

APPENDIX A
Geotechnical Data Report

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**NBC Phase III CSO Program
Consolidation Conduits
IIIA-4 and IIIA-5**

Geotechnical Data Report

**Report Status (Final)
Revision No. 4**



June 2020

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Revision Log

Revision No.	Date	Revision Description
0	11/22/2019	1 st Internal Draft
1	03/13/2020	2 nd Internal Draft – Incorporation of Supplemental Boring Program
2	04/10/2020	Draft for 30% BODR
3	05/12/2020	Draft
4	06/09/2020	Final

1.0 General

1.1 Introduction

This Geotechnical Data Report (GDR) presents a summary of the subsurface investigation program that was conducted by McMillen Jacobs Associates (McMillen Jacobs) for the Narraganset Bay Commission (NBC) Phase III Combined Sewer Overflow (CSO) Consolidation Conduits IIIA-4 and IIIA-5 Project (the Project) located in Pawtucket, Rhode Island. This work was performed under our Subconsultant Agreement with BETA Group, Inc (BETA), dated 5 March 2019.

The specific objective of the investigatory work was to conduct geotechnical subsurface explorations and a laboratory testing program to acquire data on engineering characteristics and properties of the subsurface materials.

In accordance with the referenced contract, McMillen Jacobs completed the following tasks:

- Prepared a Work Plan describing roles, responsibilities, and field investigations.
- Prepared a Health and Safety Plan (HASP) specific to the anticipated field investigation activities that described the health and site safety procedures to be followed during performance of the work.
- Provided on site supervision during drilling of the subsurface explorations.
- Arranged for and contracted with a geotechnical testing laboratory (GeoTesting Express, of Acton, Massachusetts) to perform geotechnical soil and rock testing on selected samples obtained from the test borings.
- Reviewed information from previous subsurface investigations performed for preliminary design of this Project and other projects located adjacent to the proposed alignment.
- Compiled, prepared, and submitted this GDR that documents the results of the subsurface investigation program.

1.2 Proposed Construction

The Project is one component of the NBC Phase III CSO Program, which began in 2016 and is focused primarily on the Bucklin Point Service Area (BPSA) in the communities of Pawtucket and Central Falls. The overall NBC CSO Program is aimed at lowering annual CSO volumes and reducing annual shellfish bed closures in accordance with a 1992 Consent Agreement with the Rhode Island Department of Environmental Management (RIDEM). Phases I and II of this program, which focused on the Field's Point Service Area (FPSA) in Providence, were completed in 2008 and 2015, respectively. Stantec, along with Pare Corporation as a subconsultant, is under contract with NBC to serve in the role as the Program Manager/Construction Manager (PM/CM) for Phase III CSO Program.

The Project includes the design and construction of consolidation conduits, flow diversions, a gate and screening structure, flow meters, instrumentation panels, sluice gates, and other ancillary facilities necessary to convey flow from outfalls OF-210, OF-211, OF-213, OF-214, and OF-217 to a tunnel via Drop Shaft 213 (DS-213), set to be construction under a separate contract.

1.3 Elevation Datum and Coordinate System

Horizontal coordinates in this document are projected to Rhode Island Mainland State Plane, North American Datum (NAD) 1983 and elevations are referenced to the National Geodetic Vertical Datum (NVGD) 1929, in feet.

The survey base plan was provided to McMillen Jacobs by BETA. Plan locations and elevations of the test borings were determined by Bryant Associates, Inc. of Lincoln, Rhode Island. The Project location is included on Figure 1, Project Locus. The locations of the test borings have been plotted on Figures 2A through 2E, Site and Subsurface Exploration Location Plan.

2.0 Subsurface Explorations

2.1 Exploration Program

Geotechnical test borings were performed to assess soil and bedrock conditions at the site and to acquire data on the engineering characteristics and properties of the subsurface materials. Analytical sample collection and assessment of the environmental subsurface conditions was performed by BETA during the exploration program. Details of the subsurface exploration program are described in the following sections.

2.2 Test Borings

Thirteen (13) geotechnical test borings were performed by Geologic Earth Exploration, Inc. (Geologic), Norwood, MA, during the periods of 27 August to 18 September 2019 and 4 February to 12 February 2020 at the locations shown on Figure 2. Table 1 presents a summary of the subsurface exploration program.

A representative from BETA was onsite to monitor air quality. In addition, soil samples were collected in the initial 10 feet of drilling and were submitted to the analytical laboratory for testing. Refer to the Environmental Data Report (EDR) for details and results of analytical testing.

Test borings were designated B-1 through B-13 and were terminated at depths ranging from 4 to 51 feet below existing ground surface. Vacuum excavation was performed to a depth of 6 feet at test boring locations B-1, B-2, B-3, B-6, and B-8 through B-13 to mitigate the potential for damaging any unidentified existing utilities. A representative photograph taken during vacuum excavation is shown below.



Vacuum Excavation at Test Boring B-3

Test borings were advanced using either a rubber track mounted CME-45A drill rig or a rubber track mounted Acker Scout drill rig using rotary drilling techniques with a 3-7/8 in. diameter tri-cone roller bit.

Test borings B-1, B-2, B-3, and B-9 through B-13 were drilled on the former Tidewater Site owned by National Grid. The Tidewater Site is a former MGP and power plant site and is classified as a superfund site. On behalf of National Grid, a representative from GZA GeoEnvironmental, Inc. (GZA) was onsite to provide access and monitor drilling activities for these test borings. In addition, a representative from BETA was onsite to monitor the air quality as stipulated in the National Grid Access Agreement. No environmental soil sampling was performed at the Tidewater Site.

As required by the National Grid Access Agreement, Geologic was responsible for drumming and leaving on site investigation-derived waste (IDW) that could not be placed back into the completed borehole. After completion of drilling activities on the Tidewater Site, drilling equipment was decontaminated by steam cleaning. Steam cleaning took place on a plastic containment pad allowing the wash water to be drummed as IDW. Management and disposal of the drummed IDW will be conducted by National Grid. Below is a representative photograph of steam cleaning on the Tidewater Site.



Steam Cleaning Set up on the Tidewater Site

Test borings B-4 through B-8 were drilled in the public right-of-way on city streets and required a police detail as well as signage for traffic control. Below is a representative photograph of traffic control set up at test boring B-8.



Drilling Test Boring B-8 at the Intersection of South Main St. and Roosevelt Ave. Ext.

Test borings B-4A, B-4B, B-4C and B-6 encountered obstructions before reaching the planned termination depths. Based on review of historic area photographs at test borings B-4A and B-4B, it was determined that the obstruction was likely an existing foundation from a former building. Completed test boring B-4C was offset approximately three feet from test boring B-4B and advanced through a probable foundation approximately five feet thick.

Test boring B-6 was attempted three times in the vicinity of the entrance to the parking lot south of National Grid's Bridge Mill Power Plant. Vacuum excavation was performed at two of the three locations attempted. At each of the three locations, an unidentified obstruction was encountered at approximately four feet below the existing ground surface. As a result of encountered obstructions, test boring B-6A was relocated about 100 feet to the south of the originally planned location and drilled near the southern end of Roosevelt Avenue Extension.

To prevent the potential for creating future pathways for drilling fluids used during trenchless construction, test borings B-1 through B-3 and B-9 through B-12 were tremie grouted upon completion using a cementitious grout. Test borings B-4 through B-8 and B-13 were backfilled with a mixture of silica sand and soil cuttings generated during the drilling.

Soil samples were obtained using techniques and equipment in general accordance with the American Society for Testing and Materials (ASTM) Standard Specification D1586 Standard Penetration Tests (SPT). SPT tests were performed using a standard 1-3/8-in. I.D. split-spoon sampler. SPT blow counts were recorded for 6-in. intervals, where the SPT "N" value is defined as the number of blows required to drive the split-spoon sampler with a 140-lb. hammer falling freely through a distance of 30 in. for a distance of 12 in. counted from the 6th to the 18th inch that the sampler was driven.

