333		91	40-140			
Benzo(a)anthracene	2.93	0.333	mg/kg wet	3.333		88	40-140			
Benzo(a)pyrene	2.81	0.167	mg/kg wet	3.333		84	40-140			
Benzo(b)fluoranthene	2.81	0.333	mg/kg wet	3.333		84	40-140			
Benzo(g,h,i)perylene	3.39	0.333	mg/kg wet	3.333		102	40-140			
Benzo(k)fluoranthene	3.02	0.333	mg/kg wet	3.333		91	40-140			
bis(2-Chloroethoxy)methane	2.93	0.333	mg/kg wet	3.333		88	40-140			
bis(2-Chloroethyl)ether	2.77	0.333	mg/kg wet	3.333		83	40-140			
bis(2-chloroisopropyl)Ether	2.79	0.333	mg/kg wet	3.333		84	40-140			
bis(2-Ethylhexyl)phthalate	3.30	0.333	mg/kg wet	3.333		99	40-140			
Butylbenzylphthalate	3.22	0.333	mg/kg wet	3.333		97	40-140			
Chrysene	2.95	0.167	mg/kg wet	3.333		89	40-140			
Dibenzo(a,h)Anthracene	3.31	0.167	mg/kg wet	3.333		99	40-140			
Dibenzofuran	2.83	0.333	mg/kg wet	3.333		85	40-140			
Diethylphthalate	2.94	0.333	mg/kg wet	3.333		88	40-140			
Dimethylphthalate	2.91	0.333	mg/kg wet	3.333		87	40-140			
Di-n-butylphthalate	3.08	0.333	mg/kg wet	3.333		92	40-140			
Di-n-octylphthalate	3.39	0.333	mg/kg wet	3.333		102	40-140			
Fluoranthene	2.98	0.333	mg/kg wet	3.333		89	40-140			
Fluorene	2.87	0.333	mg/kg wet	3.333		86	40-140			
Hexachlorobenzene	3.04	0.333	mg/kg wet	3.333		91	40-140			
Hexachlorobutadiene	2.76	0.333	mg/kg wet	3.333		83	40-140			
Hexachloroethane	2.88	0.333	mg/kg wet	3.333		86	40-140			
Indeno(1,2,3-cd)Pyrene	3.43	0.333	mg/kg wet	3.333		103	40-140			
Isophorone	2.81	0.333	mg/kg wet	3.333		84	40-140			
Naphthalene	2.93	0.333	mg/kg wet	3.333		88	40-140			
Nitrobenzene	2.92	0.333	mg/kg wet	3.333		88	40-140			
N-Nitrosodimethylamine	2.72	0.333	mg/kg wet	3.333		82	40-140			
Pentachlorophenol	3.25	1.67	mg/kg wet	3.333		98	30-130			
Phenanthrene	2.96	0.333	mg/kg wet	3.333		89	40-140			
Phenol	3.17	0.333	mg/kg wet	3.333		95	30-130			
Pyrene	2.95	0.333	mg/kg wet	3.333		89	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*3.12*		mg/kg wet	*3.333*		*94*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*5.50*		mg/kg wet	*5.000*		*110*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*4.33*		mg/kg wet	*5.000*		*87*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*3.39*		mg/kg wet	*3.333*		*102*	*30-130*			
Surrogate: 2-Fluorophenol	*4.47*		mg/kg wet	*5.000*		*89*	*30-130*			
Surrogate: Nitrobenzene-d5	*3.38*		mg/kg wet	*3.333*		*102*	*30-130*			
Surrogate: Phenol-d6	*4.38*		mg/kg wet	*5.000*		*88*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.32*		mg/kg wet	*3.333*		*100*	*30-130*			
LCS Dup										
1,2,4-Trichlorobenzene	2.93	0.333	mg/kg wet	3.333		88	40-140	1	30	
1,2-Dichlorobenzene	2.78	0.333	mg/kg wet	3.333		83	40-140	3	30	
1,3-Dichlorobenzene	2.73	0.333	mg/kg wet	3.333		82	40-140	2	30	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41819 - 3546										
1,4-Dichlorobenzene	2.79	0.333	mg/kg wet	3.333		84	40-140	4	30	
2,4,5-Trichlorophenol	3.28	0.333	mg/kg wet	3.333		98	30-130	5	30	
2,4,6-Trichlorophenol	3.16	0.333	mg/kg wet	3.333		95	30-130	0.2	30	
2,4-Dichlorophenol	3.10	0.333	mg/kg wet	3.333		93	30-130	0.2	30	
2,4-Dimethylphenol	3.18	0.333	mg/kg wet	3.333		95	30-130	7	30	
2,4-Dinitrophenol	2.64	1.67	mg/kg wet	3.333		79	30-130	7	30	
2,4-Dinitrotoluene	3.22	0.333	mg/kg wet	3.333		97	40-140	8	30	
2,6-Dinitrotoluene	3.11	0.333	mg/kg wet	3.333		93	40-140	5	30	
2-Chloronaphthalene	2.71	0.333	mg/kg wet	3.333		81	40-140	1	30	
2-Chlorophenol	2.85	0.333	mg/kg wet	3.333		86	30-130	2	30	
2-Methylnaphthalene	3.19	0.333	mg/kg wet	3.333		96	40-140	2	30	
2-Methylphenol	3.04	0.333	mg/kg wet	3.333		91	30-130	0.2	30	
2-Nitrophenol	3.22	0.333	mg/kg wet	3.333		97	30-130	0.8	30	
3,3´-Dichlorobenzidine	2.51	0.667	mg/kg wet	3.333		75	40-140	5	30	
3+4-Methylphenol	5.92	0.667	mg/kg wet	6.667		89	30-130	13	30	
4-Bromophenyl-phenylether	3.18	0.333	mg/kg wet	3.333		96	40-140	4	30	
4-Chloroaniline	2.12	0.667	mg/kg wet	3.333		64	40-140	5	30	
4-Nitrophenol	3.26	1.67	mg/kg wet	3.333		98	30-130	5	30	
Acenaphthene	2.90	0.333	mg/kg wet	3.333		87	40-140	3	30	
Acenaphthylene	2.78	0.333	mg/kg wet	3.333		83	40-140	4	30	
Acetophenone	2.58	0.667	mg/kg wet	3.333		77	40-140	0.3	30	
Aniline	2.51	1.67	mg/kg wet	3.333		75	40-140	6	30	
Anthracene	3.02	0.333	mg/kg wet	3.333		91	40-140	1	30	
Azobenzene	3.08	0.333	mg/kg wet	3.333		92	40-140	1	30	
Benzo(a)anthracene	2.90	0.333	mg/kg wet	3.333		87	40-140	0.9	30	
Benzo(a)pyrene	2.82	0.167	mg/kg wet	3.333		85	40-140	0.5	30	
Benzo(b)fluoranthene	3.16	0.333	mg/kg wet	3.333		95	40-140	12	30	
Benzo(g,h,i)perylene	3.35	0.333	mg/kg wet	3.333		101	40-140	1	30	
Benzo(k)fluoranthene	2.92	0.333	mg/kg wet	3.333		88	40-140	4	30	
bis(2-Chloroethoxy)methane	2.95	0.333	mg/kg wet	3.333		89	40-140	0.8	30	
bis(2-Chloroethyl)ether	2.84	0.333	mg/kg wet	3.333		85	40-140	3	30	
bis(2-chloroisopropyl)Ether	2.84	0.333	mg/kg wet	3.333		85	40-140	2	30	
bis(2-Ethylhexyl)phthalate	3.36	0.333	mg/kg wet	3.333		101	40-140	2	30	
Butylbenzylphthalate	3.22	0.333	mg/kg wet	3.333		97	40-140	0.05	30	
Chrysene	2.93	0.167	mg/kg wet	3.333		88	40-140	0.7	30	
Dibenzo(a,h)Anthracene	3.36	0.167	mg/kg wet	3.333		101	40-140	1	30	
Dibenzofuran	2.98	0.333	mg/kg wet	3.333		89	40-140	5	30	
Diethylphthalate	3.14	0.333	mg/kg wet	3.333		94	40-140	6	30	
Dimethylphthalate	3.04	0.333	mg/kg wet	3.333		91	40-140	4	30	
Di-n-butylphthalate	3.18	0.333	mg/kg wet	3.333		96	40-140	3	30	
Di-n-octylphthalate	3.57	0.333	mg/kg wet	3.333		107	40-140	5	30	
Fluoranthene	3.26	0.333	mg/kg wet	3.333		98	40-140	9	30	
Fluorene	2.94	0.333	mg/kg wet	3.333		88	40-140	3	30	
Hexachlorobenzene	3.09	0.333	mg/kg wet	3.333		93	40-140	2	30	
Hexachlorobutadiene	2.85	0.333	mg/kg wet	3.333		86	40-140	3	30	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41819 - 3546										
Hexachloroethane	2.91	0.333	mg/kg wet	3.333		87	40-140	1	30	
Indeno(1,2,3-cd)Pyrene	3.47	0.333	mg/kg wet	3.333		104	40-140	1	30	
Isophorone	2.84	0.333	mg/kg wet	3.333		85	40-140	1	30	
Naphthalene	3.01	0.333	mg/kg wet	3.333		90	40-140	3	30	
Nitrobenzene	2.95	0.333	mg/kg wet	3.333		88	40-140	0.9	30	
N-Nitrosodimethylamine	2.73	0.333	mg/kg wet	3.333		82	40-140	0.4	30	
Pentachlorophenol	3.39	1.67	mg/kg wet	3.333		102	30-130	4	30	
Phenanthrene	3.04	0.333	mg/kg wet	3.333		91	40-140	3	30	
Phenol	2.99	0.333	mg/kg wet	3.333		90	30-130	6	30	
Pyrene	3.13	0.333	mg/kg wet	3.333		94	40-140	6	30	
Surrogate: 1,2-Dichlorobenzene-d4	*2.98*		mg/kg wet	*3.333*		*89*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*5.43*		mg/kg wet	*5.000*		*109*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*4.28*		mg/kg wet	*5.000*		*86*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*3.37*		mg/kg wet	*3.333*		*101*	*30-130*			
Surrogate: 2-Fluorophenol	*4.30*		mg/kg wet	*5.000*		*86*	*30-130*			
Surrogate: Nitrobenzene-d5	*3.33*		mg/kg wet	*3.333*		*100*	*30-130*			
Surrogate: Phenol-d6	*4.25*		mg/kg wet	*5.000*		*85*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.33*		mg/kg wet	*3.333*		*100*	*30-130*			
Classical Chemistry										
Batch CH42024 - General Preparation										
Blank										
Conductivity	ND	5	umhos/cm							
LCS										
Conductivity	1400		umhos/cm	1411		99	90-110			
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41908 - 3546										
Blank										
C19-C36 Aliphatics1	ND	15.0	mg/kg wet							
C9-C18 Aliphatics1	ND	15.0	mg/kg wet							
Decane (C10)	ND	0.5	mg/kg wet							
Docosane (C22)	ND	0.5	mg/kg wet							
Dodecane (C12)	ND	0.5	mg/kg wet							
Eicosane (C20)	ND	0.5	mg/kg wet							
Hexacosane (C26)	ND	0.5	mg/kg wet							
Hexadecane (C16)	ND	0.5	mg/kg wet							
Hexatriacontane (C36)	ND	0.5	mg/kg wet							
Nonadecane (C19)	ND	0.5	mg/kg wet							
Nonane (C9)	ND	0.5	mg/kg wet							
Octacosane (C28)	ND	0.5	mg/kg wet							
Octadecane (C18)	ND	0.5	mg/kg wet							
Tetracosane (C24)	ND	0.5	mg/kg wet							
Tetradecane (C14)	ND	0.5	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41908 - 3546										
Triacontane (C30)	ND	0.5	mg/kg wet							
Surrogate: 1-Chlorooctadecane	*0.916*		mg/kg wet	*2.000*		*46*	*40-140*			
Blank										
2-Methylnaphthalene	ND	0.20	mg/kg wet							
Acenaphthene	ND	0.40	mg/kg wet							
Acenaphthylene	ND	0.20	mg/kg wet							
Anthracene	ND	0.40	mg/kg wet							
Benzo(a)anthracene	ND	0.40	mg/kg wet							
Benzo(a)pyrene	ND	0.40	mg/kg wet							
Benzo(b)fluoranthene	ND	0.40	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.40	mg/kg wet							
Benzo(k)fluoranthene	ND	0.40	mg/kg wet							
C11-C22 Unadjusted Aromatics1	ND	15.0	mg/kg wet							
Chrysene	ND	0.40	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.20	mg/kg wet							
Fluoranthene	ND	0.40	mg/kg wet							
Fluorene	ND	0.40	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.40	mg/kg wet							
Naphthalene	ND	0.40	mg/kg wet							
Phenanthrene	ND	0.40	mg/kg wet							
Pyrene	ND	0.40	mg/kg wet							
Surrogate: 2-Bromonaphthalene	*2.16*		mg/kg wet	*2.000*		*108*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*2.03*		mg/kg wet	*2.000*		*102*	*40-140*			
Surrogate: O-Terphenyl	*1.53*		mg/kg wet	*2.000*		*77*	*40-140*			
LCS										
C19-C36 Aliphatics1	12.8	15.0	mg/kg wet	16.00		80	40-140			
C9-C18 Aliphatics1	8.1	15.0	mg/kg wet	12.00		67	40-140			
Decane (C10)	0.9	0.5	mg/kg wet	2.000		46	40-140			
Docosane (C22)	1.4	0.5	mg/kg wet	2.000		70	40-140			
Dodecane (C12)	1.0	0.5	mg/kg wet	2.000		50	40-140			
Eicosane (C20)	1.3	0.5	mg/kg wet	2.000		67	40-140			
Hexacosane (C26)	1.3	0.5	mg/kg wet	2.000		67	40-140			
Hexadecane (C16)	1.3	0.5	mg/kg wet	2.000		64	40-140			
Hexatriacontane (C36)	1.4	0.5	mg/kg wet	2.000		69	40-140			
Nonadecane (C19)	1.4	0.5	mg/kg wet	2.000		68	40-140			
Nonane (C9)	0.7	0.5	mg/kg wet	2.000		34	30-140			
Octacosane (C28)	1.3	0.5	mg/kg wet	2.000		66	40-140			
Octadecane (C18)	1.3	0.5	mg/kg wet	2.000		66	40-140			
Tetracosane (C24)	1.4	0.5	mg/kg wet	2.000		70	40-140			
Tetradecane (C14)	1.1	0.5	mg/kg wet	2.000		57	40-140			
Triacontane (C30)	1.3	0.5	mg/kg wet	2.000		65	40-140			
Surrogate: 1-Chlorooctadecane	*0.917*		mg/kg wet	*2.000*		*46*	*40-140*			
LCS										

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41908 - 3546										
2-Methylnaphthalene	1.68	0.20	mg/kg wet	2.000		84	40-140			
Acenaphthene	1.72	0.40	mg/kg wet	2.000		86	40-140			
Acenaphthylene	1.71	0.20	mg/kg wet	2.000		86	40-140			
Anthracene	1.86	0.40	mg/kg wet	2.000		93	40-140			
Benzo(a)anthracene	1.92	0.40	mg/kg wet	2.000		96	40-140			
Benzo(a)pyrene	2.28	0.40	mg/kg wet	2.000		114	40-140			
Benzo(b)fluoranthene	2.07	0.40	mg/kg wet	2.000		104	40-140			
Benzo(g,h,i)perylene	2.16	0.40	mg/kg wet	2.000		108	40-140			
Benzo(k)fluoranthene	2.16	0.40	mg/kg wet	2.000		108	40-140			
C11-C22 Unadjusted Aromatics1	37.3	15.0	mg/kg wet	34.00		110	40-140			
Chrysene	1.95	0.40	mg/kg wet	2.000		98	40-140			
Dibenzo(a,h)Anthracene	2.20	0.20	mg/kg wet	2.000		110	40-140			
Fluoranthene	1.87	0.40	mg/kg wet	2.000		94	40-140			
Fluorene	1.81	0.40	mg/kg wet	2.000		91	40-140			
Indeno(1,2,3-cd)Pyrene	2.25	0.40	mg/kg wet	2.000		112	40-140			
Naphthalene	1.60	0.40	mg/kg wet	2.000		80	40-140			
Phenanthrene	1.89	0.40	mg/kg wet	2.000		94	40-140			
Pyrene	1.92	0.40	mg/kg wet	2.000		96	40-140			
Surrogate: 2-Bromonaphthalene	*2.29*		mg/kg wet	*2.000*		*115*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*2.22*		mg/kg wet	*2.000*		*111*	*40-140*			
Surrogate: O-Terphenyl	*1.60*		mg/kg wet	*2.000*		*80*	*40-140*			
LCS										
2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			
LCS Dup										
C19-C36 Aliphatics1	23.1	15.0	mg/kg wet	16.00		144	40-140	57	25	B+, D+
C9-C18 Aliphatics1	11.0	15.0	mg/kg wet	12.00		92	40-140	31	25	D+
Decane (C10)	0.9	0.5	mg/kg wet	2.000		47	40-140	2	25	
Docosane (C22)	1.9	0.5	mg/kg wet	2.000		93	40-140	29	25	D+
Dodecane (C12)	1.1	0.5	mg/kg wet	2.000		54	40-140	7	25	
Eicosane (C20)	1.8	0.5	mg/kg wet	2.000		89	40-140	27	25	D+
Hexacosane (C26)	1.8	0.5	mg/kg wet	2.000		91	40-140	31	25	D+
Hexadecane (C16)	1.6	0.5	mg/kg wet	2.000		79	40-140	21	25	
Hexatriacontane (C36)	1.8	0.5	mg/kg wet	2.000		92	40-140	28	25	D+
Nonadecane (C19)	1.8	0.5	mg/kg wet	2.000		89	40-140	27	25	D+
Nonane (C9)	0.6	0.5	mg/kg wet	2.000		31	30-140	10	25	
Octacosane (C28)	1.8	0.5	mg/kg wet	2.000		88	40-140	29	25	D+
Octadecane (C18)	1.7	0.5	mg/kg wet	2.000		86	40-140	25	25	
Tetracosane (C24)	1.9	0.5	mg/kg wet	2.000		93	40-140	29	25	D+
Tetradecane (C14)	1.3	0.5	mg/kg wet	2.000		65	40-140	14	25	
Triacontane (C30)	1.7	0.5	mg/kg wet	2.000		87	40-140	29	25	D+
Surrogate: 1-Chlorooctadecane	*1.55*		mg/kg wet	*2.000*		*77*	*40-140*			
LCS Dup										

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41908 - 3546										
2-Methylnaphthalene	1.14	0.20	mg/kg wet	2.000		57	40-140	39	20	D+
Acenaphthene	1.29	0.40	mg/kg wet	2.000		65	40-140	29	20	D+
Acenaphthylene	1.27	0.20	mg/kg wet	2.000		63	40-140	30	20	D+
Anthracene	1.59	0.40	mg/kg wet	2.000		80	40-140	15	20	
Benzo(a)anthracene	1.76	0.40	mg/kg wet	2.000		88	40-140	9	20	
Benzo(a)pyrene	2.03	0.40	mg/kg wet	2.000		102	40-140	11	20	
Benzo(b)fluoranthene	1.85	0.40	mg/kg wet	2.000		93	40-140	11	20	
Benzo(g,h,i)perylene	1.24	0.40	mg/kg wet	2.000		62	40-140	54	20	D+
Benzo(k)fluoranthene	1.86	0.40	mg/kg wet	2.000		93	40-140	15	20	
C11-C22 Unadjusted Aromatics1	25.7	15.0	mg/kg wet	34.00		75	40-140	37	25	D+
Chrysene	1.75	0.40	mg/kg wet	2.000		87	40-140	11	20	
Dibenzo(a,h)Anthracene	1.45	0.20	mg/kg wet	2.000		73	40-140	41	20	D+
Fluoranthene	1.70	0.40	mg/kg wet	2.000		85	40-140	10	20	
Fluorene	1.44	0.40	mg/kg wet	2.000		72	40-140	23	20	D+
Indeno(1,2,3-cd)Pyrene	1.46	0.40	mg/kg wet	2.000		73	40-140	42	20	D+
Naphthalene	0.99	0.40	mg/kg wet	2.000		50	40-140	47	20	D+
Phenanthrene	1.61	0.40	mg/kg wet	2.000		81	40-140	16	20	
Pyrene	1.73	0.40	mg/kg wet	2.000		87	40-140	10	20	
Surrogate: 2-Bromonaphthalene	*1.56*		mg/kg wet	*2.000*		*78*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.41*		mg/kg wet	*2.000*		*70*	*40-140*			
Surrogate: O-Terphenyl	*1.35*		mg/kg wet	*2.000*		*68*	*40-140*			
LCS Dup										
2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH42029 - 5035										
Blank										
1,2,4-Trimethylbenzene	ND	0.20	mg/kg wet							
2,2,4-Trimethylpentane	ND	5.00	mg/kg wet							
2-Methylpentane	ND	5.00	mg/kg wet							
Benzene	ND	0.20	mg/kg wet							
C5-C8 Unadjusted Aliphatics	ND	10.0	mg/kg wet							
C9-C10 Aromatics	ND	10.0	mg/kg wet							
C9-C12 Unadjusted Aliphatics	ND	10.0	mg/kg wet							
Ethylbenzene	ND	0.20	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.05	mg/kg wet							
Naphthalene	ND	0.20	mg/kg wet							
n-Butylcyclohexane	ND	5.00	mg/kg wet							
n-Decane	ND	5.00	mg/kg wet							
Nonane (C9)	ND	5.00	mg/kg wet							
Pentane	ND	5.00	mg/kg wet							
Toluene	ND	0.20	mg/kg wet							
Xylene O	ND	0.20	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH42029 - 5035										
Xylene P,M	ND	0.40	mg/kg wet							
Surrogate: 2,5-Dibromotoluene - FID	*5.68*		mg/kg wet	*5.000*		*114*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.72*		mg/kg wet	*5.000*		*114*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.31*		mg/kg wet	*5.333*		*81*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.34*		mg/kg wet	*5.333*		*81*	*70-130*			
LCS										
1,2,4-Trimethylbenzene	10.0	0.20	mg/kg wet	10.00		100	70-130			
2,2,4-Trimethylpentane	14.7	5.00	mg/kg wet	15.00		98	70-130			
2-Methylpentane	16.8	5.00	mg/kg wet	15.00		112	70-130			
Benzene	4.96	0.20	mg/kg wet	5.000		99	70-130			
C5-C8 Unadjusted Aliphatics	42.7	10.0	mg/kg wet	40.00		107	70-130			
C9-C10 Aromatics	9.83	10.0	mg/kg wet	10.00		98	70-130			
C9-C12 Unadjusted Aliphatics	25.7	10.0	mg/kg wet	30.00		86	70-130			
Ethylbenzene	5.00	0.20	mg/kg wet	5.000		100	70-130			
Methyl tert-Butyl Ether	15.8	0.05	mg/kg wet	15.00		106	70-130			
Naphthalene	8.88	0.20	mg/kg wet	10.00		89	70-130			
n-Butylcyclohexane	7.75	5.00	mg/kg wet	10.00		77	70-130			
n-Decane	8.84	5.00	mg/kg wet	10.00		88	70-130			
Nonane (C9)	8.09	5.00	mg/kg wet	10.00		81	30-130			
Pentane	11.6	5.00	mg/kg wet	10.00		116	70-130			
Toluene	15.2	0.20	mg/kg wet	15.00		101	70-130			
Xylene O	10.1	0.20	mg/kg wet	10.00		101	70-130			
Xylene P,M	20.5	0.40	mg/kg wet	20.00		102	70-130			
Surrogate: 2,5-Dibromotoluene - FID	*4.94*		mg/kg wet	*5.000*		*99*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.07*		mg/kg wet	*5.000*		*101*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.78*		mg/kg wet	*5.333*		*90*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.96*		mg/kg wet	*5.333*		*93*	*70-130*			
LCS Dup										
1,2,4-Trimethylbenzene	10.4	0.20	mg/kg wet	10.00		104	70-130	4	25	
2,2,4-Trimethylpentane	18.6	5.00	mg/kg wet	15.00		124	70-130	24	25	
2-Methylpentane	17.4	5.00	mg/kg wet	15.00		116	70-130	3	25	
Benzene	5.12	0.20	mg/kg wet	5.000		102	70-130	3	25	
C5-C8 Unadjusted Aliphatics	47.2	10.0	mg/kg wet	40.00		118	70-130	10	25	
C9-C10 Aromatics	10.3	10.0	mg/kg wet	10.00		103	70-130	5	25	
C9-C12 Unadjusted Aliphatics	28.5	10.0	mg/kg wet	30.00		95	70-130	10	25	
Ethylbenzene	5.12	0.20	mg/kg wet	5.000		102	70-130	2	25	
Methyl tert-Butyl Ether	16.2	0.05	mg/kg wet	15.00		108	70-130	2	25	
Naphthalene	9.79	0.20	mg/kg wet	10.00		98	70-130	10	25	
n-Butylcyclohexane	8.60	5.00	mg/kg wet	10.00		86	70-130	10	25	
n-Decane	9.67	5.00	mg/kg wet	10.00		97	70-130	9	25	
Nonane (C9)	9.31	5.00	mg/kg wet	10.00		93	30-130	14	25	
Pentane	11.9	5.00	mg/kg wet	10.00		119	70-130	2	25	
Toluene	15.7	0.20	mg/kg wet	15.00		104	70-130	3	25	
Xylene O	10.2	0.20	mg/kg wet	10.00		102	70-130	1	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH42029 - 5035										
Xylene P,M	20.8	0.40	mg/kg wet	20.00		104	70-130	2	25	
Surrogate: 2,5-Dibromotoluene - FID	*5.32*		mg/kg wet	*5.000*		*106*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.39*		mg/kg wet	*5.000*		*108*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.69*		mg/kg wet	*5.333*		*88*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.84*		mg/kg wet	*5.333*		*91*	*70-130*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

Notes and Definitions

Z-04	MeOH - covered
WL	Results obtained from a deionized water leach of the sample.
U	Analyte included in the analysis, but not detected
D+	Relative percent difference for duplicate is outside of criteria (D+).
D	Diluted.
C-	Continuing Calibration recovery is below lower control limit (C-).
B+	Blank Spike recovery is above upper control limit (B+).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408349

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)
A2LA Accredited: Testing Cert# 2864.01
http://www.a2la.org/scopepdf/2864-01.pdf

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002
http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01
Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)
http://www.A2LA.org/dirsearchnew/newsearch.cfm

CPSC ID# 1141
Lead Paint, Lead in Children's Metals Jewelry
http://www.cpsc.gov/cgi-bin/labapplist.aspx

Sample and Cooler Receipt Checklist

Client: PEER Consultants
Client Project ID: _____
Shipped/Delivered Via: ESS Courier

ESS Project ID: 14080349
Date Project Due: 8/25/14
Days For Project: 5 Day

Items to be checked upon receipt:

1. Air Bill Manifest Present?	* No	10. Are the samples properly preserved?	Yes
Air No.:		11. Proper sample containers used?	Yes
2. Were Custody Seals Present?	No	12. Any air bubbles in the VOA vials?	N/A
3. Were Custody Seals Intact?	N/A	13. Holding times exceeded?	No
4. Is Radiation count < 100 CPM?	Yes	14. Sufficient sample volumes?	Yes
5. Is a cooler present?	Yes	15. Any Subcontracting needed?	No
Cooler Temp: **2.5**		16. Are ESS labels on correct containers?	Yes No
Iced With: **Ice**		17. Were samples received intact?	Yes No
6. Was COC included with samples?	Yes	ESS Sample IDs: _____	
7. Was COC signed and dated by client?	Yes	Sub Lab: _____	
8. Does the COC match the sample	Yes	Analysis: _____	
9. Is COC complete and correct?	Yes	TAT: _____	

18. Was there need to call project manager to discuss status? If yes, please explain.

_____

_____

_____

Who was called?:_____ By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	40 ml - VOA	1	MeOH
1	Yes	8 oz Soil Jar	2	NP

Completed By: _____ Date/Time: 8/18/14 1712

Reviewed By: _____ Date/Time: 8/18/14 1716

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

Page 1 of 1

Turn Time: ✓ Standard Other ____
If faster than 5 days, prior approval by laboratory is required # ____

State where samples were collected from: (MA) RI CT NH NJ NY ME Other ____

Is this project for any of the following: MA-MCP Navy USACE Other ____

Reporting Limits: comm 97/ mcp RCS-1

ESS LAB PROJECT ID: 1408349

Electronic Deliverable: Yes ✓ No ____

Format: Excel ✓ Access ____ PDF ✓ Other ____

Co. Name	Project #	Project Name (20 Char. or less)
PEER Consultants	5559	Union Square

Contact Person	Address
Dave Gorden	993 Bedford St Suite 200

City	State	Zip	PO#
Burlington	MA		5559

Telephone #	Fax #	Email Address
7812388880	7812388884	gorden@peerepc.com

ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (20 Char. or less)	Pres Code	Number of Containers	Type of Containers	Write Required Analysis: VPH	EPH PCB SVOC Metals cond
1	8/15/14	1400		✓	S	PB-10 1-9'	6/1	3	G/V	✓	✓

Container Type: P-Poly G-Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters

Cooler Present ✓ Yes ___ No ✓ Internal Use Only

Seals Intact ___ Yes ___ No NA: ___ [ ] Pickup

Cooler Temp 2.5 ICE RT [ ] Technicians ____

Preservation Code 1- NP, 2- HC1, 3- H_2SO_4, 4- HNO_3, 5- NaOH, 6- MeOH, 7- Asorbic Acid, 8- ZnAct, 9- ____

Sampled by: david gordon

Comments:

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
	8/18/14 0900			COURIER	8/18/14 1134		8/18/14 1134
	8/18/14 1700		8/18/14 1711				

*By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VII A

Please fax all changes to Chain of Custody in writing.

1 (White) Lab Copy 2 (Yellow) Client Receipt

10/26/04 A

CERTIFICATE OF ANALYSIS

David Gorden
PEER Consultants, P.C.
99 S. Bedford Street
Burlington, MA 01803

RE: Union Square (5559)
ESS Laboratory Work Order Number: 1408387

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 2:57 pm, Aug 26, 2014

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408387

SAMPLE RECEIPT

The following samples were received on August 19, 2014 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has performed and reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

For EPH soil samples, the aromatic range results have been corrected for identified cartridge contaminant in accordance with the CAM protocol.

Lab Number	Sample Name	Matrix	Analysis
1408387-01	PB1 6.5-8.5ft	Soil	8260B Low
1408387-02	PB1 0.5-12.5ft	Soil	6010C, 7010, 7471A, 8082A, 8270D, 9050A, EPH8270, MADEP-EPH, MADEP-VPH
1408387-03	PB3 1-13ft	Soil	6010C, 7010, 7471A, 8082A, 8270D, 9050A, EPH8270, MADEP-EPH, MADEP-VPH

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408387

PROJECT NARRATIVE

5035/8260B Volatile Organic Compounds / Low Level

CH42130-BS1 **Blank Spike recovery is above upper control limit (B+).**
Tetrahydrofuran (141% @ 70-130%)

CH42130-BSD1 **Blank Spike recovery is above upper control limit (B+).**
Acetone (132% @ 70-130%), Tetrahydrofuran (136% @ 70-130%)

8082A Polychlorinated Biphenyls (PCB)

CH42010-BSD1 **Relative percent difference for duplicate is outside of criteria (D+).**
Aroclor 1260 (31%)

8270D Semi-Volatile Organic Compounds

CXH0219-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (86% @ 80-120%), bis(2-Ethylhexyl)phthalate (104% @ 80-120%)

CXH0219-CCV1 **Continuing Calibration recovery is below lower control limit (C-).**
Pentachlorophenol (74% @ 80-120%)

CXH0239-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (111% @ 80-120%), bis(2-Ethylhexyl)phthalate (99% @ 80-120%)

CXH0239-CCV1 **Continuing Calibration recovery is below lower control limit (C-).**
Pentachlorophenol (79% @ 80-120%)

MADEP-EPH Extractable Petroleum Hydrocarbons

CH41908-BSD1 **Blank Spike recovery is above upper control limit (B+).**
C19-C36 Aliphatics1 (125% @ 40-140%)

CH41908-BSD1 **Relative percent difference for duplicate is outside of criteria (D+).**
C19-C36 Aliphatics1 (44%), C9-C18 Aliphatics1 (28%), Docosane (C22) (26%), Eicosane (C20) (24%), Hexacosane (C26) (27%), Hexatriacontane (C36) (24%), Nonadecane (C19) (23%), Octacosane (C28) (27%), Tetracosane (C24) (24%), Triacontane (C30) (24%)

CH41908-BSD2 **Relative percent difference for duplicate is outside of criteria (D+).**
2-Methylnaphthalene (39%), Acenaphthene (29%), Acenaphthylene (30%), Benzo(g,h,i)perylene (54%), C11-C22 Unadjusted Aromatics1 (37%), Dibenzo(a,h)Anthracene (41%), Fluorene (23%), Indeno(1,2,3-cd)Pyrene (42%), Naphthalene (47%)

CXH0227-CCV2 **Continuing Calibration recovery is below lower control limit (C-).**
Benzo(g,h,i)perylene (68% @ 80-120%), Dibenzo(a,h)Anthracene (79% @ 80-120%)

No other observations noted.