Rock coring was performed using a five-foot long NX (2 in. O.D.) core barrel. The top of bedrock was estimated based on the drilling operations (e.g. excessive rig chatter, difficult drilling penetration) and

practical split-spoon refusal. Rock coring was performed in order to confirm bedrock and to assess its relative quality as indicated by Core Recovery¹ and Rock Quality Designation (RQD)².

Soil and rock were classified in the field using visual/manual methods, in accordance with the Unified Soil Classification System (USCS) and the NBC Phase III CSO Program Geotechnical/Environmental Investigation Work Plan Standards as practiced by McMillen Jacobs. Selected soil and rock samples were delivered to GeoTesting Express laboratory in Acton, Massachusetts, for laboratory testing.

Test boring logs are provided in Appendix A and rock coring photographs are provided in Appendix B.

Split-spoon samples were screened in the field for VOCs using a MiniRAE 3000 photoionization detector (PID). Once the soil sample from the split-spoon was collected in a sample jar, the headspace readings were obtained by opening the sample jar and immediately inserting the PID probe into the sample jar headspace to measure the VOCs present within the soil sample. PID results were recorded adjacent to the sample description on the boring logs. In addition to PID readings, any staining, visual and/or olfactory evidence of contamination were also recorded on the boring log within the sample description or as a note beneath the sample descriptions.

Four groundwater observation wells were installed in completed boreholes B-2, B-3, B-4C, and B-7, and two were installed in boreholes adjacent to completed test borings B-9 and B-10. Groundwater observation wells installed in B-2, B-3, B-4C, and B-7 required backfilling to the desired depths of the screened intervals using either grout, bentonite chips, or drill cuttings. The water level observed at the time of drilling is indicated on the test boring logs. Groundwater monitoring was performed between the period 9 September 2019 to 12 February 2020. Groundwater observation well installation and monitoring reports are provided in Appendix C.

¹ The Core Recovery is defined as the ratio (expressed as a percent) of the total length of recovered core to the length cored.

² The Rock Quality Designation (RQD) is defined as the sum in inches of all pieces of moderately weathered to less weathered rock core, 4 inches in length or longer, divided by the length in inches of core run (expressed as a percentage). If the core is broken by handling or drilling procedures, the pieces of core are fitted together and counted as one piece, provided they constitute the required 4-inch length.

3.0 Subsurface Investigations by Others

3.1 General

Subsurface explorations have been performed by others in the vicinity of the Project for preliminary design and to construct bridges, roadways, utilities, and conduct environmental assessments. Existing test borings, laboratory testing results, and geophysical data that were judged to be relevant to this Project have been included in this GDR. Brief descriptions of the additional information included is provided below.

Historic data is provided in Appendix D. The locations of the historic test borings are shown on Figure 2.

3.2 Previous Test Borings by Stantec/Pare

Geotechnical subsurface explorations have been performed along the Project alignment by the PM/CM in support of the overall NBC CSO Phase III Program. The following information was provided and reviewed for pertinent information:

- Report entitled “NBC CSO Phase IIIA Contract No. 308.01 C, Request for Proposal, Appendix C, Geotechnical Data Report”, prepared by Stantec and Pare Corporation, dated December 23, 2019.

3.3 Tidewater Site

Geotechnical subsurface explorations have been performed across the Tidewater Site by various consultants for National Grid in support of the remediation of the site. The following information was reviewed for pertinent test boring logs:

- Report entitled “Remedial Action Work Plan National Grid Former Tidewater Facility 200 Taft Street Pawtucket, Rhode Island” prepared by GZA GeoEnvironmental, Inc.; dated June 2018.
- Report entitled “Site Investigation Data Report, Former Tidewater MGP and Power Plant Site, Pawtucket, Rhode Island, RIDEM Case No. 95-022” prepared by GZA GeoEnvironmental Inc.; dated January 2011.

3.4 Other Sources of Data

Other subsurface explorations along or adjacent to the project alignment have been performed for various purposes. The following information was reviewed for pertinent test boring logs and data:

- Drawing set entitled “State of Rhode Island and Providence Plantations, Blackstone Valley Sewer District Commission, Taft St. – Pleasant St. Branch Interceptor, Section B, Contract 18”, prepared by Metcalf & Eddy Engineers, dated 1950.
- State of Rhode Island, Department of Public Works, Division of Roads and Bridges, Plan, Profile and Sections of Proposed State Highway, Division St. Project, Contract Three, Rhode Island FA Project No.1-01(11), Contract No. 5737, dated 1957.
- State of Rhode Island, Department of Transportation, Plans, Profiles, and Section of Proposed Bridge Replacement, Pawtucket Bridge No. 550, I-95 Over the Seekonk River, Volume 3 Bridge Plans, Rhode Island Contract No. 2010-CB-004, FA Project Nos.BRO-0550(003), IM-0550(004), IMG-0550(005), prepared by Commonwealth Engineers & Consultants Inc., dated April 2010.

4.0 LABORATORY TESTING

4.1 General

A program of geotechnical laboratory testing was performed on selected soil and rock samples collected during the exploration program. Laboratory testing was conducted at the GeoTesting Express geotechnical laboratory, located in Acton, Massachusetts.

A summary of the completed laboratory testing, indicating the number of tests conducted in each exploration, is provided in Table 2. Individual testing results are provided in Appendix E.

4.2 Soil Testing

4.2.1 Grain Size Distribution

A total of nineteen (19) mechanical grain size distribution tests were performed in accordance with ASTM International Standard D421. The results of the grain size analyses were used to confirm field determined soil classifications and material characteristics.

4.3 Rock Testing

4.3.1 Unconfined Compressive Strength

Two unconfined compression strength (UCS) tests were performed on rock core samples in general accordance with ASTM International Standard D7012.

4.3.2 Cerchar Abrasivity Index

Two Cerchar Abrasivity Index (CAI) tests were performed on rock core samples in general accordance with ASTM International Standard D7625. The CAI gives an indication of potential wear of rock excavation equipment.

4.3.3 Brazilian Tensile Strength

Two Brazilian tensile strength (splitting tensile strength) tests were performed on rock core samples in general accordance with ASTM International Standard D3967.

5.0 Limitations

This report has been prepared for specific application to the proposed Consolidation Conduits IIIA-4 and IIIA-5 of the NBC Phase III CSO Program in Pawtucket, Rhode Island, in accordance with generally accepted geotechnical engineering practice.

The data presented herein are based, in part, on information from subsurface explorations that are available to us at this time obtained for design of the proposed facilities. The nature and extent of variations in the subsurface conditions between explorations may vary.

The scope of work undertaken for this GDR does not include a site assessment for the presence of oil or hazardous materials, nor did it include an evaluation of the impact of oil and hazardous materials, if present, to the project, nor any regulatory interaction and remedial activities associated with any contaminated soil, water, or materials that may exist on the site. Observations regarding the presence of oil or hazardous materials were made by McMillen Jacobs on a qualitative basis during drilling of the test borings.

TABLES

TABLE 1
Summary of Subsurface Exploration Program
NBC Phase III CSO Program
Consolidation Conduits IIIA-4 and IIIA-5
Pawtucket, RI

Test Boring Designation	Total Drilled Depth (ft)	Depth Drilled in Soil (ft)	Depth Drilled in Rock (ft)	Observation Well Installed
B-1 ¹	22.0	10.0	12.0	
B-2 ¹	34.0	29.0	5.0	1
B-3 ¹	37.0	27.0	10.0	1
B-4A ²	8.9	8.9	n/e ³	
B-4B ²	10.0	10.0	n/e	
B-4C	35.0	29.5	5.5	1
B-5	35.0	27.0	8.0	
B-6 ²	4.0	4.0	n/e	
B-6A ¹	31.0	26.0	5.0	
B-7	29.2	29.2	n/e	1
B-8 ¹	25.0	16.0	9.0	
B-9 ¹	39.0	29.0	10.0	1
B-10 ¹	31.0	21.0	10.0	1
B-11 ¹	39.0	29.0	10.0	
B-12 ¹	51.0	29.0	22.0	
B-13 ¹	21.0	21.0	n/e	
Totals	452.1	345.6	106.5	6

Notes

1. Test borings B-1, B-2, B-3, B-6A, and B-8 through B-13 were vacuum excavated to a depth of about 6 feet below the existing ground surface.
2. Test borings B-4A, B-4B, and B-6 encountered obstructions and were terminated before reaching the planned total depth.
3. "n/e" means not encountered.