End of Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408387

DATA USABILITY LINKS

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408387

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1408387-01 through 1408387-03**

Matrices: ( ) Ground Water/Surface Water (X) Soil/Sediment ( ) Drinking Water ( ) Air ( ) Other:_____

CAM Protocol (check all that apply below):

(X) 8260 VOC CAM II A	(X) 7470/7471 Hg CAM III B	(X) MassDEP VPH CAM IV A	( ) 8081 Pesticides CAM V B	( ) 7196 Hex Cr CAM VI B	( ) MassDEP APH CAM IX A
(X) 8270 SVOC CAM II B	(X) 7010 Metals CAM III C	(X) MassDEP EPH CAM IV B	( ) 8151 Herbicides CAM V C	( ) 8330 Explosives CAM VIII A	( ) TO-15 VOC CAM IX B
(X) 6010 Metals CAM III A	( ) 6020 Metals CAM III D	(X) 8082 PCB CAM V A	( ) 6860 Perchlorate CAM VIII B	( ) 9014 Total Cyanide/PAC CAM VI A	

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes (X) No ( )
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	Yes (X) No ( )
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	Yes (X) No ( )
D	Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (X) No ( )
E	a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	Yes (X) No ( )
	b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes ( ) No ( )
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	Yes (X) No ( )

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?	Yes (X) No ( )*
	***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**	
H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes ( ) No (X)*
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes (X) No ( )*

All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ Date: August 26, 2014

Printed Name: Laurel Stoddard Position: Laboratory Director

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 6.5-8.5ft
Date Sampled: 08/18/14 11:51
Percent Solids: 93
Initial Volume: 5.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,1,1-Trichloroethane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,1,2,2-Tetrachloroethane	ND (0.0021)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,1,2-Trichloroethane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,1-Dichloroethane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,1-Dichloroethene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,1-Dichloropropene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,2,3-Trichlorobenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,2,3-Trichloropropane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,2,4-Trichlorobenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,2,4-Trimethylbenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,2-Dibromo-3-Chloropropane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,2-Dibromoethane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,2-Dichlorobenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,2-Dichloroethane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,2-Dichloropropane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,3,5-Trimethylbenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,3-Dichlorobenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,3-Dichloropropane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,4-Dichlorobenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
1,4-Dioxane	ND (0.103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
2,2-Dichloropropane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
2-Butanone	ND (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
2-Chlorotoluene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
2-Hexanone	ND (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
4-Chlorotoluene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
4-Isopropyltoluene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
4-Methyl-2-Pentanone	ND (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Acetone	**0.0130** (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Benzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Bromobenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Bromochloromethane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 6.5-8.5ft
Date Sampled: 08/18/14 11:51
Percent Solids: 93
Initial Volume: 5.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Bromoform	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Bromomethane	ND (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Carbon Disulfide	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Carbon Tetrachloride	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Chlorobenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Chloroethane	ND (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Chloroform	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Chloromethane	ND (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
cis-1,2-Dichloroethene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
cis-1,3-Dichloropropene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Dibromochloromethane	ND (0.0021)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Dibromomethane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Dichlorodifluoromethane	ND (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Diethyl Ether	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Di-isopropyl ether	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Ethyl tertiary-butyl ether	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Ethylbenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Hexachlorobutadiene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Isopropylbenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Methyl tert-Butyl Ether	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Methylene Chloride	ND (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Naphthalene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
n-Butylbenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
n-Propylbenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
sec-Butylbenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Styrene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
tert-Butylbenzene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Tertiary-amyl methyl ether	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Tetrachloroethene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Tetrahydrofuran	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Toluene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 6.5-8.5ft
Date Sampled: 08/18/14 11:51
Percent Solids: 93
Initial Volume: 5.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
trans-1,2-Dichloroethene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
trans-1,3-Dichloropropene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Trichloroethene	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Trichlorofluoromethane	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Vinyl Chloride	ND (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Xylene O	ND (0.0051)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Xylene P,M	ND (0.0103)		8260B Low		1	08/21/14 21:29	CXH0248	CH42130
Xylenes (Total)	ND (0.0103)		8260B Low		1	08/21/14 21:29		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*111 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*108 %*		*70-130*
Surrogate: Dibromofluoromethane	*111 %*		*70-130*
Surrogate: Toluene-d8	*112 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 0.5-12.5ft
Date Sampled: 08/18/14 13:29
Percent Solids: 93

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (3.9)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203
Arsenic	**4.2** (2.0)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203
Barium	**11.7** (2.0)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203
Beryllium	**0.18** (0.09)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203
Cadmium	ND (0.39)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203
Chromium	**8.9** (0.8)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203
Lead	**9.0** (3.9)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203
Mercury	**0.165** (0.036)		7471A		1	BJV	08/26/14 12:18	0.6	40	CH42505
Nickel	**7.5** (2.0)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203
Selenium	ND (1.96)		7010		5	KJK	08/22/14 23:43	2.75	100	CH42203
Silver	ND (0.39)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203
Thallium	ND (0.98)		7010		5	JP	08/25/14 15:48	2.75	100	CH42203
Vanadium	**12.4** (0.8)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203
Zinc	**21.3** (2.0)		6010C		1	KJK	08/22/14 20:20	2.75	100	CH42203

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 0.5-12.5ft
Date Sampled: 08/18/14 13:29
Percent Solids: 93
Initial Volume: 20.3
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TAJ
Prepared: 8/20/14 18:04
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.0531)		8082A		1	08/21/14 13:16		CH42010
Aroclor 1221	ND (0.0531)		8082A		1	08/21/14 13:16		CH42010
Aroclor 1232	ND (0.0531)		8082A		1	08/21/14 13:16		CH42010
Aroclor 1242	ND (0.0531)		8082A		1	08/21/14 13:16		CH42010
Aroclor 1248	ND (0.0531)		8082A		1	08/21/14 13:16		CH42010
Aroclor 1254	ND (0.0531)		8082A		1	08/21/14 13:16		CH42010
Aroclor 1260	ND (0.0531)		8082A		1	08/21/14 13:16		CH42010
Aroclor 1262	ND (0.0531)		8082A		1	08/21/14 13:16		CH42010
Aroclor 1268	ND (0.0531)		8082A		1	08/21/14 13:16		CH42010

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*69 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*65 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*82 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*88 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 0.5-12.5ft
Date Sampled: 08/18/14 13:29
Percent Solids: 93
Initial Volume: 15
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/20/14 12:00

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
1,2-Dichlorobenzene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
1,3-Dichlorobenzene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
1,4-Dichlorobenzene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2,4,5-Trichlorophenol	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2,4,6-Trichlorophenol	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2,4-Dichlorophenol	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2,4-Dimethylphenol	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2,4-Dinitrophenol	ND (1.80)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2,4-Dinitrotoluene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2,6-Dinitrotoluene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2-Chloronaphthalene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2-Chlorophenol	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2-Methylnaphthalene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2-Methylphenol	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
2-Nitrophenol	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
3,3´-Dichlorobenzidine	ND (0.719)		8270D		1	08/21/14 10:25	CXH0239	CH41931
3+4-Methylphenol	ND (0.719)		8270D		1	08/21/14 10:25	CXH0239	CH41931
4-Bromophenyl-phenylether	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
4-Chloroaniline	ND (0.719)		8270D		1	08/21/14 10:25	CXH0239	CH41931
4-Nitrophenol	ND (1.80)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Acenaphthene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Acenaphthylene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Acetophenone	ND (0.719)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Aniline	ND (1.80)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Anthracene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Azobenzene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Benzo(a)anthracene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Benzo(a)pyrene	ND (0.180)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Benzo(b)fluoranthene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Benzo(g,h,i)perylene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Benzo(k)fluoranthene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 0.5-12.5ft
Date Sampled: 08/18/14 13:29
Percent Solids: 93
Initial Volume: 15
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/20/14 12:00

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
bis(2-Chloroethoxy)methane	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
bis(2-Chloroethyl)ether	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
bis(2-chloroisopropyl)Ether	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
bis(2-Ethylhexyl)phthalate	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Butylbenzylphthalate	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Chrysene	ND (0.180)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Dibenzo(a,h)Anthracene	ND (0.180)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Dibenzofuran	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Diethylphthalate	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Dimethylphthalate	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Di-n-butylphthalate	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Di-n-octylphthalate	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Fluoranthene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Fluorene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Hexachlorobenzene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Hexachlorobutadiene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Hexachloroethane	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Indeno(1,2,3-cd)Pyrene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Isophorone	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Naphthalene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Nitrobenzene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
N-Nitrosodimethylamine	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Pentachlorophenol	ND (1.80)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Phenanthrene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Phenol	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931
Pyrene	ND (0.359)		8270D		1	08/21/14 10:25	CXH0239	CH41931

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*63 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*73 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*72 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*70 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 0.5-12.5ft
Date Sampled: 08/18/14 13:29
Percent Solids: 93
Initial Volume: 15
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/20/14 12:00

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		*66 %*		*30-130*				
Surrogate: Nitrobenzene-d5		*67 %*		*30-130*				
Surrogate: Phenol-d6		*75 %*		*30-130*				
Surrogate: p-Terphenyl-d14		*83 %*		*30-130*				

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 0.5-12.5ft
Date Sampled: 08/18/14 13:29
Percent Solids: 93

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-02
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 197** (5)		9050A		1	JLK	08/20/14 15:39	umhos/cm	CH42024

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 0.5-12.5ft
Date Sampled: 08/18/14 13:29
Percent Solids: 93
Initial Volume: 25
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-02
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/20/14 15:46

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (16.2)		MADEP-EPH		1	VSC	08/22/14 1:09	CXH0226	CH41908
C19-C36 Aliphatics1	ND (16.2)		MADEP-EPH		1	VSC	08/22/14 1:09	CXH0226	CH41908
C11-C22 Unadjusted Aromatics1	ND (16.2)		EPH8270		1	VSC	08/22/14 15:41	CXH0265	CH41908
C11-C22 Aromatics1,2	ND (16.2)		EPH8270			VSC	08/22/14 15:41		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*66 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*82 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*75 %*		*40-140*
Surrogate: O-Terphenyl	*63 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1 0.5-12.5ft
Date Sampled: 08/18/14 13:29
Percent Solids: 93
Initial Volume: 15.7
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: NMS

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (11.1)		MADEP-VPH		1	08/21/14 15:59	CXH0256	CH42140
C5-C8 Aliphatics1,2	ND (11.1)		MADEP-VPH		1	08/21/14 15:59		[CALC]
C9-C12 Aliphatics2,3	ND (11.1)		MADEP-VPH		1	08/21/14 15:59		[CALC]
Benzene	ND (0.22)		MADEP-VPH		1	08/21/14 15:59	CXH0256	CH42140
Ethylbenzene	ND (0.22)		MADEP-VPH		1	08/21/14 15:59	CXH0256	CH42140
Methyl tert-Butyl Ether	ND (0.06)		MADEP-VPH		1	08/21/14 15:59	CXH0256	CH42140
Naphthalene	ND (0.22)		MADEP-VPH		1	08/21/14 15:59	CXH0256	CH42140
Toluene	ND (0.22)		MADEP-VPH		1	08/21/14 15:59	CXH0256	CH42140
Xylene O	ND (0.22)		MADEP-VPH		1	08/21/14 15:59	CXH0256	CH42140
Xylene P,M	ND (0.44)		MADEP-VPH		1	08/21/14 15:59	CXH0256	CH42140
1:1 Methanol/Soil Ratio %D	**5** (N/A)		MADEP-VPH			08/21/14 0:00		CH42140
Preservative:	**MeOH - covered**		MADEP-VPH					CH42140

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*111 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*113 %*		*70-130*
Surrogate: Trifluorotoluene - FID	*101 %*		*70-130*
Surrogate: Trifluorotoluene - PID	*103 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3 1-13ft
Date Sampled: 08/19/14 10:48
Percent Solids: 88

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-03
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (4.6)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203
Arsenic	**3.5** (2.3)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203
Barium	**14.4** (2.3)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203
Beryllium	**0.17** (0.10)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203
Cadmium	ND (0.46)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203
Chromium	**7.2** (0.9)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203
Lead	**6.9** (4.6)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203
Mercury	ND (0.037)		7471A		1	BJV	08/26/14 12:21	0.6	40	CH42505
Nickel	**7.5** (2.3)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203
Selenium	ND (2.32)		7010		5	KJK	08/22/14 23:48	2.45	100	CH42203
Silver	ND (0.46)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203
Thallium	ND (1.16)		7010		5	JP	08/25/14 16:05	2.45	100	CH42203
Vanadium	**11.7** (0.9)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203
Zinc	**16.7** (2.3)		6010C		1	KJK	08/22/14 20:24	2.45	100	CH42203

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3 1-13ft
Date Sampled: 08/19/14 10:48
Percent Solids: 88
Initial Volume: 20.2
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TAJ
Prepared: 8/20/14 18:04
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.0562)		8082A		1	08/21/14 13:35		CH42010
Aroclor 1221	ND (0.0562)		8082A		1	08/21/14 13:35		CH42010
Aroclor 1232	ND (0.0562)		8082A		1	08/21/14 13:35		CH42010
Aroclor 1242	ND (0.0562)		8082A		1	08/21/14 13:35		CH42010
Aroclor 1248	ND (0.0562)		8082A		1	08/21/14 13:35		CH42010
Aroclor 1254	ND (0.0562)		8082A		1	08/21/14 13:35		CH42010
Aroclor 1260	ND (0.0562)		8082A		1	08/21/14 13:35		CH42010
Aroclor 1262	ND (0.0562)		8082A		1	08/21/14 13:35		CH42010
Aroclor 1268	ND (0.0562)		8082A		1	08/21/14 13:35		CH42010

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*81 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*74 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*91 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*99 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3 1-13ft
Date Sampled: 08/19/14 10:48
Percent Solids: 88
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/20/14 12:00

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
1,2-Dichlorobenzene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
1,3-Dichlorobenzene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
1,4-Dichlorobenzene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2,4,5-Trichlorophenol	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2,4,6-Trichlorophenol	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2,4-Dichlorophenol	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2,4-Dimethylphenol	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2,4-Dinitrophenol	ND (1.93)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2,4-Dinitrotoluene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2,6-Dinitrotoluene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2-Chloronaphthalene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2-Chlorophenol	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2-Methylnaphthalene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2-Methylphenol	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
2-Nitrophenol	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
3,3´-Dichlorobenzidine	ND (0.773)		8270D		1	08/20/14 19:19	CXH0219	CH41931
3+4-Methylphenol	ND (0.773)		8270D		1	08/20/14 19:19	CXH0219	CH41931
4-Bromophenyl-phenylether	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
4-Chloroaniline	ND (0.773)		8270D		1	08/20/14 19:19	CXH0219	CH41931
4-Nitrophenol	ND (1.93)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Acenaphthene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Acenaphthylene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Acetophenone	ND (0.773)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Aniline	ND (1.93)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Anthracene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Azobenzene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Benzo(a)anthracene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Benzo(a)pyrene	ND (0.193)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Benzo(b)fluoranthene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Benzo(g,h,i)perylene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Benzo(k)fluoranthene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3 1-13ft
Date Sampled: 08/19/14 10:48
Percent Solids: 88
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/20/14 12:00

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
bis(2-Chloroethoxy)methane	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
bis(2-Chloroethyl)ether	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
bis(2-chloroisopropyl)Ether	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
bis(2-Ethylhexyl)phthalate	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Butylbenzylphthalate	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Chrysene	ND (0.193)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Dibenzo(a,h)Anthracene	ND (0.193)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Dibenzofuran	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Diethylphthalate	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Dimethylphthalate	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Di-n-butylphthalate	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Di-n-octylphthalate	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Fluoranthene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Fluorene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Hexachlorobenzene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Hexachlorobutadiene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Hexachloroethane	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Indeno(1,2,3-cd)Pyrene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Isophorone	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Naphthalene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Nitrobenzene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
N-Nitrosodimethylamine	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Pentachlorophenol	ND (1.93)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Phenanthrene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Phenol	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931
Pyrene	ND (0.386)		8270D		1	08/20/14 19:19	CXH0219	CH41931

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*65 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*78 %*		*30-130*
Surrogate: 2-Chlorophenol-d4	*68 %*		*30-130*
Surrogate: 2-Fluorobiphenyl	*73 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3 1-13ft
Date Sampled: 08/19/14 10:48
Percent Solids: 88
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: IBM
Prepared: 8/20/14 12:00

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		*65 %*		*30-130*				
Surrogate: Nitrobenzene-d5		*69 %*		*30-130*				
Surrogate: Phenol-d6		*74 %*		*30-130*				
Surrogate: p-Terphenyl-d14		*89 %*		*30-130*				

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3 1-13ft
Date Sampled: 08/19/14 10:48
Percent Solids: 88

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-03
Sample Matrix: Soil

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Conductivity	**WL 1490** (5)		9050A		1	JLK	08/20/14 15:39	umhos/cm	CH42024

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3 1-13ft
Date Sampled: 08/19/14 10:48
Percent Solids: 88
Initial Volume: 24.9
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-03
Sample Matrix: Soil
Units: mg/kg dry

Prepared: 8/20/14 15:46

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (17.1)		MADEP-EPH		1	VSC	08/22/14 2:00	CXH0226	CH41908
C19-C36 Aliphatics1	ND (17.1)		MADEP-EPH		1	VSC	08/22/14 2:00	CXH0226	CH41908
C11-C22 Unadjusted Aromatics1	ND (17.1)		EPH8270		1	VSC	08/22/14 16:31	CXH0265	CH41908
C11-C22 Aromatics1,2	ND (17.1)		EPH8270			VSC	08/22/14 16:31		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*78 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*90 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*81 %*		*40-140*
Surrogate: O-Terphenyl	*66 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3 1-13ft
Date Sampled: 08/19/14 10:48
Percent Solids: 88
Initial Volume: 14.4
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 1408387
ESS Laboratory Sample ID: 1408387-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: NMS

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (13.2)		MADEP-VPH		1	08/21/14 18:50	CXH0256	CH42140
C5-C8 Aliphatics1,2	ND (13.2)		MADEP-VPH		1	08/21/14 18:50		[CALC]
C9-C12 Aliphatics2,3	ND (13.2)		MADEP-VPH		1	08/21/14 18:50		[CALC]
Benzene	ND (0.26)		MADEP-VPH		1	08/21/14 18:50	CXH0256	CH42140
Ethylbenzene	ND (0.26)		MADEP-VPH		1	08/21/14 18:50	CXH0256	CH42140
Methyl tert-Butyl Ether	ND (0.07)		MADEP-VPH		1	08/21/14 18:50	CXH0256	CH42140
Naphthalene	ND (0.26)		MADEP-VPH		1	08/21/14 18:50	CXH0256	CH42140
Toluene	ND (0.26)		MADEP-VPH		1	08/21/14 18:50	CXH0256	CH42140
Xylene O	ND (0.26)		MADEP-VPH		1	08/21/14 18:50	CXH0256	CH42140
Xylene P,M	ND (0.53)		MADEP-VPH		1	08/21/14 18:50	CXH0256	CH42140
1:1 Methanol/Soil Ratio %D	**4** (N/A)		MADEP-VPH			08/21/14 0:00		CH42140
Preservative:	**MeOH - covered**		MADEP-VPH					CH42140

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*115 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*118 %*		*70-130*
Surrogate: Trifluorotoluene - FID	*95 %*		*70-130*
Surrogate: Trifluorotoluene - PID	*98 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

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Quality Control Data

Total Metals

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch CH42203 - 3050B										
Blank										
Antimony	ND	5.0	mg/kg wet							
Arsenic	ND	2.5	mg/kg wet							
Barium	ND	2.5	mg/kg wet							
Beryllium	ND	0.11	mg/kg wet							
Cadmium	ND	0.50	mg/kg wet							
Chromium	ND	1.0	mg/kg wet							
Lead	ND	5.0	mg/kg wet							
Nickel	ND	2.5	mg/kg wet							
Selenium	ND	0.50	mg/kg wet							
Silver	ND	0.50	mg/kg wet							
Thallium	ND	1.25	mg/kg wet							
Vanadium	ND	1.0	mg/kg wet							
Zinc	ND	2.5	mg/kg wet							
LCS										
Antimony	76.6	13.3	mg/kg wet	94.00		81	80-120			
Arsenic	89.9	6.7	mg/kg wet	113.0		80	80-120			
Barium	124	6.7	mg/kg wet	155.0		80	73-127			
Beryllium	86.1	0.29	mg/kg wet	109.0		79	75-125			
Cadmium	50.4	1.33	mg/kg wet	67.50		75	73-127			
Chromium	133	2.7	mg/kg wet	164.0		81	80-120			
Lead	75.2	13.3	mg/kg wet	90.10		83	80-120			
Nickel	73.0	6.7	mg/kg wet	89.30		82	80-120			
Selenium	147	66.7	mg/kg wet	156.0		94	80-120			
Silver	43.0	1.33	mg/kg wet	52.60		82	80-120			
Thallium	96.8	33.3	mg/kg wet	116.0		83	80-120			
Vanadium	57.5	2.7	mg/kg wet	73.00		79	60-140			
Zinc	131	6.7	mg/kg wet	168.0		78	69-132			
LCS Dup										
Antimony	78.1	14.9	mg/kg wet	94.00		83	80-120	2	20	
Arsenic	91.6	7.5	mg/kg wet	113.0		81	80-120	2	20	
Barium	122	7.5	mg/kg wet	155.0		79	73-127	2	20	
Beryllium	87.5	0.33	mg/kg wet	109.0		80	75-125	2	20	
Cadmium	51.6	1.49	mg/kg wet	67.50		77	73-127	2	20	
Chromium	132	3.0	mg/kg wet	164.0		81	80-120	0.3	20	
Lead	75.6	14.9	mg/kg wet	90.10		84	80-120	0.5	20	
Nickel	74.7	7.5	mg/kg wet	89.30		84	80-120	2	20	
Selenium	145	74.6	mg/kg wet	156.0		93	80-120	2	20	
Silver	42.2	1.49	mg/kg wet	52.60		80	80-120	2	20	
Thallium	96.3	37.3	mg/kg wet	116.0		83	80-120	0.6	20	
Vanadium	56.8	3.0	mg/kg wet	73.00		78	60-140	1	20	
Zinc	133	7.5	mg/kg wet	168.0		79	69-132	2	20	
Batch CH42505 - 7471A										
Blank										

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CH42505 - 7471A										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	8.00	1.50	mg/kg wet	8.370		96	80-120			
LCS Dup										
Mercury	8.00	1.27	mg/kg wet	8.370		96	80-120	0.01	20	
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
Blank										
1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet							
1,1,1-Trichloroethane	ND	0.0050	mg/kg wet							
1,1,2,2-Tetrachloroethane	ND	0.0020	mg/kg wet							
1,1,2-Trichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethene	ND	0.0050	mg/kg wet							
1,1-Dichloropropene	ND	0.0050	mg/kg wet							
1,2,3-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,3-Trichloropropane	ND	0.0050	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.0050	mg/kg wet							
1,2,4-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,2-Dibromo-3-Chloropropane	ND	0.0050	mg/kg wet							
1,2-Dibromoethane	ND	0.0050	mg/kg wet							
1,2-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,2-Dichloroethane	ND	0.0050	mg/kg wet							
1,2-Dichloropropane	ND	0.0050	mg/kg wet							
1,3,5-Trimethylbenzene	ND	0.0050	mg/kg wet							
1,3-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,3-Dichloropropane	ND	0.0050	mg/kg wet							
1,4-Dichlorobenzene	ND	0.0050	mg/kg wet							
1,4-Dioxane	ND	0.100	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0100	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0100	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0100	mg/kg wet							
Acetone	ND	0.0100	mg/kg wet							
Benzene	ND	0.0050	mg/kg wet							
Bromobenzene	ND	0.0050	mg/kg wet							
Bromochloromethane	ND	0.0050	mg/kg wet							
Bromodichloromethane	ND	0.0050	mg/kg wet							
Bromoform	ND	0.0050	mg/kg wet							
Bromomethane	ND	0.0100	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
Carbon Disulfide	ND	0.0050	mg/kg wet							
Carbon Tetrachloride	ND	0.0050	mg/kg wet							
Chlorobenzene	ND	0.0050	mg/kg wet							
Chloroethane	ND	0.0100	mg/kg wet							
Chloroform	ND	0.0050	mg/kg wet							
Chloromethane	ND	0.0100	mg/kg wet							
cis-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Dibromochloromethane	ND	0.0020	mg/kg wet							
Dibromomethane	ND	0.0050	mg/kg wet							
Dichlorodifluoromethane	ND	0.0100	mg/kg wet							
Diethyl Ether	ND	0.0050	mg/kg wet							
Di-isopropyl ether	ND	0.0050	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.0050	mg/kg wet							
Ethylbenzene	ND	0.0050	mg/kg wet							
Hexachlorobutadiene	ND	0.0050	mg/kg wet							
Isopropylbenzene	ND	0.0050	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.0050	mg/kg wet							
Methylene Chloride	ND	0.0100	mg/kg wet							
Naphthalene	ND	0.0050	mg/kg wet							
n-Butylbenzene	ND	0.0050	mg/kg wet							
n-Propylbenzene	ND	0.0050	mg/kg wet							
sec-Butylbenzene	ND	0.0050	mg/kg wet							
Styrene	ND	0.0050	mg/kg wet							
tert-Butylbenzene	ND	0.0050	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.0050	mg/kg wet							
Tetrachloroethene	ND	0.0050	mg/kg wet							
Tetrahydrofuran	ND	0.0050	mg/kg wet							
Toluene	ND	0.0050	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.0050	mg/kg wet							
trans-1,3-Dichloropropene	ND	0.0050	mg/kg wet							
Trichloroethene	ND	0.0050	mg/kg wet							
Trichlorofluoromethane	ND	0.0050	mg/kg wet							
Vinyl Chloride	ND	0.0100	mg/kg wet							
Xylene O	ND	0.0050	mg/kg wet							
Xylene P,M	ND	0.0100	mg/kg wet							
Surrogate: 1,2-Dichloroethane-d4	*0.0516*		mg/kg wet	*0.05000*		*103*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0544*		mg/kg wet	*0.05000*		*109*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0533*		mg/kg wet	*0.05000*		*107*	*70-130*			
Surrogate: Toluene-d8	*0.0548*		mg/kg wet	*0.05000*		*110*	*70-130*			
LCS										
1,1,1,2-Tetrachloroethane	0.0455	0.0050	mg/kg wet	0.05000		91	70-130			
1,1,1-Trichloroethane	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
1,1,2,2-Tetrachloroethane	0.0568	0.0020	mg/kg wet	0.05000		114	70-130			
1,1,2-Trichloroethane	0.0505	0.0050	mg/kg wet	0.05000		101	70-130			

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
1,1-Dichloroethane	0.0517	0.0050	mg/kg wet	0.05000		103	70-130			
1,1-Dichloroethene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
1,1-Dichloropropene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130			
1,2,3-Trichlorobenzene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
1,2,3-Trichloropropane	0.0536	0.0050	mg/kg wet	0.05000		107	70-130			
1,2,4-Trichlorobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
1,2,4-Trimethylbenzene	0.0568	0.0050	mg/kg wet	0.05000		114	70-130			
1,2-Dibromo-3-Chloropropane	0.0627	0.0050	mg/kg wet	0.05000		125	70-130			
1,2-Dibromoethane	0.0489	0.0050	mg/kg wet	0.05000		98	70-130			
1,2-Dichlorobenzene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			
1,2-Dichloroethane	0.0523	0.0050	mg/kg wet	0.05000		105	70-130			
1,2-Dichloropropane	0.0480	0.0050	mg/kg wet	0.05000		96	70-130			
1,3,5-Trimethylbenzene	0.0604	0.0050	mg/kg wet	0.05000		121	70-130			
1,3-Dichlorobenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
1,3-Dichloropropane	0.0463	0.0050	mg/kg wet	0.05000		93	70-130			
1,4-Dichlorobenzene	0.0490	0.0050	mg/kg wet	0.05000		98	70-130			
1,4-Dioxane	1.25	0.100	mg/kg wet	1.000		125	70-130			
2,2-Dichloropropane	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
2-Butanone	0.214	0.0100	mg/kg wet	0.2500		85	70-130			
2-Chlorotoluene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
2-Hexanone	0.288	0.0100	mg/kg wet	0.2500		115	70-130			
4-Chlorotoluene	0.0615	0.0050	mg/kg wet	0.05000		123	70-130			
4-Isopropyltoluene	0.0571	0.0050	mg/kg wet	0.05000		114	70-130			
4-Methyl-2-Pentanone	0.301	0.0100	mg/kg wet	0.2500		120	70-130			
Acetone	0.320	0.0100	mg/kg wet	0.2500		128	70-130			
Benzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Bromobenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
Bromochloromethane	0.0545	0.0050	mg/kg wet	0.05000		109	70-130			
Bromodichloromethane	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
Bromoform	0.0479	0.0050	mg/kg wet	0.05000		96	70-130			
Bromomethane	0.0548	0.0100	mg/kg wet	0.05000		110	70-130			
Carbon Disulfide	0.0632	0.0050	mg/kg wet	0.05000		126	70-130			
Carbon Tetrachloride	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
Chlorobenzene	0.0495	0.0050	mg/kg wet	0.05000		99	70-130			
Chloroethane	0.0537	0.0100	mg/kg wet	0.05000		107	70-130			
Chloroform	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Chloromethane	0.0618	0.0100	mg/kg wet	0.05000		124	70-130			
cis-1,2-Dichloroethene	0.0499	0.0050	mg/kg wet	0.05000		100	70-130			
cis-1,3-Dichloropropene	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
Dibromochloromethane	0.0467	0.0020	mg/kg wet	0.05000		93	70-130			
Dibromomethane	0.0595	0.0050	mg/kg wet	0.05000		119	70-130			
Dichlorodifluoromethane	0.0644	0.0100	mg/kg wet	0.05000		129	70-130			
Diethyl Ether	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
Di-isopropyl ether	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
Ethyl tertiary-butyl ether	0.0451	0.0050	mg/kg wet	0.05000		90	70-130			

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
Ethylbenzene	0.0553	0.0050	mg/kg wet	0.05000		111	70-130			
Hexachlorobutadiene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Isopropylbenzene	0.0564	0.0050	mg/kg wet	0.05000		113	70-130			
Methyl tert-Butyl Ether	0.0488	0.0050	mg/kg wet	0.05000		98	70-130			
Methylene Chloride	0.0586	0.0100	mg/kg wet	0.05000		117	70-130			
Naphthalene	0.0458	0.0050	mg/kg wet	0.05000		92	70-130			
n-Butylbenzene	0.0573	0.0050	mg/kg wet	0.05000		115	70-130			
n-Propylbenzene	0.0567	0.0050	mg/kg wet	0.05000		113	70-130			
sec-Butylbenzene	0.0559	0.0050	mg/kg wet	0.05000		112	70-130			
Styrene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
tert-Butylbenzene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130			
Tertiary-amyl methyl ether	0.0490	0.0050	mg/kg wet	0.05000		98	70-130			
Tetrachloroethene	0.0436	0.0050	mg/kg wet	0.05000		87	70-130			
Tetrahydrofuran	0.0703	0.0050	mg/kg wet	0.05000		141	70-130			B+
Toluene	0.0588	0.0050	mg/kg wet	0.05000		118	70-130			
trans-1,2-Dichloroethene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
trans-1,3-Dichloropropene	0.0465	0.0050	mg/kg wet	0.05000		93	70-130			
Trichloroethene	0.0491	0.0050	mg/kg wet	0.05000		98	70-130			
Trichlorofluoromethane	0.0492	0.0050	mg/kg wet	0.05000		98	70-130			
Vinyl Chloride	0.0626	0.0100	mg/kg wet	0.05000		125	70-130			
Xylene O	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Xylene P,M	0.105	0.0100	mg/kg wet	0.1000		105	70-130			
Surrogate: 1,2-Dichloroethane-d4	*0.0561*		mg/kg wet	*0.05000*		*112*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0596*		mg/kg wet	*0.05000*		*119*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0568*		mg/kg wet	*0.05000*		*114*	*70-130*			
Surrogate: Toluene-d8	*0.0525*		mg/kg wet	*0.05000*		*105*	*70-130*			
LCS Dup										
1,1,1,2-Tetrachloroethane	0.0517	0.0050	mg/kg wet	0.05000		103	70-130	13	25	
1,1,1-Trichloroethane	0.0566	0.0050	mg/kg wet	0.05000		113	70-130	9	25	
1,1,2,2-Tetrachloroethane	0.0607	0.0020	mg/kg wet	0.05000		121	70-130	7	25	
1,1,2-Trichloroethane	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	8	25	
1,1-Dichloroethane	0.0568	0.0050	mg/kg wet	0.05000		114	70-130	9	25	
1,1-Dichloroethene	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	6	25	
1,1-Dichloropropene	0.0585	0.0050	mg/kg wet	0.05000		117	70-130	15	25	
1,2,3-Trichlorobenzene	0.0545	0.0050	mg/kg wet	0.05000		109	70-130	5	25	
1,2,3-Trichloropropane	0.0574	0.0050	mg/kg wet	0.05000		115	70-130	7	25	
1,2,4-Trichlorobenzene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130	7	25	
1,2,4-Trimethylbenzene	0.0595	0.0050	mg/kg wet	0.05000		119	70-130	5	25	
1,2-Dibromo-3-Chloropropane	0.0608	0.0050	mg/kg wet	0.05000		122	70-130	3	25	
1,2-Dibromoethane	0.0547	0.0050	mg/kg wet	0.05000		109	70-130	11	25	
1,2-Dichlorobenzene	0.0529	0.0050	mg/kg wet	0.05000		106	70-130	4	25	
1,2-Dichloroethane	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	9	25	
1,2-Dichloropropane	0.0534	0.0050	mg/kg wet	0.05000		107	70-130	11	25	
1,3,5-Trimethylbenzene	0.0625	0.0050	mg/kg wet	0.05000		125	70-130	3	25	
1,3-Dichlorobenzene	0.0569	0.0050	mg/kg wet	0.05000		114	70-130	8	25	

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
1,3-Dichloropropane	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	15	25	
1,4-Dichlorobenzene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	3	25	
1,4-Dioxane	1.22	0.100	mg/kg wet	1.000		122	70-130	3	20	
2,2-Dichloropropane	0.0582	0.0050	mg/kg wet	0.05000		116	70-130	8	25	
2-Butanone	0.257	0.0100	mg/kg wet	0.2500		103	70-130	18	25	
2-Chlorotoluene	0.0568	0.0050	mg/kg wet	0.05000		114	70-130	5	25	
2-Hexanone	0.286	0.0100	mg/kg wet	0.2500		114	70-130	0.5	25	
4-Chlorotoluene	0.0626	0.0050	mg/kg wet	0.05000		125	70-130	2	25	
4-Isopropyltoluene	0.0587	0.0050	mg/kg wet	0.05000		117	70-130	3	25	
4-Methyl-2-Pentanone	0.298	0.0100	mg/kg wet	0.2500		119	70-130	1	25	
Acetone	0.329	0.0100	mg/kg wet	0.2500		132	70-130	3	25	B+
Benzene	0.0590	0.0050	mg/kg wet	0.05000		118	70-130	12	25	
Bromobenzene	0.0553	0.0050	mg/kg wet	0.05000		111	70-130	5	25	
Bromochloromethane	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	2	25	
Bromodichloromethane	0.0535	0.0050	mg/kg wet	0.05000		107	70-130	14	25	
Bromoform	0.0559	0.0050	mg/kg wet	0.05000		112	70-130	15	25	
Bromomethane	0.0598	0.0100	mg/kg wet	0.05000		120	70-130	9	25	
Carbon Disulfide	0.0622	0.0050	mg/kg wet	0.05000		124	70-130	2	25	
Carbon Tetrachloride	0.0603	0.0050	mg/kg wet	0.05000		121	70-130	11	25	
Chlorobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	4	25	
Chloroethane	0.0512	0.0100	mg/kg wet	0.05000		102	70-130	5	25	
Chloroform	0.0584	0.0050	mg/kg wet	0.05000		117	70-130	11	25	
Chloromethane	0.0603	0.0100	mg/kg wet	0.05000		121	70-130	2	25	
cis-1,2-Dichloroethene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	10	25	
cis-1,3-Dichloropropene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130	13	25	
Dibromochloromethane	0.0538	0.0020	mg/kg wet	0.05000		108	70-130	14	25	
Dibromomethane	0.0645	0.0050	mg/kg wet	0.05000		129	70-130	8	25	
Dichlorodifluoromethane	0.0634	0.0100	mg/kg wet	0.05000		127	70-130	2	25	
Diethyl Ether	0.0558	0.0050	mg/kg wet	0.05000		112	70-130	6	25	
Di-isopropyl ether	0.0580	0.0050	mg/kg wet	0.05000		116	70-130	8	25	
Ethyl tertiary-butyl ether	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	18	25	
Ethylbenzene	0.0577	0.0050	mg/kg wet	0.05000		115	70-130	4	25	
Hexachlorobutadiene	0.0557	0.0050	mg/kg wet	0.05000		111	70-130	7	25	
Isopropylbenzene	0.0594	0.0050	mg/kg wet	0.05000		119	70-130	5	25	
Methyl tert-Butyl Ether	0.0546	0.0050	mg/kg wet	0.05000		109	70-130	11	25	
Methylene Chloride	0.0600	0.0100	mg/kg wet	0.05000		120	70-130	2	25	
Naphthalene	0.0467	0.0050	mg/kg wet	0.05000		93	70-130	2	25	
n-Butylbenzene	0.0603	0.0050	mg/kg wet	0.05000		121	70-130	5	25	
n-Propylbenzene	0.0592	0.0050	mg/kg wet	0.05000		118	70-130	4	25	
sec-Butylbenzene	0.0586	0.0050	mg/kg wet	0.05000		117	70-130	5	25	
Styrene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	2	25	
tert-Butylbenzene	0.0588	0.0050	mg/kg wet	0.05000		118	70-130	7	25	
Tertiary-amyl methyl ether	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	10	25	
Tetrachloroethene	0.0466	0.0050	mg/kg wet	0.05000		93	70-130	7	25	
Tetrahydrofuran	0.0681	0.0050	mg/kg wet	0.05000		136	70-130	3	25	B+

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
5035/8260B Volatile Organic Compounds / Low Level										
Batch CH42130 - 5035										
Toluene	0.0610	0.0050	mg/kg wet	0.05000		122	70-130	4	25	
trans-1,2-Dichloroethene	0.0586	0.0050	mg/kg wet	0.05000		117	70-130	12	25	
trans-1,3-Dichloropropene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	12	25	
Trichloroethene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	9	25	
Trichlorofluoromethane	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	10	25	
Vinyl Chloride	0.0600	0.0100	mg/kg wet	0.05000		120	70-130	4	25	
Xylene O	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	3	25	
Xylene P,M	0.110	0.0100	mg/kg wet	0.1000		110	70-130	4	25	
Surrogate: 1,2-Dichloroethane-d4	*0.0588*		mg/kg wet	*0.05000*		*118*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0580*		mg/kg wet	*0.05000*		*116*	*70-130*			
Surrogate: Dibromofluoromethane	*0.0583*		mg/kg wet	*0.05000*		*117*	*70-130*			
Surrogate: Toluene-d8	*0.0536*		mg/kg wet	*0.05000*		*107*	*70-130*			
8082A Polychlorinated Biphenyls (PCB)										
Batch CH42010 - 3540C										
Blank										
Aroclor 1016	ND	0.0500	mg/kg wet							
Aroclor 1221	ND	0.0500	mg/kg wet							
Aroclor 1232	ND	0.0500	mg/kg wet							
Aroclor 1242	ND	0.0500	mg/kg wet							
Aroclor 1248	ND	0.0500	mg/kg wet							
Aroclor 1254	ND	0.0500	mg/kg wet							
Aroclor 1260	ND	0.0500	mg/kg wet							
Aroclor 1262	ND	0.0500	mg/kg wet							
Aroclor 1268	ND	0.0500	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0232*		mg/kg wet	*0.02500*		*93*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0243*		mg/kg wet	*0.02500*		*97*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0219*		mg/kg wet	*0.02500*		*88*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0208*		mg/kg wet	*0.02500*		*83*	*30-150*			
LCS										
Aroclor 1016	0.657	0.0500	mg/kg wet	0.5000		131	40-140			
Aroclor 1260	0.653	0.0500	mg/kg wet	0.5000		131	40-140			
Surrogate: Decachlorobiphenyl	*0.0252*		mg/kg wet	*0.02500*		*101*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0262*		mg/kg wet	*0.02500*		*105*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0221*		mg/kg wet	*0.02500*		*88*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0227*		mg/kg wet	*0.02500*		*91*	*30-150*			
LCS Dup										
Aroclor 1016	0.485	0.0500	mg/kg wet	0.5000		97	40-140	30	30	
Aroclor 1260	0.479	0.0500	mg/kg wet	0.5000		96	40-140	31	30	D+
Surrogate: Decachlorobiphenyl	*0.0247*		mg/kg wet	*0.02500*		*99*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0257*		mg/kg wet	*0.02500*		*103*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0229*		mg/kg wet	*0.02500*		*92*	*30-150*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408387