TABLE 2
Summary of Laboratory Testing Program
NBC Phase III CSO Program
Consolidation Conduits IIIA-4 and IIIA-5
Pawtucket, RI

Test Boring Designation	Sample ID	Sample Depth (ft)	Soil Testing ¹	Rock Testing ²		
			Sieve	Cerchar	Brazilian Tensile Strength	Unconfined Compression Strength
B-1	S-1	6-8	1			
B-2	S-3	10-12	1			
B-2	S-7	18-20	1			
B-3	S-2	14-16	1			
B-3	S-5	25-27	1			
B-4C	S-2	14-16	1			
B-4C	S-3b	19-21	1			
B-5	S-4	6-8	1			
B-5	S-8	19-21	1			
B-6A	S-5	19-21	1			
B-7	S-5	8-10	1			
B-7	S-7	14-16	1			
B-8	S-3	10-12	1			
B-9	S-4	17-19	1			
B-9	S-6	21-23	1			
B-9	C-1	29.9-30.3		1	1	1
B-10	S-6	16-18	1			
B-10	C-1	22.3-22.7		1	1	1
B-11	S-7	19-21	1			
B-12	S-7	27-29	1			
B-13	S-2a	8-10	1			
Totals			19	2	2	2

Notes

1. Laboratory soil testing performed in general accordance with ASTM International Standard D421.
2. Laboratory rock testing performed in general accordance with ASTM International Standards D7625, D3967, and D7012C.

FIGURES



SEEKONK RIVER

PROJECT LOCATION

PROJECT LOCUS

PROJECT 5980



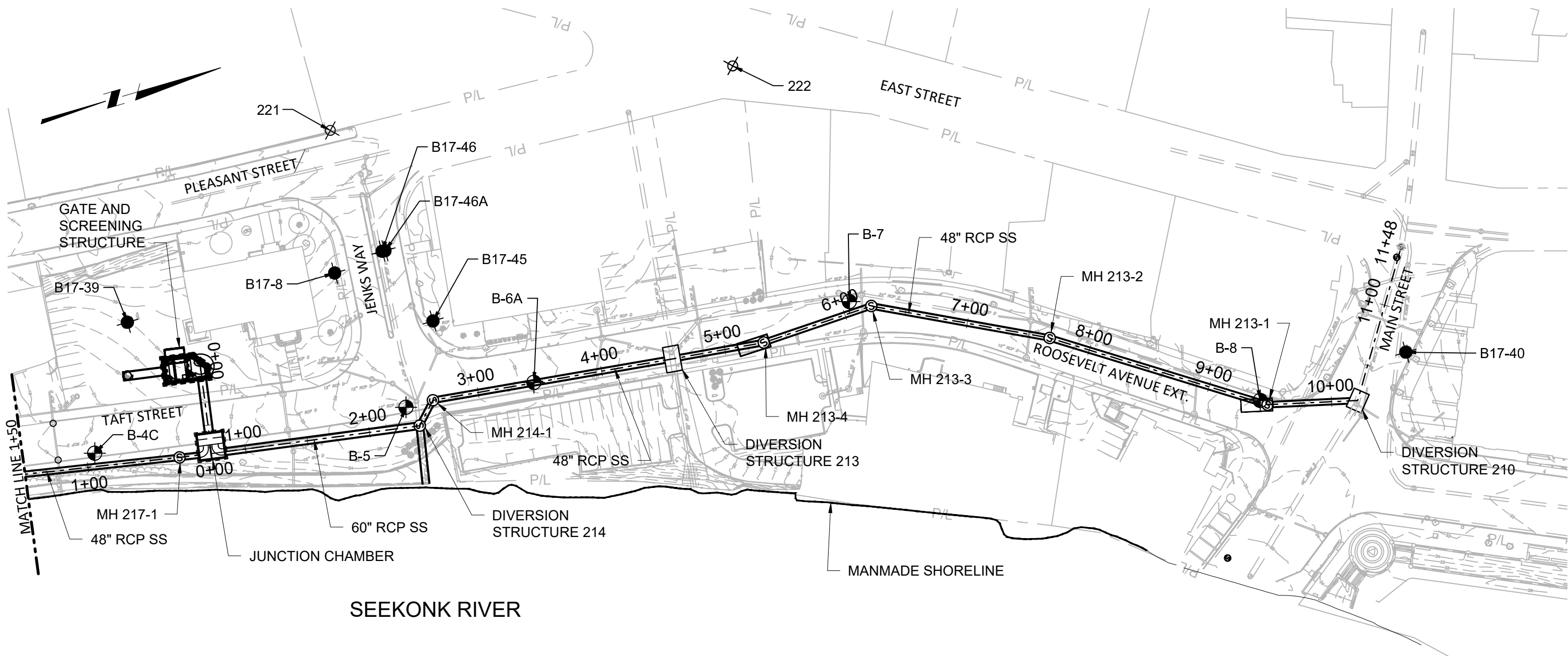
NARRAGANSETT BAY COMMISSION
PHASE III COMBINED SEWER
OVERFLOW PROGRAM



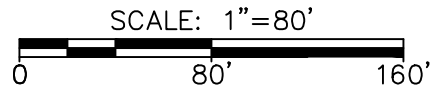
NBC PHASE III CSO PROGRAM
CONSOLIDATION CONDUITS PHASE IIIA-4 AND IIIA-5
PROJECT LOCUS
PAWTUCKET, RHODE ISLAND

DATE
MAY, 2020

FIGURE
1



PLAN



NOTE: SEE FIGURE 2E FOR LEGEND AND NOTES.

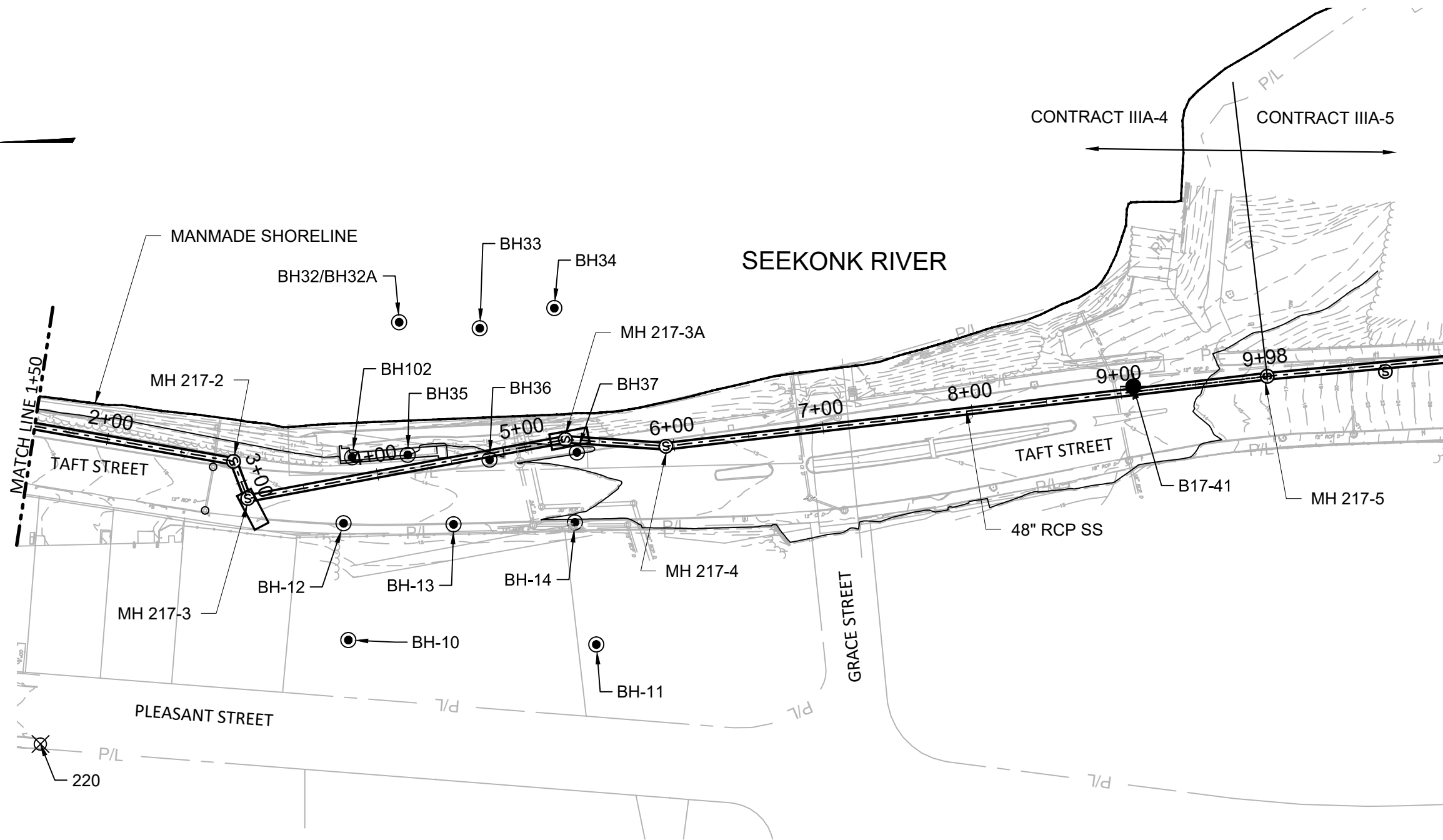
PROJECT 5980



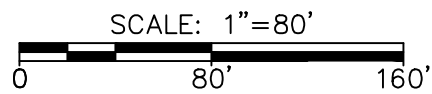
NARRAGANSETT BAY COMMISSION
 PHASE III COMBINED SEWER
 OVERFLOW PROGRAM

NBC PHASE III CSO PROGRAM
 CONSOLIDATION CONDUITS PHASE IIIA-4 AND IIIA-5
 SITE AND SUBSURFACE EXPLORATION PLAN
 ALIGNMENT IIIA-4 (SHEET 1 OF 2)

DATE
 MAY, 2020
 FIGURE
 2A



PLAN



NOTE: SEE FIGURE 2E FOR LEGEND AND NOTES.

PROJECT 5980

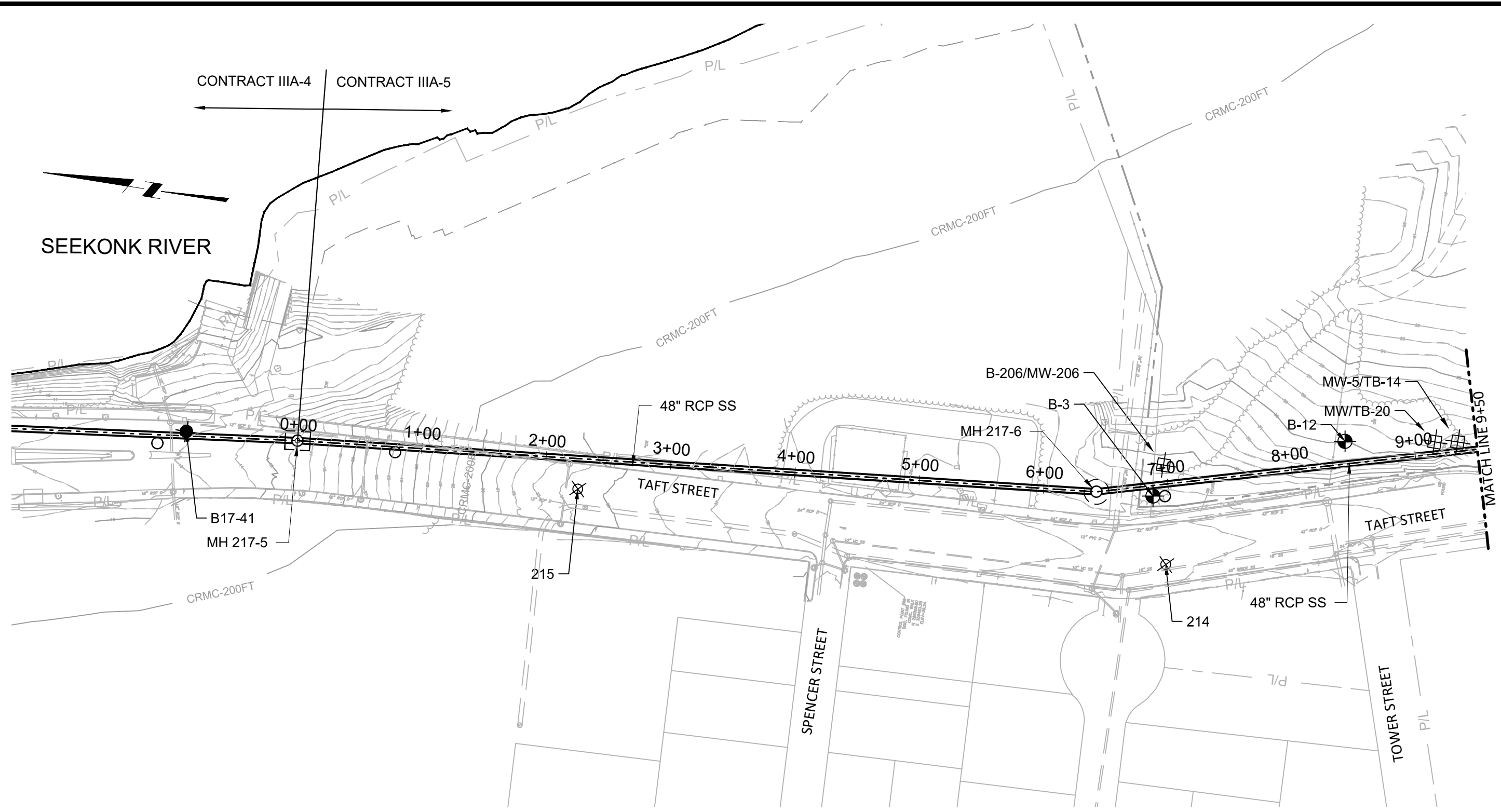


NARRAGANSETT BAY COMMISSION
PHASE III COMBINED SEWER
OVERFLOW PROGRAM

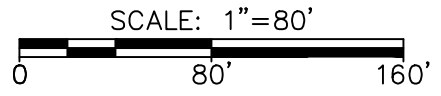


NBC PHASE III CSO PROGRAM
CONSOLIDATION CONDUITS PHASE IIIA-4 AND IIIA-5
SITE AND SUBSURFACE EXPLORATION PLAN
ALIGNMENT IIIA-4 (SHEET 2 OF 2)