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8082A Polychlorinated Biphenyls (PCB)										
Batch CH42010 - 3540C										
Surrogate: Tetrachloro-m-xylene [2C]	*0.0232*		mg/kg wet	*0.02500*		*93*	*30-150*			
8270D Semi-Volatile Organic Compounds										
Batch CH41931 - 3546										
Blank										
1,2,4-Trichlorobenzene	ND	0.333	mg/kg wet							
1,2-Dichlorobenzene	ND	0.333	mg/kg wet							
1,3-Dichlorobenzene	ND	0.333	mg/kg wet							
1,4-Dichlorobenzene	ND	0.333	mg/kg wet							
2,4,5-Trichlorophenol	ND	0.333	mg/kg wet							
2,4,6-Trichlorophenol	ND	0.333	mg/kg wet							
2,4-Dichlorophenol	ND	0.333	mg/kg wet							
2,4-Dimethylphenol	ND	0.333	mg/kg wet							
2,4-Dinitrophenol	ND	1.67	mg/kg wet							
2,4-Dinitrotoluene	ND	0.333	mg/kg wet							
2,6-Dinitrotoluene	ND	0.333	mg/kg wet							
2-Chloronaphthalene	ND	0.333	mg/kg wet							
2-Chlorophenol	ND	0.333	mg/kg wet							
2-Methylnaphthalene	ND	0.333	mg/kg wet							
2-Methylphenol	ND	0.333	mg/kg wet							
2-Nitrophenol	ND	0.333	mg/kg wet							
3,3´-Dichlorobenzidine	ND	0.667	mg/kg wet							
3+4-Methylphenol	ND	0.667	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet							
4-Chloroaniline	ND	0.667	mg/kg wet							
4-Nitrophenol	ND	1.67	mg/kg wet							
Acenaphthene	ND	0.333	mg/kg wet							
Acenaphthylene	ND	0.333	mg/kg wet							
Acetophenone	ND	0.667	mg/kg wet							
Aniline	ND	1.67	mg/kg wet							
Anthracene	ND	0.333	mg/kg wet							
Azobenzene	ND	0.333	mg/kg wet							
Benzo(a)anthracene	ND	0.333	mg/kg wet							
Benzo(a)pyrene	ND	0.167	mg/kg wet							
Benzo(b)fluoranthene	ND	0.333	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.333	mg/kg wet							
Benzo(k)fluoranthene	ND	0.333	mg/kg wet							
bis(2-Chloroethoxy)methane	ND	0.333	mg/kg wet							
bis(2-Chloroethyl)ether	ND	0.333	mg/kg wet							
bis(2-chloroisopropyl)Ether	ND	0.333	mg/kg wet							
bis(2-Ethylhexyl)phthalate	ND	0.333	mg/kg wet							
Butylbenzylphthalate	ND	0.333	mg/kg wet							
Chrysene	ND	0.167	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.167	mg/kg wet							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41931 - 3546										
Dibenzofuran	ND	0.333	mg/kg wet							
Diethylphthalate	ND	0.333	mg/kg wet							
Dimethylphthalate	ND	0.333	mg/kg wet							
Di-n-butylphthalate	ND	0.333	mg/kg wet							
Di-n-octylphthalate	ND	0.333	mg/kg wet							
Fluoranthene	ND	0.333	mg/kg wet							
Fluorene	ND	0.333	mg/kg wet							
Hexachlorobenzene	ND	0.333	mg/kg wet							
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachloroethane	ND	0.333	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.333	mg/kg wet							
Isophorone	ND	0.333	mg/kg wet							
Naphthalene	ND	0.333	mg/kg wet							
Nitrobenzene	ND	0.333	mg/kg wet							
N-Nitrosodimethylamine	ND	0.333	mg/kg wet							
Pentachlorophenol	ND	1.67	mg/kg wet							
Phenanthrene	ND	0.333	mg/kg wet							
Phenol	ND	0.333	mg/kg wet							
Pyrene	ND	0.333	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	*2.91*		mg/kg wet	*3.333*		*87*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.18*		mg/kg wet	*5.000*		*84*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*4.39*		mg/kg wet	*5.000*		*88*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.95*		mg/kg wet	*3.333*		*89*	*30-130*			
Surrogate: 2-Fluorophenol	*4.24*		mg/kg wet	*5.000*		*85*	*30-130*			
Surrogate: Nitrobenzene-d5	*3.02*		mg/kg wet	*3.333*		*90*	*30-130*			
Surrogate: Phenol-d6	*4.61*		mg/kg wet	*5.000*		*92*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.74*		mg/kg wet	*3.333*		*112*	*30-130*			
LCS										
1,2,4-Trichlorobenzene	2.57	0.333	mg/kg wet	3.333		77	40-140			
1,2-Dichlorobenzene	2.53	0.333	mg/kg wet	3.333		76	40-140			
1,3-Dichlorobenzene	2.51	0.333	mg/kg wet	3.333		75	40-140			
1,4-Dichlorobenzene	2.53	0.333	mg/kg wet	3.333		76	40-140			
2,4,5-Trichlorophenol	3.00	0.333	mg/kg wet	3.333		90	30-130			
2,4,6-Trichlorophenol	3.04	0.333	mg/kg wet	3.333		91	30-130			
2,4-Dichlorophenol	2.87	0.333	mg/kg wet	3.333		86	30-130			
2,4-Dimethylphenol	2.89	0.333	mg/kg wet	3.333		87	30-130			
2,4-Dinitrophenol	2.80	1.67	mg/kg wet	3.333		84	30-130			
2,4-Dinitrotoluene	2.78	0.333	mg/kg wet	3.333		83	40-140			
2,6-Dinitrotoluene	2.92	0.333	mg/kg wet	3.333		88	40-140			
2-Chloronaphthalene	2.42	0.333	mg/kg wet	3.333		73	40-140			
2-Chlorophenol	2.73	0.333	mg/kg wet	3.333		82	30-130			
2-Methylnaphthalene	2.67	0.333	mg/kg wet	3.333		80	40-140			
2-Methylphenol	2.90	0.333	mg/kg wet	3.333		87	30-130			
2-Nitrophenol	2.74	0.333	mg/kg wet	3.333		82	30-130			
3,3´-Dichlorobenzidine	2.45	0.667	mg/kg wet	3.333		74	40-140			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41931 - 3546										
3+4-Methylphenol	6.14	0.667	mg/kg wet	6.667		92	30-130			
4-Bromophenyl-phenylether	2.68	0.333	mg/kg wet	3.333		80	40-140			
4-Chloroaniline	2.00	0.667	mg/kg wet	3.333		60	40-140			
4-Nitrophenol	3.08	1.67	mg/kg wet	3.333		93	30-130			
Acenaphthene	2.60	0.333	mg/kg wet	3.333		78	40-140			
Acenaphthylene	2.52	0.333	mg/kg wet	3.333		76	40-140			
Acetophenone	2.61	0.667	mg/kg wet	3.333		78	40-140			
Aniline	2.24	1.67	mg/kg wet	3.333		67	40-140			
Anthracene	2.83	0.333	mg/kg wet	3.333		85	40-140			
Azobenzene	2.81	0.333	mg/kg wet	3.333		84	40-140			
Benzo(a)anthracene	2.91	0.333	mg/kg wet	3.333		87	40-140			
Benzo(a)pyrene	2.70	0.167	mg/kg wet	3.333		81	40-140			
Benzo(b)fluoranthene	3.10	0.333	mg/kg wet	3.333		93	40-140			
Benzo(g,h,i)perylene	2.93	0.333	mg/kg wet	3.333		88	40-140			
Benzo(k)fluoranthene	2.61	0.333	mg/kg wet	3.333		78	40-140			
bis(2-Chloroethoxy)methane	2.69	0.333	mg/kg wet	3.333		81	40-140			
bis(2-Chloroethyl)ether	2.67	0.333	mg/kg wet	3.333		80	40-140			
bis(2-chloroisopropyl)Ether	2.61	0.333	mg/kg wet	3.333		78	40-140			
bis(2-Ethylhexyl)phthalate	3.18	0.333	mg/kg wet	3.333		95	40-140			
Butylbenzylphthalate	2.99	0.333	mg/kg wet	3.333		90	40-140			
Chrysene	2.86	0.167	mg/kg wet	3.333		86	40-140			
Dibenzo(a,h)Anthracene	2.90	0.167	mg/kg wet	3.333		87	40-140			
Dibenzofuran	2.58	0.333	mg/kg wet	3.333		77	40-140			
Diethylphthalate	3.05	0.333	mg/kg wet	3.333		92	40-140			
Dimethylphthalate	2.79	0.333	mg/kg wet	3.333		84	40-140			
Di-n-butylphthalate	3.23	0.333	mg/kg wet	3.333		97	40-140			
Di-n-octylphthalate	3.16	0.333	mg/kg wet	3.333		95	40-140			
Fluoranthene	2.98	0.333	mg/kg wet	3.333		89	40-140			
Fluorene	2.75	0.333	mg/kg wet	3.333		82	40-140			
Hexachlorobenzene	2.71	0.333	mg/kg wet	3.333		81	40-140			
Hexachlorobutadiene	2.45	0.333	mg/kg wet	3.333		74	40-140			
Hexachloroethane	2.61	0.333	mg/kg wet	3.333		78	40-140			
Indeno(1,2,3-cd)Pyrene	2.99	0.333	mg/kg wet	3.333		90	40-140			
Isophorone	2.68	0.333	mg/kg wet	3.333		80	40-140			
Naphthalene	2.66	0.333	mg/kg wet	3.333		80	40-140			
Nitrobenzene	2.70	0.333	mg/kg wet	3.333		81	40-140			
N-Nitrosodimethylamine	2.21	0.333	mg/kg wet	3.333		66	40-140			
Pentachlorophenol	2.60	1.67	mg/kg wet	3.333		78	30-130			
Phenanthrene	2.85	0.333	mg/kg wet	3.333		85	40-140			
Phenol	2.98	0.333	mg/kg wet	3.333		89	30-130			
Pyrene	3.02	0.333	mg/kg wet	3.333		91	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*2.99*		mg/kg wet	*3.333*		*90*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.60*		mg/kg wet	*5.000*		*92*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*4.47*		mg/kg wet	*5.000*		*89*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*3.01*		mg/kg wet	*3.333*		*90*	*30-130*			

CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41931 - 3546										
Surrogate: 2-Fluorophenol	*4.40*		mg/kg wet	*5.000*		*88*	*30-130*			
Surrogate: Nitrobenzene-d5	*3.11*		mg/kg wet	*3.333*		*93*	*30-130*			
Surrogate: Phenol-d6	*4.73*		mg/kg wet	*5.000*		*95*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.70*		mg/kg wet	*3.333*		*111*	*30-130*			
LCS Dup										
1,2,4-Trichlorobenzene	2.52	0.333	mg/kg wet	3.333		75	40-140	2	30	
1,2-Dichlorobenzene	2.44	0.333	mg/kg wet	3.333		73	40-140	4	30	
1,3-Dichlorobenzene	2.40	0.333	mg/kg wet	3.333		72	40-140	5	30	
1,4-Dichlorobenzene	2.42	0.333	mg/kg wet	3.333		73	40-140	4	30	
2,4,5-Trichlorophenol	3.02	0.333	mg/kg wet	3.333		91	30-130	0.7	30	
2,4,6-Trichlorophenol	3.06	0.333	mg/kg wet	3.333		92	30-130	0.5	30	
2,4-Dichlorophenol	2.84	0.333	mg/kg wet	3.333		85	30-130	1	30	
2,4-Dimethylphenol	2.91	0.333	mg/kg wet	3.333		87	30-130	0.4	30	
2,4-Dinitrophenol	3.03	1.67	mg/kg wet	3.333		91	30-130	8	30	
2,4-Dinitrotoluene	2.85	0.333	mg/kg wet	3.333		85	40-140	3	30	
2,6-Dinitrotoluene	2.98	0.333	mg/kg wet	3.333		89	40-140	2	30	
2-Chloronaphthalene	2.42	0.333	mg/kg wet	3.333		73	40-140	0.08	30	
2-Chlorophenol	2.66	0.333	mg/kg wet	3.333		80	30-130	3	30	
2-Methylnaphthalene	2.64	0.333	mg/kg wet	3.333		79	40-140	1	30	
2-Methylphenol	2.84	0.333	mg/kg wet	3.333		85	30-130	2	30	
2-Nitrophenol	2.71	0.333	mg/kg wet	3.333		81	30-130	1	30	
3,3´-Dichlorobenzidine	2.51	0.667	mg/kg wet	3.333		75	40-140	2	30	
3+4-Methylphenol	5.68	0.667	mg/kg wet	6.667		85	30-130	8	30	
4-Bromophenyl-phenylether	2.66	0.333	mg/kg wet	3.333		80	40-140	0.4	30	
4-Chloroaniline	2.02	0.667	mg/kg wet	3.333		61	40-140	1	30	
4-Nitrophenol	3.20	1.67	mg/kg wet	3.333		96	30-130	4	30	
Acenaphthene	2.62	0.333	mg/kg wet	3.333		79	40-140	0.8	30	
Acenaphthylene	2.52	0.333	mg/kg wet	3.333		76	40-140	0.07	30	
Acetophenone	2.54	0.667	mg/kg wet	3.333		76	40-140	3	30	
Aniline	2.20	1.67	mg/kg wet	3.333		66	40-140	2	30	
Anthracene	2.85	0.333	mg/kg wet	3.333		85	40-140	0.6	30	
Azobenzene	2.80	0.333	mg/kg wet	3.333		84	40-140	0.4	30	
Benzo(a)anthracene	2.89	0.333	mg/kg wet	3.333		87	40-140	0.6	30	
Benzo(a)pyrene	2.76	0.167	mg/kg wet	3.333		83	40-140	2	30	
Benzo(b)fluoranthene	3.14	0.333	mg/kg wet	3.333		94	40-140	1	30	
Benzo(g,h,i)perylene	3.00	0.333	mg/kg wet	3.333		90	40-140	2	30	
Benzo(k)fluoranthene	2.72	0.333	mg/kg wet	3.333		82	40-140	4	30	
bis(2-Chloroethoxy)methane	2.66	0.333	mg/kg wet	3.333		80	40-140	1	30	
bis(2-Chloroethyl)ether	2.52	0.333	mg/kg wet	3.333		75	40-140	6	30	
bis(2-chloroisopropyl)Ether	2.53	0.333	mg/kg wet	3.333		76	40-140	3	30	
bis(2-Ethylhexyl)phthalate	3.18	0.333	mg/kg wet	3.333		95	40-140	0.04	30	
Butylbenzylphthalate	2.95	0.333	mg/kg wet	3.333		89	40-140	1	30	
Chrysene	2.86	0.167	mg/kg wet	3.333		86	40-140	0.02	30	
Dibenzo(a,h)Anthracene	2.97	0.167	mg/kg wet	3.333		89	40-140	2	30	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH41931 - 3546										
Dibenzofuran	2.61	0.333	mg/kg wet	3.333		78	40-140	1	30	
Diethylphthalate	3.09	0.333	mg/kg wet	3.333		93	40-140	1	30	
Dimethylphthalate	2.78	0.333	mg/kg wet	3.333		83	40-140	0.4	30	
Di-n-butylphthalate	3.24	0.333	mg/kg wet	3.333		97	40-140	0.4	30	
Di-n-octylphthalate	3.20	0.333	mg/kg wet	3.333		96	40-140	1	30	
Fluoranthene	3.02	0.333	mg/kg wet	3.333		91	40-140	1	30	
Fluorene	2.77	0.333	mg/kg wet	3.333		83	40-140	0.7	30	
Hexachlorobenzene	2.73	0.333	mg/kg wet	3.333		82	40-140	0.8	30	
Hexachlorobutadiene	2.41	0.333	mg/kg wet	3.333		72	40-140	2	30	
Hexachloroethane	2.50	0.333	mg/kg wet	3.333		75	40-140	4	30	
Indeno(1,2,3-cd)Pyrene	3.05	0.333	mg/kg wet	3.333		92	40-140	2	30	
Isophorone	2.65	0.333	mg/kg wet	3.333		79	40-140	1	30	
Naphthalene	2.61	0.333	mg/kg wet	3.333		78	40-140	2	30	
Nitrobenzene	2.65	0.333	mg/kg wet	3.333		80	40-140	2	30	
N-Nitrosodimethylamine	2.13	0.333	mg/kg wet	3.333		64	40-140	4	30	
Pentachlorophenol	2.66	1.67	mg/kg wet	3.333		80	30-130	2	30	
Phenanthrene	2.87	0.333	mg/kg wet	3.333		86	40-140	0.9	30	
Phenol	2.85	0.333	mg/kg wet	3.333		86	30-130	4	30	
Pyrene	2.98	0.333	mg/kg wet	3.333		89	40-140	1	30	
Surrogate: 1,2-Dichlorobenzene-d4	*2.80*		mg/kg wet	*3.333*		*84*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.51*		mg/kg wet	*5.000*		*90*	*30-130*			
Surrogate: 2-Chlorophenol-d4	*4.32*		mg/kg wet	*5.000*		*86*	*30-130*			
Surrogate: 2-Fluorobiphenyl	*2.95*		mg/kg wet	*3.333*		*89*	*30-130*			
Surrogate: 2-Fluorophenol	*4.18*		mg/kg wet	*5.000*		*84*	*30-130*			
Surrogate: Nitrobenzene-d5	*3.01*		mg/kg wet	*3.333*		*90*	*30-130*			
Surrogate: Phenol-d6	*4.53*		mg/kg wet	*5.000*		*91*	*30-130*			
Surrogate: p-Terphenyl-d14	*3.57*		mg/kg wet	*3.333*		*107*	*30-130*			
Classical Chemistry										
Batch CH42024 - General Preparation										
Blank										
Conductivity	ND	5	umhos/cm							
LCS										
Conductivity	1400		umhos/cm	1411		99	90-110			
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41908 - 3546										
Blank										
C19-C36 Aliphatics1	ND	15.0	mg/kg wet							
C9-C18 Aliphatics1	ND	15.0	mg/kg wet							
Decane (C10)	ND	0.5	mg/kg wet							
Docosane (C22)	ND	0.5	mg/kg wet							
Dodecane (C12)	ND	0.5	mg/kg wet							
Eicosane (C20)	ND	0.5	mg/kg wet							

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Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41908 - 3546										
Hexacosane (C26)	ND	0.5	mg/kg wet							
Hexadecane (C16)	ND	0.5	mg/kg wet							
Hexatriacontane (C36)	ND	0.5	mg/kg wet							
Nonadecane (C19)	ND	0.5	mg/kg wet							
Nonane (C9)	ND	0.5	mg/kg wet							
Octacosane (C28)	ND	0.5	mg/kg wet							
Octadecane (C18)	ND	0.5	mg/kg wet							
Tetracosane (C24)	ND	0.5	mg/kg wet							
Tetradecane (C14)	ND	0.5	mg/kg wet							
Triacontane (C30)	ND	0.5	mg/kg wet							
Surrogate: 1-Chlorooctadecane	*0.916*		mg/kg wet	*2.000*		*46*	*40-140*			
Blank										
2-Methylnaphthalene	ND	0.20	mg/kg wet							
Acenaphthene	ND	0.40	mg/kg wet							
Acenaphthylene	ND	0.20	mg/kg wet							
Anthracene	ND	0.40	mg/kg wet							
Benzo(a)anthracene	ND	0.40	mg/kg wet							
Benzo(a)pyrene	ND	0.40	mg/kg wet							
Benzo(b)fluoranthene	ND	0.40	mg/kg wet							
Benzo(g,h,i)perylene	ND	0.40	mg/kg wet							
Benzo(k)fluoranthene	ND	0.40	mg/kg wet							
C11-C22 Unadjusted Aromatics1	ND	15.0	mg/kg wet							
Chrysene	ND	0.40	mg/kg wet							
Dibenzo(a,h)Anthracene	ND	0.20	mg/kg wet							
Fluoranthene	ND	0.40	mg/kg wet							
Fluorene	ND	0.40	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.40	mg/kg wet							
Naphthalene	ND	0.40	mg/kg wet							
Phenanthrene	ND	0.40	mg/kg wet							
Pyrene	ND	0.40	mg/kg wet							
Surrogate: 2-Bromonaphthalene	*2.16*		mg/kg wet	*2.000*		*108*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*2.03*		mg/kg wet	*2.000*		*102*	*40-140*			
Surrogate: O-Terphenyl	*1.53*		mg/kg wet	*2.000*		*77*	*40-140*			
LCS										
C19-C36 Aliphatics1	12.8	15.0	mg/kg wet	16.00		80	40-140			
C9-C18 Aliphatics1	8.1	15.0	mg/kg wet	12.00		67	40-140			
Decane (C10)	0.9	0.5	mg/kg wet	2.000		46	40-140			
Docosane (C22)	1.4	0.5	mg/kg wet	2.000		70	40-140			
Dodecane (C12)	1.0	0.5	mg/kg wet	2.000		50	40-140			
Eicosane (C20)	1.3	0.5	mg/kg wet	2.000		67	40-140			
Hexacosane (C26)	1.3	0.5	mg/kg wet	2.000		67	40-140			
Hexadecane (C16)	1.3	0.5	mg/kg wet	2.000		64	40-140			
Hexatriacontane (C36)	1.4	0.5	mg/kg wet	2.000		69	40-140			
Nonadecane (C19)	1.4	0.5	mg/kg wet	2.000		68	40-140			

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41908 - 3546										
Nonane (C9)	0.7	0.5	mg/kg wet	2.000		34	30-140			
Octacosane (C28)	1.3	0.5	mg/kg wet	2.000		66	40-140			
Octadecane (C18)	1.3	0.5	mg/kg wet	2.000		66	40-140			
Tetracosane (C24)	1.4	0.5	mg/kg wet	2.000		70	40-140			
Tetradecane (C14)	1.1	0.5	mg/kg wet	2.000		57	40-140			
Triacontane (C30)	1.3	0.5	mg/kg wet	2.000		65	40-140			
Surrogate: 1-Chlorooctadecane	*0.917*		mg/kg wet	*2.000*		*46*	*40-140*			
LCS										
2-Methylnaphthalene	1.68	0.20	mg/kg wet	2.000		84	40-140			
Acenaphthene	1.72	0.40	mg/kg wet	2.000		86	40-140			
Acenaphthylene	1.71	0.20	mg/kg wet	2.000		86	40-140			
Anthracene	1.86	0.40	mg/kg wet	2.000		93	40-140			
Benzo(a)anthracene	1.92	0.40	mg/kg wet	2.000		96	40-140			
Benzo(a)pyrene	2.28	0.40	mg/kg wet	2.000		114	40-140			
Benzo(b)fluoranthene	2.07	0.40	mg/kg wet	2.000		104	40-140			
Benzo(g,h,i)perylene	2.16	0.40	mg/kg wet	2.000		108	40-140			
Benzo(k)fluoranthene	2.16	0.40	mg/kg wet	2.000		108	40-140			
C11-C22 Unadjusted Aromatics1	37.3	15.0	mg/kg wet	34.00		110	40-140			
Chrysene	1.95	0.40	mg/kg wet	2.000		98	40-140			
Dibenzo(a,h)Anthracene	2.20	0.20	mg/kg wet	2.000		110	40-140			
Fluoranthene	1.87	0.40	mg/kg wet	2.000		94	40-140			
Fluorene	1.81	0.40	mg/kg wet	2.000		91	40-140			
Indeno(1,2,3-cd)Pyrene	2.25	0.40	mg/kg wet	2.000		112	40-140			
Naphthalene	1.60	0.40	mg/kg wet	2.000		80	40-140			
Phenanthrene	1.89	0.40	mg/kg wet	2.000		94	40-140			
Pyrene	1.92	0.40	mg/kg wet	2.000		96	40-140			
Surrogate: 2-Bromonaphthalene	*2.29*		mg/kg wet	*2.000*		*115*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*2.22*		mg/kg wet	*2.000*		*111*	*40-140*			
Surrogate: O-Terphenyl	*1.60*		mg/kg wet	*2.000*		*80*	*40-140*			
LCS										
2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			
LCS Dup										
C19-C36 Aliphatics1	20.0	15.0	mg/kg wet	16.00		125	40-140	44	25	B+, D+
C9-C18 Aliphatics1	10.7	15.0	mg/kg wet	12.00		89	40-140	28	25	D+
Decane (C10)	0.9	0.5	mg/kg wet	2.000		45	40-140	1	25	
Docosane (C22)	1.8	0.5	mg/kg wet	2.000		91	40-140	26	25	D+
Dodecane (C12)	1.0	0.5	mg/kg wet	2.000		52	40-140	3	25	
Eicosane (C20)	1.7	0.5	mg/kg wet	2.000		86	40-140	24	25	D+
Hexacosane (C26)	1.7	0.5	mg/kg wet	2.000		87	40-140	27	25	D+
Hexadecane (C16)	1.5	0.5	mg/kg wet	2.000		76	40-140	18	25	
Hexatriacontane (C36)	1.8	0.5	mg/kg wet	2.000		88	40-140	24	25	D+
Nonadecane (C19)	1.7	0.5	mg/kg wet	2.000		86	40-140	23	25	D+

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CH41908 - 3546										
Nonane (C9)	0.6	0.5	mg/kg wet	2.000		30	30-140	13	25	
Octacosane (C28)	1.7	0.5	mg/kg wet	2.000		86	40-140	27	25	D+
Octadecane (C18)	1.7	0.5	mg/kg wet	2.000		83	40-140	22	25	
Tetracosane (C24)	1.8	0.5	mg/kg wet	2.000		89	40-140	24	25	D+
Tetradecane (C14)	1.3	0.5	mg/kg wet	2.000		63	40-140	11	25	
Triacontane (C30)	1.7	0.5	mg/kg wet	2.000		83	40-140	24	25	D+
Surrogate: 1-Chlorooctadecane	*1.49*		mg/kg wet	*2.000*		*75*	*40-140*			
LCS Dup										
2-Methylnaphthalene	1.14	0.20	mg/kg wet	2.000		57	40-140	39	20	D+
Acenaphthene	1.29	0.40	mg/kg wet	2.000		65	40-140	29	20	D+
Acenaphthylene	1.27	0.20	mg/kg wet	2.000		63	40-140	30	20	D+
Anthracene	1.59	0.40	mg/kg wet	2.000		80	40-140	15	20	
Benzo(a)anthracene	1.76	0.40	mg/kg wet	2.000		88	40-140	9	20	
Benzo(a)pyrene	2.03	0.40	mg/kg wet	2.000		102	40-140	11	20	
Benzo(b)fluoranthene	1.85	0.40	mg/kg wet	2.000		93	40-140	11	20	
Benzo(g,h,i)perylene	1.24	0.40	mg/kg wet	2.000		62	40-140	54	20	D+
Benzo(k)fluoranthene	1.86	0.40	mg/kg wet	2.000		93	40-140	15	20	
C11-C22 Unadjusted Aromatics1	25.7	15.0	mg/kg wet	34.00		75	40-140	37	25	D+
Chrysene	1.75	0.40	mg/kg wet	2.000		87	40-140	11	20	
Dibenzo(a,h)Anthracene	1.45	0.20	mg/kg wet	2.000		73	40-140	41	20	D+
Fluoranthene	1.70	0.40	mg/kg wet	2.000		85	40-140	10	20	
Fluorene	1.44	0.40	mg/kg wet	2.000		72	40-140	23	20	D+
Indeno(1,2,3-cd)Pyrene	1.46	0.40	mg/kg wet	2.000		73	40-140	42	20	D+
Naphthalene	0.99	0.40	mg/kg wet	2.000		50	40-140	47	20	D+
Phenanthrene	1.61	0.40	mg/kg wet	2.000		81	40-140	16	20	
Pyrene	1.73	0.40	mg/kg wet	2.000		87	40-140	10	20	
Surrogate: 2-Bromonaphthalene	*1.56*		mg/kg wet	*2.000*		*78*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*1.41*		mg/kg wet	*2.000*		*70*	*40-140*			
Surrogate: O-Terphenyl	*1.35*		mg/kg wet	*2.000*		*68*	*40-140*			
LCS Dup										
2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH42140 - 5035										
Blank										
1,2,4-Trimethylbenzene	ND	0.20	mg/kg wet							
2,2,4-Trimethylpentane	ND	5.00	mg/kg wet							
2-Methylpentane	ND	5.00	mg/kg wet							
Benzene	ND	0.20	mg/kg wet							
C5-C8 Unadjusted Aliphatics	ND	10.0	mg/kg wet							
C9-C10 Aromatics	ND	10.0	mg/kg wet							
C9-C12 Unadjusted Aliphatics	ND	10.0	mg/kg wet							

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Quality Control Data

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch CH42140 - 5035										
Ethylbenzene	ND	0.20	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.05	mg/kg wet							
Naphthalene	ND	0.20	mg/kg wet							
n-Butylcyclohexane	ND	5.00	mg/kg wet							
n-Decane	ND	5.00	mg/kg wet							
Nonane (C9)	ND	5.00	mg/kg wet							
Pentane	ND	5.00	mg/kg wet							
Toluene	ND	0.20	mg/kg wet							
Xylene O	ND	0.20	mg/kg wet							
Xylene P,M	ND	0.40	mg/kg wet							
Surrogate: 2,5-Dibromotoluene - FID	*5.20*		mg/kg wet	*5.000*		*104*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.28*		mg/kg wet	*5.000*		*106*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.40*		mg/kg wet	*5.333*		*83*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.56*		mg/kg wet	*5.333*		*85*	*70-130*			
LCS										
1,2,4-Trimethylbenzene	10.2	0.20	mg/kg wet	10.00		102	70-130			
2,2,4-Trimethylpentane	14.1	5.00	mg/kg wet	15.00		94	70-130			
2-Methylpentane	16.5	5.00	mg/kg wet	15.00		110	70-130			
Benzene	4.94	0.20	mg/kg wet	5.000		99	70-130			
C5-C8 Unadjusted Aliphatics	41.8	10.0	mg/kg wet	40.00		105	70-130			
C9-C10 Aromatics	9.94	10.0	mg/kg wet	10.00		99	70-130			
C9-C12 Unadjusted Aliphatics	25.6	10.0	mg/kg wet	30.00		85	70-130			
Ethylbenzene	5.04	0.20	mg/kg wet	5.000		101	70-130			
Methyl tert-Butyl Ether	15.1	0.05	mg/kg wet	15.00		101	70-130			
Naphthalene	8.85	0.20	mg/kg wet	10.00		89	70-130			
n-Butylcyclohexane	7.77	5.00	mg/kg wet	10.00		78	70-130			
n-Decane	8.79	5.00	mg/kg wet	10.00		88	70-130			
Nonane (C9)	8.05	5.00	mg/kg wet	10.00		80	30-130			
Pentane	11.5	5.00	mg/kg wet	10.00		115	70-130			
Toluene	15.2	0.20	mg/kg wet	15.00		102	70-130			
Xylene O	10.2	0.20	mg/kg wet	10.00		102	70-130			
Xylene P,M	20.8	0.40	mg/kg wet	20.00		104	70-130			
Surrogate: 2,5-Dibromotoluene - FID	*4.89*		mg/kg wet	*5.000*		*98*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.01*		mg/kg wet	*5.000*		*100*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.46*		mg/kg wet	*5.333*		*84*	*70-130*			
Surrogate: Trifluorotoluene - PID	*4.69*		mg/kg wet	*5.333*		*88*	*70-130*			
LCS Dup										
1,2,4-Trimethylbenzene	10.2	0.20	mg/kg wet	10.00		102	70-130	0.6	25	
2,2,4-Trimethylpentane	17.1	5.00	mg/kg wet	15.00		114	70-130	20	25	
2-Methylpentane	16.5	5.00	mg/kg wet	15.00		110	70-130	0.1	25	
Benzene	4.94	0.20	mg/kg wet	5.000		99	70-130	0.05	25	
C5-C8 Unadjusted Aliphatics	44.3	10.0	mg/kg wet	40.00		111	70-130	6	25	
C9-C10 Aromatics	9.83	10.0	mg/kg wet	10.00		98	70-130	1	25	
C9-C12 Unadjusted Aliphatics	24.5	10.0	mg/kg wet	30.00		82	70-130	4	25	

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CH42140 - 5035										
Ethylbenzene	4.98	0.20	mg/kg wet	5.000		100	70-130	1	25	
Methyl tert-Butyl Ether	15.8	0.05	mg/kg wet	15.00		105	70-130	4	25	
Naphthalene	9.50	0.20	mg/kg wet	10.00		95	70-130	7	25	
n-Butylcyclohexane	7.36	5.00	mg/kg wet	10.00		74	70-130	5	25	
n-Decane	8.18	5.00	mg/kg wet	10.00		82	70-130	7	25	
Nonane (C9)	8.13	5.00	mg/kg wet	10.00		81	30-130	0.9	25	
Pentane	11.4	5.00	mg/kg wet	10.00		114	70-130	0.9	25	
Toluene	15.1	0.20	mg/kg wet	15.00		101	70-130	0.7	25	
Xylene O	10.0	0.20	mg/kg wet	10.00		100	70-130	2	25	
Xylene P,M	20.4	0.40	mg/kg wet	20.00		102	70-130	2	25	
Surrogate: 2,5-Dibromotoluene - FID	*5.30*		mg/kg wet	*5.000*		*106*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*5.40*		mg/kg wet	*5.000*		*108*	*70-130*			
Surrogate: Trifluorotoluene - FID	*4.90*		mg/kg wet	*5.333*		*92*	*70-130*			
Surrogate: Trifluorotoluene - PID	*5.05*		mg/kg wet	*5.333*		*95*	*70-130*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square ESS Laboratory Work Order: 1408387

Notes and Definitions

Z-04	MeOH - covered
WL	Results obtained from a deionized water leach of the sample.
U	Analyte included in the analysis, but not detected
Q	Calibration required quadratic regression (Q).
D+	Relative percent difference for duplicate is outside of criteria (D+).
D	Diluted.
C-	Continuing Calibration recovery is below lower control limit (C-).
B+	Blank Spike recovery is above upper control limit (B+).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1408387

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)
A2LA Accredited: Testing Cert# 2864.01
http://www.a2la.org/scopepdf/2864-01.pdf

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002
http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01
Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)
http://www.A2LA.org/dirsearchnew/newsearch.cfm

CPSC ID# 1141
Lead Paint, Lead in Children's Metals Jewelry
http://www.cpsc.gov/cgi-bin/labapplist.aspx

Sample and Cooler Receipt Checklist

Client: PEER Consultants
Client Project ID: _____
Shipped/Delivered Via: ESS Courier

ESS Project ID: 14080387
Date Project Due: 8/26/14
Days For Project: 5 Day

Items to be checked upon receipt:

1. Air Bill Manifest Present?	* No	10. Are the samples properly preserved?	Yes
Air No.:		11. Proper sample containers used?	Yes
2. Were Custody Seals Present?	No	12. Any air bubbles in the VOA vials?	N/A
3. Were Custody Seals Intact?	N/A	13. Holding times exceeded?	No
4. Is Radiation count < 100 CPM?	Yes	14. Sufficient sample volumes?	Yes
5. Is a cooler present?	Yes	15. Any Subcontracting needed?	No
Cooler Temp: **1.8**		16. Are ESS labels on correct containers?	Yes|No
Iced With: **Ice**		17. Were samples received intact?	Yes|No
6. Was COC included with samples?	Yes	ESS Sample IDs: _____	
7. Was COC signed and dated by client?	Yes	Sub Lab: _____	
8. Does the COC match the sample	Yes	Analysis: _____	
9. Is COC complete and correct?	Yes	TAT: _____	

18. Was there need to call project manager to discuss status? If yes, please explain.

LC vials frozen 8/19/14 @ 1735 MB 8/19/14

Who was called?: _____ By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	4 oz Soil Jar	1	NP
1	Yes	40 ml - VOA	1	MeOH
1	Yes	40 ml - VOA	2	other
2	Yes	4 oz Soil Jar	2	NP
2	Yes	40 ml - VOA	1	MeOH
3	Yes	4 oz Soil Jar	2	NP
3	Yes	40 ml - VOA	1	MeOH

Completed By: _____ Date/Time: 8/19/14 1718
Reviewed By: _____ Date/Time: 8/19/14 1732

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

Page 1 of 1

Turn Time: ✓ Standard Other ____
If faster than 5 days, prior approval by laboratory is required # ____

State where samples were collected from:
(MA) RI CT NH NJ NY ME Other ____

Is this project for any of the following:
MA-MCP Navy USACE Other ____

Reporting Limits: comm97/ mcp s-1

ESS LAB PROJECT ID: 1408387

Electronic Deliverable: Yes ✓ No ____

Format: Excel ✓ Access ____ PDF ✓ Other ____

Co. Name	Project #	Project Name (20 Char. or less)
PEER Consultants	5559	Union Square

Contact Person	Address
Dave Gorden	99 S. Bedford St Suite 200

City	State	Zip	PO#
Burlington	MA	01803	5559

Telephone #	Fax #	Email Address
7812388880	7812388884	gorden@peercpc.com

ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (20 Char. or less)	Pres Code	Number of Containers	Type of Containers	VOC hi	VOC lo	VPH	EPH & PCB SVOC metals soil	% solids
1	8/18/14	1151		✓	S	PB1 6.5-8.5'	6/9	4	G/V	✓	✓			✓
2	8/18/14	1329			S	PB1 0.5 - 12.5'	6/1	3	G/V			✓	✓	
3	8/19/14	1048			S	PB3 1 - 13'	6/1	3	G/V			✓	✓	
	~~8/19/14~~				S									

Container Type: P-Poly G-Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters

Cooler Present ✓ Yes ___ No — Internal Use Only

Seals Intact ✓ Yes ___ No NA: ___ [ ] Pickup

Cooler Temp: 1.8 ICE Kit [ ] Technicians ___

Preservation Code 1- NP, 2- HCl, 3- H_2SO_4, 4- HNO_3, 5- NaOH, 6- MeOH, 7- Asorbic Acid, 8- ZnAct, 9- ____

Sampled by: dave gorden

Comments:

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
	8/19/14 1205		8/19/14 1205		8/19/14 1710		8/19/14 1717
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

*By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VII A

Please fax all changes to Chain of Custody in writing.

1 (White) Lab Copy 2 (Yellow) Client Receipt

10/26/04 A

Limited Groundwater Sampling Investigation

Union Square Utilities and Roadway Improvements Project
Washington Street and Somerville Avenue
Somerville, Massachusetts

January 12, 2015

PEER Project No. 5559

Prepared for:
City of Somerville
Somerville, Massachusetts

Prepared through:
Parsons Brinckerhoff
Boston, Massachusetts

Prepared by:
PEER Consultants, P.C.
Burlington, Massachusetts

PEER
CONSULTANTS, P.C.

Est. 1978

99 South Bedford Street, Suite 200 • Burlington, MA 01803
Phone: 781-238-8880 • Fax: 781-238-8884

Engineers • Scientists • Planners

January 12, 2015

Parsons Brinckerhoff
75 Arlington Street
Boston, MA 02116

Attn: Ms. Rachel Burckhardt

Re: Limited Groundwater Sampling Investigation
Union Square Utilities and Roadway Improvements Project
Washington Street and Somerville Avenue
Somerville, Middlesex County, Massachusetts
PEER Project No. 5559

Dear Ms. Burckhardt:

PEER Consultants, P.C. (PEER) is pleased to submit our report of Limited Groundwater Sampling Investigation (LGSI) activities completed at the site referenced above. The report presents data from field activities that included the environmental sampling of three groundwater monitoring wells for chemical analysis. The activities were completed to pre-characterize the groundwater within the Union Square area as part of the Union Square Utilities and Roadway Improvements Project.

PEER appreciates this opportunity to provide environmental support services to Parsons Brinckerhoff. Should you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,
PEER Consultants, P.C.

David Gorden, CPSS | CWS
Environmental Scientist

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Analytical Report and Chain of Custody

ACKNOWLEDGEMENTS

This report to the City of Somerville has been prepared by PEER Consultants P.C. for Parsons Brinckerhoff. Parsons Brinckerhoff is the lead firm of the Union Square Utilities and Roadway Improvements Project. This report has been prepared by Mr. David Gorden, who serves as the PEER Project Manager for the project. This report has been reviewed by Mr. Kenneth Menzies, Licensed Site Professional.

LIMITED GROUNDWATER SAMPLING INVESTIGATION
UNION SQUARE UTILITIES & ROADWAY IMPROVEMENTS PROJECT
SOMERVILLE, MASSACHUSETTS

PEER Project No. 5559
January 12, 2015

1.0 INTRODUCTION

The site location is depicted on Figure 1 within Appendix A, which was reproduced from a portion of the Boston North, Massachusetts USGS 7.5-minute series topographic map. The Union Square Utilities & Roadway Improvements project area is centered on Union Square and extends roughly in a narrow quadrilateral of 4,000 LF by 400 LF (Figure 1). The corridor is bounded on the east and west by McGrath Highway and Dane Street, respectively. The approximately linear corridor is centered on Somerville Avenue. The main utility corridor extends along Somerville Avenue from Webster Street to Medford Street on the eastern half of the project area.

PEER previously performed a Limited Environmental Site Analysis of the property for Parsons Brinckerhoff (PB) (Project No. 5559, report dated November 15, 2013). Based on the findings of this limited analysis, PEER concluded that during any Phase II investigation, it may be appropriate to collect and analyze soil samples along utility line sections which are likely to be replaced, and which are within 0.25 miles of sources that are ranked as a High Potential for Impact. PEER completed this soil investigation, and provided the information to PB as part of a Limited Soil Sampling Investigation (LSSI) report, dated December 9, 2014. During the soil investigation, PB installed three groundwater monitoring wells across the study area. PB requested that PEER sample these groundwater monitoring wells for chemical constituents, and on December 15, 2014, PEER conducted this groundwater monitoring well sampling task.

2.0 APPROACH

PEER's Limited Groundwater Sampling Investigation (LGSI) was undertaken in response to the findings in the limited ESA and the findings in the LSSI. The LGSI was conducted to assess for potential contaminants in groundwater that may impact the Union Square Utilities and Roadway Improvements Project and may necessitate the need to pre-characterize groundwater that may be affected by or require pumping as a result of proposed project activities. The approach was not intended to identify every chemical possibly associated with the project site. In addition, groundwater monitoring well installation locations, from which PEER collected environmental samples, were pre-selected by PB in advance to gauge groundwater level, and may not represent groundwater conditions within the entire utility corridor.

PEER conducted the fieldwork under a soil and groundwater sampling plan proposal developed for this project. Work was performed using United States Environmental Protection Agency (USEPA) modified Level D work attire.

On December 15, 2014, PEER collected environmental groundwater samples from three groundwater monitoring well locations from within this corridor. Monitoring wells were developed by using a bailer to purge the monitoring wells of three times the well volume, before grab groundwater samples were collected.

Upon removal of the bailer from the monitoring well, PEER poured the groundwater from the bailer into laboratory-provided containers. PEER then recorded the sample time on each container label in permanent ink and placed the filled containers in an ice-filled cooler for transport to ESS Laboratory, a National Environmental Laboratory Accreditation Conference laboratory, in Cranston, Rhode Island.

PEER submitted the following samples for laboratory analysis:

- Groundwater samples PB-5, PB-3, and PB-1 were submitted for laboratory analysis for volatile organic compounds (VOCs) by EPA Method 8260B (extraction method 5030B), polychlorinated biphenyls (PCBs) by EPA Method 8082A (extraction method 3510C), semivolatile organic compounds (SVOCs) by EPA Method 8270C (extraction method 3520C) and EPA Method 8270D(SIM) (extraction method 3510C), extractable petroleum hydrocarbons (EPH) by MADEP Methods and EPH8270SIM Methods (extraction method 3510C), volatile petroleum hydrocarbons (VPH) by MADEP Methods (extraction method 5030B), and dissolved metals by EPA Method 6010C, 7010, or 7470A (extraction method 3005A).

Groundwater samples for dissolved metals were collected unpreserved, and were filtered at ESS laboratory. According to the laboratory, due to traffic delays, the dissolved metals sample for PB-5, was filtered 0.5 hours outside of the 24-hour holding time required by the analytical method. As the analytical results for dissolved metals in all three groundwater samples analyzed were very similar, this exceedance of holding time is not considered significant to the quality of the dissolved metals data for PB-5. Holding times for the other two samples were not exceeded for dissolved metals.

2.1 Limitations

PEER's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time. PEER makes no warranties, either express or implied, regarding the findings, conclusions,

or recommendations. Please note that PEER does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of the report. These LSSI services were performed in accordance with the scope of work agreed with you, our client, as reflected in our proposal and were not restricted by ASTM E1903-11.

Findings, conclusions, and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, non-detectable, or not present during these services. We cannot represent that the site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this LGSI. Subsurface conditions may vary from those encountered at specific locations during surveys, tests, assessments, investigations, or exploratory services. The data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

3.0 FINDINGS

3.1 Geology/Hydrogeology

In general, as described in the LSSI report, surface soil types were consistent with urban fill, soils that have been excavated or filled by anthropogenic means. The following field textural analysis and groundwater depths were as determined by PB during the LSSI. The following information was updated based on the groundwater monitoring well sampling for the three groundwater monitoring wells:

- PB-1; sand and gravel to sand to clay to an end of boring depth of 27 feet.
    - Groundwater encountered at 12.9 feet below ground surface during LSSI.
    - Groundwater measured at 11.8 feet below ground surface during LGSI.
- PB-3; sand to gravel to clay at depths to an end of boring depth of 27 feet.
    - Groundwater encountered at 9 feet below ground surface during LSSI
    - Groundwater measured at 8 feet below ground surface during LGSI.
- PB-5; sand to sand and silt to clay to an end of boring depth of 32 feet.
    - Groundwater encountered at 9 feet below ground surface during LSSI.
    - Groundwater measured at 8 feet below ground surface during LGSI.

3.2 Analytical Results

For the purpose of determining whether a notification obligation exists under 310 CMR 40.0315, measured dissolved concentrations of any oil or hazardous material listed at 310 CMR 40.1600 shall be compared to the Reportable Concentration (RC) value in the reporting category that best characterizes the site under evaluation, as described below:

(a) Reporting Category RCGW-1. Reporting category RCGW-1 shall be applied to all groundwater samples obtained:

1. within a Current Drinking Water Source Area; or
2. within a Potential Drinking Water Source Area.

(b) Reporting Category RCGW-2. Reporting category RCGW-2 shall be applied to all groundwater samples that are not obtained from category RCGW-1 areas.

For the purpose of this investigation, since groundwater samples were obtained from areas not within a current or potential drinking water source area, they were compared to Massachusetts Contingency Plan RC GW-2 criteria.

A summary of the laboratory analytical data is presented in Appendix B and the full laboratory analytical report and chain-of-custody record are attached in Appendix C. The following sections describe the results of the groundwater testing.

3.2.1 Groundwater Sample Results

VOCs were not detected in groundwater samples from PB-5 and PB-3. However, groundwater samples from PB-1 had detectable concentrations of cis-1,2-dichloroethene [6.8 micrograms per Liter (ug/L)], tetrachloroethene (72.8 ug/L), and trichloroethene (11.4 ug/L). The method reporting limits (MRLs) were all less than the RC values for GW-2 groundwater.

PCB concentrations were not detected in any of the groundwater samples analyzed as part of this project. The MRLs were all less than the RC values for GW-2 groundwater.

SVOC concentrations were not detected in any of the groundwater samples analyzed as part of this project. The MRLs were all less than the RC values for GW-2 groundwater.

EPH concentrations were not detected in any of the groundwater samples analyzed as part of this project. The MRLs were all less than the RC values for GW-2 groundwater.

VPH concentrations were not detected in any of the groundwater samples analyzed as part of this project. The MRLs were all less than the RC values for GW-2 groundwater.

Dissolved metal concentrations were not detected in the groundwater sample from PB-1, analyzed as part of this project. Barium was the only metal detected in groundwater sample PB-5 (172 ug/L) and PB-3 (230 ug/L). The MRLs were all less than the RC values for GW-2 groundwater.

3.2.2 Groundwater Reportable Concentration Parameters Sample Results

For the purpose of this investigation, since groundwater samples were obtained from areas not within a current or potential drinking water source area, the analytical results were compared to MCP RC GW-2 criteria.

For this project, groundwater samples were collected from flush-mounted groundwater monitoring wells located within the pavement of the public way, and the MCP reporting category RCGW-2 is used for comparison purposes. Of the analytes sampled within the three groundwater monitoring well sample locations, only two compounds, tetrachloroethene (72.8 ug/L) and trichloroethene (11.4 ug/L), in PB-1, were detected at a concentration equal to or above the RCGW-2 RC of 50 ug/L and 5 ug/L, respectively.

Two properties along the corridor and upgradient to PB-1 are listed on environmental database reports for concerns related to historical cleaners. Specifically, Davidson Laundry (10 Bow Street) and Andrades Cleaning & Maintenance (22 Bow Street) are listed in the historical cleaners EDR database. Tetrachloroethene, a typical solvent used by cleaners, was identified in monitoring well PB-1, downgradient of the listed facility. Trichloroethene and cis-1,2-dichloroethene, also identified in groundwater samples from PB-1 are typical chemical breakdown products of tetrachloroethene.

4.0 CONCLUSIONS

Based on the approach described in this report and subject to the limitations described herein, PEER concludes the following.

- None of the concentrations of contaminants analyzed as part of this investigation in the groundwater for samples PB-5, PB-3, and PB-1 exceeded MCP RC for reporting category RCGW-2, except for tetrachloroethene (72.8 ug/L) and trichloroethene (11.4 ug/L), in PB-1. These contaminants were detected at a concentration equal to or above the RCGW-2 RC of 50 ug/L and 5 ug/L, respectively.

- Two properties along the corridor and upgradient to PB-1 are listed on environmental database reports for concerns related to historical cleaners. Specifically, Davidson Laundry (10 Bow Street) and Andrades Cleaning & Maintenance (22 Bow Street) are listed in the historical cleaners EDR database.

- Tetrachloroethene, a typical solvent used by cleaners, was identified in monitoring well PB-1, downgradient of the listed facility. Trichloroethene and cis-1,2-dichloroethene, also identified in groundwater samples from PB-1 are typical chemical breakdown products of tetrachloroethene.

5.0 DISCUSSION

Based on the results of the groundwater sampling activities, it appears that most groundwater, if encountered during the proposed project, may be managed on site. However, some groundwater with a contaminant concentration greater than or equal to the RC for reporting category RCGW-2 may be found and need to be treated and managed on-site or removed off-site for proper disposal.

Therefore, if the proposed work generates a need to manage groundwater within the excavation, PEER suggests obtaining pre-characterization approvals from a Massachusetts licensed treatment facility/waste hauler, prior to disposal of construction media. This may necessitate the installation of additional groundwater monitoring wells along the corridor, or may require City and State permit approvals to discharge groundwater into the sanitary or sewer system, or may require the on-site placement of holding tanks, in order to manage and treat groundwater prior to discharge, either on-site or off site.

This limited groundwater sampling program does not represent conditions along the entire construction corridor. It's likely that other areas within the corridor that are near known (or unknown) release sites may have elevated levels of contaminants. PEER recommends providing MADEP a Downgradient Property Status (DPS) Submittal for this release at PB-1. The DPS submittal is for properties that have been affected by contamination from an upgradient or upstream source and may not be able to meet the requirements of the MCP because they do not control the source of contamination.

In addition, PEER recommends that an environmental monitor be present during the Union Square Utilities & Roadway Improvements project in order to monitor and assist with groundwater (and soil) management during construction activities.

In summary, limited pre-characterization groundwater sampling has been completed for the proposed Union Square Utilities & Roadway Improvements project. Should excavations involve areas in or beneath the groundwater table, groundwater may need to be managed through groundwater management plan. In addition, as this was a limited groundwater sampling event, additional groundwater characterization may be required.

APPENDIX A
FIGURE 1 – USGS TOPOGRAPHIC MAP

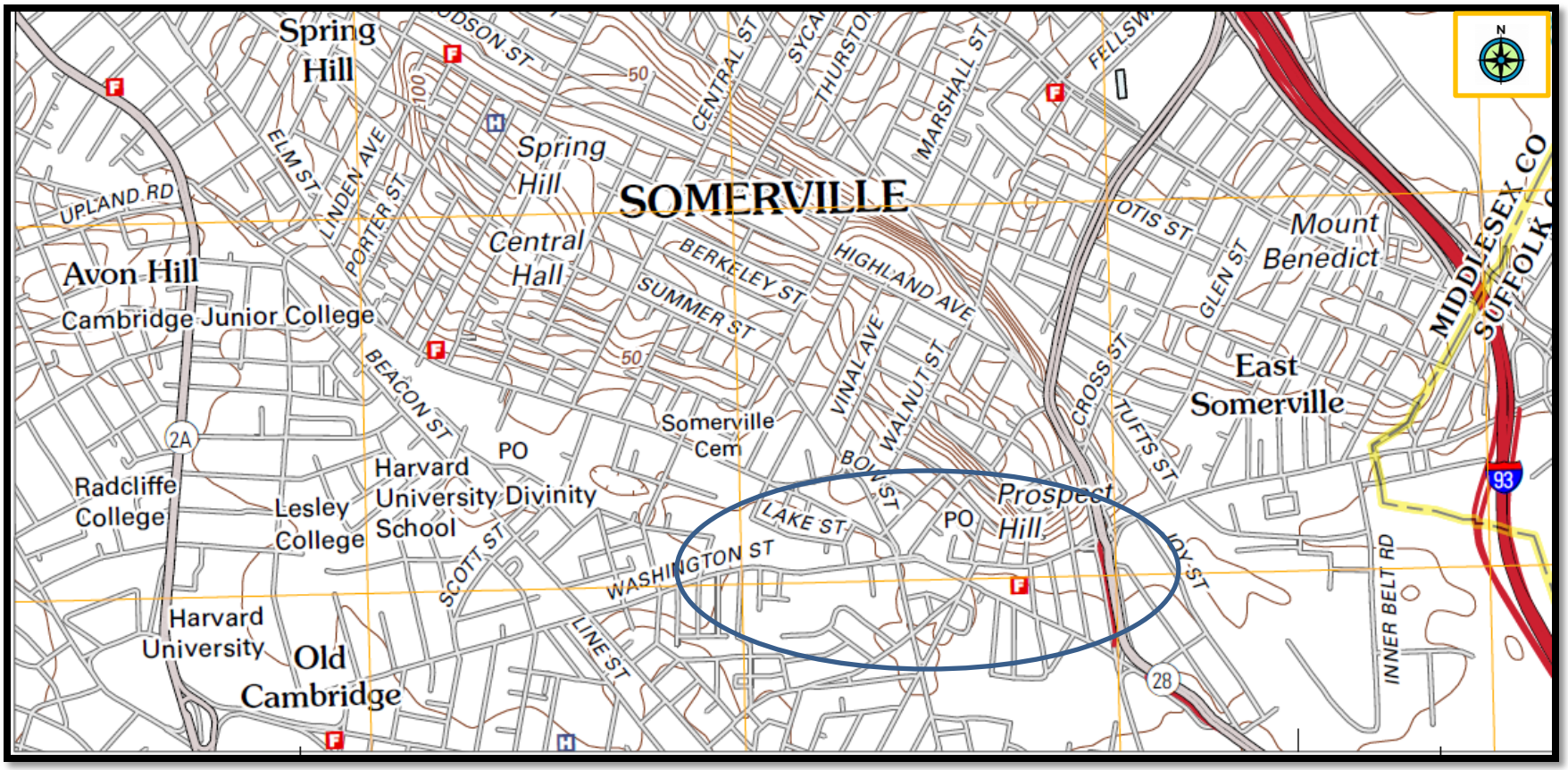

Figure 1 – USGS Topographic Map

Boston North, MA (2012), 1:24,000

Union Square
Somerville, Massachusetts

APPENDIX B
ANALYTICAL SUMMARY TABLES

Table 1
Volatile Organic Compounds
Union Square - Somerville, MA

Client Sample No. Sample Date Lab Sample ID	2014-RCGW1	2014-RCGW2	Units		PB5 12/15/2014 1412310-01		PB3 12/15/2014 1412310-02		PB1 12/15/2014 1412310-03	
8260B VOCs										
1,1,1,2-Tetrachloroethane	5	10	ug/L		1	U	1	U	1	U
1,1,1-Trichloroethane	200	4,000	ug/L		1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	2	9	ug/L		0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	5	900	ug/L		1	U	1	U	1	U
1,1-Dichloroethane	70	2,000	ug/L		1	U	1	U	1	U
1,1-Dichloroethene	7	80	ug/L		1	U	1	U	1	U
1,1-Dichloropropene	NA	NA	ug/L		2	U	2	U	2	U
1,2,3-Trichlorobenzene	NA	NA	ug/L		1	U	1	U	1	U
1,2,3-Trichloropropane	1,000	10,000	ug/L		1	U	1	U	1	U
1,2,4-Trichlorobenzene	70	200	ug/L		1	U	1	U	1	U
1,2,4-Trimethylbenzene	10,000	100,000	ug/L		1	U	1	U	1	U
1,2-Dibromo-3-Chloropropane	100	1,000	ug/L		5	U	5	U	5	U
1,2-Dibromoethane	0.02	2	ug/L		1 *	U	1 *	U	1 *	U
1,2-Dichlorobenzene	600	2,000	ug/L		1	U	1	U	1	U
1,2-Dichloroethane	5	5	ug/L		1	U	1	U	1	U
1,2-Dichloropropane	3	3	ug/L		1	U	1	U	1	U
1,3,5-Trimethylbenzene	100	1,000	ug/L		1	U	1	U	1	U
1,3-Dichlorobenzene	100	6,000	ug/L		1	U	1	U	1	U
1,3-Dichloropropane	5,000	50,000	ug/L		1	U	1	U	1	U
1,4-Dichlorobenzene	5	60	ug/L		1	U	1	U	1	U
1,4-Dioxane - Screen	0.3	6,000	ug/L		500 *	U	500 *	U	500 *	U
2,2-Dichloropropane	NA	NA	ug/L		1	U	1	U	1	U
2-Butanone	4,000	50,000	ug/L		10	U	10	U	10	U
2-Chlorotoluene	1,000	10,000	ug/L		1	U	1	U	1	U
2-Hexanone	1,000	10,000	ug/L		10	U	10	U	10	U
4-Chlorotoluene	NA	NA	ug/L		1	U	1	U	1	U
4-Isopropyltoluene	200	7,000	ug/L		1	U	1	U	1	U
4-Methyl-2-Pentanone	350	50,000	ug/L		10	U	10	U	10	U
Acetone	6,300	50,000	ug/L		10	U	10	U	10	U
Benzene	5	1,000	ug/L		1	U	1	U	1	U
Bromobenzene	1,000	10,000	ug/L		2	U	2	U	2	U
Bromochloromethane	NA	NA	ug/L		1	U	1	U	1	U
Bromodichloromethane	3	6	ug/L		0.6	U	0.6	U	0.6	U
Bromoform	4	700	ug/L		1	U	1	U	1	U
Bromomethane	7	7	ug/L		2	U	2	U	2	U
Carbon Disulfide	1,000	10,000	ug/L		1	U	1	U	1	U
Carbon Tetrachloride	2	2	ug/L		1	U	1	U	1	U
Chlorobenzene	100	200	ug/L		1	U	1	U	1	U
Chloroethane	1,000	10,000	ug/L		2	U	2	U	2	U
Chloroform	50	50	ug/L		1	U	1	U	1	U
Chloromethane	1,000	10,000	ug/L		2	U	2	U	2	U
cis-1,2-Dichloroethene	20	20	ug/L		1	U	1	U	6.8	
cis-1,3-Dichloropropene	0.4	10	ug/L		0.4	U	0.4	U	0.4	U
Dibromochloromethane	2	20	ug/L		1	U	1	U	1	U
Dibromomethane	5,000	50,000	ug/L		1	U	1	U	1	U
Dichlorodifluoromethane	10,000	100,000	ug/L		2	U	2	U	2	U
Diethyl Ether	1,000	10,000	ug/L		1	U	1	U	1	U
Di-isopropyl ether	1,000	10,000	ug/L		1	U	1	U	1	U

Table 1
Volatile Organic Compounds
Union Square - Somerville, MA

Client Sample No. Sample Date Lab Sample ID	2014-RCGW1	2014-RCGW2	Units		PB5 12/15/2014 1412310-01		PB3 12/15/2014 1412310-02		PB1 12/15/2014 1412310-03	
8260B VOCs										
Ethyl tertiary-butyl ether	NA	NA	ug/L		1	U	1	U	1	U
Ethylbenzene	700	5,000	ug/L		1	U	1	U	1	U
Hexachlorobutadiene	0.6	50	ug/L		0.6	U	0.6	U	0.6	U
Hexachloroethane	8	100	ug/L		1	U	1	U	1	U
Isopropylbenzene	10,000	100,000	ug/L		1	U	1	U	1	U
Methyl tert-Butyl Ether	70	5,000	ug/L		1	U	1	U	1	U
Methylene Chloride	5	2,000	ug/L		2	U	2	U	2	U
Naphthalene	140	700	ug/L		1	U	1	U	1	U
n-Butylbenzene	200	7,000	ug/L		1	U	1	U	1	U
n-Propylbenzene	1,000	10,000	ug/L		1	U	1	U	1	U
sec-Butylbenzene	200	7,000	ug/L		1	U	1	U	1	U
Styrene	100	100	ug/L		1	U	1	U	1	U
tert-Butylbenzene	1,000	10,000	ug/L		1	U	1	U	1	U
Tertiary-amyl methyl ether	NA	NA	ug/L		1	U	1	U	1	U
Tetrachloroethene	5	50	ug/L		1	U	1	U	**72.8**	
Tetrahydrofuran	5,000	50,000	ug/L		5	U	5	U	5	U
Toluene	1,000	40,000	ug/L		1	U	1	U	1	U
trans-1,2-Dichloroethene	80	80	ug/L		1	U	1	U	1	U
trans-1,3-Dichloropropene	0.4	10	ug/L		0.4	U	0.4	U	0.4	U
Trichloroethene	5	5	ug/L		1	U	1	U	**11.4**	
Trichlorofluoromethane	10,000	100,000	ug/L		1	U	1	U	1	U
Vinyl Chloride	2	2	ug/L		1	U	1	U	1	U
Xylene O	3,000	3,000	ug/L		1	U	1	U	1	U
Xylene P,M	3,000	3,000	ug/L		2	U	2	U	2	U
Xylenes (Total)	3,000	3,000	ug/L		2	U	2	U	2	U

U = Analyte included in the analysis, but not detected

* = The method requested for this analysis does not meet criteria for all compounds.
The compound is undetected, however, the MRL is greater than the State limit.

Table 2

Polychlorinated Biphenyls

Union Square - Somerville, MA

Client Sample No.					PB5		PB3		PB1	
Sample Date					12/15/2014		12/15/2014		12/15/2014	
Lab Sample ID	2014-RCGW1	2014-RCGW2	Units		1412310-01		1412310-02		1412310-03	
8082A PCBs										
Aroclor 1016	0.5	5	ug/L		0.1	U	0.1	U	0.1	U
Aroclor 1221	0.5	5	ug/L		0.1	U	0.1	U	0.1	U
Aroclor 1232	0.5	5	ug/L		0.1	U	0.1	U	0.1	U
Aroclor 1242	0.5	5	ug/L		0.1	U	0.1	U	0.1	U
Aroclor 1248	0.5	5	ug/L		0.1	U	0.1	U	0.1	U
Aroclor 1254	0.5	5	ug/L		0.1	U	0.1	U	0.1	U
Aroclor 1260	0.5	5	ug/L		0.1	U	0.1	U	0.1	U
Aroclor 1262	0.5	5	ug/L		0.1	U	0.1	U	0.1	U
Aroclor 1268	0.5	5	ug/L		0.1	U	0.1	U	0.1	U

U = Analyte included in the analysis, but not detected

Table 3
Semi-volatile Organic Compounds
Union Square - Somerville, MA

Client Sample No. Sample Date Lab Sample ID	2014-RCGW1	2014-RCGW2	Units		PB5 12/15/2014 1412310-01		PB3 12/15/2014 1412310-02		PB1 12/15/2014 1412310-03	
8270C SVOCs										
1,2,4-Trichlorobenzene	70	200	ug/L		9.6	U	10	U	9.6	U
1,2-Dichlorobenzene	600	2,000	ug/L		9.6	U	10	U	9.6	U
1,3-Dichlorobenzene	100	6,000	ug/L		9.6	U	10	U	9.6	U
1,4-Dichlorobenzene	5	60	ug/L		9.6 *	U	10 *	U	9.6 *	U
2,4,5-Trichlorophenol	200	3,000	ug/L		9.6	U	10	U	9.6	U
2,4,6-Trichlorophenol	10	500	ug/L		9.6	U	10	U	9.6	U
2,4-Dichlorophenol	10	2,000	ug/L		9.6	U	10	U	9.6	U
2,4-Dimethylphenol	60	40,000	ug/L		48.1	U	50	U	48.1	U
2,4-Dinitrophenol	200	20,000	ug/L		48.1	U	50	U	48.1	U
2,4-Dinitrotoluene	30	20,000	ug/L		9.6	U	10	U	9.6	U
2,6-Dinitrotoluene	1,000	10,000	ug/L		9.6	U	10	U	9.6	U
2-Chloronaphthalene	10,000	100,000	ug/L		9.6	U	10	U	9.6	U
2-Chlorophenol	10	7,000	ug/L		9.6	U	10	U	9.6	U
2-Methylphenol	5,000	50,000	ug/L		9.6	U	10	U	9.6	U
2-Nitrophenol	1,000	10,000	ug/L		9.6	U	10	U	9.6	U
3,3´-Dichlorobenzidine	80	2,000	ug/L		19.2	U	20	U	19.2	U
3+4-Methylphenol	5,000	50,000	ug/L		19.2	U	20	U	19.2	U
4-Bromophenyl-phenylether	1,000	10,000	ug/L		9.6	U	10	U	9.6	U
4-Chloroaniline	20	300	ug/L		19.2	U	20	U	19.2	U
4-Nitrophenol	1,000	10,000	ug/L		48.1	U	50	U	48.1	U
Acetophenone	10,000	100,000	ug/L		9.6	U	10	U	9.6	U
Aniline	10,000	100,000	ug/L		9.6	U	10	U	9.6	U
Azobenzene	500	5,000	ug/L		19.2	U	20	U	19.2	U
bis(2-Chloroethoxy)methane	5,000	50,000	ug/L		9.6	U	10	U	9.6	U
bis(2-Chloroethyl)ether	30	30	ug/L		9.6	U	10	U	9.6	U
bis(2-chloroisopropyl)Ether	30	100	ug/L		9.6	U	10	U	9.6	U
bis(2-Ethylhexyl)phthalate	6	50,000	ug/L		5.8	U	6	U	5.8	U
Butylbenzylphthalate	1,000	10,000	ug/L		9.6	U	10	U	9.6	U
Dibenzofuran	1,000	10,000	ug/L		9.6	U	10	U	9.6	U
Diethylphthalate	2,000	9,000	ug/L		9.6	U	10	U	9.6	U
Dimethylphthalate	300	50,000	ug/L		9.6	U	10	U	9.6	U
Di-n-butylphthalate	500	5,000	ug/L		9.6	U	10	U	9.6	U
Di-n-octylphthalate	10,000	100,000	ug/L		9.6	U	10	U	9.6	U
Hexachlorobutadiene	0.6	50	ug/L		9.6 *	U	10 *	U	9.6 *	U
Hexachloroethane	8	100	ug/L		4.8	U	5	U	4.8	U
Isophorone	1,000	10,000	ug/L		9.6	U	10	U	9.6	U
Nitrobenzene	5,000	50,000	ug/L		9.6	U	10	U	9.6	U
N-Nitrosodimethylamine	500	5,000	ug/L		9.6	U	10	U	9.6	U
Phenol	1,000	2,000	ug/L		9.6	U	10	U	9.6	U
8270D(SIM) SVOCs										
2-Methylnaphthalene	10	2,000	ug/L		0.2	U	0.2	U	0.2	U
Acenaphthene	20	6,000	ug/L		0.2	U	0.2	U	0.2	U
Acenaphthylene	30	40	ug/L		0.2	U	0.2	U	0.2	U
Anthracene	30	30	ug/L		0.2	U	0.2	U	0.2	U
Benzo(a)anthracene	1	1,000	ug/L		0.05	U	0.05	U	0.05	U
Benzo(a)pyrene	0.2	500	ug/L		0.05	U	0.05	U	0.05	U
Benzo(b)fluoranthene	1	400	ug/L		0.05	U	0.05	U	0.05	U

Table 3

Semi-volatile Organic Compounds

Union Square - Somerville, MA

Client Sample No.					PB5		PB3		PB1	
Sample Date					12/15/2014		12/15/2014		12/15/2014	
Lab Sample ID	2014-RCGW1	2014-RCGW2	Units		1412310-01		1412310-02		1412310-03	
8270D(SIM) SVOCs										
Benzo(g,h,i)perylene	20	20	ug/L		0.2	U	0.2	U	0.2	U
Benzo(k)fluoranthene	1	100	ug/L		0.05	U	0.05	U	0.05	U
Chrysene	2	70	ug/L		0.05	U	0.05	U	0.05	U
Dibenzo(a,h)Anthracene	0.5	40	ug/L		0.05	U	0.05	U	0.05	U
Fluoranthene	90	200	ug/L		0.2	U	0.2	U	0.2	U
Fluorene	30	40	ug/L		0.2	U	0.2	U	0.2	U
Hexachlorobenzene	1	1	ug/L		0.2	U	0.2	U	0.2	U
Indeno(1,2,3-cd)Pyrene	0.5	100	ug/L		0.05	U	0.05	U	0.05	U
Naphthalene	140	700	ug/L		0.2	U	0.2	U	0.2	U
Pentachlorophenol	1	200	ug/L		0.9	U	0.9	U	0.9	U
Phenanthrene	40	10,000	ug/L		0.2	U	0.2	U	0.2	U
Pyrene	20	20	ug/L		0.2	U	0.2	U	0.2	U

U = Analyte included in the analysis, but not detected

* = The method requested for this analysis does not meet criteria for all compounds.
The compound is undetected, however, the MRL is greater than the State limit.