DATE
MAY, 2020
FIGURE
2B



PLAN



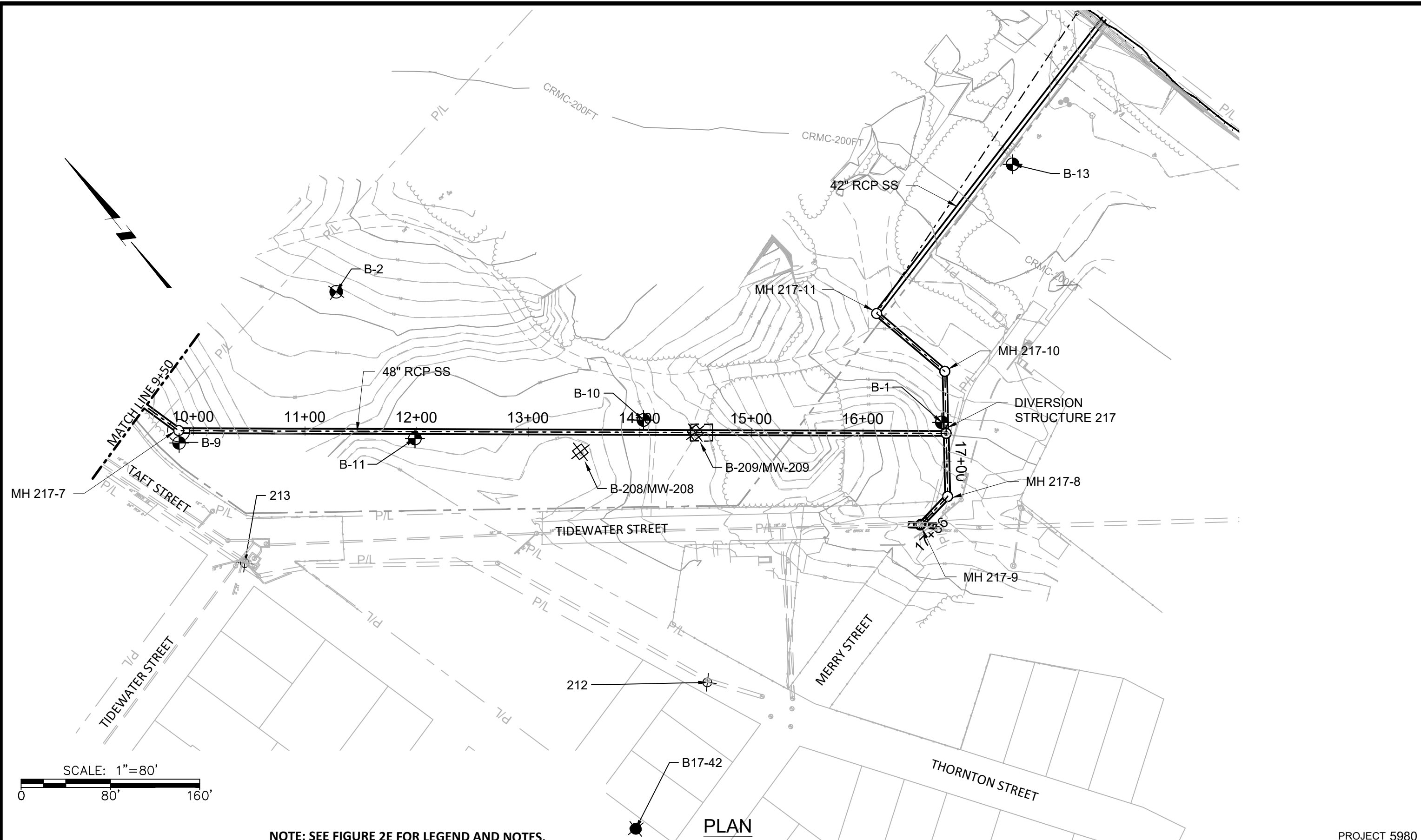
NOTE: SEE FIGURE 2E FOR LEGEND AND NOTES.

PROJECT 5980



NBC PHASE III CSO PROGRAM
 CONSOLIDATION CONDUITS PHASE IIIA-4 AND IIIA-5
 SITE AND SUBSURFACE EXPLORATION PLAN
 ALIGNMENT IIIA-5 (SHEET 1 OF 2)

DATE
 MAY, 2020
 FIGURE
 2C








PROJECT 5980



NBC PHASE III CSO PROGRAM
 CONSOLIDATION CONDUITS PHASE IIIA-4 AND IIIA-5
 SITE AND SUBSURFACE EXPLORATION PLAN
 ALIGNMENT IIIA-5 (SHEET 2 OF 2)

DATE
 MAY, 2020
 FIGURE
 2D

LEGEND

-  B-7 DESIGNATION AND LOCATION OF TEST BORING PERFORMED BY GEOLOGIC EARTH EXPLORATION, INC. DURING THE PERIODS 27 AUGUST THROUGH 18 SEPTEMBER AND 04 FEBRUARY THROUGH 12 FEBRUARY UNDER THE SUPERVISION OF MCMILLEN JACOBS ASSOCIATES.
-  BH-35 DESIGNATION AND LOCATION OF TEST BORING PERFORMED FOR THE PAWTUCKET BRIDGE AND PAWTUCKET BRIDGE REPLACEMENT PERFORMED IN 1955 AND 2010.
-  B17-39 DESIGNATION AND LOCATION OF TEST BORING PERFORMED BY NEW ENGLAND BORING CONTRACTORS, INC. PERFORMED BETWEEN 04 MAY 2018 AND 08 AUGUST 2019 UNDER THE SUPERVISION OF PARE CORPORATION.
-  221 DESIGNATION AND LOCATION OF TEST BORING PERFORMED FOR THE TAFT ST. - PLEASANT ST. BRANCH INTERCEPTOR SECTION B DATED 1950.
-  MW/TB-20 DESIGNATION AND LOCATION OF PREVIOUS TEST BORING CONDUCTED ON THE FORMER TIDEWATER FACILITY.

NOTES

1. BASE PLAN USED FOR FIGURES 2A, 2B AND PART OF 2C WAS A CAD-GENERATED DRAWING TITLED "PAWT_SITE_PLAN_&_PROFILE_IIIA-4" PREPARED BY BETA GROUP, INC. AND OBTAINED ON 2/24/2020 BY MCMILLEN JACOBS ASSOCIATES VIA PROJECTWISE SHAREPOINT.
2. BASE PLAN USED FOR PART OF FIGURE 2C AND 2D WAS A CAD-GENERATED DRAWING TITLED "PAWT_SITE_PLAN_&_PROFILE_IIIA-5_ALT3" PREPARED BY BETA GROUP, INC. AND OBTAINED ON 2/24/2020 BY MCMILLEN JACOBS ASSOCIATES VIA PROJECTWISE SHAREPOINT.
3. AS DRILLED LOCATIONS OF THE B-SERIES TEST BORINGS CONDUCTED IN 2019 AND 2020 WERE SURVEYED BY BRYANT AND ASSOCIATES, INC. IN NOVEMBER 2019 AND FEBRUARY 2020 AND PROVIDED TO MCMILLEN JACOBS ASSOCIATES BY BETA GROUP, INC.
4. ALL ELEVATIONS ARE IN FEET AND REFER TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NVD29).
5. NORTH ARROW ALIGNED WITH GRID NORTH, RHODE ISLAND STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM OF 1983 (NAD83).
6. REFER TO THE APPENDICES OF THIS REPORT FOR TEST BORING LOGS AND GROUNDWATER INSTALLATION AND MONITORING REPORTS.

PROJECT 5980



NARRAGANSETT BAY COMMISSION
PHASE III COMBINED SEWER
OVERFLOW PROGRAM



NBC PHASE III CSO PROGRAM
CONSOLIDATION CONDUITS PHASE IIIA-4 AND IIIA-5
SITE AND SUBSURFACE EXPLORATION PLAN
LEGEND AND NOTES (SHEET 1 OF 1)

DATE
MAY, 2020
FIGURE
2E

APPENDICES

APPENDIX A
Test Boring Logs

SOIL

Soil description on logs of subsurface explorations are based on Standard Penetration Test (SPT) results, visual-manual examination of exposed soil samples, and the results of laboratory tests on selected samples. The criteria, descriptive terms, and definitions are presented herein. The natural soils are identified and described by visual-manual procedures (ASTM D2488) and in accordance with the United Soil Classification System (USCS) (ASTM D2487) as practiced by McMillen Jacobs Associates. Fill materials may not be classified by USCS criteria.

PENETRATION RESISTANCE

Standard penetration resistance (SPT) (ASTM D1586) - Number of blows required to drive a standard 2 in. O.D. split spoon sampler one foot with a 140 lb. weight falling 30 inches freely downward.

DENSITY / CONSISTENCY

Coarse - Grained Soils	
Apparent Density	SPT Resistance, N (BPF)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

Fine - Grained Soils	
Apparent Consistency	SPT Resistance, N (BPF)
Very Soft	0 - 2
Soft	2 - 4
Medium Stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	>30

Notes: BPF = Blows Per Foot (uncorrected)

WOR = Weight of Rod

COLOR

Basic colors (black, brown, gray, olive, red, and yellow) and combinations (i.e. gray-brown, olive-brown, olive-gray, red-gray, red-brown, yellow-brown, and red-yellow). Modifiers such as light and dark may be used.

SUPPLEMENTAL SOIL DESCRIPTIONS AND STRUCTURE:

- Laminating - 0 to 1/16 in. thick (cohesive)
- Parting - 0 to 1/16 in. thick (granular)
- Seam - 1/16 to 1/2 in. thick
- Layer - 1/2 to 12 in. thick
- Stratum - > 12 in. thick
- Pocket - Small, erratic deposit less than 12 in. size
- Lens - Lenticular deposit larger than a pocket
- Occasional - One or less per 12 in. of thickness
- Frequent - More than one per 12 in. of thickness
- Interbedded - Alternating soil layers of differing composition
- Varved - Alternating thin seams of silt and clay
- Mottled - Variation of color

SAMPLE SYMBOLS

- X SPT Sample 2 in. OD
- X SPT Sample 3 in. OD
- █ Shelby Tube Sample

ADDITIONAL GRAPHIC DESCRIPTIONS

- █ Asphalt
- █ Fill

SOIL IDENTIFICATION AND DESCRIPTION

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS Based on ASTM D2488 & D2487)				
MAJOR DIVISIONS	GROUP/SYMBOL	TYPICAL DESCRIPTION		
GRAVELS (more than 50% retained on No. 4 sieve)	CLEAN GRAVELS (less than 5% fines)	GW	WELL-GRADED GRAVEL	
		GP	POORLY GRADED GRAVEL	
	GRAVELS WITH SILT (with 5 to 12% fines)	GW-GM	WELL-GRADED GRAVEL WITH SILT	
		GP-GM	POORLY GRADED GRAVEL WITH SILT	
		GRAVELS WITH CLAY (with more than 12% fines)	GW-GC	WELL-GRADED GRAVEL WITH CLAY
			GP-GC	POORLY GRADED GRAVEL WITH CLAY
	COARSE-GRAINED SOILS (50% or more retained on No. 200 sieve)	GM	SILTY GRAVEL	
		GC	CLAYEY GRAVEL	
		CLEAN SANDS (less than 5% fines)	SW	WELL-GRADED SAND
			SP	POORLY GRADED SAND
SANDS (with 5 to 12% fines)		SW-SM	WELL-GRADED SAND WITH SILT	
		SW-SC	WELL-GRADED SAND WITH CLAY	
		SANDS WITH FINES (more than 12% fines)	SP-SM	POORLY GRADED SAND WITH SILT
			SP-SC	POORLY GRADED SAND WITH CLAY
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)		SM	SILTY SAND	
		SC	CLAYEY SAND	
	SILTS & CLAYS (liquid limit less than 50)	ML	SILT	
		CL	LEAN CLAY	
	SILTS & CLAYS (liquid limit greater than 50)	OL	LOW PLASTICITY ORGANIC CLAY	
		MH	ELASTIC SILT	
		SILT CLAY (liquid limit between 12 and 20)	CH	FAT CLAY
			OH	HIGH PLASTICITY ORGANIC CLAY
	HIGHLY ORGANIC SOILS	CL-ML	CLAYEY SILT / SILTY CLAY	
		PT	PEAT	

Notes:
1. Dual symbols (symbols separated by a hyphen, e.g. SP-SM, slightly silty fine SAND) are used for soils between 5% and 12% fines or when liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.

ROCK

Rock descriptions noted on logs of subsurface explorations are based on visual-manual examination of exposed rock outcrops and core samples. The criteria, descriptive terms and definitions used are as follows:

FIELD HARDNESS / STRENGTH

- (after ISRM, 1978; CGS, 1985; Marinos & Hoek, 2001)
- Extremely Strong Cannot be scratched with a knife point or sharp pick; can only be chipped with repeated heavy hammer blows.
- Very Strong Cannot be scratched with a knife point or sharp pick; core breaks with repeated heavy hammer blows.
- Strong Can be scratched with a knife or pick; core breaks with heavy hammer blow.
- Moderately Weak Can be grooved 1/16 in. deep by knife or sharp pick; core breaks with light hammer blow.
- Weak Can be grooved easily with a knife or pick; can be scratched with fingernail; core breaks with light pressure.
- Very Weak Can be readily indented; grooved with fingernail or carved with a knife; core breaks with light pressure.

WEATHERING (after ISRM, 1978)

- The action of organic and inorganic chemical and physical processes resulting in alteration of color, texture, and composition
- Fresh No visible sign of alteration, except perhaps slight discoloration on major discontinuity surfaces
- Slight Discoloration of rock material and discontinuity surfaces
- Moderate Less than half the rock material decomposed to soil. Some fresh rock; continuous "framework".
- High More than half the rock material decomposed and/or disintegrated to soil.
- Completely All rock material disintegrated to soil, but mass still intact
- Residual Soil All rock material converted to soil. Material has not been significantly transported.

COLOR:

Basic colors and combinations: gray, light gray, brown, red-brown

TEXTURE

- Size, shape and arrangements of constituents
- Aphanitic Individual grains invisible
- Fine-grained Grains barely visible to the unaided eye, up to 1/16 in. dia.
- Medium Grained Grains between 1/16 and 3/16 in. dia.
- Coarse Grained Grains between 3/16 and 1/4 in. dia.
- Very Coarse Grained Grains larger than 1/4 in. dia.

LITHOLOGY

Rock Classification and modifiers; accepted formation names

DISCONTINUITIES:

- | Type | Definition |
|---------------------|--|
| Joint | A natural fracture along which no displacement has occurred. May occur in parallel groups called sets. |
| Shear | A natural fracture along which displacement has occurred. Surface may be slickensided or striated. |
| Fault | A natural fracture along which displacement has occurred. Usually lined with gouge and slickensides. |
| Shear or Fault Zone | Zone of fractured rock and gouge bordering the displacement plane. |

ORIENTATION / ATTITUDE

Term	Angle (degrees)
Horizontal	0-5
Low Angle	6-35
Moderately Dipping	36-55
High Angle	56-85
Vertical	86-100

SPACING

Term	Inches
Extremely Close	<3/4
Very Close	3/4 - 2-1/2
Close	2-1/2 - 8
Moderate	8 - 24
Wide	24 - 80
Very Wide	80- 20 ft.
Extremely Wide	> 20 ft.

ROUGHNESS OF DISCONTINUITY SURFACE

Term	Abbreviation	Description
Very Rough	VR	Near-vertical steps and ridges
Rough	R	Ridges, side-steps, and asperities evident; abrasive to the touch
Slightly Rough	SR	Asperities can be felt.
Smooth	SM	Smooth to the touch
Slickensided	SL	Smooth glossy finish with visible striations

APERTURE/GAP

Term	MM	Material	Abbreviation
Very Tight	< .1	Clay	CL
Tight	0.1 - 0.25	Silt	SI
Partly Open	0.25 - 0.5	Sand	SA
Open	0.5 - 2.5	Serpentine	SE
Moderately Wide	2.5 - 10	Sulfide	SL
Wide	> 10	Calcite	CA
Very Wide	10 - 100	Pyrite	PY
Extremely Wide	100 - 1000	Quartz	QZ
Cavernous	> 1000	Chlorite	CH
		Iron Oxide Staining	FE
		Could not be determined	X

BEDDING

Term	Inches	Term	Inches
Very Thin	< 2.5	Thick	25-36
Thin	2.5 - 8	Very Thick	< 36
Medium	9 - 24		

GENERAL NOTES:

- Logs of subsurface exploration depict soil, rock and groundwater conditions only at the boring locations specified on the dates indicated. Subsurface conditions may vary at other locations and at other times.
- Water levels, where noted on the logs, were measured at the times under the conditions indicated. During test boring drilling, these water levels could have been affected by the introduction of water in to the borehole, extraction of tools or other procedures and thus may not reflect actual groundwater levels at the test boring location. Groundwater level fluctuations may also occur as a results of variations in precipitation, temperature, season, tides, river stage, adjacent construction operations, construction dewatering systems, water supply well pumping, and other conditions.