Table 4

Extractable Petroleum Hydrocarbons / Volatile Petroleum Hydrocarbons
Union Square - Somerville, MA

Client Sample No. Sample Date Lab Sample ID	2014-RCGW1	2014-RCGW2	Units		PB5 12/15/2014 1412310-01		PB3 12/15/2014 1412310-02		PB1 12/15/2014 1412310-03	
MADEP-EPH										
2-Methylnaphthalene	10	2,000	ug/L		0.49	U	0.5	U	0.53	U
Acenaphthene	20	6,000	ug/L		0.19	U	0.2	U	0.21	U
Acenaphthylene	30	40	ug/L		0.19	U	0.2	U	0.21	U
Anthracene	30	30	ug/L		0.19	U	0.2	U	0.21	U
Benzo(a)anthracene	1	1,000	ug/L		0.19	U	0.2	U	0.21	U
Benzo(a)pyrene	0.2	500	ug/L		0.1	U	0.1	U	0.11	U
Benzo(b)fluoranthene	1	400	ug/L		0.19	U	0.2	U	0.21	U
Benzo(g,h,i)perylene	20	20	ug/L		0.19	U	0.2	U	0.21	U
Benzo(k)fluoranthene	1	100	ug/L		0.19	U	0.2	U	0.21	U
C11-C22 Aromatics1,2	200	5,000	ug/L		98	U	99	U	105	U
C11-C22 Unadjusted Aromatics1	200	5,000	ug/L		98	U	99	U	105	U
C19-C36 Aliphatics1	14,000	50,000	ug/L		98	U	99	U	105	U
C9-C18 Aliphatics1	700	5,000	ug/L		98	U	99	U	105	U
Chrysene	2	70	ug/L		0.19	U	0.2	U	0.21	U
Dibenzo(a,h)Anthracene	0.5	40	ug/L		0.19	U	0.2	U	0.21	U
Fluoranthene	90	200	ug/L		0.19	U	0.2	U	0.21	U
Fluorene	30	40	ug/L		0.19	U	0.2	U	0.21	U
Indeno(1,2,3-cd)Pyrene	0.5	100	ug/L		0.19	U	0.2	U	0.21	U
Naphthalene	140	700	ug/L		0.49	U	0.5	U	0.53	U
Phenanthrene	40	10,000	ug/L		0.49	U	0.5	U	0.53	U
Pyrene	20	20	ug/L		0.19	U	0.2	U	0.21	U
MADEP-VPH										
Benzene	5	1,000	ug/L		1.5	U	1.5	U	1.5	U
C5-C8 Aliphatics1,2	300	3,000	ug/L		150	U	150	U	150	U
C9-C10 Aromatics	200	4,000	ug/L		100	U	100	U	100	U
C9-C12 Aliphatics2,3	700	5,000	ug/L		150	U	150	U	150	U
Ethylbenzene	700	5,000	ug/L		5	U	5	U	5	U
Methyl tert-Butyl Ether	70	5,000	ug/L		1.5	U	1.5	U	1.5	U
Naphthalene	140	700	ug/L		5	U	5	U	5	U
Toluene	1,000	40,000	ug/L		5	U	5	U	5	U
Xylene O	3,000	3,000	ug/L		5	U	5	U	5	U
Xylene P,M	3,000	3,000	ug/L		10	U	10	U	10	U

U = Analyte included in the analysis, but not detected

Table 5
Dissolved Metals
Union Square - Somerville, MA

Client Sample No.					PB5		PB3		PB1	
Sample Date					12/15/2014		12/15/2014		12/15/2014	
Lab Sample ID	2014-RCGW1	2014-RCGW2	Units		1412310-01		1412310-02		1412310-03	
Dissolved Metals										
Arsenic	10	900	ug/L		2.5	U	2.5	U	2.5	U
Barium	2,000	50,000	ug/L		172		230		25	U
Cadmium	4	4	ug/L		2.5	U	2.5	U	2.5	U
Chromium	100	300	ug/L		10	U	10	U	10	U
Lead	10	10	ug/L		5	U, D	10	U	2.5	U
Mercury	2	20	ug/L		0.2	U	0.2	U	0.2	U
Selenium	50	100	ug/L		5	U	5	U	5	U
Silver	7	7	ug/L		5	U	5	U	5	U

D = Sample was diluted in order to obtain a value within the calibration range.
U = Analyte included in the analysis, but not detected

APPENDIX C
ANALYTICAL REPORT AND CHAIN OF CUSTODY

CERTIFICATE OF ANALYSIS

David Gorden
PEER Consultants, P.C.
99 S. Bedford Street
Burlington, MA 01803

RE: Union Square (5559)
ESS Laboratory Work Order Number: 1412310

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 11:01 am, Dec 24, 2014

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

SAMPLE RECEIPT

The following samples were received on December 16, 2014 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has performed and reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

For EPH soil samples, the aromatic range results have been corrected for identified cartridge contaminant in accordance with the CAM protocol.

Question A : Sample 1412310-01 (PB5) was filtered for dissolved metals outside of the 24 hour HT by the laboratory.

Question I: All samples for Metals were analyzed for a subset of the required MCP list per the client's request.

Lab Number	Sample Name	Matrix	Analysis
1412310-01	PB5	Ground Water	6010C, 7010, 7470A, 8082A, 8260B, 8270C, 8270D SIM, EPH8270, EPH8270SIM, MADEP-EPH, MADEP-VPH
1412310-02	PB3	Ground Water	6010C, 7010, 7470A, 8082A, 8260B, 8270C, 8270D SIM, EPH8270, EPH8270SIM, MADEP-EPH, MADEP-VPH
1412310-03	PB1	Ground Water	6010C, 7010, 7470A, 8082A, 8260B, 8270C, 8270D SIM, EPH8270, EPH8270SIM, MADEP-EPH, MADEP-VPH

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

PROJECT NARRATIVE

8270C Semi-Volatile Organic Compounds

CL41611-BSD1 **Relative percent difference for duplicate is outside of criteria (D+).**
N-Nitrosodimethylamine (30% @ 20%)

CXL0261-CCV1 **Continuing Calibration recovery is above upper control limit (C+).**
Di-n-octylphthalate (122% @ 80-120%)

8270D(SIM) Semi-Volatile Organic Compounds

1412310-01 **Surrogate recovery(ies) above upper control limit (S+).**
2,4,6-Tribromophenol (143% @ 15-110%)

CL41801-BS1 **Surrogate recovery(ies) above upper control limit (S+).**
2,4,6-Tribromophenol (116% @ 15-110%)

CXL0274-CCV1 **Continuing Calibration recovery is above upper control limit (C+).**
2,4,6-Tribromophenol (162% @ 70-130%), Hexachlorobenzene (157% @ 70-130%), Pentachlorophenol (144% @ 70-130%)

Dissolved Metals

CL41709-BSD1 **Blank Spike recovery is below lower control limit (B-).**
Silver (27% @ 80-120%)

CL41709-BSD1 **Relative percent difference for duplicate is outside of criteria (D+).**
Selenium (26% @ 20%), Silver (122% @ 20%)

MADEP-EPH Extractable Petroleum Hydrocarbons

1412310-01 **Surrogate recovery(ies) outside of criteria. Reextraction/Reanalysis confirms results (SC).**
1-Chlorooctadecane (22% @ 40-140%)

1412310-01RE1 **Surrogate recovery(ies) outside of criteria. Reextraction/Reanalysis confirms results (SC).**
1-Chlorooctadecane (28% @ 40-140%)

1412310-02 **Surrogate recovery(ies) outside of criteria. Reextraction/Reanalysis confirms results (SC).**
1-Chlorooctadecane (23% @ 40-140%)

1412310-02RE1 **Surrogate recovery(ies) outside of criteria. Reextraction/Reanalysis confirms results (SC).**
1-Chlorooctadecane (24% @ 40-140%)

CL41521-BSD1 **Blank Spike recovery is below lower control limit (B-).**
Decane (C10) (31% @ 40-140%), Dodecane (C12) (38% @ 40-140%), Nonane (C9) (24% @ 30-140%)

CL41521-BSD1 **Relative percent difference for duplicate is outside of criteria (D+).**

No other observations noted.

End of Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

DATA USABILITY LINKS

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015D - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP and Graphite Furnace Digestion
3020A - Aqueous ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1412310-01 through 1412310-03**

Matrices: (X) Ground Water/Surface Water ( ) Soil/Sediment ( ) Drinking Water ( ) Air ( ) Other:_____

CAM Protocol (check all that apply below):

(X) 8260 VOC CAM II A	(X) 7470/7471 Hg CAM III B	(X) MassDEP VPH CAM IV A	( ) 8081 Pesticides CAM V B	( ) 7196 Hex Cr CAM VI B	( ) MassDEP APH CAM IX A
(X) 8270 SVOC CAM II B	(X) 7010 Metals CAM III C	(X) MassDEP EPH CAM IV B	( ) 8151 Herbicides CAM V C	( ) 8330 Explosives CAM VIII A	( ) TO-15 VOC CAM IX B
(X) 6010 Metals CAM III A	( ) 6020 Metals CAM III D	(X) 8082 PCB CAM V A	( ) 6860 Perchlorate CAM VIII B	( ) 9014 Total Cyanide/PAC CAM VI A	

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes ( ) No (X)
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	Yes (X) No ( )
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	Yes (X) No ( )
D	Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (X) No ( )
E	a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	Yes (X) No ( )
	b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes ( ) No ( )
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	Yes (X) No ( )

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?	Yes (X) No ( )*
	***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**	
H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes ( ) No (X)*
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes ( ) No (X)*

All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ Date: December 24, 2014

Printed Name: Laurel Stoddard Position: Laboratory Director

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A

Dissolved Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Arsenic	ND (2.5)		7010		1	KJK	12/17/14 22:39	50	25	CL41709
Barium	**172** (25.0)		6010C		1	KJK	12/18/14 2:55	50	25	CL41709
Cadmium	ND (2.5)		6010C		1	KJK	12/18/14 2:55	50	25	CL41709
Chromium	ND (10.0)		6010C		1	KJK	12/18/14 2:55	50	25	CL41709
Lead	ND (5.0)		7010		2	KJK	12/19/14 18:17	50	25	CL41709
Mercury	ND (0.20)		7470A		1	BJV	12/18/14 13:22	20	40	CL41752
Selenium	ND (5.0)		7010		1	NAR	12/24/14 1:13	50	25	CL41709
Silver	ND (5.0)		6010C		1	KJK	12/18/14 2:55	50	25	CL41709

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A
Initial Volume: 1030
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: TAJ
Prepared: 12/16/14 17:45
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.10)		8082A		1	12/17/14 20:54		CL41635
Aroclor 1221	ND (0.10)		8082A		1	12/17/14 20:54		CL41635
Aroclor 1232	ND (0.10)		8082A		1	12/17/14 20:54		CL41635
Aroclor 1242	ND (0.10)		8082A		1	12/17/14 20:54		CL41635
Aroclor 1248	ND (0.10)		8082A		1	12/17/14 20:54		CL41635
Aroclor 1254	ND (0.10)		8082A		1	12/17/14 20:54		CL41635
Aroclor 1260	ND (0.10)		8082A		1	12/17/14 20:54		CL41635
Aroclor 1262	ND (0.10)		8082A		1	12/17/14 20:54		CL41635
Aroclor 1268	ND (0.10)		8082A		1	12/17/14 20:54		CL41635

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*72 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*66 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*85 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*93 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,1,1-Trichloroethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,1,2,2-Tetrachloroethane	ND (0.5)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,1,2-Trichloroethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,1-Dichloroethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,1-Dichloroethene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,1-Dichloropropene	ND (2.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,2,3-Trichlorobenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,2,3-Trichloropropane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,2,4-Trichlorobenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,2,4-Trimethylbenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,2-Dibromo-3-Chloropropane	ND (5.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,2-Dibromoethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,2-Dichlorobenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,2-Dichloroethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,2-Dichloropropane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,3,5-Trimethylbenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,3-Dichlorobenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,3-Dichloropropane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,4-Dichlorobenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
1,4-Dioxane - Screen	ND (500)		8260B		1	12/23/14 12:26	CXL0348	CL42337
2,2-Dichloropropane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
2-Butanone	ND (10.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
2-Chlorotoluene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
2-Hexanone	ND (10.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
4-Chlorotoluene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
4-Isopropyltoluene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
4-Methyl-2-Pentanone	ND (10.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Acetone	ND (10.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Benzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Bromobenzene	ND (2.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Bromochloromethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.6)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Bromoform	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Bromomethane	ND (2.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Carbon Disulfide	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Carbon Tetrachloride	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Chlorobenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Chloroethane	ND (2.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Chloroform	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Chloromethane	ND (2.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
cis-1,2-Dichloroethene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
cis-1,3-Dichloropropene	ND (0.4)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Dibromochloromethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Dibromomethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Dichlorodifluoromethane	ND (2.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Diethyl Ether	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Di-isopropyl ether	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Ethyl tertiary-butyl ether	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Ethylbenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Hexachlorobutadiene	ND (0.6)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Hexachloroethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Isopropylbenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Methyl tert-Butyl Ether	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Methylene Chloride	ND (2.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Naphthalene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
n-Butylbenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
n-Propylbenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
sec-Butylbenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Styrene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
tert-Butylbenzene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Tertiary-amyl methyl ether	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Tetrachloroethene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Tetrahydrofuran	ND (5.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Toluene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
trans-1,2-Dichloroethene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
trans-1,3-Dichloropropene	ND (0.4)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Trichloroethene	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Trichlorofluoromethane	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Vinyl Chloride	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Xylene O	ND (1.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Xylene P,M	ND (2.0)		8260B		1	12/23/14 12:26	CXL0348	CL42337
Xylenes (Total)	ND (2.0)		8260B		1	12/23/14 12:26		[CALC]

	%Recovery	*Qualifier*	*Limits*
Surrogate: 1,2-Dichloroethane-d4	*102 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*105 %*		*70-130*
Surrogate: Dibromofluoromethane	*110 %*		*70-130*
Surrogate: Toluene-d8	*99 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A
Initial Volume: 1040
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 12/16/14 19:15

8270C Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
1,2-Dichlorobenzene	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
1,3-Dichlorobenzene	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
1,4-Dichlorobenzene	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2,4,5-Trichlorophenol	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2,4,6-Trichlorophenol	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2,4-Dichlorophenol	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2,4-Dimethylphenol	ND (48.1)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2,4-Dinitrophenol	ND (48.1)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2,4-Dinitrotoluene	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2,6-Dinitrotoluene	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2-Chloronaphthalene	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2-Chlorophenol	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2-Methylphenol	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
2-Nitrophenol	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
3,3´-Dichlorobenzidine	ND (19.2)		8270C		1	12/18/14 6:47	CXL0261	CL41611
3+4-Methylphenol	ND (19.2)		8270C		1	12/18/14 6:47	CXL0261	CL41611
4-Bromophenyl-phenylether	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
4-Chloroaniline	ND (19.2)		8270C		1	12/18/14 6:47	CXL0261	CL41611
4-Nitrophenol	ND (48.1)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Acetophenone	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Aniline	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Azobenzene	ND (19.2)		8270C		1	12/18/14 6:47	CXL0261	CL41611
bis(2-Chloroethoxy)methane	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
bis(2-Chloroethyl)ether	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
bis(2-chloroisopropyl)Ether	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
bis(2-Ethylhexyl)phthalate	ND (5.8)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Butylbenzylphthalate	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Dibenzofuran	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Diethylphthalate	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Dimethylphthalate	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Di-n-butylphthalate	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A
Initial Volume: 1040
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 12/16/14 19:15

8270C Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Di-n-octylphthalate	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Hexachlorobutadiene	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Hexachloroethane	ND (4.8)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Isophorone	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Nitrobenzene	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
N-Nitrosodimethylamine	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611
Phenol	ND (9.6)		8270C		1	12/18/14 6:47	CXL0261	CL41611

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*59 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*68 %*		*15-110*
Surrogate: 2-Chlorophenol-d4	*72 %*		*15-110*
Surrogate: 2-Fluorobiphenyl	*73 %*		*30-130*
Surrogate: 2-Fluorophenol	*61 %*		*15-110*
Surrogate: Nitrobenzene-d5	*65 %*		*30-130*
Surrogate: Phenol-d6	*64 %*		*15-110*
Surrogate: p-Terphenyl-d14	*59 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A
Initial Volume: 1000
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 12/18/14 15:10

8270D(SIM) Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
2-Methylnaphthalene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Acenaphthene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Acenaphthylene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Anthracene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Benzo(a)anthracene	ND (0.05)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Benzo(a)pyrene	ND (0.05)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Benzo(b)fluoranthene	ND (0.05)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Benzo(g,h,i)perylene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Benzo(k)fluoranthene	ND (0.05)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Chrysene	ND (0.05)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Dibenzo(a,h)Anthracene	ND (0.05)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Fluoranthene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Fluorene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Hexachlorobenzene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Indeno(1,2,3-cd)Pyrene	ND (0.05)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Naphthalene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Pentachlorophenol	ND (0.90)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Phenanthrene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801
Pyrene	ND (0.20)		8270D SIM		1	12/18/14 22:44	CXL0274	CL41801

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*56 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*143 %*	*S+*	*15-110*
Surrogate: 2-Fluorobiphenyl	*104 %*		*30-130*
Surrogate: Nitrobenzene-d5	*85 %*		*30-130*
Surrogate: p-Terphenyl-d14	*121 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A
Initial Volume: 1020
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01
Sample Matrix: Ground Water
Units: ug/L

Prepared: 12/16/14 13:50

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (98)		MADEP-EPH		1	JXS	12/18/14 0:14	CXL0263	CL41521
C19-C36 Aliphatics1	ND (98)		MADEP-EPH		1	JXS	12/18/14 0:14	CXL0263	CL41521
C11-C22 Unadjusted Aromatics1	ND (98.0)		EPH8270		1	JXS	12/18/14 1:15	CXL0257	CL41521
C11-C22 Aromatics1,2	ND (98.0)		EPH8270			IBM	12/19/14 19:27		[CALC]
2-Methylnaphthalene	ND (0.49)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Acenaphthene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Naphthalene	ND (0.49)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Phenanthrene	ND (0.49)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Acenaphthylene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Anthracene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Benzo(a)anthracene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Benzo(a)pyrene	ND (0.10)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Benzo(b)fluoranthene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Benzo(g,h,i)perylene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Benzo(k)fluoranthene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Chrysene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Dibenzo(a,h)Anthracene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Fluoranthene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Fluorene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Indeno(1,2,3-cd)Pyrene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Pyrene	ND (0.19)		EPH8270SIM		1	IBM	12/19/14 19:27	CXL0286	CL41822
Preservative:	**pH <= 2**		MADEP-EPH			JXS			CL41521

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*22 %*	*SC*	*40-140*
Surrogate: 2-Bromonaphthalene	*82 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*96 %*		*40-140*
Surrogate: O-Terphenyl	*59 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: EEB

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (100)		MADEP-VPH		1	12/17/14 18:52	CXL0249	CL41743
C5-C8 Aliphatics1,2	ND (150)		MADEP-VPH		1	12/17/14 18:52		[CALC]
C9-C12 Aliphatics2,3	ND (150)		MADEP-VPH		1	12/17/14 18:52		[CALC]
Benzene	ND (1.5)		MADEP-VPH		1	12/17/14 18:52	CXL0249	CL41743
Ethylbenzene	ND (5.0)		MADEP-VPH		1	12/17/14 18:52	CXL0249	CL41743
Methyl tert-Butyl Ether	ND (1.5)		MADEP-VPH		1	12/17/14 18:52	CXL0249	CL41743
Naphthalene	ND (5.0)		MADEP-VPH		1	12/17/14 18:52	CXL0249	CL41743
Toluene	ND (5.0)		MADEP-VPH		1	12/17/14 18:52	CXL0249	CL41743
Xylene O	ND (5.0)		MADEP-VPH		1	12/17/14 18:52	CXL0249	CL41743
Xylene P,M	ND (10.0)		MADEP-VPH		1	12/17/14 18:52	CXL0249	CL41743
Preservative:	**pH <= 2**		MADEP-VPH					CL41743

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*102 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*107 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB5
Date Sampled: 12/15/14 10:00
Percent Solids: N/A
Initial Volume: 1030
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-01RE1
Sample Matrix: Ground Water
Units: ug/L

Prepared: 12/18/14 16:55

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (97)		MADEP-EPH		1	DPS	12/20/14 18:55	CXL0298	CL41822
C19-C36 Aliphatics1	ND (97)		MADEP-EPH		1	DPS	12/20/14 18:55	CXL0298	CL41822
C11-C22 Unadjusted Aromatics1	ND (97.1)		EPH8270		1	IBM	12/19/14 21:26	CXL0317	CL41822
C11-C22 Aromatics1,2	ND (97.1)		EPH8270			IBM	12/19/14 21:26		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*28 %*	*SC*	*40-140*
Surrogate: 2-Bromonaphthalene	*86 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*95 %*		*40-140*
Surrogate: O-Terphenyl	*64 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A

Dissolved Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Arsenic	ND (2.5)		7010		1	KJK	12/17/14 20:55	50	25	CL41709
Barium	**230** (25.0)		6010C		1	KJK	12/18/14 3:00	50	25	CL41709
Cadmium	ND (2.5)		6010C		1	KJK	12/18/14 3:00	50	25	CL41709
Chromium	ND (10.0)		6010C		1	KJK	12/18/14 3:00	50	25	CL41709
Lead	ND (10.0)		6010C		1	KJK	12/18/14 14:51	50	25	CL41709
Mercury	ND (0.20)		7470A		1	BJV	12/18/14 13:25	20	40	CL41752
Selenium	ND (5.0)		7010		1	NAR	12/24/14 1:19	50	25	CL41709
Silver	ND (5.0)		6010C		1	KJK	12/18/14 3:00	50	25	CL41709

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A
Initial Volume: 990
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: TAJ
Prepared: 12/16/14 17:45
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.10)		8082A		1	12/17/14 21:13		CL41635
Aroclor 1221	ND (0.10)		8082A		1	12/17/14 21:13		CL41635
Aroclor 1232	ND (0.10)		8082A		1	12/17/14 21:13		CL41635
Aroclor 1242	ND (0.10)		8082A		1	12/17/14 21:13		CL41635
Aroclor 1248	ND (0.10)		8082A		1	12/17/14 21:13		CL41635
Aroclor 1254	ND (0.10)		8082A		1	12/17/14 21:13		CL41635
Aroclor 1260	ND (0.10)		8082A		1	12/17/14 21:13		CL41635
Aroclor 1262	ND (0.10)		8082A		1	12/17/14 21:13		CL41635
Aroclor 1268	ND (0.10)		8082A		1	12/17/14 21:13		CL41635

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*47 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*44 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*87 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*96 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,1,1-Trichloroethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,1,2,2-Tetrachloroethane	ND (0.5)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,1,2-Trichloroethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,1-Dichloroethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,1-Dichloroethene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,1-Dichloropropene	ND (2.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,2,3-Trichlorobenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,2,3-Trichloropropane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,2,4-Trichlorobenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,2,4-Trimethylbenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,2-Dibromo-3-Chloropropane	ND (5.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,2-Dibromoethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,2-Dichlorobenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,2-Dichloroethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,2-Dichloropropane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,3,5-Trimethylbenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,3-Dichlorobenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,3-Dichloropropane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,4-Dichlorobenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
1,4-Dioxane - Screen	ND (500)		8260B		1	12/23/14 12:52	CXL0348	CL42337
2,2-Dichloropropane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
2-Butanone	ND (10.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
2-Chlorotoluene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
2-Hexanone	ND (10.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
4-Chlorotoluene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
4-Isopropyltoluene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
4-Methyl-2-Pentanone	ND (10.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Acetone	ND (10.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Benzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Bromobenzene	ND (2.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Bromochloromethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.6)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Bromoform	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Bromomethane	ND (2.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Carbon Disulfide	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Carbon Tetrachloride	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Chlorobenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Chloroethane	ND (2.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Chloroform	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Chloromethane	ND (2.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
cis-1,2-Dichloroethene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
cis-1,3-Dichloropropene	ND (0.4)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Dibromochloromethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Dibromomethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Dichlorodifluoromethane	ND (2.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Diethyl Ether	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Di-isopropyl ether	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Ethyl tertiary-butyl ether	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Ethylbenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Hexachlorobutadiene	ND (0.6)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Hexachloroethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Isopropylbenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Methyl tert-Butyl Ether	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Methylene Chloride	ND (2.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Naphthalene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
n-Butylbenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
n-Propylbenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
sec-Butylbenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Styrene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
tert-Butylbenzene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Tertiary-amyl methyl ether	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Tetrachloroethene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Tetrahydrofuran	ND (5.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Toluene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
trans-1,2-Dichloroethene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
trans-1,3-Dichloropropene	ND (0.4)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Trichloroethene	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Trichlorofluoromethane	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Vinyl Chloride	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Xylene O	ND (1.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Xylene P,M	ND (2.0)		8260B		1	12/23/14 12:52	CXL0348	CL42337
Xylenes (Total)	ND (2.0)		8260B		1	12/23/14 12:52		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*104 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*106 %*		*70-130*
Surrogate: Dibromofluoromethane	*113 %*		*70-130*
Surrogate: Toluene-d8	*99 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A
Initial Volume: 1000
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 12/16/14 19:15

8270C Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
1,2-Dichlorobenzene	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
1,3-Dichlorobenzene	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
1,4-Dichlorobenzene	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2,4,5-Trichlorophenol	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2,4,6-Trichlorophenol	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2,4-Dichlorophenol	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2,4-Dimethylphenol	ND (50.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2,4-Dinitrophenol	ND (50.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2,4-Dinitrotoluene	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2,6-Dinitrotoluene	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2-Chloronaphthalene	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2-Chlorophenol	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2-Methylphenol	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
2-Nitrophenol	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
3,3´-Dichlorobenzidine	ND (20.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
3+4-Methylphenol	ND (20.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
4-Bromophenyl-phenylether	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
4-Chloroaniline	ND (20.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
4-Nitrophenol	ND (50.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Acetophenone	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Aniline	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Azobenzene	ND (20.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
bis(2-Chloroethoxy)methane	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
bis(2-Chloroethyl)ether	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
bis(2-chloroisopropyl)Ether	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
bis(2-Ethylhexyl)phthalate	ND (6.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Butylbenzylphthalate	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Dibenzofuran	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Diethylphthalate	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Dimethylphthalate	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Di-n-butylphthalate	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A
Initial Volume: 1000
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 12/16/14 19:15

8270C Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Di-n-octylphthalate	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Hexachlorobutadiene	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Hexachloroethane	ND (5.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Isophorone	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Nitrobenzene	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
N-Nitrosodimethylamine	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611
Phenol	ND (10.0)		8270C		1	12/18/14 7:23	CXL0261	CL41611

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*62 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*52 %*		*15-110*
Surrogate: 2-Chlorophenol-d4	*67 %*		*15-110*
Surrogate: 2-Fluorobiphenyl	*67 %*		*30-130*
Surrogate: 2-Fluorophenol	*55 %*		*15-110*
Surrogate: Nitrobenzene-d5	*65 %*		*30-130*
Surrogate: Phenol-d6	*60 %*		*15-110*
Surrogate: p-Terphenyl-d14	*40 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A
Initial Volume: 1000
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 12/18/14 15:10

8270D(SIM) Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
2-Methylnaphthalene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Acenaphthene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Acenaphthylene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Anthracene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Benzo(a)anthracene	ND (0.05)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Benzo(a)pyrene	ND (0.05)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Benzo(b)fluoranthene	ND (0.05)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Benzo(g,h,i)perylene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Benzo(k)fluoranthene	ND (0.05)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Chrysene	ND (0.05)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Dibenzo(a,h)Anthracene	ND (0.05)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Fluoranthene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Fluorene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Hexachlorobenzene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Indeno(1,2,3-cd)Pyrene	ND (0.05)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Naphthalene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Pentachlorophenol	ND (0.90)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Phenanthrene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801
Pyrene	ND (0.20)		8270D SIM		1	12/18/14 23:34	CXL0274	CL41801

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*51 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*79 %*		*15-110*
Surrogate: 2-Fluorobiphenyl	*78 %*		*30-130*
Surrogate: Nitrobenzene-d5	*71 %*		*30-130*
Surrogate: p-Terphenyl-d14	*72 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A
Initial Volume: 1010
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02
Sample Matrix: Ground Water
Units: ug/L

Prepared: 12/16/14 13:50

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (99)		MADEP-EPH		1	JXS	12/18/14 1:05	CXL0263	CL41521
C19-C36 Aliphatics1	ND (99)		MADEP-EPH		1	JXS	12/18/14 1:05	CXL0263	CL41521
C11-C22 Unadjusted Aromatics1	ND (99.0)		EPH8270		1	JXS	12/18/14 1:52	CXL0257	CL41521
C11-C22 Aromatics1,2	ND (99.0)		EPH8270			IBM	12/19/14 20:18		[CALC]
2-Methylnaphthalene	ND (0.50)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Acenaphthene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Naphthalene	ND (0.50)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Phenanthrene	ND (0.50)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Acenaphthylene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Anthracene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Benzo(a)anthracene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Benzo(a)pyrene	ND (0.10)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Benzo(b)fluoranthene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Benzo(g,h,i)perylene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Benzo(k)fluoranthene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Chrysene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Dibenzo(a,h)Anthracene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Fluoranthene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Fluorene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Indeno(1,2,3-cd)Pyrene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Pyrene	ND (0.20)		EPH8270SIM		1	IBM	12/19/14 20:18	CXL0286	CL41822
Preservative:	**pH <= 2**		MADEP-EPH			JXS			CL41521

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*23 %*	*SC*	*40-140*
Surrogate: 2-Bromonaphthalene	*73 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*93 %*		*40-140*
Surrogate: O-Terphenyl	*57 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: EEB

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (100)		MADEP-VPH		1	12/17/14 19:27	CXL0249	CL41743
C5-C8 Aliphatics1,2	ND (150)		MADEP-VPH		1	12/17/14 19:27		[CALC]
C9-C12 Aliphatics2,3	ND (150)		MADEP-VPH		1	12/17/14 19:27		[CALC]
Benzene	ND (1.5)		MADEP-VPH		1	12/17/14 19:27	CXL0249	CL41743
Ethylbenzene	ND (5.0)		MADEP-VPH		1	12/17/14 19:27	CXL0249	CL41743
Methyl tert-Butyl Ether	ND (1.5)		MADEP-VPH		1	12/17/14 19:27	CXL0249	CL41743
Naphthalene	ND (5.0)		MADEP-VPH		1	12/17/14 19:27	CXL0249	CL41743
Toluene	ND (5.0)		MADEP-VPH		1	12/17/14 19:27	CXL0249	CL41743
Xylene O	ND (5.0)		MADEP-VPH		1	12/17/14 19:27	CXL0249	CL41743
Xylene P,M	ND (10.0)		MADEP-VPH		1	12/17/14 19:27	CXL0249	CL41743
Preservative:	**pH <= 2**		MADEP-VPH					CL41743

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*97 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*101 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB3
Date Sampled: 12/15/14 12:00
Percent Solids: N/A
Initial Volume: 1000
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-02RE1
Sample Matrix: Ground Water
Units: ug/L

Prepared: 12/18/14 16:55

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (100)		MADEP-EPH		1	DPS	12/20/14 19:45	CXL0298	CL41822
C19-C36 Aliphatics1	ND (100)		MADEP-EPH		1	DPS	12/20/14 19:45	CXL0298	CL41822
C11-C22 Unadjusted Aromatics1	ND (100)		EPH8270		1	IBM	12/19/14 22:02	CXL0317	CL41822
C11-C22 Aromatics1,2	ND (100)		EPH8270			IBM	12/19/14 22:02		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*24 %*	*SC*	*40-140*
Surrogate: 2-Bromonaphthalene	*88 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*96 %*		*40-140*
Surrogate: O-Terphenyl	*70 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1
Date Sampled: 12/15/14 14:00
Percent Solids: N/A

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-03
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A

Dissolved Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Arsenic	ND (2.5)		7010		1	KJK	12/17/14 21:00	50	25	CL41709
Barium	ND (25.0)		6010C		1	KJK	12/18/14 3:05	50	25	CL41709
Cadmium	ND (2.5)		6010C		1	KJK	12/18/14 3:05	50	25	CL41709
Chromium	ND (10.0)		6010C		1	KJK	12/18/14 3:05	50	25	CL41709
Lead	ND (2.5)		7010		1	KJK	12/23/14 16:53	50	25	CL41709
Mercury	ND (0.20)		7470A		1	BJV	12/18/14 13:27	20	40	CL41752
Selenium	ND (5.0)		7010		1	NAR	12/24/14 1:25	50	25	CL41709
Silver	ND (5.0)		6010C		1	KJK	12/18/14 3:05	50	25	CL41709

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1
Date Sampled: 12/15/14 14:00
Percent Solids: N/A
Initial Volume: 1000
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: TAJ
Prepared: 12/16/14 17:45
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.10)		8082A		1	12/17/14 21:32		CL41635
Aroclor 1221	ND (0.10)		8082A		1	12/17/14 21:32		CL41635
Aroclor 1232	ND (0.10)		8082A		1	12/17/14 21:32		CL41635
Aroclor 1242	ND (0.10)		8082A		1	12/17/14 21:32		CL41635
Aroclor 1248	ND (0.10)		8082A		1	12/17/14 21:32		CL41635
Aroclor 1254	ND (0.10)		8082A		1	12/17/14 21:32		CL41635
Aroclor 1260	ND (0.10)		8082A		1	12/17/14 21:32		CL41635
Aroclor 1262	ND (0.10)		8082A		1	12/17/14 21:32		CL41635
Aroclor 1268	ND (0.10)		8082A		1	12/17/14 21:32		CL41635

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*68 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*66 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*78 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*86 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1
Date Sampled: 12/15/14 14:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1,2-Tetrachloroethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,1,1-Trichloroethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,1,2,2-Tetrachloroethane	ND (0.5)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,1,2-Trichloroethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,1-Dichloroethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,1-Dichloroethene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,1-Dichloropropene	ND (2.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,2,3-Trichlorobenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,2,3-Trichloropropane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,2,4-Trichlorobenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,2,4-Trimethylbenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,2-Dibromo-3-Chloropropane	ND (5.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,2-Dibromoethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,2-Dichlorobenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,2-Dichloroethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,2-Dichloropropane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,3,5-Trimethylbenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,3-Dichlorobenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,3-Dichloropropane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,4-Dichlorobenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
1,4-Dioxane - Screen	ND (500)		8260B		1	12/23/14 13:20	CXL0348	CL42337
2,2-Dichloropropane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
2-Butanone	ND (10.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
2-Chlorotoluene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
2-Hexanone	ND (10.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
4-Chlorotoluene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
4-Isopropyltoluene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
4-Methyl-2-Pentanone	ND (10.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Acetone	ND (10.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Benzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Bromobenzene	ND (2.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Bromochloromethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1
Date Sampled: 12/15/14 14:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Bromodichloromethane	ND (0.6)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Bromoform	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Bromomethane	ND (2.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Carbon Disulfide	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Carbon Tetrachloride	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Chlorobenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Chloroethane	ND (2.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Chloroform	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Chloromethane	ND (2.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
cis-1,2-Dichloroethene	**6.8** (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
cis-1,3-Dichloropropene	ND (0.4)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Dibromochloromethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Dibromomethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Dichlorodifluoromethane	ND (2.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Diethyl Ether	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Di-isopropyl ether	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Ethyl tertiary-butyl ether	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Ethylbenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Hexachlorobutadiene	ND (0.6)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Hexachloroethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Isopropylbenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Methyl tert-Butyl Ether	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Methylene Chloride	ND (2.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Naphthalene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
n-Butylbenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
n-Propylbenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
sec-Butylbenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Styrene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
tert-Butylbenzene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Tertiary-amyl methyl ether	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Tetrachloroethene	**72.8** (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Tetrahydrofuran	ND (5.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1
Date Sampled: 12/15/14 14:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Toluene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
trans-1,2-Dichloroethene	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
trans-1,3-Dichloropropene	ND (0.4)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Trichloroethene	**11.4** (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Trichlorofluoromethane	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Vinyl Chloride	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Xylene O	ND (1.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Xylene P,M	ND (2.0)		8260B		1	12/23/14 13:20	CXL0348	CL42337
Xylenes (Total)	ND (2.0)		8260B		1	12/23/14 13:20		[CALC]

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	*101 %*		*70-130*
Surrogate: 4-Bromofluorobenzene	*103 %*		*70-130*
Surrogate: Dibromofluoromethane	*112 %*		*70-130*
Surrogate: Toluene-d8	*98 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1
Date Sampled: 12/15/14 14:00
Percent Solids: N/A
Initial Volume: 1040
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 12/16/14 19:15

8270C Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
1,2-Dichlorobenzene	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
1,3-Dichlorobenzene	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
1,4-Dichlorobenzene	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2,4,5-Trichlorophenol	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2,4,6-Trichlorophenol	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2,4-Dichlorophenol	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2,4-Dimethylphenol	ND (48.1)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2,4-Dinitrophenol	ND (48.1)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2,4-Dinitrotoluene	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2,6-Dinitrotoluene	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2-Chloronaphthalene	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2-Chlorophenol	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2-Methylphenol	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
2-Nitrophenol	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
3,3´-Dichlorobenzidine	ND (19.2)		8270C		1	12/18/14 8:00	CXL0261	CL41611
3+4-Methylphenol	ND (19.2)		8270C		1	12/18/14 8:00	CXL0261	CL41611
4-Bromophenyl-phenylether	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
4-Chloroaniline	ND (19.2)		8270C		1	12/18/14 8:00	CXL0261	CL41611
4-Nitrophenol	ND (48.1)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Acetophenone	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Aniline	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Azobenzene	ND (19.2)		8270C		1	12/18/14 8:00	CXL0261	CL41611
bis(2-Chloroethoxy)methane	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
bis(2-Chloroethyl)ether	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
bis(2-chloroisopropyl)Ether	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
bis(2-Ethylhexyl)phthalate	ND (5.8)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Butylbenzylphthalate	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Dibenzofuran	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Diethylphthalate	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Dimethylphthalate	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Di-n-butylphthalate	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1
Date Sampled: 12/15/14 14:00
Percent Solids: N/A
Initial Volume: 1040
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 12/16/14 19:15

8270C Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Di-n-octylphthalate	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Hexachlorobutadiene	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Hexachloroethane	ND (4.8)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Isophorone	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Nitrobenzene	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
N-Nitrosodimethylamine	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611
Phenol	ND (9.6)		8270C		1	12/18/14 8:00	CXL0261	CL41611