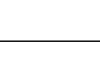


SUBSURFACE EXPLORATION KEY

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-1

Date(s) Drilled 09/05/2019 - 09/06/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 22.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 14.5 ft / NGVD 1929	
Location Southerly end of Tidewater Site	Coordinates 360205.11E,285935.78N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-10								Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	13/24	18-18-17-20 (N=35)	SM		Moist, dense, brown, fine SAND and gravel, little silt (FILL)	PID=0
		8-10	S-2	10/24	14-30-22-19 (N=52)	SP-SM		Moist, very dense, brown, fine SAND, some gravel (FILL)	
								Top of possible boulder/bedrock. See Core Boring Report for rock details.	
0	∞	15-16.9	S-3	14/23	16-27-31-50/5" (N=58)	SW-SM		Wet, very dense, gray, SAND, some gravel and silt (Completely Weathered Bedrock)	PID=30
-5								See Core Boring Report for Rock Details	



∞ - Water Level at Time of Drilling

Boring B-1

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-1

Date(s) Drilled: 09/05/2019 - 09/06/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 22.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 14.5 ft / NGVD 1929	
Location: Southerly end of Tidewater Site	Coordinates: 360205.11E,285935.78N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
			4						See Test Boring Report for Overburden Details							
			4						Strong, gray, moderately weathered, medium-grained CONGLOMERATE. Mechanical breaks at 10.5 ft, 11.3 ft, and 11.8 ft.							
	10-15	3	2	C-1	24/40%	20/33%										
		1														
0		2														
	15									Sample obtained using split spoon sampler. See Test Boring Report for details.						
		2							Strong, gray, moderately weathered, fine-grained SILTSTONE	17.3	J	30	S	1.00	FR	
	17-22	2	2	C-2	45/75%	17/28%				18.8	J	30	SR	1.00	FR	
		2								19.1	J	40	SR	1.00	FR	
-5		2								19.8	J	40	SR	1.00	FR	



Boring B-1

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-1

Date(s) Drilled: 09/05/2019 - 09/06/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.		Total Depth of Borehole: 22.0 ft
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in		Ground Surface Elevation/Datum: 14.5 ft / NGVD 1929
Location: Southerly end of Tidewater Site		Coordinates: 360205.11E,285935.78N	Elevation Source: Field Survey

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
		17-22	6	2	C-2	45/ 75%	17/ 28%	XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX	Strong, gray, moderately weathered, fine-grained SILTSTONE	20.0	J	30	SR	5.00	FR	
			5							20.1	J	30	R	5.00	FR	
-10	25								Bottom of borehole at 22.0 ft.							
-15																



Boring B-1

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-2

Date(s) Drilled 09/03/2019 - 09/05/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 34.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 22.2 ft / NGVD 1929	
Location Tidewater Site	Coordinates 359851.53E,286363.91N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
18								Vacuum excavated from about 0 to 6 ft (FILL)	
	5	6-8	S-1	24/24	2-1-2-4 (N=3)	CL		Moist, soft, grayish brown, silty CLAY (FILL)	PID=20
13		8-10	S-2	18/24	1-1-0-3 (N=1)	ML		Moist, very soft, gray, SILT (FILL)	PID=32
	10	10-12	S-3	12/24	1-4-1-17 (N=5)	ML		Wet, medium stiff, light gray, SILT, some gravel, little fine sand (FILL)	PID=50
		12-14	S-4	12/24	9-6-7-12 (N=13)	SP		Wet, medium dense, brown, medium SAND some gravel, little silt (FILL)	PID=20
8	15	14-16	S-5	8/24	8-8-5-8 (N=13)	SW-SM		Wet, medium dense, brown, coarse to fine SAND, some gravel, trace fines (ALLUVIUM)	PID=3
		16-18	S-6	20/24	7-3-3-11 (N=6)	ML		Wet, medium stiff, light brown, SILT, some fine sand (ALLUVIUM)	PID=0
3		18-20	S-7	9/24	9-7-6-9 (N=13)			Wet, medium dense, brown, fine to medium SAND, some silt (ALLUVIUM)	PID=0



∇ - Water Level at Time of Drilling

Boring B-2

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-2

Date(s) Drilled 09/03/2019 - 09/05/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 34.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 22.2 ft / NGVD 1929	
Location Tidewater Site	Coordinates 359851.53E,286363.91N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-2						SM		Wet, medium dense, brown, fine to medium SAND, some silt (ALLUVIUM)	Occasional rig chatter starting at 21'
	25	24-26	S-8	6/24	9-8-8-8 (N=16)	SC		Wet, medium dense, gray and brown SAND, some clay, little gravel (GLACIAL TILL)	
-7		29-29	S-9	0/0	50/0"			Top of Bedrock at 29.0 ft. See Core Boring Report for rock details.	
-12		35							
-17									



∇ - Water Level at Time of Drilling

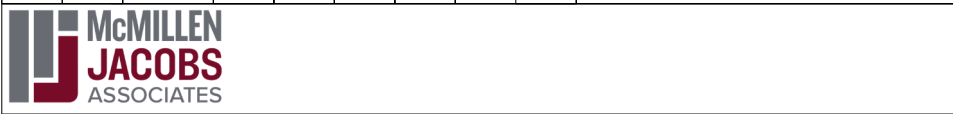
Boring B-2

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-2

Date(s) Drilled: 09/03/2019 - 09/05/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 34.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 22.2 ft / NGVD 1929	
Location: Tidewater Site	Coordinates: 359851.53E,286363.91N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
-2	25								See Test Boring Report for Overburden Details						
-7		29-34	5	1	C-1	56/93%	36/60%	.....	Strong, fresh, gray, medium-grained SANDSTONE	29.5	J	40	SR	1.00	FR



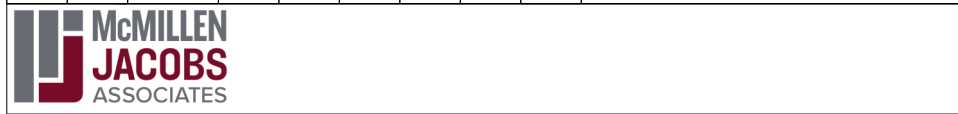
Boring B-2

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-2

Date(s) Drilled: 09/03/2019 - 09/05/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 34.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 22.2 ft / NGVD 1929	
Location: Tidewater Site	Coordinates: 359851.53E,286363.91N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES									
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL				
-12	35	29-34	4	1	C-1	56/ 93%	36/ 60%	.....	Strong, fresh, gray, medium-grained SANDSTONE	30.7	J	40	SR	5.00	FR				
										31.2	J	40	S	1.00	FR					
										31.6	J	20	S	5.00	FR					
										31.8	J	30	S	1.00	FR					
										32.0	J	20	SR	1.00	FR					
										32.8	J	20	SR	1.00	SL					
										32.9	J	20	S	1.00	FR					
										33.0	J	20	S	1.00	FR					
										33.2	J	10	S	1.00	FR					
										33.3	J	40	SR	5.00	FR					
										33.5	J	20	S	1.00	FR					
										33.7	J	20	R	5.00	SL					
										Bottom of borehole at 34.0 ft.										



Boring B-2

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-3

Date(s) Drilled 09/06/2019 - 09/09/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 37.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 37.4 ft / NGVD 1929	
Location Northwestern corner of Tidewater Site	Coordinates 359575.63E,286640.16N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
33		5						Vacuum excavated from about 0 to 6 ft (FILL)	
								Drilled from 6 to 8 ft without sampling (FILL)	Rig Chatter/Slow Drilling
28		8-10	S-1	19/24	15-35-20-19 (N=55)			Moist, very dense, brown, SAND, little gravel and silt. Fragments of brick. (FILL)	PID=0
						SP-SM			
23	∇	14-16	S-2	9/24	14-10-9-8 (N=19)			Wet, medium dense, tan, coarse to fine SAND, trace gravel and fines (ALLUVIUM)	PID=0
						SM			
18								Wet, medium dense, tan, coarse to fine SAND, trace gravel and fines (ALLUVIUM)	