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*74 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*62 %*		*15-110*
Surrogate: 2-Chlorophenol-d4	*78 %*		*15-110*
Surrogate: 2-Fluorobiphenyl	*79 %*		*30-130*
Surrogate: 2-Fluorophenol	*62 %*		*15-110*
Surrogate: Nitrobenzene-d5	*74 %*		*30-130*
Surrogate: Phenol-d6	*68 %*		*15-110*
Surrogate: p-Terphenyl-d14	*76 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1
Date Sampled: 12/15/14 14:00
Percent Solids: N/A
Initial Volume: 1000
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 12/18/14 15:10

8270D(SIM) Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
2-Methylnaphthalene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Acenaphthene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Acenaphthylene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Anthracene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Benzo(a)anthracene	ND (0.05)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Benzo(a)pyrene	ND (0.05)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Benzo(b)fluoranthene	ND (0.05)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Benzo(g,h,i)perylene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Benzo(k)fluoranthene	ND (0.05)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Chrysene	ND (0.05)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Dibenzo(a,h)Anthracene	ND (0.05)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Fluoranthene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Fluorene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Hexachlorobenzene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Indeno(1,2,3-cd)Pyrene	ND (0.05)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Naphthalene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Pentachlorophenol	ND (0.90)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Phenanthrene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801
Pyrene	ND (0.20)		8270D SIM		1	12/19/14 0:24	CXL0274	CL41801

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*56 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*93 %*		*15-110*
Surrogate: 2-Fluorobiphenyl	*81 %*		*30-130*
Surrogate: Nitrobenzene-d5	*72 %*		*30-130*
Surrogate: p-Terphenyl-d14	*100 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1
Date Sampled: 12/15/14 14:00
Percent Solids: N/A
Initial Volume: 950
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-03
Sample Matrix: Ground Water
Units: ug/L

Prepared: 12/16/14 13:50

MADEP-EPH Extractable Petroleum Hydrocarbons

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C9-C18 Aliphatics1	ND (105)		MADEP-EPH		1	JXS	12/18/14 1:55	CXL0263	CL41521
C19-C36 Aliphatics1	ND (105)		MADEP-EPH		1	JXS	12/18/14 1:55	CXL0263	CL41521
C11-C22 Unadjusted Aromatics1	ND (105)		EPH8270		1	JXS	12/18/14 2:28	CXL0257	CL41521
C11-C22 Aromatics1,2	ND (105)		EPH8270			VSC	12/18/14 2:28		[CALC]
2-Methylnaphthalene	ND (0.53)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Acenaphthene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Naphthalene	ND (0.53)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Phenanthrene	ND (0.53)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Acenaphthylene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Anthracene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Benzo(a)anthracene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Benzo(a)pyrene	ND (0.11)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Benzo(b)fluoranthene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Benzo(g,h,i)perylene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Benzo(k)fluoranthene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Chrysene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Dibenzo(a,h)Anthracene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Fluoranthene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Fluorene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Indeno(1,2,3-cd)Pyrene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Pyrene	ND (0.21)		EPH8270SIM		1	VSC	12/17/14 18:01	CXL0251	CL41521
Preservative:	**pH <= 2**		MADEP-EPH			JXS			CL41521

	%Recovery	Qualifier	Limits
Surrogate: 1-Chlorooctadecane	*42 %*		*40-140*
Surrogate: 2-Bromonaphthalene	*91 %*		*40-140*
Surrogate: 2-Fluorobiphenyl	*92 %*		*40-140*
Surrogate: O-Terphenyl	*60 %*		*40-140*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square
Client Sample ID: PB1
Date Sampled: 12/15/14 14:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1412310
ESS Laboratory Sample ID: 1412310-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: EEB

MADEP-VPH Volatile Petroleum Hydrocarbon

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
C9-C10 Aromatics	ND (100)		MADEP-VPH		1	12/17/14 20:01	CXL0249	CL41743
C5-C8 Aliphatics1,2	ND (150)		MADEP-VPH		1	12/17/14 20:01		[CALC]
C9-C12 Aliphatics2,3	ND (150)		MADEP-VPH		1	12/17/14 20:01		[CALC]
Benzene	ND (1.5)		MADEP-VPH		1	12/17/14 20:01	CXL0249	CL41743
Ethylbenzene	ND (5.0)		MADEP-VPH		1	12/17/14 20:01	CXL0249	CL41743
Methyl tert-Butyl Ether	ND (1.5)		MADEP-VPH		1	12/17/14 20:01	CXL0249	CL41743
Naphthalene	ND (5.0)		MADEP-VPH		1	12/17/14 20:01	CXL0249	CL41743
Toluene	ND (5.0)		MADEP-VPH		1	12/17/14 20:01	CXL0249	CL41743
Xylene O	ND (5.0)		MADEP-VPH		1	12/17/14 20:01	CXL0249	CL41743
Xylene P,M	ND (10.0)		MADEP-VPH		1	12/17/14 20:01	CXL0249	CL41743
Preservative:	**pH <= 2**		MADEP-VPH					CL41743

	%Recovery	Qualifier	Limits
Surrogate: 2,5-Dibromotoluene - FID	*103 %*		*70-130*
Surrogate: 2,5-Dibromotoluene - PID	*107 %*		*70-130*

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Dissolved Metals										
Batch CL41709 - 3005A										
Blank										
Arsenic	ND	2.5	ug/L							
Barium	ND	25.0	ug/L							
Cadmium	ND	2.5	ug/L							
Chromium	ND	10.0	ug/L							
Lead	ND	10.0	ug/L							
Selenium	ND	5.0	ug/L							
Silver	ND	5.0	ug/L							
Blank										
Arsenic	ND	2.5	ug/L							
Lead	ND	2.5	ug/L							
Lead	ND	10.0	ug/L							
Selenium	ND	5.0	ug/L							
LCS										
Arsenic	269	50.0	ug/L	250.0		107	80-120			
Barium	270	25.0	ug/L	250.0		108	80-120			
Cadmium	131	2.5	ug/L	125.0		105	80-120			
Chromium	273	10.0	ug/L	250.0		109	80-120			
Lead	270	10.0	ug/L	250.0		108	80-120			
Lead	214	50.0	ug/L	250.0		86	80-120			
Selenium	400	100	ug/L	500.0		80	80-120			
Silver	139	5.0	ug/L	125.0		112	80-120			
LCS Dup										
Arsenic	262	50.0	ug/L	250.0		105	80-120	3	20	
Barium	226	25.0	ug/L	250.0		90	80-120	18	20	
Cadmium	111	2.5	ug/L	125.0		89	80-120	17	20	
Chromium	226	10.0	ug/L	250.0		90	80-120	19	20	
Lead	261	50.0	ug/L	250.0		104	80-120	20	20	
Lead	230	10.0	ug/L	250.0		92	80-120	16	20	
Selenium	518	100	ug/L	500.0		104	80-120	26	20	D+
Silver	33.8	5.0	ug/L	125.0		27	80-120	122	20	B-, D+
Batch CL41752 - 245.1/7470A										
Blank										
Mercury	ND	0.20	ug/L							
LCS										
Mercury	6.22	0.20	ug/L	6.000		104	80-120			
8082A Polychlorinated Biphenyls (PCB)										
Batch CL41635 - 3510C										
Blank										
Aroclor 1016	ND	0.05	ug/L							
Aroclor 1221	ND	0.05	ug/L							
Aroclor 1232	ND	0.05	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8082A Polychlorinated Biphenyls (PCB)										
Batch CL41635 - 3510C										
Aroclor 1242	ND	0.05	ug/L							
Aroclor 1248	ND	0.05	ug/L							
Aroclor 1254	ND	0.05	ug/L							
Aroclor 1260	ND	0.05	ug/L							
Aroclor 1262	ND	0.05	ug/L							
Aroclor 1268	ND	0.05	ug/L							
Surrogate: Decachlorobiphenyl	*0.0466*		ug/L	*0.05000*		*93*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0463*		ug/L	*0.05000*		*93*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0270*		ug/L	*0.05000*		*54*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0310*		ug/L	*0.05000*		*62*	*30-150*			
LCS										
Aroclor 1016	0.83	0.05	ug/L	1.000		83	40-140			
Aroclor 1260	1.01	0.05	ug/L	1.000		101	40-140			
Surrogate: Decachlorobiphenyl	*0.0432*		ug/L	*0.05000*		*86*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0438*		ug/L	*0.05000*		*88*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0285*		ug/L	*0.05000*		*57*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0300*		ug/L	*0.05000*		*60*	*30-150*			
LCS Dup										
Aroclor 1016	0.76	0.05	ug/L	1.000		76	40-140	8	20	
Aroclor 1260	1.02	0.05	ug/L	1.000		102	40-140	0.9	20	
Surrogate: Decachlorobiphenyl	*0.0446*		ug/L	*0.05000*		*89*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0442*		ug/L	*0.05000*		*88*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0226*		ug/L	*0.05000*		*45*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0241*		ug/L	*0.05000*		*48*	*30-150*			
8260B Volatile Organic Compounds										
Batch CL42337 - 5030B										
Blank										
1,1,1,2-Tetrachloroethane	ND	1.0	ug/L							
1,1,1-Trichloroethane	ND	1.0	ug/L							
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L							
1,1,2-Trichloroethane	ND	1.0	ug/L							
1,1-Dichloroethane	ND	1.0	ug/L							
1,1-Dichloroethene	ND	1.0	ug/L							
1,1-Dichloropropene	ND	2.0	ug/L							
1,2,3-Trichlorobenzene	ND	1.0	ug/L							
1,2,3-Trichloropropane	ND	1.0	ug/L							
1,2,4-Trichlorobenzene	ND	1.0	ug/L							
1,2,4-Trimethylbenzene	ND	1.0	ug/L							
1,2-Dibromo-3-Chloropropane	ND	5.0	ug/L							
1,2-Dibromoethane	ND	1.0	ug/L							
1,2-Dichlorobenzene	ND	1.0	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch CL42337 - 5030B										
1,2-Dichloroethane	ND	1.0	ug/L							
1,2-Dichloropropane	ND	1.0	ug/L							
1,3,5-Trimethylbenzene	ND	1.0	ug/L							
1,3-Dichlorobenzene	ND	1.0	ug/L							
1,3-Dichloropropane	ND	1.0	ug/L							
1,4-Dichlorobenzene	ND	1.0	ug/L							
1,4-Dioxane - Screen	ND	500	ug/L							
2,2-Dichloropropane	ND	1.0	ug/L							
2-Butanone	ND	10.0	ug/L							
2-Chlorotoluene	ND	1.0	ug/L							
2-Hexanone	ND	10.0	ug/L							
4-Chlorotoluene	ND	1.0	ug/L							
4-Isopropyltoluene	ND	1.0	ug/L							
4-Methyl-2-Pentanone	ND	10.0	ug/L							
Acetone	ND	10.0	ug/L							
Benzene	ND	1.0	ug/L							
Bromobenzene	ND	2.0	ug/L							
Bromochloromethane	ND	1.0	ug/L							
Bromodichloromethane	ND	0.6	ug/L							
Bromoform	ND	1.0	ug/L							
Bromomethane	ND	2.0	ug/L							
Carbon Disulfide	ND	1.0	ug/L							
Carbon Tetrachloride	ND	1.0	ug/L							
Chlorobenzene	ND	1.0	ug/L							
Chloroethane	ND	2.0	ug/L							
Chloroform	ND	1.0	ug/L							
Chloromethane	ND	2.0	ug/L							
cis-1,2-Dichloroethene	ND	1.0	ug/L							
cis-1,3-Dichloropropene	ND	0.4	ug/L							
Dibromochloromethane	ND	1.0	ug/L							
Dibromomethane	ND	1.0	ug/L							
Dichlorodifluoromethane	ND	2.0	ug/L							
Diethyl Ether	ND	1.0	ug/L							
Di-isopropyl ether	ND	1.0	ug/L							
Ethyl tertiary-butyl ether	ND	1.0	ug/L							
Ethylbenzene	ND	1.0	ug/L							
Hexachlorobutadiene	ND	0.6	ug/L							
Hexachloroethane	ND	1.0	ug/L							
Isopropylbenzene	ND	1.0	ug/L							
Methyl tert-Butyl Ether	ND	1.0	ug/L							
Methylene Chloride	ND	2.0	ug/L							
Naphthalene	ND	1.0	ug/L							
n-Butylbenzene	ND	1.0	ug/L							
n-Propylbenzene	ND	1.0	ug/L							
sec-Butylbenzene	ND	1.0	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch CL42337 - 5030B										
Styrene	ND	1.0	ug/L							
tert-Butylbenzene	ND	1.0	ug/L							
Tertiary-amyl methyl ether	ND	1.0	ug/L							
Tetrachloroethene	ND	1.0	ug/L							
Tetrahydrofuran	ND	5.0	ug/L							
Toluene	ND	1.0	ug/L							
trans-1,2-Dichloroethene	ND	1.0	ug/L							
trans-1,3-Dichloropropene	ND	0.4	ug/L							
Trichloroethene	ND	1.0	ug/L							
Trichlorofluoromethane	ND	1.0	ug/L							
Vinyl Chloride	ND	1.0	ug/L							
Xylene O	ND	1.0	ug/L							
Xylene P,M	ND	2.0	ug/L							
Surrogate: 1,2-Dichloroethane-d4	*25.0*		ug/L	*25.00*		*100*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*25.6*		ug/L	*25.00*		*102*	*70-130*			
Surrogate: Dibromofluoromethane	*28.9*		ug/L	*25.00*		*116*	*70-130*			
Surrogate: Toluene-d8	*24.9*		ug/L	*25.00*		*100*	*70-130*			
LCS										
1,1,1,2-Tetrachloroethane	9.1		ug/L	10.00		91	70-130			
1,1,1-Trichloroethane	9.8		ug/L	10.00		98	70-130			
1,1,2,2-Tetrachloroethane	9.6		ug/L	10.00		96	70-130			
1,1,2-Trichloroethane	8.9		ug/L	10.00		89	70-130			
1,1-Dichloroethane	9.4		ug/L	10.00		94	70-130			
1,1-Dichloroethene	9.3		ug/L	10.00		93	70-130			
1,1-Dichloropropene	9.0		ug/L	10.00		90	70-130			
1,2,3-Trichlorobenzene	10.2		ug/L	10.00		102	70-130			
1,2,3-Trichloropropane	9.2		ug/L	10.00		92	70-130			
1,2,4-Trichlorobenzene	10.0		ug/L	10.00		100	70-130			
1,2,4-Trimethylbenzene	9.5		ug/L	10.00		95	70-130			
1,2-Dibromo-3-Chloropropane	9.7		ug/L	10.00		97	70-130			
1,2-Dibromoethane	9.6		ug/L	10.00		96	70-130			
1,2-Dichlorobenzene	9.1		ug/L	10.00		91	70-130			
1,2-Dichloroethane	9.4		ug/L	10.00		94	70-130			
1,2-Dichloropropane	8.6		ug/L	10.00		86	70-130			
1,3,5-Trimethylbenzene	10.1		ug/L	10.00		101	70-130			
1,3-Dichlorobenzene	9.5		ug/L	10.00		95	70-130			
1,3-Dichloropropane	8.7		ug/L	10.00		87	70-130			
1,4-Dichlorobenzene	9.7		ug/L	10.00		97	70-130			
1,4-Dioxane - Screen	319		ug/L	200.0		159	0-332			
2,2-Dichloropropane	9.0		ug/L	10.00		90	70-130			
2-Butanone	47.5		ug/L	50.00		95	70-130			
2-Chlorotoluene	9.1		ug/L	10.00		91	70-130			
2-Hexanone	47.7		ug/L	50.00		95	70-130			
4-Chlorotoluene	9.5		ug/L	10.00		95	70-130			
4-Isopropyltoluene	10.7		ug/L	10.00		107	70-130			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch CL42337 - 5030B										
4-Methyl-2-Pentanone	42.4		ug/L	50.00		85	70-130			
Acetone	61.5		ug/L	50.00		123	70-130			
Benzene	9.3		ug/L	10.00		93	70-130			
Bromobenzene	10.1		ug/L	10.00		101	70-130			
Bromochloromethane	9.4		ug/L	10.00		94	70-130			
Bromodichloromethane	9.4		ug/L	10.00		94	70-130			
Bromoform	11.0		ug/L	10.00		110	70-130			
Bromomethane	10.4		ug/L	10.00		104	70-130			
Carbon Disulfide	8.8		ug/L	10.00		88	70-130			
Carbon Tetrachloride	10.4		ug/L	10.00		104	70-130			
Chlorobenzene	9.6		ug/L	10.00		96	70-130			
Chloroethane	8.0		ug/L	10.00		80	70-130			
Chloroform	9.1		ug/L	10.00		91	70-130			
Chloromethane	11.2		ug/L	10.00		112	70-130			
cis-1,2-Dichloroethene	9.4		ug/L	10.00		94	70-130			
cis-1,3-Dichloropropene	8.2		ug/L	10.00		82	70-130			
Dibromochloromethane	10.3		ug/L	10.00		103	70-130			
Dibromomethane	9.6		ug/L	10.00		96	70-130			
Dichlorodifluoromethane	10.2		ug/L	10.00		102	70-130			
Diethyl Ether	8.9		ug/L	10.00		89	70-130			
Di-isopropyl ether	9.4		ug/L	10.00		94	70-130			
Ethyl tertiary-butyl ether	8.0		ug/L	10.00		80	70-130			
Ethylbenzene	9.4		ug/L	10.00		94	70-130			
Hexachlorobutadiene	10.4		ug/L	10.00		104	70-130			
Hexachloroethane	11.8		ug/L	10.00		118	70-130			
Isopropylbenzene	9.4		ug/L	10.00		94	70-130			
Methyl tert-Butyl Ether	8.4		ug/L	10.00		84	70-130			
Methylene Chloride	9.0		ug/L	10.00		90	70-130			
Naphthalene	8.0		ug/L	10.00		80	70-130			
n-Butylbenzene	10.8		ug/L	10.00		108	70-130			
n-Propylbenzene	9.2		ug/L	10.00		92	70-130			
sec-Butylbenzene	9.8		ug/L	10.00		98	70-130			
Styrene	8.7		ug/L	10.00		87	70-130			
tert-Butylbenzene	9.1		ug/L	10.00		91	70-130			
Tertiary-amyl methyl ether	7.9		ug/L	10.00		79	70-130			
Tetrachloroethene	9.2		ug/L	10.00		92	70-130			
Tetrahydrofuran	10.0		ug/L	10.00		100	70-130			
Toluene	9.2		ug/L	10.00		92	70-130			
trans-1,2-Dichloroethene	9.0		ug/L	10.00		90	70-130			
trans-1,3-Dichloropropene	7.9		ug/L	10.00		79	70-130			
Trichloroethene	8.9		ug/L	10.00		89	70-130			
Trichlorofluoromethane	9.1		ug/L	10.00		91	70-130			
Vinyl Chloride	10.2		ug/L	10.00		102	70-130			
Xylene O	8.9		ug/L	10.00		89	70-130			
Xylene P,M	18.1		ug/L	20.00		91	70-130			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch CL42337 - 5030B										
Surrogate: 1,2-Dichloroethane-d4	*25.8*		ug/L	*25.00*		*103*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*24.2*		ug/L	*25.00*		*97*	*70-130*			
Surrogate: Dibromofluoromethane	*28.2*		ug/L	*25.00*		*113*	*70-130*			
Surrogate: Toluene-d8	*25.0*		ug/L	*25.00*		*100*	*70-130*			
LCS Dup										
1,1,1,2-Tetrachloroethane	9.5		ug/L	10.00		95	70-130	4	25	
1,1,1-Trichloroethane	10.1		ug/L	10.00		101	70-130	3	25	
1,1,2,2-Tetrachloroethane	9.1		ug/L	10.00		91	70-130	6	25	
1,1,2-Trichloroethane	8.4		ug/L	10.00		84	70-130	6	25	
1,1-Dichloroethane	8.5		ug/L	10.00		85	70-130	11	25	
1,1-Dichloroethene	9.4		ug/L	10.00		94	70-130	1	25	
1,1-Dichloropropene	9.4		ug/L	10.00		94	70-130	4	25	
1,2,3-Trichlorobenzene	9.0		ug/L	10.00		90	70-130	13	25	
1,2,3-Trichloropropane	8.6		ug/L	10.00		86	70-130	6	25	
1,2,4-Trichlorobenzene	9.0		ug/L	10.00		90	70-130	10	25	
1,2,4-Trimethylbenzene	9.1		ug/L	10.00		91	70-130	5	25	
1,2-Dibromo-3-Chloropropane	9.9		ug/L	10.00		99	70-130	2	25	
1,2-Dibromoethane	9.4		ug/L	10.00		94	70-130	2	25	
1,2-Dichlorobenzene	8.8		ug/L	10.00		88	70-130	3	25	
1,2-Dichloroethane	9.7		ug/L	10.00		97	70-130	3	25	
1,2-Dichloropropane	8.4		ug/L	10.00		84	70-130	2	25	
1,3,5-Trimethylbenzene	9.4		ug/L	10.00		94	70-130	8	25	
1,3-Dichlorobenzene	9.4		ug/L	10.00		94	70-130	1	25	
1,3-Dichloropropane	9.1		ug/L	10.00		91	70-130	5	25	
1,4-Dichlorobenzene	9.0		ug/L	10.00		90	70-130	7	25	
1,4-Dioxane - Screen	246		ug/L	200.0		123	0-332	26	200	
2,2-Dichloropropane	9.2		ug/L	10.00		92	70-130	2	25	
2-Butanone	46.4		ug/L	50.00		93	70-130	2	25	
2-Chlorotoluene	8.8		ug/L	10.00		88	70-130	4	25	
2-Hexanone	51.0		ug/L	50.00		102	70-130	7	25	
4-Chlorotoluene	9.4		ug/L	10.00		94	70-130	0.7	25	
4-Isopropyltoluene	9.6		ug/L	10.00		96	70-130	11	25	
4-Methyl-2-Pentanone	42.6		ug/L	50.00		85	70-130	0.3	25	
Acetone	48.8		ug/L	50.00		98	70-130	23	25	
Benzene	9.2		ug/L	10.00		92	70-130	2	25	
Bromobenzene	9.4		ug/L	10.00		94	70-130	7	25	
Bromochloromethane	10.1		ug/L	10.00		101	70-130	8	25	
Bromodichloromethane	9.7		ug/L	10.00		97	70-130	4	25	
Bromoform	11.4		ug/L	10.00		114	70-130	3	25	
Bromomethane	10.0		ug/L	10.00		100	70-130	3	25	
Carbon Disulfide	9.1		ug/L	10.00		91	70-130	3	25	
Carbon Tetrachloride	10.7		ug/L	10.00		107	70-130	3	25	
Chlorobenzene	9.6		ug/L	10.00		96	70-130	0.1	25	
Chloroethane	8.4		ug/L	10.00		84	70-130	4	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch CL42337 - 5030B										
Chloroform	9.2		ug/L	10.00		92	70-130	0.4	25	
Chloromethane	11.3		ug/L	10.00		113	70-130	0.9	25	
cis-1,2-Dichloroethene	9.2		ug/L	10.00		92	70-130	2	25	
cis-1,3-Dichloropropene	8.7		ug/L	10.00		87	70-130	6	25	
Dibromochloromethane	10.7		ug/L	10.00		107	70-130	4	25	
Dibromomethane	9.3		ug/L	10.00		93	70-130	3	25	
Dichlorodifluoromethane	9.8		ug/L	10.00		98	70-130	4	25	
Diethyl Ether	8.9		ug/L	10.00		89	70-130	0.4	25	
Di-isopropyl ether	9.4		ug/L	10.00		94	70-130	0.4	25	
Ethyl tertiary-butyl ether	8.6		ug/L	10.00		86	70-130	7	25	
Ethylbenzene	9.6		ug/L	10.00		96	70-130	2	25	
Hexachlorobutadiene	9.9		ug/L	10.00		99	70-130	4	25	
Hexachloroethane	10.9		ug/L	10.00		109	70-130	8	25	
Isopropylbenzene	9.0		ug/L	10.00		90	70-130	5	25	
Methyl tert-Butyl Ether	8.3		ug/L	10.00		83	70-130	1	25	
Methylene Chloride	8.7		ug/L	10.00		87	70-130	3	25	
Naphthalene	7.4		ug/L	10.00		74	70-130	8	25	
n-Butylbenzene	9.6		ug/L	10.00		96	70-130	11	25	
n-Propylbenzene	8.5		ug/L	10.00		85	70-130	7	25	
sec-Butylbenzene	9.1		ug/L	10.00		91	70-130	8	25	
Styrene	8.7		ug/L	10.00		87	70-130	0	25	
tert-Butylbenzene	8.9		ug/L	10.00		89	70-130	2	25	
Tertiary-amyl methyl ether	8.0		ug/L	10.00		80	70-130	2	25	
Tetrachloroethene	9.7		ug/L	10.00		97	70-130	5	25	
Tetrahydrofuran	9.2		ug/L	10.00		92	70-130	8	25	
Toluene	9.1		ug/L	10.00		91	70-130	1	25	
trans-1,2-Dichloroethene	9.0		ug/L	10.00		90	70-130	0.3	25	
trans-1,3-Dichloropropene	7.8		ug/L	10.00		78	70-130	2	25	
Trichloroethene	9.4		ug/L	10.00		94	70-130	5	25	
Trichlorofluoromethane	9.5		ug/L	10.00		95	70-130	5	25	
Vinyl Chloride	10.4		ug/L	10.00		104	70-130	2	25	
Xylene O	9.3		ug/L	10.00		93	70-130	5	25	
Xylene P,M	19.1		ug/L	20.00		96	70-130	5	25	
Surrogate: 1,2-Dichloroethane-d4	*25.5*		ug/L	*25.00*		*102*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*24.1*		ug/L	*25.00*		*96*	*70-130*			
Surrogate: Dibromofluoromethane	*28.4*		ug/L	*25.00*		*114*	*70-130*			
Surrogate: Toluene-d8	*25.4*		ug/L	*25.00*		*102*	*70-130*			
8270C Semi-Volatile Organic Compounds										
Batch CL41611 - 3520C										
Blank										
1,2,4-Trichlorobenzene	ND	10.0	ug/L							
1,2-Dichlorobenzene	ND	10.0	ug/L							
1,3-Dichlorobenzene	ND	10.0	ug/L							
1,4-Dichlorobenzene	ND	10.0	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270C Semi-Volatile Organic Compounds										
Batch CL41611 - 3520C										
2,4,5-Trichlorophenol	ND	10.0	ug/L							
2,4,6-Trichlorophenol	ND	10.0	ug/L							
2,4-Dichlorophenol	ND	10.0	ug/L							
2,4-Dimethylphenol	ND	50.0	ug/L							
2,4-Dinitrophenol	ND	50.0	ug/L							
2,4-Dinitrotoluene	ND	10.0	ug/L							
2,6-Dinitrotoluene	ND	10.0	ug/L							
2-Chloronaphthalene	ND	10.0	ug/L							
2-Chlorophenol	ND	10.0	ug/L							
2-Methylphenol	ND	10.0	ug/L							
2-Nitrophenol	ND	10.0	ug/L							
3,3´-Dichlorobenzidine	ND	20.0	ug/L							
3+4-Methylphenol	ND	20.0	ug/L							
4-Bromophenyl-phenylether	ND	10.0	ug/L							
4-Chloroaniline	ND	20.0	ug/L							
4-Nitrophenol	ND	50.0	ug/L							
Acetophenone	ND	10.0	ug/L							
Aniline	ND	10.0	ug/L							
Azobenzene	ND	20.0	ug/L							
bis(2-Chloroethoxy)methane	ND	10.0	ug/L							
bis(2-Chloroethyl)ether	ND	10.0	ug/L							
bis(2-chloroisopropyl)Ether	ND	10.0	ug/L							
bis(2-Ethylhexyl)phthalate	6.3	6.0	ug/L							
Butylbenzylphthalate	ND	10.0	ug/L							
Dibenzofuran	ND	10.0	ug/L							
Diethylphthalate	ND	10.0	ug/L							
Dimethylphthalate	ND	10.0	ug/L							
Di-n-butylphthalate	ND	10.0	ug/L							
Di-n-octylphthalate	ND	10.0	ug/L							
Hexachlorobutadiene	ND	10.0	ug/L							
Hexachloroethane	ND	5.0	ug/L							
Isophorone	ND	10.0	ug/L							
Nitrobenzene	ND	10.0	ug/L							
N-Nitrosodimethylamine	ND	10.0	ug/L							
Phenol	ND	10.0	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	*73.1*		ug/L	*100.0*		*73*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*104*		ug/L	*150.0*		*70*	*15-110*			
Surrogate: 2-Chlorophenol-d4	*115*		ug/L	*150.0*		*77*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*73.0*		ug/L	*100.0*		*73*	*30-130*			
Surrogate: 2-Fluorophenol	*97.2*		ug/L	*150.0*		*65*	*15-110*			
Surrogate: Nitrobenzene-d5	*69.9*		ug/L	*100.0*		*70*	*30-130*			
Surrogate: Phenol-d6	*107*		ug/L	*150.0*		*72*	*15-110*			
Surrogate: p-Terphenyl-d14	*81.9*		ug/L	*100.0*		*82*	*30-130*			
LCS										
1,2,4-Trichlorobenzene	81.1	10.0	ug/L	100.0		81	40-140			

CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270C Semi-Volatile Organic Compounds										
Batch CL41611 - 3520C										
1,2-Dichlorobenzene	76.4	10.0	ug/L	100.0		76	40-140			
1,3-Dichlorobenzene	75.2	10.0	ug/L	100.0		75	40-140			
1,4-Dichlorobenzene	74.3	10.0	ug/L	100.0		74	40-140			
2,4,5-Trichlorophenol	96.1	10.0	ug/L	100.0		96	30-130			
2,4,6-Trichlorophenol	97.8	10.0	ug/L	100.0		98	30-130			
2,4-Dichlorophenol	92.4	10.0	ug/L	100.0		92	30-130			
2,4-Dimethylphenol	78.5	50.0	ug/L	100.0		79	30-130			
2,4-Dinitrophenol	76.1	50.0	ug/L	100.0		76	30-130			
2,4-Dinitrotoluene	79.5	10.0	ug/L	100.0		80	40-140			
2,6-Dinitrotoluene	83.4	10.0	ug/L	100.0		83	40-140			
2-Chloronaphthalene	64.1	10.0	ug/L	100.0		64	40-140			
2-Chlorophenol	76.4	10.0	ug/L	100.0		76	30-130			
2-Methylphenol	75.8	10.0	ug/L	100.0		76	30-130			
2-Nitrophenol	92.1	10.0	ug/L	100.0		92	30-130			
3,3´-Dichlorobenzidine	80.2	20.0	ug/L	100.0		80	40-140			
3+4-Methylphenol	152	20.0	ug/L	200.0		76	30-130			
4-Bromophenyl-phenylether	72.8	10.0	ug/L	100.0		73	40-140			
4-Chloroaniline	66.8	20.0	ug/L	100.0		67	40-140			
4-Nitrophenol	69.9	50.0	ug/L	100.0		70	30-130			
Acetophenone	71.5	10.0	ug/L	100.0		72	40-140			
Aniline	58.6	10.0	ug/L	100.0		59	40-140			
Azobenzene	66.4	20.0	ug/L	100.0		66	40-140			
bis(2-Chloroethoxy)methane	67.4	10.0	ug/L	100.0		67	40-140			
bis(2-Chloroethyl)ether	64.1	10.0	ug/L	100.0		64	40-140			
bis(2-chloroisopropyl)Ether	70.7	10.0	ug/L	100.0		71	40-140			
bis(2-Ethylhexyl)phthalate	97.6	6.0	ug/L	100.0		98	40-140			
Butylbenzylphthalate	87.1	10.0	ug/L	100.0		87	40-140			
Dibenzofuran	77.8	10.0	ug/L	100.0		78	40-140			
Diethylphthalate	76.0	10.0	ug/L	100.0		76	40-140			
Dimethylphthalate	76.6	10.0	ug/L	100.0		77	40-140			
Di-n-butylphthalate	80.4	10.0	ug/L	100.0		80	40-140			
Di-n-octylphthalate	93.8	10.0	ug/L	100.0		94	40-140			
Hexachlorobutadiene	76.8	10.0	ug/L	100.0		77	40-140			
Hexachloroethane	68.2	5.0	ug/L	100.0		68	40-140			
Isophorone	64.2	10.0	ug/L	100.0		64	40-140			
Nitrobenzene	65.7	10.0	ug/L	100.0		66	40-140			
N-Nitrosodimethylamine	85.2	10.0	ug/L	100.0		85	40-140			
Phenol	69.7	10.0	ug/L	100.0		70	30-130			
Surrogate: 1,2-Dichlorobenzene-d4	*73.6*		ug/L	*100.0*		*74*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*121*		ug/L	*150.0*		*80*	*15-110*			
Surrogate: 2-Chlorophenol-d4	*117*		ug/L	*150.0*		*78*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*79.0*		ug/L	*100.0*		*79*	*30-130*			
Surrogate: 2-Fluorophenol	*104*		ug/L	*150.0*		*69*	*15-110*			
Surrogate: Nitrobenzene-d5	*75.5*		ug/L	*100.0*		*76*	*30-130*			
Surrogate: Phenol-d6	*110*		ug/L	*150.0*		*73*	*15-110*			
Surrogate: p-Terphenyl-d14	*85.6*		ug/L	*100.0*		*86*	*30-130*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270C Semi-Volatile Organic Compounds										
Batch CL41611 - 3520C										
LCS Dup										
1,2,4-Trichlorobenzene	81.4	10.0	ug/L	100.0		81	40-140	0.5	20	
1,2-Dichlorobenzene	79.1	10.0	ug/L	100.0		79	40-140	3	20	
1,3-Dichlorobenzene	79.0	10.0	ug/L	100.0		79	40-140	5	20	
1,4-Dichlorobenzene	77.0	10.0	ug/L	100.0		77	40-140	4	20	
2,4,5-Trichlorophenol	95.5	10.0	ug/L	100.0		96	30-130	0.5	20	
2,4,6-Trichlorophenol	99.4	10.0	ug/L	100.0		99	30-130	2	20	
2,4-Dichlorophenol	91.6	10.0	ug/L	100.0		92	30-130	0.8	20	
2,4-Dimethylphenol	81.2	50.0	ug/L	100.0		81	30-130	3	20	
2,4-Dinitrophenol	83.8	50.0	ug/L	100.0		84	30-130	10	20	
2,4-Dinitrotoluene	80.4	10.0	ug/L	100.0		80	40-140	1	20	
2,6-Dinitrotoluene	81.8	10.0	ug/L	100.0		82	40-140	2	20	
2-Chloronaphthalene	55.3	10.0	ug/L	100.0		55	40-140	15	20	
2-Chlorophenol	79.2	10.0	ug/L	100.0		79	30-130	4	20	
2-Methylphenol	79.8	10.0	ug/L	100.0		80	30-130	5	20	
2-Nitrophenol	90.8	10.0	ug/L	100.0		91	30-130	1	20	
3,3´-Dichlorobenzidine	81.4	20.0	ug/L	100.0		81	40-140	1	20	
3+4-Methylphenol	156	20.0	ug/L	200.0		78	30-130	3	20	
4-Bromophenyl-phenylether	73.2	10.0	ug/L	100.0		73	40-140	0.6	20	
4-Chloroaniline	64.4	20.0	ug/L	100.0		64	40-140	4	20	
4-Nitrophenol	72.1	50.0	ug/L	100.0		72	30-130	3	20	
Acetophenone	76.1	10.0	ug/L	100.0		76	40-140	6	20	
Aniline	59.9	10.0	ug/L	100.0		60	40-140	2	20	
Azobenzene	70.4	20.0	ug/L	100.0		70	40-140	6	20	
bis(2-Chloroethoxy)methane	69.7	10.0	ug/L	100.0		70	40-140	3	20	
bis(2-Chloroethyl)ether	66.9	10.0	ug/L	100.0		67	40-140	4	20	
bis(2-chloroisopropyl)Ether	74.8	10.0	ug/L	100.0		75	40-140	6	20	
bis(2-Ethylhexyl)phthalate	89.8	6.0	ug/L	100.0		90	40-140	8	20	
Butylbenzylphthalate	88.8	10.0	ug/L	100.0		89	40-140	2	20	
Dibenzofuran	79.8	10.0	ug/L	100.0		80	40-140	3	20	
Diethylphthalate	77.6	10.0	ug/L	100.0		78	40-140	2	20	
Dimethylphthalate	79.9	10.0	ug/L	100.0		80	40-140	4	20	
Di-n-butylphthalate	81.2	10.0	ug/L	100.0		81	40-140	1	20	
Di-n-octylphthalate	95.1	10.0	ug/L	100.0		95	40-140	1	20	
Hexachlorobutadiene	75.6	10.0	ug/L	100.0		76	40-140	2	20	
Hexachloroethane	70.9	5.0	ug/L	100.0		71	40-140	4	20	
Isophorone	63.8	10.0	ug/L	100.0		64	40-140	0.6	20	
Nitrobenzene	66.5	10.0	ug/L	100.0		67	40-140	1	20	
N-Nitrosodimethylamine	115	10.0	ug/L	100.0		115	40-140	30	20	D+
Phenol	71.1	10.0	ug/L	100.0		71	30-130	2	20	
Surrogate: 1,2-Dichlorobenzene-d4	*76.2*		ug/L	*100.0*		*76*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*125*		ug/L	*150.0*		*84*	*15-110*			
Surrogate: 2-Chlorophenol-d4	*120*		ug/L	*150.0*		*80*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*80.2*		ug/L	*100.0*		*80*	*30-130*			
Surrogate: 2-Fluorophenol	*104*		ug/L	*150.0*		*70*	*15-110*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270C Semi-Volatile Organic Compounds										
Batch CL41611 - 3520C										
Surrogate: Nitrobenzene-d5	*75.7*		ug/L	*100.0*		*76*	*30-130*			
Surrogate: Phenol-d6	*112*		ug/L	*150.0*		*75*	*15-110*			
Surrogate: p-Terphenyl-d14	*89.8*		ug/L	*100.0*		*90*	*30-130*			
8270D(SIM) Semi-Volatile Organic Compounds										
Batch CL41801 - 3510C										
Blank										
2-Methylnaphthalene	ND	0.20	ug/L							
Acenaphthene	ND	0.20	ug/L							
Acenaphthylene	ND	0.20	ug/L							
Anthracene	ND	0.20	ug/L							
Benzo(a)anthracene	ND	0.05	ug/L							
Benzo(a)pyrene	ND	0.05	ug/L							
Benzo(b)fluoranthene	ND	0.05	ug/L							
Benzo(g,h,i)perylene	ND	0.20	ug/L							
Benzo(k)fluoranthene	ND	0.05	ug/L							
Chrysene	ND	0.05	ug/L							
Dibenzo(a,h)Anthracene	ND	0.05	ug/L							
Fluoranthene	ND	0.20	ug/L							
Fluorene	ND	0.20	ug/L							
Hexachlorobenzene	ND	0.20	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	0.05	ug/L							
Naphthalene	ND	0.20	ug/L							
Pentachlorophenol	ND	0.90	ug/L							
Phenanthrene	ND	0.20	ug/L							
Pyrene	ND	0.20	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	*0.818*		ug/L	*2.500*		*33*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.41*		ug/L	*3.750*		*91*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.42*		ug/L	*2.500*		*57*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.39*		ug/L	*2.500*		*56*	*30-130*			
Surrogate: p-Terphenyl-d14	*1.94*		ug/L	*2.500*		*78*	*30-130*			
LCS										
2-Methylnaphthalene	2.00	0.40	ug/L	4.000		50	40-140			
Acenaphthene	3.03	0.40	ug/L	4.000		76	40-140			
Acenaphthylene	2.92	0.40	ug/L	4.000		73	40-140			
Anthracene	3.16	0.40	ug/L	4.000		79	40-140			
Benzo(a)anthracene	3.01	0.10	ug/L	4.000		75	40-140			
Benzo(a)pyrene	3.20	0.10	ug/L	4.000		80	40-140			
Benzo(b)fluoranthene	3.08	0.10	ug/L	4.000		77	40-140			
Benzo(g,h,i)perylene	3.18	0.40	ug/L	4.000		80	40-140			
Benzo(k)fluoranthene	3.26	0.10	ug/L	4.000		81	40-140			
Chrysene	3.32	0.10	ug/L	4.000		83	40-140			
Dibenzo(a,h)Anthracene	3.22	0.10	ug/L	4.000		81	40-140			
Fluoranthene	3.27	0.40	ug/L	4.000		82	40-140			

CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D(SIM) Semi-Volatile Organic Compounds										
Batch CL41801 - 3510C										
Fluorene	3.33	0.40	ug/L	4.000		83	40-140			
Hexachlorobenzene	3.64	0.40	ug/L	4.000		91	40-140			
Indeno(1,2,3-cd)Pyrene	3.18	0.10	ug/L	4.000		79	40-140			
Naphthalene	1.99	0.40	ug/L	4.000		50	40-140			
Pentachlorophenol	4.57	1.80	ug/L	4.000		114	30-130			
Phenanthrene	3.06	0.40	ug/L	4.000		77	40-140			
Pyrene	3.25	0.40	ug/L	4.000		81	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*1.19*		ug/L	*2.500*		*48*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*4.33*		ug/L	*3.750*		*116*	*15-110*			*S+*
Surrogate: 2-Fluorobiphenyl	*2.07*		ug/L	*2.500*		*83*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.83*		ug/L	*2.500*		*73*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.29*		ug/L	*2.500*		*91*	*30-130*			
LCS Dup										
2-Methylnaphthalene	1.87	0.40	ug/L	4.000		47	40-140	7	20	
Acenaphthene	2.80	0.40	ug/L	4.000		70	40-140	8	20	
Acenaphthylene	2.67	0.40	ug/L	4.000		67	40-140	9	20	
Anthracene	2.96	0.40	ug/L	4.000		74	40-140	7	20	
Benzo(a)anthracene	2.81	0.10	ug/L	4.000		70	40-140	7	20	
Benzo(a)pyrene	2.99	0.10	ug/L	4.000		75	40-140	7	20	
Benzo(b)fluoranthene	3.05	0.10	ug/L	4.000		76	40-140	0.8	20	
Benzo(g,h,i)perylene	3.06	0.40	ug/L	4.000		76	40-140	4	20	
Benzo(k)fluoranthene	2.90	0.10	ug/L	4.000		72	40-140	12	20	
Chrysene	3.11	0.10	ug/L	4.000		78	40-140	7	20	
Dibenzo(a,h)Anthracene	3.08	0.10	ug/L	4.000		77	40-140	4	20	
Fluoranthene	3.08	0.40	ug/L	4.000		77	40-140	6	20	
Fluorene	3.09	0.40	ug/L	4.000		77	40-140	7	20	
Hexachlorobenzene	3.16	0.40	ug/L	4.000		79	40-140	14	20	
Indeno(1,2,3-cd)Pyrene	3.07	0.10	ug/L	4.000		77	40-140	4	20	
Naphthalene	1.87	0.40	ug/L	4.000		47	40-140	6	20	
Pentachlorophenol	4.04	1.80	ug/L	4.000		101	30-130	12	20	
Phenanthrene	2.89	0.40	ug/L	4.000		72	40-140	6	20	
Pyrene	3.01	0.40	ug/L	4.000		75	40-140	8	20	
Surrogate: 1,2-Dichlorobenzene-d4	*1.16*		ug/L	*2.500*		*46*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.58*		ug/L	*3.750*		*95*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.87*		ug/L	*2.500*		*75*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.69*		ug/L	*2.500*		*67*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.05*		ug/L	*2.500*		*82*	*30-130*			
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CL41521 - 3510C										
Blank										
C19-C36 Aliphatics1	ND	100	ug/L							
C9-C18 Aliphatics1	ND	100	ug/L							
Decane (C10)	ND	5	ug/L							
Docosane (C22)	ND	5	ug/L							

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Client Name: PEER Consultants, P.C.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CL41521 - 3510C										
Dodecane (C12)	ND	5	ug/L							
Eicosane (C20)	ND	5	ug/L							
Hexacosane (C26)	ND	5	ug/L							
Hexadecane (C16)	ND	5	ug/L							
Hexatriacontane (C36)	ND	5	ug/L							
Nonadecane (C19)	ND	5	ug/L							
Nonane (C9)	ND	5	ug/L							
Octacosane (C28)	ND	5	ug/L							
Octadecane (C18)	ND	5	ug/L							
Tetracosane (C24)	ND	5	ug/L							
Tetradecane (C14)	ND	5	ug/L							
Triacontane (C30)	ND	5	ug/L							
Surrogate: 1-Chlorooctadecane	*37.6*		ug/L	*50.00*		*75*	*40-140*			
Blank										
C11-C22 Unadjusted Aromatics1	ND	100	ug/L							
Surrogate: 2-Bromonaphthalene	*56.5*		ug/L	*50.00*		*113*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*56.6*		ug/L	*50.00*		*113*	*40-140*			
Surrogate: O-Terphenyl	*31.3*		ug/L	*50.00*		*63*	*40-140*			
Blank										
2-Methylnaphthalene	ND	0.50	ug/L							
Acenaphthene	ND	0.20	ug/L							
Acenaphthylene	ND	0.20	ug/L							
Anthracene	ND	0.20	ug/L							
Benzo(a)anthracene	ND	0.20	ug/L							
Benzo(a)pyrene	ND	0.10	ug/L							
Benzo(b)fluoranthene	ND	0.20	ug/L							
Benzo(g,h,i)perylene	ND	0.20	ug/L							
Benzo(k)fluoranthene	ND	0.20	ug/L							
Chrysene	ND	0.20	ug/L							
Dibenzo(a,h)Anthracene	ND	0.20	ug/L							
Fluoranthene	ND	0.20	ug/L							
Fluorene	ND	0.20	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	0.20	ug/L							
Naphthalene	ND	0.50	ug/L							
Phenanthrene	ND	0.50	ug/L							
Pyrene	ND	0.20	ug/L							
LCS										
C19-C36 Aliphatics1	380	100	ug/L	400.0		95	40-140			
C9-C18 Aliphatics1	242	100	ug/L	300.0		81	40-140			
Decane (C10)	28	5	ug/L	50.00		57	40-140			
Docosane (C22)	48	5	ug/L	50.00		97	40-140			
Dodecane (C12)	32	5	ug/L	50.00		64	40-140			
Eicosane (C20)	48	5	ug/L	50.00		96	40-140			
Hexacosane (C26)	50	5	ug/L	50.00		99	40-140			

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CL41521 - 3510C										
Hexadecane (C16)	43	5	ug/L	50.00		86	40-140			
Hexatriacontane (C36)	50	5	ug/L	50.00		100	40-140			
Nonadecane (C19)	48	5	ug/L	50.00		95	40-140			
Nonane (C9)	22	5	ug/L	50.00		44	30-140			
Octacosane (C28)	49	5	ug/L	50.00		99	40-140			
Octadecane (C18)	47	5	ug/L	50.00		94	40-140			
Tetracosane (C24)	46	5	ug/L	50.00		93	40-140			
Tetradecane (C14)	37	5	ug/L	50.00		75	40-140			
Triacontane (C30)	50	5	ug/L	50.00		100	40-140			
Surrogate: 1-Chlorooctadecane	*37.6*		ug/L	*50.00*		*75*	*40-140*			
LCS										
C11-C22 Unadjusted Aromatics1	810	100	ug/L	850.0		95	40-140			
Surrogate: 2-Bromonaphthalene	*64.4*		ug/L	*50.00*		*129*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*59.9*		ug/L	*50.00*		*120*	*40-140*			
Surrogate: O-Terphenyl	*36.5*		ug/L	*50.00*		*73*	*40-140*			
LCS										
2-Methylnaphthalene Breakthrough	0.0		%				0-5			
Naphthalene Breakthrough	0.0		%				0-5			
LCS										
2-Methylnaphthalene	3.03	0.50	ug/L	5.000		61	40-140			
Acenaphthene	4.15	0.20	ug/L	5.000		83	40-140			
Acenaphthylene	4.23	0.20	ug/L	5.000		85	40-140			
Anthracene	4.28	0.20	ug/L	5.000		86	40-140			
Benzo(a)anthracene	4.33	0.20	ug/L	5.000		87	40-140			
Benzo(a)pyrene	4.49	0.10	ug/L	5.000		90	40-140			
Benzo(b)fluoranthene	4.58	0.20	ug/L	5.000		92	40-140			
Benzo(g,h,i)perylene	4.74	0.20	ug/L	5.000		95	40-140			
Benzo(k)fluoranthene	4.59	0.20	ug/L	5.000		92	40-140			
Chrysene	4.84	0.20	ug/L	5.000		97	40-140			
Dibenzo(a,h)Anthracene	4.75	0.20	ug/L	5.000		95	40-140			
Fluoranthene	4.53	0.20	ug/L	5.000		91	40-140			
Fluorene	4.43	0.20	ug/L	5.000		89	40-140			
Indeno(1,2,3-cd)Pyrene	4.79	0.20	ug/L	5.000		96	40-140			
Naphthalene	3.18	0.50	ug/L	5.000		64	40-140			
Phenanthrene	4.32	0.50	ug/L	5.000		86	40-140			
Pyrene	4.64	0.20	ug/L	5.000		93	40-140			
LCS Dup										**D+**
C19-C36 Aliphatics1	303	100	ug/L	400.0		76	40-140	22	25	
C9-C18 Aliphatics1	149	100	ug/L	300.0		50	40-140	48	25	
Decane (C10)	16	5	ug/L	50.00		31	40-140	58	25	B-
Docosane (C22)	38	5	ug/L	50.00		75	40-140	25	25	
Dodecane (C12)	19	5	ug/L	50.00		38	40-140	52	25	B-
Eicosane (C20)	35	5	ug/L	50.00		70	40-140	31	25	
Hexacosane (C26)	42	5	ug/L	50.00		84	40-140	16	25	

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CL41521 - 3510C										
Hexadecane (C16)	28	5	ug/L	50.00		57	40-140	42	25	
Hexatriacontane (C36)	46	5	ug/L	50.00		92	40-140	8	25	
Nonadecane (C19)	34	5	ug/L	50.00		68	40-140	34	25	
Nonane (C9)	12	5	ug/L	50.00		24	30-140	60	25	B-
Octacosane (C28)	43	5	ug/L	50.00		86	40-140	14	25	
Octadecane (C18)	32	5	ug/L	50.00		65	40-140	36	25	
Tetracosane (C24)	38	5	ug/L	50.00		76	40-140	20	25	
Tetradecane (C14)	24	5	ug/L	50.00		47	40-140	46	25	
Triacontane (C30)	45	5	ug/L	50.00		89	40-140	12	25	
Surrogate: 1-Chlorooctadecane	*27.6*		ug/L	*50.00*		*55*	*40-140*			
LCS Dup										
C11-C22 Unadjusted Aromatics1	824	100	ug/L	850.0		97	40-140	2	25	
Surrogate: 2-Bromonaphthalene	*59.4*		ug/L	*50.00*		*119*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*59.0*		ug/L	*50.00*		*118*	*40-140*			
Surrogate: O-Terphenyl	*34.7*		ug/L	*50.00*		*69*	*40-140*			
LCS Dup										
2-Methylnaphthalene Breakthrough	0.0		%				0-5		200	
Naphthalene Breakthrough	0.0		%				0-5		200	
LCS Dup										
2-Methylnaphthalene	2.76	0.50	ug/L	5.000		55	40-140	9	25	
Acenaphthene	3.78	0.20	ug/L	5.000		76	40-140	9	25	
Acenaphthylene	3.85	0.20	ug/L	5.000		77	40-140	9	25	
Anthracene	3.99	0.20	ug/L	5.000		80	40-140	7	25	
Benzo(a)anthracene	4.06	0.20	ug/L	5.000		81	40-140	6	25	
Benzo(a)pyrene	4.26	0.10	ug/L	5.000		85	40-140	5	25	
Benzo(b)fluoranthene	4.37	0.20	ug/L	5.000		87	40-140	5	25	
Benzo(g,h,i)perylene	4.42	0.20	ug/L	5.000		88	40-140	7	25	
Benzo(k)fluoranthene	4.39	0.20	ug/L	5.000		88	40-140	4	25	
Chrysene	4.50	0.20	ug/L	5.000		90	40-140	7	25	
Dibenzo(a,h)Anthracene	4.49	0.20	ug/L	5.000		90	40-140	6	25	
Fluoranthene	4.31	0.20	ug/L	5.000		86	40-140	5	25	
Fluorene	3.99	0.20	ug/L	5.000		80	40-140	11	25	
Indeno(1,2,3-cd)Pyrene	4.51	0.20	ug/L	5.000		90	40-140	6	25	
Naphthalene	3.02	0.50	ug/L	5.000		60	40-140	5	25	
Phenanthrene	3.97	0.50	ug/L	5.000		79	40-140	8	25	
Pyrene	4.27	0.20	ug/L	5.000		85	40-140	8	25	
Batch CL41822 - 3510C										
Blank										
C19-C36 Aliphatics1	ND	100	ug/L							
C9-C18 Aliphatics1	ND	100	ug/L							
Decane (C10)	ND	5	ug/L							
Docosane (C22)	ND	5	ug/L							
Dodecane (C12)	ND	5	ug/L							

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CL41822 - 3510C										
Eicosane (C20)	ND	5	ug/L							
Hexacosane (C26)	ND	5	ug/L							
Hexadecane (C16)	ND	5	ug/L							
Hexatriacontane (C36)	ND	5	ug/L							
Nonadecane (C19)	ND	5	ug/L							
Nonane (C9)	ND	5	ug/L							
Octacosane (C28)	ND	5	ug/L							
Octadecane (C18)	ND	5	ug/L							
Tetracosane (C24)	ND	5	ug/L							
Tetradecane (C14)	ND	5	ug/L							
Triacontane (C30)	ND	5	ug/L							
Surrogate: 1-Chlorooctadecane	*33.0*		ug/L	*50.00*		*66*	*40-140*			
Blank										
C11-C22 Unadjusted Aromatics1	ND	100	ug/L							
Surrogate: 2-Bromonaphthalene	*34.2*		ug/L	*50.00*		*68*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*43.0*		ug/L	*50.00*		*86*	*40-140*			
Surrogate: O-Terphenyl	*34.4*		ug/L	*50.00*		*69*	*40-140*			
Blank										
2-Methylnaphthalene	ND	0.50	ug/L							
Acenaphthene	ND	0.20	ug/L							
Acenaphthylene	ND	0.20	ug/L							
Anthracene	ND	0.20	ug/L							
Benzo(a)anthracene	ND	0.20	ug/L							
Benzo(a)pyrene	ND	0.10	ug/L							
Benzo(b)fluoranthene	ND	0.20	ug/L							
Benzo(g,h,i)perylene	ND	0.20	ug/L							
Benzo(k)fluoranthene	ND	0.20	ug/L							
Chrysene	ND	0.20	ug/L							
Dibenzo(a,h)Anthracene	ND	0.20	ug/L							
Fluoranthene	ND	0.20	ug/L							
Fluorene	ND	0.20	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	0.20	ug/L							
Naphthalene	ND	0.50	ug/L							
Phenanthrene	ND	0.50	ug/L							
Pyrene	ND	0.20	ug/L							
LCS										
C19-C36 Aliphatics1	348	100	ug/L	400.0		87	40-140			
C9-C18 Aliphatics1	224	100	ug/L	300.0		75	40-140			
Decane (C10)	27	5	ug/L	50.00		54	40-140			
Docosane (C22)	45	5	ug/L	50.00		91	40-140			
Dodecane (C12)	31	5	ug/L	50.00		62	40-140			
Eicosane (C20)	45	5	ug/L	50.00		89	40-140			
Hexacosane (C26)	46	5	ug/L	50.00		92	40-140			
Hexadecane (C16)	41	5	ug/L	50.00		82	40-140			

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CL41822 - 3510C										
Hexatriacontane (C36)	45	5	ug/L	50.00		91	40-140			
Nonadecane (C19)	44	5	ug/L	50.00		89	40-140			
Nonane (C9)	21	5	ug/L	50.00		42	30-140			
Octacosane (C28)	46	5	ug/L	50.00		91	40-140			
Octadecane (C18)	44	5	ug/L	50.00		87	40-140			
Tetracosane (C24)	43	5	ug/L	50.00		86	40-140			
Tetradecane (C14)	37	5	ug/L	50.00		73	40-140			
Triacontane (C30)	46	5	ug/L	50.00		93	40-140			
Surrogate: 1-Chlorooctadecane	*34.5*		ug/L	*50.00*		*69*	*40-140*			
LCS										
C11-C22 Unadjusted Aromatics1	925	100	ug/L	850.0		109	40-140			
Surrogate: 2-Bromonaphthalene	*40.7*		ug/L	*50.00*		*81*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*48.0*		ug/L	*50.00*		*96*	*40-140*			
Surrogate: O-Terphenyl	*33.7*		ug/L	*50.00*		*67*	*40-140*			
LCS										
2-Methylnaphthalene	3.03	0.50	ug/L	5.000		61	40-140			
Acenaphthene	4.18	0.20	ug/L	5.000		84	40-140			
Acenaphthylene	4.22	0.20	ug/L	5.000		84	40-140			
Anthracene	4.34	0.20	ug/L	5.000		87	40-140			
Benzo(a)anthracene	4.39	0.20	ug/L	5.000		88	40-140			
Benzo(a)pyrene	4.72	0.10	ug/L	5.000		94	40-140			
Benzo(b)fluoranthene	4.62	0.20	ug/L	5.000		92	40-140			
Benzo(g,h,i)perylene	4.77	0.20	ug/L	5.000		95	40-140			
Benzo(k)fluoranthene	4.96	0.20	ug/L	5.000		99	40-140			
Chrysene	5.02	0.20	ug/L	5.000		100	40-140			
Dibenzo(a,h)Anthracene	4.68	0.20	ug/L	5.000		94	40-140			
Fluoranthene	4.62	0.20	ug/L	5.000		92	40-140			
Fluorene	4.36	0.20	ug/L	5.000		87	40-140			
Indeno(1,2,3-cd)Pyrene	4.67	0.20	ug/L	5.000		93	40-140			
Naphthalene	3.20	0.50	ug/L	5.000		64	40-140			
Phenanthrene	4.38	0.50	ug/L	5.000		88	40-140			
Pyrene	4.88	0.20	ug/L	5.000		98	40-140			
LCS Dup										
C19-C36 Aliphatics1	356	100	ug/L	400.0		89	40-140	2	25	
C9-C18 Aliphatics1	216	100	ug/L	300.0		72	40-140	3	25	
Decane (C10)	25	5	ug/L	50.00		50	40-140	7	25	
Docosane (C22)	47	5	ug/L	50.00		93	40-140	3	25	
Dodecane (C12)	29	5	ug/L	50.00		58	40-140	7	25	
Eicosane (C20)	46	5	ug/L	50.00		92	40-140	3	25	
Hexacosane (C26)	48	5	ug/L	50.00		95	40-140	3	25	
Hexadecane (C16)	42	5	ug/L	50.00		85	40-140	3	25	
Hexatriacontane (C36)	46	5	ug/L	50.00		93	40-140	3	25	
Nonadecane (C19)	46	5	ug/L	50.00		92	40-140	3	25	
Nonane (C9)	19	5	ug/L	50.00		39	30-140	6	25	

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-EPH Extractable Petroleum Hydrocarbons										
Batch CL41822 - 3510C										
Octacosane (C28)	47	5	ug/L	50.00		94	40-140	3	25	
Octadecane (C18)	45	5	ug/L	50.00		90	40-140	3	25	
Tetracosane (C24)	45	5	ug/L	50.00		89	40-140	3	25	
Tetradecane (C14)	36	5	ug/L	50.00		73	40-140	0.9	25	
Triacontane (C30)	48	5	ug/L	50.00		96	40-140	3	25	
Surrogate: 1-Chlorooctadecane	*34.1*		ug/L	*50.00*		*68*	*40-140*			
LCS Dup										
C11-C22 Unadjusted Aromatics1	827	100	ug/L	850.0		97	40-140	11	25	
Surrogate: 2-Bromonaphthalene	*43.1*		ug/L	*50.00*		*86*	*40-140*			
Surrogate: 2-Fluorobiphenyl	*47.4*		ug/L	*50.00*		*95*	*40-140*			
Surrogate: O-Terphenyl	*33.4*		ug/L	*50.00*		*67*	*40-140*			
LCS Dup										
2-Methylnaphthalene	2.91	0.50	ug/L	5.000		58	40-140	4	25	
Acenaphthene	3.96	0.20	ug/L	5.000		79	40-140	5	25	
Acenaphthylene	4.05	0.20	ug/L	5.000		81	40-140	4	25	
Anthracene	4.07	0.20	ug/L	5.000		81	40-140	7	25	
Benzo(a)anthracene	3.99	0.20	ug/L	5.000		80	40-140	10	25	
Benzo(a)pyrene	4.41	0.10	ug/L	5.000		88	40-140	7	25	
Benzo(b)fluoranthene	4.15	0.20	ug/L	5.000		83	40-140	11	25	
Benzo(g,h,i)perylene	4.43	0.20	ug/L	5.000		89	40-140	7	25	
Benzo(k)fluoranthene	4.76	0.20	ug/L	5.000		95	40-140	4	25	
Chrysene	4.67	0.20	ug/L	5.000		93	40-140	7	25	
Dibenzo(a,h)Anthracene	4.36	0.20	ug/L	5.000		87	40-140	7	25	
Fluoranthene	4.27	0.20	ug/L	5.000		85	40-140	8	25	
Fluorene	4.16	0.20	ug/L	5.000		83	40-140	5	25	
Indeno(1,2,3-cd)Pyrene	4.39	0.20	ug/L	5.000		88	40-140	6	25	
Naphthalene	2.98	0.50	ug/L	5.000		60	40-140	7	25	
Phenanthrene	4.06	0.50	ug/L	5.000		81	40-140	7	25	
Pyrene	4.38	0.20	ug/L	5.000		88	40-140	11	25	
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CL41743 - 5030B										
Blank										
1,2,4-Trimethylbenzene	ND	5.0	ug/L							
2,2,4-Trimethylpentane	ND	5.0	ug/L							
2-Methylpentane	ND	5.0	ug/L							
Benzene	ND	1.5	ug/L							
C5-C8 Unadjusted Aliphatics	ND	150	ug/L							
C9-C10 Aromatics	ND	100	ug/L							
C9-C12 Unadjusted Aliphatics	ND	150	ug/L							
Ethylbenzene	ND	5.0	ug/L							
Methyl tert-Butyl Ether	ND	1.5	ug/L							
Naphthalene	ND	5.0	ug/L							
n-Butylcyclohexane	46.7	5.0	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CL41743 - 5030B										
n-Decane	38.6	5.0	ug/L							
Nonane (C9)	45.5	5.0	ug/L							
Pentane	ND	5.0	ug/L							
Toluene	ND	5.0	ug/L							
Xylene O	ND	5.0	ug/L							
Xylene P,M	ND	10.0	ug/L							
Surrogate: 2,5-Dibromotoluene - FID	*46.6*		ug/L	*50.00*		*93*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*49.1*		ug/L	*50.00*		*98*	*70-130*			
LCS										
1,2,4-Trimethylbenzene	98.5		ug/L	100.0		98	70-130			
2,2,4-Trimethylpentane	129		ug/L	150.0		86	70-130			
2-Methylpentane	151		ug/L	150.0		101	70-130			
Benzene	46.9		ug/L	50.00		94	70-130			
C5-C8 Unadjusted Aliphatics	385		ug/L	400.0		96	70-130			
C9-C10 Aromatics	96.5		ug/L	100.0		97	70-130			
C9-C12 Unadjusted Aliphatics	285		ug/L	300.0		95	70-130			
Ethylbenzene	48.4		ug/L	50.00		97	70-130			
Methyl tert-Butyl Ether	150		ug/L	150.0		100	70-130			
Naphthalene	99.3		ug/L	100.0		99	70-130			
n-Butylcyclohexane	103		ug/L	100.0		103	70-130			
n-Decane	109		ug/L	100.0		109	70-130			
Nonane (C9)	102		ug/L	100.0		102	30-130			
Pentane	112		ug/L	100.0		112	70-130			
Toluene	147		ug/L	150.0		98	70-130			
Xylene O	96.9		ug/L	100.0		97	70-130			
Xylene P,M	198		ug/L	200.0		99	70-130			
Surrogate: 2,5-Dibromotoluene - FID	*55.2*		ug/L	*50.00*		*110*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*57.9*		ug/L	*50.00*		*116*	*70-130*			
LCS Dup										
1,2,4-Trimethylbenzene	97.4		ug/L	100.0		97	70-130	1	25	
2,2,4-Trimethylpentane	164		ug/L	150.0		109	70-130	24	25	
2-Methylpentane	155		ug/L	150.0		103	70-130	2	25	
Benzene	46.7		ug/L	50.00		93	70-130	0.5	25	
C5-C8 Unadjusted Aliphatics	422		ug/L	400.0		106	70-130	9	25	
C9-C10 Aromatics	96.4		ug/L	100.0		96	70-130	0.05	25	
C9-C12 Unadjusted Aliphatics	290		ug/L	300.0		97	70-130	2	25	
Ethylbenzene	48.2		ug/L	50.00		96	70-130	0.4	25	
Methyl tert-Butyl Ether	148		ug/L	150.0		99	70-130	0.9	25	
Naphthalene	103		ug/L	100.0		103	70-130	3	25	
n-Butylcyclohexane	103		ug/L	100.0		103	70-130	0.5	25	
n-Decane	111		ug/L	100.0		111	70-130	2	25	
Nonane (C9)	106		ug/L	100.0		106	30-130	4	25	
Pentane	112		ug/L	100.0		112	70-130	0.6	25	
Toluene	147		ug/L	150.0		98	70-130	0.2	25	

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
MADEP-VPH Volatile Petroleum Hydrocarbon										
Batch CL41743 - 5030B										
Xylene O	95.4		ug/L	100.0		95	70-130	2	25	
Xylene P,M	195		ug/L	200.0		98	70-130	1	25	
Surrogate: 2,5-Dibromotoluene - FID	*53.2*		ug/L	*50.00*		*106*	*70-130*			
Surrogate: 2,5-Dibromotoluene - PID	*55.9*		ug/L	*50.00*		*112*	*70-130*			

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

Notes and Definitions

Z-06	pH <= 2
U	Analyte included in the analysis, but not detected
SC	Surrogate recovery(ies) outside of criteria. Reextraction/Reanalysis confirms results (SC).
S+	Surrogate recovery(ies) above upper control limit (S+).
D+	Relative percent difference for duplicate is outside of criteria (D+).
D	Diluted.
C+	Continuing Calibration recovery is above upper control limit (C+).
B-	Blank Spike recovery is below lower control limit (B-).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report

CERTIFICATE OF ANALYSIS

Client Name: PEER Consultants, P.C.
Client Project ID: Union Square

ESS Laboratory Work Order: 1412310

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)
A2LA Accredited: Testing Cert# 2864.01
http://www.a2la.org/scopepdf/2864-01.pdf

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002
http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/documents/AllLabs.xls

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.depweb.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01
Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)
http://www.A2LA.org/dirsearchnew/newsearch.cfm

CPSC ID# 1141
Lead Paint, Lead in Children's Metals Jewelry
http://www.cpsc.gov/cgi-bin/labapplist.aspx

Sample and Cooler Receipt Checklist

Client: PEER Consultants
Client Project ID: _____
Shipped/Delivered Via: ESS Courier

ESS Project ID: 14120310
Date Project Due: 12/23/14
Days For Project: 5 Day

Items to be checked upon receipt:

1. Air Bill Manifest Present?	* No	10. Are the samples properly preserved?	Yes
Air No.:		11. Proper sample containers used?	Yes
2. Were Custody Seals Present?	No	12. Any air bubbles in the VOA vials?	No MS 12/16/14
3. Were Custody Seals Intact?	N/A	13. Holding times exceeded?	No
4. Is Radiation count < 100 CPM?	Yes	14. Sufficient sample volumes?	Yes
5. Is a cooler present?	Yes	15. Any Subcontracting needed?	No
Cooler Temp: **3.6**		16. Are ESS labels on correct containers?	**Yes|No**
Iced With: **Ice**		17. Were samples received intact?	**Yes|No**
6. Was COC included with samples?	Yes	ESS Sample IDs:	_____
7. Was COC signed and dated by client?	Yes	Sub Lab:	_____
8. Does the COC match the sample	Yes	Analysis:	_____
9. Is COC complete and correct?	Yes	TAT:	_____

18. Was there need to call project manager to discuss status? If yes, please explain.
PB-5 - diss. Metals ~~expired~~ out of hold MB 12/16/14 MB 12/16/14

Who was called?: _____ By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	1 L Glass	2	HCL
1	Yes	1 L Glass	4	NP
1	Yes	250 ml Plastic	1	~~HNO3~~ NP MB 12/16/14
1	Yes	40 ml - VOA	6	HCL
2	Yes	1 L Glass	2	HCL
2	Yes	1 L Glass	4	NP
2	Yes	250 ml Plastic	1	~~HNO3~~ NP MB 12/16/14
2	Yes	40 ml - VOA	6	HCL
3	Yes	1 L Glass	2	HCL
3	Yes	1 L Glass	4	NP
3	Yes	250 ml Plastic	1	~~HNO3~~ NP MB 12/16/14
3	Yes	40 ml - VOA	6	HCL

Completed By: _____ Date/Time: 12/16/14 0943
Reviewed By: _____ Date/Time: 12/16/14 1022

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

Page 1 of 1

Turn Time: ✓ Standard Other ____
If faster than 5 days, prior approval by laboratory is required # ____

State where samples were collected from: (MA) RI CT NH NJ NY ME Other ____

Is this project for any of the following: MA-MCP Navy USACE Other ____

Reporting Limits: GW-1

ESS LAB PROJECT ID: 1412310

Electronic Deliverable: Yes ✓ No ____
Format: Excel ✓ Access ____ PDF ✓ Other ____

Co. Name	Project #	Project Name (20 Char. or less)
PEER Consultants	5559	Union Square

Contact Person	Address
Dave Gorden	99 S. Bedford St Suite 200

City	State	Zip	PO#
Burlington	MA	01803	5559

Telephone #	Fax #	Email Address
7812388880	7812388884	gorden@peercpc.com

ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (20 Char. or less)	Pres Code	Number of Containers	Type of Containers	8260 VOA (524.2, 624)	8021 MTBE/BTEX (8015 GRO, VPH w/ranges)	8100 TPH (8015 DRO)	EPH w/o PAHs (8081 Pesticides) (EPH w/PAHs, 4 Diesel)	8082 PCB (8081 Pesticides) (608 PCB, 608 Pesticides)	8270 SVOA (625, PAH 8270)	RCRA8 (PP13, TAL23)	TCLP-RCRA8 (NBC7)	MCP-METALS (13) (MCP-METALS (13) w/Hg)
1	12-15-14	1000		✓	GW	PB5	1,2,4	13	GVP	X	X		X	X	X	X		
2	↓	1200		✓	↓	PB3	↓	↓	↓	X	X		X	X	X	X		
3	↓	1400		✓	↓	PB1	↓	↓	↓	X	X		X	X	X	X		

Container Type: P-Poly G-Glass S-Sterile V-VOA

Matrix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters

Cooler Present: X Yes ___ No

Seals Intact: ___ Yes ___ No NA: X

Cooler Temp: Tim ice 3.6°/3.4°/3.1°

Internal Use Only
[ ] Pickup 12/16/14
[ ] Technicians ____

Preservation Code: 1- NP, 2- HCl, 3- H_2SO_4, 4- HNO_3, 5- NaOH, 6- MeOH, 7- Asorbic Acid, 8- ZnAct, 9- ____

Sampled by: dave gorden (PEER)

Comments:

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
	12/15/14 1500	J Byrne	10/15/14 3:30pm	J Byrne	12/16/14 9am		12/16/14 10928
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

*By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VII A

Please fax all changes to Chain of Custody in writing.

1 (White) Lab Copy 2 (Yellow) Client Receipt

10/26/04 B

ATTACHMENT C – TRAFFIC MARKINGS – COATING SYSTEMS

STREETBONDCL COATING APPLICATION TO NON-TEXTURED ASPHALT PAVEMENT SPECIFICATION

while providing good durability. **StreetBondCL** is durable in both dry and wet environments.

B. **StreetBond Colorant** is a highly concentrated, high quality, UV stable pigment blend designed to add color to **StreetBondCL**. One unit of Colorant shall be used with one pail of **StreetBondCL** coating material.

2.1.1 Properties of StreetBond coatings

The following tables outline the physical and performance properties of the **StreetBond** coatings as determined by an independent testing laboratory.

TABLE 1: Typical Physical Properties of StreetBondCL Coatings.

Characteristic	Test Specification	StreetBondCL
Solids by Volume	ASTM D-2697	**55%**
Solids by Weight	ASTM D-2369	**68.9%**
Density	ASTM D-1475	**13.34 lbs/gal (1.599 kg/l)**

TABLE 2: Typical Performance Properties of StreetBond Coatings

Characteristic	Test Specification	StreetBondCL	
Dry time (To re-coat)	ASTM D-5895 23℃; 37% RH	**35 min**	
Taber Wear Abrasion Dry H-10 wheel	ASTM D-4060 1 day cure	**0.98 g/1000 cycles**	
Taber Wear Abrasion Wet H-10 wheel	ASTM D-4060 7 days cure	**3.4 g/1000 cycles**	
Accelerated Weathering Environment	ASTM G-155 2,000 hours (CIE Units)	**ΔE = 0.49 (brick color)**	
Hydrophobicity Water absorption	ASTM D-570	**8.3% (9 days immersion)**	
Shore hardness	ASTM D-2240	**63 Type D**	
Mandrel Bend	ASTM D522-93A	**1/4" @ 21°C**	
Permeance	ASTM D1653	**3.45 g/m²/hr (52 mils)**	
VOC	Per MSDS	**23 g/l**	
Adhesion to Asphalt	ASTM D-4541	**Substrate Failure**	
Friction Wet	ASTM E-303 British Pendulum Tester	**WP* coated**	**64**
		WP* uncoated	**57**
		AC coated**	**73**
		AC uncoated**	**60**

F07067 MADE IN CHINA

STREETBONDCL COATING APPLICATION TO NON-TEXTURED ASPHALT PAVEMENT SPECIFICATION

PART 1 – GENERAL

1.1 DESCRIPTION

A. **StreetBondCL** cycle lane coating is a highly specialized coating specifically designed for application onto asphalt pavement to demarcate cycle lanes.

B. **StreetBondCL** Advanced Coatings for Asphalt are specifically formulated for application to asphalt pavement and have been confirmed by a certified testing facility to possess a balance of performance properties for a durable and color-fast finish.

C. A variety of colors are available, including green and red. Please refer to www.streetbond.com to view these. Custom colors are available upon request as well as LEED compliant colors.

D. **StreetBondCL** cycle lane coating performance has been tested and verified by an independent recognized testing laboratory. A Certificate of Analysis confirming these test results is available through either an Accredited Applicator or directly from Quest Construction Products (800-541-4383). Please refer to the certified performance properties of **StreetBondCL** cycle lane coating outlined in Section 2 of this specification.

E. **StreetBondCL** coatings are only available from Quest Construction Products, (Tel. 800-541-4383).

F. Qualifications. Only **Accredited Applicators** may bid for and perform the imprinted portion of this work. Please refer to **Section 1.3 DEFINITIONS.**

1.2 REFERENCES

A. ASTM D-4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Tester.

B. ASTM D-4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.

C. ASTM D-2697 Standard Test Method for Volume of Nonvolatile Matter in Clear or Pigmented Coatings.

D. ASTM D522-93A Standard Test Method for Mandrel Bend Test of Attached Organic Coatings.

E. ASTM D1653 Standard test method for water vapor transmission or organic film coatings.

F. ASTM G-155 Accelerated Weathering Environment Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials.

G. ASTM D 2369 Weight Solids Standard test method for Volatile Content of Coatings.

H. ASTM D 1475 Standard Test method for Density of Paint, Varnish, Lacquer, Other related products.

STREETBONDCL COATING APPLICATION TO NON-TEXTURED ASPHALT PAVEMENT SPECIFICATION

I. ASTM D-2240 (2000) Standard Test Method for Rubber property – Durometer hardness.
J. ASTM D-5895 Standard Test Method of drying or curing during film formation of organic coatings using mechanical recorders.
K. ASTM D-570 Standard Test Method for water absorption of plastics.

1.3 DEFINITIONS

A. **"Accredited Applicator"** has a valid Accreditation Certificate as offered by Quest Construction Products. (Tel. 800-541-4383). **StreetBond** applicators are reviewed on an annual basis. All **Accredited Applicators** have been qualified by Quest Construction Products to perform the Work.
B. **"Applicator"** means the installer of the **StreetBond** coatings.
C. **"Owner"** means the Owner and refers to the representative person who has decision making authority for the Work.
D. **"Textured asphalt pavement"** is asphalt pavement that has been subjected to imprinting or stamping in a specific pattern.
E. **"Non-textured asphalt pavement"** is asphalt pavement that is unstamped and is sometimes referred to as "flatwork".
F. **The "Work"** is the asphalt pavement texturing work contemplated in this bid submission and specification.
G. **"Scuffing"** is a "tear" of the asphalt pavement caused by an external force. Stationary vehicle tires turning on the pavement surface is a typical cause.
H. **"Layer"** is a pass, using the RSG spray gun, that is allowed to dry before the next pass is applied.

1.4 SUBMITTALS

A copy of the Accreditation Certificate, available from the **Applicator,** is required with submittal.

PART 2 – PRODUCTS

2.1 MATERIALS – STREETBONDCL COATING

StreetBondCL coating has been scientifically formulated to provide the optimal balance of performance properties for a durable, long lasting color and texture finish to asphalt pavement surfaces. Some of these key properties include wear and crack resistance, color retention, adhesion, minimal water absorption and increased friction properties. **StreetBond** coatings are environmentally safe and meet EPA requirements for Volatile Organic Compounds (VOC).

A. **StreetBondCL** is a premium epoxy modified, acrylic, waterborne coating specifically designed for application on asphalt pavements. It has a balance of properties to ensure good adhesion and movement on flexible pavement,

STREETBONDCL COATING APPLICATION TO NON-TEXTURED ASPHALT PAVEMENT SPECIFICATION

*WP – test conducted on asphalt pavement in wheel path
**AC – test conducted on asphalt pavement adjacent to curb.

Certificates of Analysis are available upon request for each of these properties.

2.2 EQUIPMENT FOR STREETBOND APPLICATION

The equipment described has been designed specifically for optimal application of StreetBond coatings. Other equipment may or may not be suitable and could compromise the performance of the StreetBond coatings and/or reduce crew productivity.

A. The **Rapid Sprayer II** is a proprietary coating sprayer supplied by Integrated Paving Concepts Inc. and is capable of applying the **StreetBond** coatings to the asphalt pavement surface in a thin, controlled film which will optimize the drying and curing time of the coating.

B. The **StreetBond Coatings Mixer** is a motorized mixing device designed to ensure efficient and thorough blending of the **StreetBond** components.

C. The **Rapid Finisher II** is an electric powered broom supplied by Integrated Paving Concepts Inc. that can be used in the application of **StreetBond** coatings to improve productivity. It is especially useful on larger projects.

PART 3 - EXECUTION

3.1 GENERAL

StreetBond coating shall be supplied and applied on non-textured asphalt surface by an **Accredited Applicator** in accordance with the plans and specifications or as directed by the Owner. Do not begin installation without confirmation of an Accreditation Certificate.

3.2 PRE-CONDITIONS

The condition of the asphalt substrate will impact the performance of the **StreetBond** coatings. A highly stable asphalt pavement free of defects is recommended.

3.2.1 Pre-requisites for new asphalt pavement

A durable and stable asphalt pavement mix design installed according to best practices over a properly prepared and stable substrate is a pre-requisite for all long-lasting asphalt pavement surfaces. The application of **StreetBond** does not change this requirement.

STREETBONDCL COATING APPLICATION TO NON-TEXTURED ASPHALT PAVEMENT SPECIFICATION

3.2.3 Pavement Marking Removal: recommended guidelines

Pavement markings may be removed by sandblasting, water-blasting, grinding, or other approved mechanical methods. The removal methods should, to the fullest extent possible, cause no significant damage to the pavement surface.
The Owner shall determine if the removal of the markings is satisfactory for the application of **StreetBond** coatings. Work shall not proceed until this approval is granted.

3.2.4 Surface Preparation

The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.

3.3 APPLICATION OF STREETBOND COATINGS

3.3.1 StreetBond Coating System Options

The selection of the appropriate **StreetBond** coating or system of coatings and the required number of layers of each is dependent upon the application as outlined here in **TABLE 3**.

TABLE 3: COATING SYSTEM OPTIONS

	Stamped Asphalt surface Scuff** concern	Stamped Asphalt surface No Scuff** concern	Non Stamped / Textured*** Asphalt surface
No Vehicle Traffic ▪ Pedestrian ▪ Cycle paths ▪ Sidewalks ▪ Plazas	N/A	3 layers StreetBond150	
Very Low Vehicle Traffic ▪ Residential	1 layer StreetBond150 over 2 layers StreetBond CemBase		3 layers StreetBond150
Low / Medium Vehicle Traffic ▪ Parking lots ▪ Low traffic crosswalks ▪ Low traffic entries ▪ Level Medians ▪ Cycle paths in traffic	2 layers StreetBond150 over 2 layers StreetBond CemBase		4 layers StreetBond150

Notes:

1. The **Applicator** can make the final determination of the coating system option to be used for the project.

STREETBONDCL COATING APPLICATION TO NON-TEXTURED ASPHALT PAVEMENT SPECIFICATION

2. Additional layers of **StreetBondCL** may be used to provide additional build thickness in high wear areas such as wheel paths and vehicle turning areas.
3. A maintenance program may be required for applications exposed to:
   - scuffing
   - abrasive materials (such as salt and sand)
   - abrasive equipment (such as snow removal equipment)

3.3.2 Coating Application Guidelines

A. The **Applicator** shall use the **Rapid Sprayer II** to apply the **StreetBond** coatings.

B. The asphalt pavement surface shall be completely dry and thoroughly cleaned prior to application of the coatings.

C. The coating application shall proceed as soon as practical upon completion of the imprinting of the asphalt pavement where applicable.

D. The first layer of coating shall be spray applied then broomed to work the coating material into the pavement surface. Subsequent applications shall be sprayed then broomed or rolled. Each application of coating material shall be allowed to dry to the touch before applying the next layer.

E. The **Applicator** shall apply the **StreetBond** coatings only when the air temperature is 50℉ / (10℃) and rising and will no t drop below 50℉ / (10℃) within 24 hours. No precipitation should be expected within 24 hours.

3.4 COATING COVERAGE & THICKNESS

Recommended coating coverage and thickness is as outlined in **TABLE 4** below. Actual coverage may be affected by the texture of the asphalt pavement substrate and the imprint pattern selected. There will be less coverage with the first layer and higher coverage with subsequent layers.

TABLE 4: COATING COVERAGE AND THICKNESS

	COVERAGE (approx.)		THICKNESS (approx.)			
# OF LAYERS	TEXTURED (Offset brick) SF/pail	NON-TEXTURED SF/pail	WET		DRY	
			mm	mil	mm	mil
3	200	225	0.65	25.7	0.36	14.1
4	150	175	0.87	34.3	0.48	18.9

STREETBONDCL COATING APPLICATION TO NON-TEXTURED ASPHALT PAVEMENT SPECIFICATION

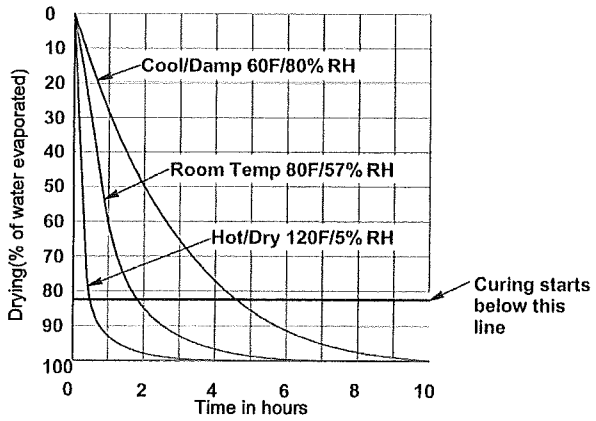
3.5 OPENING TO TRAFFIC

Minimally, the surface coating must be 100% dry before traffic is permitted. The following table is a guide:

3.6 EDGE STRIPING

Once **StreetBondCL** cycle lane coating has dried, a hot spray applied white stripe may be installed along the edge of the bike path if desired.

TABLE 5: COATING DRY TIMES (TYPICAL)



Coating Dry Time (Laboratory)

This graph shows the increase in drying time when temperatures are lower.

Environmental factors such as sunlight and wind play a major role in drying.

If StreetBond coatings are applied when moisture cannot evaporate, then the coating will not dry. The drying and curing of StreetBond coatings have a direct impact on performance.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

The measured area is the actual area of asphalt pavement where **StreetBond** has been applied, measured in place. No deduction will be made for the area(s) occupied by manholes, inlets, drainage structures, bollards or by any public utility appurtenances within the area.

4.2 PAYMENT

Payment will be full compensation for all work completed as per conditions set out in the contract. For unit price contracts, the payment shall be calculated using the measured area as determined above.

Steve Stella

From: Alicia Climer
Sent: Friday, June 27, 2014 8:11 AM
To: Steve Stella
Subject: FW: request for specs
Attachments: Bike Lane coating Specifcation.pdf

From: John McNulty [mailto:john@mcnultyconstruction.com]
Sent: Thursday, June 26, 2014 4:57 PM
To: Alicia Climer
Subject: RE: request for specs

They are changing the name back to Ride-a-way.
They are also looking to make the color standardize with the brighter green like we did on Commonwealth Avenue.
The coating is exactly the dame as we have always used.
As soon as I get the one with the different name I will send it along.

Thanks
John McNulty

From: Alicia Climer [mailto:Alicia@markingsinc.com]
Sent: Thursday, June 26, 2014 8:17 AM
To: john@mcnultyconstruction.com
Subject: request for specs

Please send green epoxy specs.

Thank you.
Steve

STREETBONDSR COATED ASPHALT SPECIFICATION
FLAT (NON STAMPED) SURFACE

PART 1 – GENERAL

1.1 DESCRIPTION

A. **StreetBond** Advanced Coatings for Asphalt are specifically formulated for application to asphalt pavement and have been confirmed by a certified testing facility to possess a balance of performance properties for a durable and color-fast finish.

B. Certain colors of the **StreetBond** coatings have been independently verified to have an SRI greater than 29 and therefore can help projects qualify for points in the LEED program under Heat Island Effect: Non-Roof. Please refer to www.quest-cp.com for further information.

C. **StreetBondSR** is created when **StreetBond150** are mixed use one of the colorant with SRI greater than 29.

D. Qualifications. Only **Accredited StreetBond Applicators** may bid for and perform the imprinted portion of this work. Please refer to **Section 1.3 DEFINITIONS.**

E. **StreetBond** products are manufactured in **ISO9001 / ISO14001** facilities to ensure quality products produced in legally-responsible and environmentally-conscious manner

F. **StreetBond** coatings are only available from Quest Construction Products.

1.2 REFERENCES

A. ASTM D-4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Tester.

B. ASTM D-4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.

C. ASTM D-2697 Standard Test Method for Volume of Nonvolatile Matter in Clear or Pigmented Coatings.

D. ASTM D522-93A Standard Test Method for Mandrel Bend Test of Attached Organic Coatings.

E. ASTM D1653 Standard test method for water vapor transmission through organic film coatings.

F. ASTM G-154 QUV Accelerated Weathering Environment. Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials.

G. ASTM D 2369 Weight Solids Standard test method for Volatile Content of Coatings.

H. ASTM D 1475 Standard Test method for Density of Paint, Varnish, Lacquer, Other related products.

I. ASTM D-2240 (2000) Standard Test Method for Rubber property – Durometer hardness.

J. ASTM D-5895 Standard Test Method of drying or curing during film formation of organic coatings using mechanical recorders.
K. ASTM D-570 Standard Test Method for water absorption of plastics.

1.3 DEFINITIONS

A. **"Accredited StreetBond Applicator"** has valid Certification for both Textured (stamped) and Non-Textured (flatwork) as offered by Quest Construction Products and are reviewed on an annual basis. All **Accredited StreetBond Applicators** have been qualified by Quest Construction Products to perform the Work and offer a product Warranty.
B. **"Approved Applicator"** has valid Certification for non-textured (flatwork) application **ONLY** as offered by Quest Construction Products and are reviewed on an annual basis. Product Warranties may be available to **Approved Applicators** but require approval and supervision by a Quest Construction Products Technical Sales Representative.
C. **"Applicator"** means the installer of the **StreetBond** coatings.
D. **"Owner"** means the Owner and refers to the representative person who has decision making authority for the Work.
E. "**TSR**" is a Quest Technical Sales Representative who manages the StreetBond product in a given territory.
F. **"Stamped asphalt pavement"** is asphalt pavement that has been subjected to imprinting or texturing in a specific pattern.
G. **"Non-Stamped asphalt pavement"** is asphalt pavement that is unstamped and is sometimes referred to as "flatwork".
H. **The "Work"** is the asphalt pavement texturing work contemplated in this bid submission and specification.
I. **"Scuffing"** is a "tear" of the asphalt pavement caused by an external force – for example turning the steering wheel of a stationary vehicle. Scuffing is generally the result of poorly designed or improperly installed asphalt and would most-commonly be seen on weaker residential asphalt.
J. **"Layer"** is a signal thin pass of coating, applied with a texture spray gun, which is allowed to dry before the next layer is applied.
K. **"Warranty"** is a guarantee to the property owner that StreetBond150, when properly applied will not peel, delaminate or show abnormal wear over specific period of time depending on the traffic volumes and number of layer applied. Please contact your local TSR for more details.

1.4 SUBMITTALS

A copy of the Accreditation Certificate, available from the **Applicator,** is required with submittal. Independent test results available upon request.

PART 2 – PRODUCTS

2.1 MATERIALS – STREETBOND COATINGS

StreetBond coatings have been scientifically formulated to provide the optimal balance of performance properties for a durable, long-lasting color and textured finish to asphalt pavement surfaces. Some of these key properties include wear and crack resistance, color retention, adhesion, minimal water absorption and increased friction properties. **StreetBond** coatings are environmentally safe and meet EPA requirements for Volatile Organic Compounds (VOC).

A. StreetBond150 is a premium epoxy-modified, acrylic, waterborne coating specifically designed for application on asphalt pavements. It has a balance of properties to ensure good adhesion and movement on flexible pavement, while providing good durability. **StreetBond150** is durable in both dry and wet environments.

B. StreetBond Colorant is a highly-concentrated, high quality, UV stable pigment blend designed to add color to **StreetBond150** coatings. One unit of Colorant shall be used with one pail of **StreetBond** coating material.

2.1.1 Properties of StreetBond coatings

The following tables outline the test results for physical and performance properties of the **StreetBond** coatings as determined by an independent testing laboratory.

TABLE 1: Typical Physical Properties of StreetBond Coatings.

Characteristic	Test Specification	SB150
Solids by Volume	ASTM D-2697	58.187%
Solids by Weight	ASTM D-2369	74.919%
Density	ASTM D-1475	13.8 lbs/gal (1.58 kg/l)

TABLE 2: Typical Performance Properties of StreetBond Coatings

Characteristic	Test Specification	SB150
Dry time (To re-coat)	ASTM D-5895 23°C; 37% RH	35 min
Taber Wear Abrasion Dry H-10 wheel	ASTM D-4060 1 day cure	0.760g/1000 cycles
Taber Wear Abrasion Wet H-10 wheel	ASTM D-4060 7 days cure	1.670g/1000 cycles
QUV Accelerate Weathering Environment	ASTM G-151 ΔE 1,500hrs.	0.53 (Brick Colorant)
Hydrophobicity Water Absorption	ASTM D-570	11.945%
Shore hardness	ASTM D-2240	38.3
Mandrel Bend	ASTM D522-93A	1/4" @ 21° C
Permeance	ASTM D-1653	3.45g/m²/ 24hr/mmHg (52 mils)
VOC	per MSDS	19.14%
Adhesion to Asphalt	ASTM D-4541	Substrate Failure
Friction Wet	ASTM E-303 British Pendulum Tester	Wet=77.3 Dry=81.3

Certificates of Analysis are available upon request for each of these properties.

2.2 EQUIPMENT FOR STREETBOND APPLICATION

The equipment described has been designed specifically for optimal application of StreetBond coatings. Other equipment may or may not be suitable and could compromise the performance of the StreetBond coatings and/or reduce crew productivity.

A. The **SB Flex Sprayer** is a proprietary coating sprayer supplied by Intech Equipment and is capable of applying the **StreetBond** coatings to the asphalt pavement surface in a thin, controlled film which will optimize the drying and curing time of the coating. A **Graco RTX** and **RapidSprayerII** sprayer may also be used.

B. The **StreetBond Coatings Mixer** is a motorized mixing device designed to ensure efficient and thorough blending of the **StreetBond** components.

C. **Backpack or Hand-Held sprayer** to apply the diluted **StreetBond Adhesion Promoter Concentrate.**

D. The **RapidFinisher II** is an electric powered broom produced by Integrated Paving Concepts Inc. that can be used in the application of **StreetBond** coatings to improve productivity. It is especially useful on larger projects.

PART 3 - EXECUTION

3.1 GENERAL

StreetBond coating shall be supplied and applied on non-textured asphalt surface by an **Accredited StreetBond Applicator** in accordance with the plans and specifications or as directed by the Owner. Do not begin installation without confirmation of an Accreditation Certificate. Specifications for the execution of the **StreetPrint®** system can be found at www.quest-cp.com.

3.2 PRE-CONDITIONS

The condition of the asphalt substrate will impact the performance of the **StreetBond** coatings. A highly stable asphalt pavement free of defects is recommended.

3.2.1 Pre-requisites for new asphalt pavement

A durable and stable asphalt pavement mix design installed according to best practices over a properly prepared and stable substrate is a pre-requisite for all long-lasting asphalt pavement surfaces. The application of **StreetBond** does not change this requirement.

3.2.3 Pavement Marking Removal: recommended guidelines

Pavement markings may be removed by sandblasting, water-blasting, grinding, or other approved mechanical methods. The removal methods should, to the fullest extent possible, cause no significant damage to the pavement surface.
The Owner shall determine if the removal of the markings is satisfactory for the application of **StreetBond** coatings. Work shall not proceed until this approval is granted.

3.2.4 Surface Preparation

The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.

3.3 APPLICATION OF STREETBOND COATINGS

3.3.1 Coating Application Guidelines

A. The **Applicator** shall use the **SB Flex Spray System** or suitable texture coatings sprayers to apply the **StreetBond** coatings.
B. The asphalt pavement surface shall be completely dry and thoroughly cleaned prior to application of the coatings.
C. The coating application shall proceed as soon as practical upon completion of the imprinting of the asphalt pavement where applicable.

D. For polished asphalt, **StreetBond Adhesion Promoter** should be applied directly to the asphalt and allowed to dry completely prior to the first layers of coating.

E. For concrete surfaces, **StreetBond Concrete Primer WB** or **StreetBond Concrete Primer QS** should be applied and allowed to cure prior to the first layers of coating. Please consult Technical Data sheets for more details on applications.

F. The first layer of coating shall be spray applied then broomed to work the coating material into the pavement surface. Subsequent applications shall be sprayed then broomed or rolled. Each application of coating material shall be allowed to dry to the touch before applying the next layer.

G. The **Applicator** shall apply the **StreetBond** coatings only when the air temperature is 50°F / (10°C) and rising and will not drop below 50°F / (10°C) within 24 hours. No precipitation should be expected within 24 hours.

3.4 COATING COVERAGE & THICKNESS

Coating coverage and thickness is as outlined in **TABLE 4** below. Actual coverage may be affected by the texture of the asphalt pavement substrate and the imprint pattern selected. There will be less coverage with the first layer and higher coverage with subsequent layers.

TABLE 4: COATING COVERAGE AND THICKNESS

	COVERAGE (approx.)		THICKNESS (approx.)			
# OF LAYERS	NON-TEXTURED		WET		DRY	
	sqft/unit*	sqm/unit*	mm	mil	mm	mil
3	200	18.6	0.84	33	0.48	19
4	150	13.9	1.12	44	0.66	26
5	120	11.2	1.40	55	0.81	32
6	100	9.3	1.68	66	0.97	38

*1 unit is a nominal 5 gallon pail comprising Part A, Part B and Colorant (approximately 4.12 gallons). 1 unit when sprayed as a single layer covers approximately 600sqft (55.7 sqm), with an approximate thickness of 6.3mil (0.16mm) dry.

STREETBONDSR COATED ASPHALT SPECIFICATION
FLAT (NON STAMPED) SURFACE

3.5 Recommended Coating Coverage Rates

Please check with Quest Construction Products in advance to confirm the recommended application for the climate conditions at the project location.

TABLE 5: Recommended Coating Coverage Rates

	Hot Dry Climate	Temperate/Winter Climate
Application		
Pedestrian only	3 layers at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 200 ft2 (18.6m2) per 5 gallon (20 Litre) unit	3 layers at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 200 ft2 (18.6m2) per 5 gallon (20 Litre) unit
Residential driveway	3 layers at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 200 ft2 (18.6m2) per 5 gallon (20 Litre) unit	3 layers at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 200 ft2 (18.6m2) per 5 gallon (20 Litre) unit
Vehicular traffic		
Up to 500 cars per day per lane	4 layers at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 150 ft2 (13.9m2) per 5 gallon (20 Litre) unit	4 layers at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 150 ft2 (13.9m2) per 5 gallon (20 Litre) unit
500 to 1000 cars per day per lane	4 layers at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 150 ft2 (13.9m2) per 5 gallon (20 Litre) unit	4 layers at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 150 ft2 (13.9m2) per 5 gallon (20 Litre) unit, plus one additional layer in the wheel paths
1000 to 2000 cars per day per lane	4 layers at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 150 ft2 (13.9m2) per 5 gallon (20 Litre) unit, plus one additional layer in the wheel paths	4 layers at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 150 ft2 (13.9m2) per 5 gallon (20 Litre) unit, plus two additional layers in the wheel paths
2000 to 3000 cars per day per lane	4 passes at 600 ft2 (56m2) per 5 gallon (20 Litre) unit for a net coverage of 150 ft2 (13.9m2) per 5 gallon (20 Litre) unit, plus two additional layers in the wheel paths	**No warranty is provided for traffic levels above 2000 cars per day per lane**
	No warranty is provided for traffic levels above 3000 cars per day per lane	

1. **Additional layers** of **StreetBond150** coatings may be used to provide additional build thickness in high wear areas such as vehicle wheel paths and turning areas.

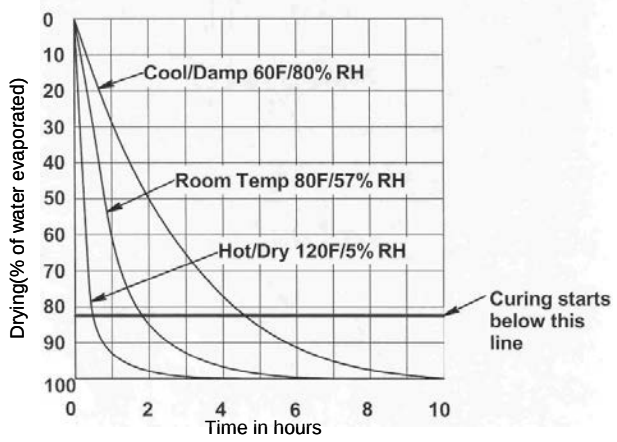
2. A maintenance program may be required for applications exposed to:

- abrasive materials (such as salt and sand)
- abrasive equipment (such as snow removal equipment)
- Studded winter tire

3.6 OPENING TO TRAFFIC

Minimally, StreetBond150 coating must be 100% dry and sufficient curing time must be allowed before traffic is permitted on the surface.

TABLE 6: COATING DRY TIMES (TYPICAL)



Coating Dry Time (Laboratory)

This graph shows the increase in drying time when temperatures are lower.

Environmental factors such as sunlight and wind play a major role in drying.

If StreetBond coatings are applied when moisture cannot evaporate, then the coating will not dry. The drying and curing of StreetBond coatings have a direct impact on performance.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

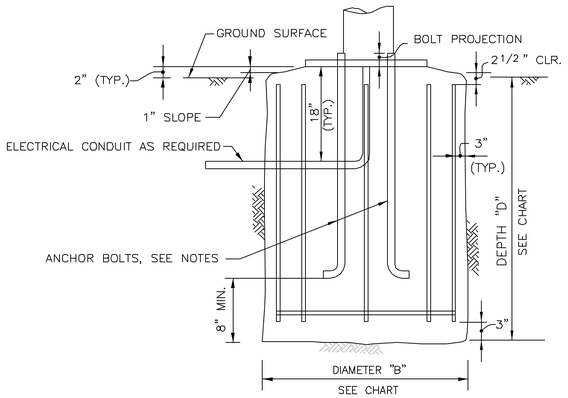
The measured area is the actual area of asphalt pavement where **StreetBond** has been applied, measured in place. No deduction will be made for the area(s) occupied by manholes, inlets, drainage structures, bollards or by any public utility appurtenances within the area.

4.2 PAYMENT

Payment will be full compensation for all work completed as per conditions set out in the contract. For unit price contracts, the payment shall be calculated using the measured area as determined above.

ATTACHMENT D – CITY STANDARD MAST ARM

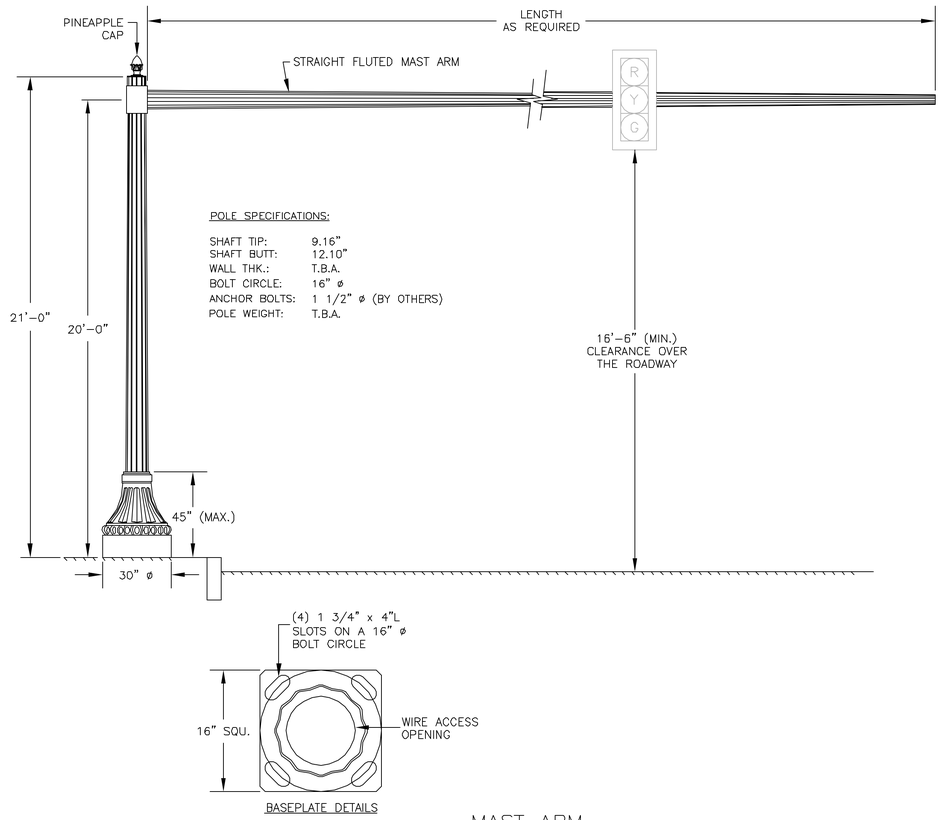
MAST ARM DETAILS



ELEVATION
NOT TO SCALE

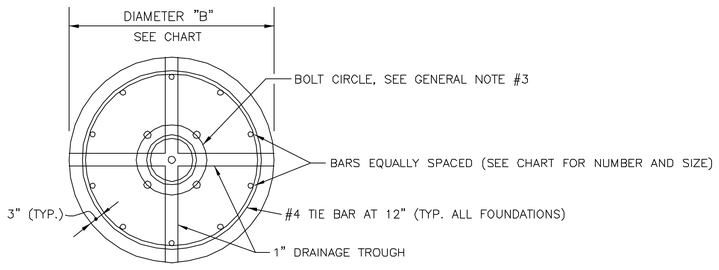
NOTES:

1. POLE, BASE PLATE AND ANCHOR BOLTS SHALL BE DESIGNED BY THE POLE MANUFACTURER.
2. MINIMUM FOUNDATION DEPTH SHALL BE CHECKED TO INSURE ADEQUATE ANCHOR BOLT EMBEDMENT–CLEARANCE, AND PROJECTION.
3. OPTIONAL END ANCHORAGE FOR ANCHOR BOLTS CAN BE A STEEL PLATE WITH THREADED HOLES DESIGNED BY THE POLE MANUFACTURER.



BASEPLATE DETAILS

MAST ARM
NOT TO SCALE



PLAN
NOT TO SCALE

SOIL TYPE (SEE GENERAL NOTE NO. 7)	DIA. (B)= 2'– 6"		DIA. (B)= 3'– 0"		DIA. (B)= 3'– 6"	
	DEPTH (D)	VERTICAL BARS	DEPTH (D)	VERTICAL BARS	DEPTH (D)	VERTICAL BARS
DRY SANDY SOIL	5'– 9"	10#5	5'– 0"	10#6	4'– 9"	10#7
WET SANDY SOIL	6'– 9"	10#5	6'– 0"	10#6	5'– 6"	10#7
CLAYEY SOIL (MEDIUM STIFF)	9'– 9"	10#5	8'– 9"	10#6	8'– 0"	10#7
ALLUVIAL SOIL	14'– 3"	10#5	12'– 9"	10#6	11'– 9"	10#7

FOUNDATION DESIGN CHART

GENERAL NOTES:

1. FOUNDATIONS SHALL BE MASS HIGHWAY STANDARD M4.02 4,000 PSI 1 ½" 565 LB CEMENT CONCRETE MASONRY.
2. REINFORCEMENT SHALL BE A.S.T.M. A615–Gr 60.
3. BOLT CIRCLE AND ANCHOR BOLTS TO BE PROVIDED BY THE CONTRACTOR. THE ANCHOR BOLTS SHALL BE SUPPLIED WITH A TEMPLATE FOR SETTING THE BOLTS AND NECESSARY BOLT PROJECTIONS.
4. PROVIDE FOR ELECTRICAL CONDUIT AS REQUIRED.
5. EXCAVATION SHALL BE BY THE AUGER METHOD TO THE NEAT LINES OF THE OUTSIDE DIMENSION OF THE FOUNDATION WITHOUT DISTURBING THE SOIL AROUND AND BELOW THE PROPOSED FOUNDATION BOTTOM. ALTERNATE METHODS OF EXCAVATION MAY BE SUBMITTED FOR APPROVAL IF THEY MEET THE REQUIREMENTS LISTED IN THE GENERAL NOTES OF SHEETS 3 & 4 OF THE SPAN WIRE ASSEMBLY FOUNDATION DETAILS AND DESIGN CHARTS.
6. IF THE SOIL IS DISTURBED OR REMOVED BEYOND THE NEAT LINES OF THE OUTSIDE DIMENSION OF THE FOUNDATION AS SPECIFIED, IT SHALL BE REPLACED WITH CONCRETE. ANY ADDITIONAL COST FOR THE CONCRETE SHALL BE PAID FOR BY THE CONTRACTOR.
7. DETERMINATION OF EXISTING SOIL CONDITIONS SHALL BE MADE BY THE DESIGN ENGINEER.
8. VERTICAL REINFORCEMENT BARS ARE TO BE EVENLY SPACED IN THE FOUNDATION AS SHOWN.
9. THE SMALLEST DIAMETER FOUNDATION SHALL BE USED THAT WILL MEET THE MOMENT REQUIREMENT AND BE AT LEAST 16" GREATER IN DIAMETER THAN THE BOLT CIRCLE DIAMETER.
10. IF A POOR SOIL OR LEDGE IS ENCOUNTERED, (i.e., ONE WHICH DOES NOT APPLY TO THE DESIGN CHARTS SHOWN ON THIS SHEET), AN ALTERNATIVE DESIGN SHALL BE DEVELOPED BY THE DESIGN ENGINEER. DECISIONS MADE IN NOTES #7 & #10, SHALL BE SUBMITTED TO THE M.D.P.W. FOR APPROVAL. IF UTILITIES OR OTHER UNDERGROUND OBSTRUCTIONS ARE ENCOUNTERED, THE CONTRACTOR SHALL BACKFILL THE AREA TO ITS ORIGINAL CONDITION UNTIL AN ALTERNATE DESIGN HAS BEEN PROVIDED BY THE DESIGN ENGINEER.
11. THE FOUNDATIONS SHOWN ON THIS DRAWING ARE FOR A 35–FOOT CANTILEVERED TYPE II MAST ARM CARRYING A THREE WAY, THREE SECTION, TWELVE INCH (12") LENS TRAFFIC SIGNAL HOUSING FIXED AT THE END OF THE ARM, AND A ONE–WAY, THREE–SECTION, TWELVE INCH (12") LENS TRAFFIC SIGNAL FIXED TWELVE FEET (12') AWAY, AND ANOTHER ONE–WAY, THREE SECTION TWELVE INCH (12") LENS TRAFFIC SIGNAL FIXED TWELVE FEET (12') AWAY FROM THAT.

P:\2007 Projects\2007-069 Broadway Somerville (english)\dwg_ENGINEERING\07069 Loop Detector & Mast Arm Details.dwg 8/25/2011 1:40:50 PM EDT