∇ - Water Level at Time of Drilling

Boring B-3

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-3

Date(s) Drilled 09/06/2019 - 09/09/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 37.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 37.4 ft / NGVD 1929	
Location Northwestern corner of Tidewater Site	Coordinates 359575.63E,286640.16N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-13	25	19-21	S-3	9/24	10-9-9-9 (N=18)	SM		Wet, medium dense, tan, coarse to fine SAND, trace gravel and fines (ALLUVIUM)	PID=0
		23-25	S-4	10/24	15-21-26-38 (N=47)	CL-GC		Wet, hard, brown, sandy CLAY and coarse to fine gravel (GLACIAL TILL)	PID=0
		25-27	S-5	13/24	16-34-34-28 (N=68)	SM-GM		Wet, very dense, brown, SAND and gravel, little silt (GLACIAL TILL)	PID=0
-8	30							Top of Bedrock at 27.0 ft. See Core Boring Report for rock details.	
-3	35								
-2									



∇ - Water Level at Time of Drilling

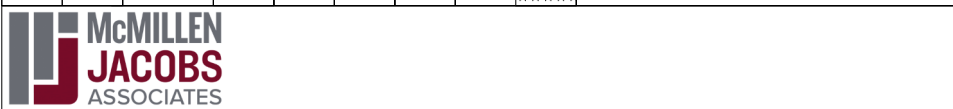
Boring B-3

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-3

Date(s) Drilled: 09/06/2019 - 09/09/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 37.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 37.4 ft / NGVD 1929	
Location: Northwestern corner of Tidewater Site	Coordinates: 359575.63E,286640.16N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
13	25								See Test Boring Report for Overburden Details						
		27-32	1	2	C-1	22/ 37%	14/ 24%	Recovered material described as follows: Strong, slightly weathered, purple, fine-grained SILTSTONE. No water return while coring run C-1.		27.3	J	30	SR	1.00	FR
										27.4	J	30	SR	1.00	FR
8			2						28.4	J	20	SR	1.00	FR	



Boring B-3

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-3

Date(s) Drilled: 09/06/2019 - 09/09/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 37.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 37.4 ft / NGVD 1929	
Location: Northwestern corner of Tidewater Site	Coordinates: 359575.63E,286640.16N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
3	27-32		1	2	C-1	22/37%	14/24%	XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX	Recovered material described as follows: Strong, slightly weathered, purple, fine-grained SILTSTONE. No water return while coring run C-1.							
			2													
	35	32-37		2	2	C-2	16/27%	0/0%	XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX	Recovered material described as follows: Strong, slightly weathered, purple to gray, fine-grained SILTSTONE. No water return while coring run C-2.						
				2												
				1												
				4												
								Bottom of borehole at 37.0 ft.								
-2																



Boring B-3

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-4A

Date(s) Drilled 08/28/2019 - 08/28/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 8.9 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 19.9 ft / NGVD 1929	
Location Taft St north of I-95 bridge	Coordinates	Elevation Source Google Earth	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
15	∞						(ASPHALT)		
		0.5-2	S-1	13/18	23-24-30 (N=54)	SP		Moist, very dense, reddish brown, coarse to fine SAND, little gravel (FILL)	PID=0
		2-4	S-2	10/24	23-26-21-16 (N=47)	SP-SM		Moist, dense, gray, medium to fine SAND, some gravel, little fines (FILL)	PID=0
		4-6	S-3	10/24	19-19-10-5 (N=29)	ML-SM		Wet, very stiff, light brown, medium to fine sandy SILT, little gravel. Fragments of brick and glass. (FILL)	PID=0
		6-8	S-4	6/24	5-5-6-13 (N=11)	SP-SM		Wet, medium dense, dark brown, medium to fine SAND, some gravel, trace fines (FILL)	
		8-8.9	S-5	4/11	71-50/5" (N=50/5")	SP-SM		Wet, very dense, light brown, coarse to fine SAND, some gravel, trace silt. Pieces of concrete. (FILL)	PID=0
10							Bottom of borehole at 8.9 ft.		
							Pieces of possible concrete in tip of sampler. Relocated to new location at Boring B-4B.		



∞ - Water Level at Time of Drilling

Boring B-4A

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-4B

Date(s) Drilled 08/28/2019 - 08/28/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 10.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 19.9 ft / NGVD 1929	
Location Taft St north of I-95 bridge	Coordinates	Elevation Source Google Earth	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
15	5							No sampling from 0 to 8 ft (FILL)	Offset hole about 1 ft from B-4A and continued drilling and sampling from 8 ft below ground surface.
10	40	8-10	S-1	14/24	15-12-14-23 (N=26)	SP-SM		Wet, medium dense, light brown, medium to fine SAND, some gravel, trace fines (FILL)	PID=0
5	15							Bottom of borehole at 10.0 ft. Pieces of possible concrete in tip of sample. Relocated to new location at Boring B-4C.	



∇ - Water Level at Time of Drilling

Boring B-4B

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-4C

Date(s) Drilled 08/29/2019 - 08/29/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 35.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 19.9 ft / NGVD 1929	
Location Taft St north of I-95 bridge	Coordinates 359477.61E,288205.01N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
15	5							No sampling from 0 to 9.5 ft (FILL)	Offset hole about 3 ft from B-4B and continued drilling and sampling from 9.5 ft below ground surface. Occasional rig chatter from 0 to 9.5 ft.
10	10	9.5-11.5	S-1	14/24	18-18-29-23 (N=47)	SP		Dry, dense, light brown, coarse to fine SAND, some gravel, trace fines. Possible concrete. (FILL)	PID=0
5	15	14-16	S-2	10/24	15-10-10-15 (N=20)	SP-SM		Moist, dense, light brown, coarse to fine SAND, little gravel, trace fines (FILL)	PID=0
∞						GP		Wet, dense, dark brown, GRAVEL, little sand, trace fines (FILL)	



∞ - Water Level at Time of Drilling

Boring B-4C

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-4C

Date(s) Drilled 08/29/2019 - 08/29/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 35.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 19.9 ft / NGVD 1929	
Location Taft St north of I-95 bridge	Coordinates 359477.61E,288205.01N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
		19-21	S-3	14/24	10-23-18-12 (N=41)	ML-SM		Wet, hard, red, SILT and fine to medium SAND, trace gravel (GLACIOFLUVIAL)	PID=0
-5	25	24-26	S-4	13/24	38-29-20-16 (N=49)	GP-GM		Wet, dense, gray, coarse to fine GRAVEL, little sand (GLACIAL TILL)	PID=0 Rig Chatter
-10	30	29-29.5	S-5	6/6	70-50/0"	ML		Wet, very stiff, gray, sandy SILT, little gravel (GLACIAL TILL)	
								Top of Bedrock at 29.5 ft. See Core Boring Report for rock details.	
-15	35								



∇ - Water Level at Time of Drilling

Boring B-4C

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-5

Date(s) Drilled 08/27/2019 - 08/27/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 35.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 26.8 ft / NGVD 1929	
Location Intersection of Taft St. and Jenks Way	Coordinates 359511.82E,288453.92N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
							(ASPHALT)		
		0.5-2	S-1	14/18	44-30-30 (N=60)	SM		Dry, very dense, dark gray, coarse to fine SAND, little gravel and silt (FILL)	PID=0
		2-4	S-2	15/24	22-23-19-16 (N=42)	SM		Dry, very dense, light brown, medium to fine SAND, little silt, trace gravel (FILL)	PID=0
22		4-6	S-3	6/24	15-8-5-4 (N=13)	GP		Moist, medium dense, gray, coarse GRAVEL (FILL)	
		6-8	S-4	10/24	7-10-12-5 (N=22)	SM		Moist, medium dense, dark gray, coarse to fine SAND and GRAVEL, little silt (FILL)	PID=0
		8-10	S-5	0/24	7-6-6-6 (N=12)			No recovery. Gravel stuck in tip of sampler. (FILL)	PID=0
17		10-12	S-6	11/24	5-6-6-7 (N=12)	ML		Moist, stiff, light brown SILT, trace gravel (FILL)	PID=0
		14-16	S-7	9/24	5-7-5-3 (N=12)	GW		Wet, medium dense, gray, coarse to fine GRAVEL, little sand, trace fines. Fragments of brick. (FILL)	PID=0 Cobble from 16-17.5 ft
12									
7									



∇ - Water Level at Time of Drilling

Boring B-5

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-5

Date(s) Drilled 08/27/2019 - 08/27/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 35.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 26.8 ft / NGVD 1929	
Location Intersection of Taft St. and Jenks Way	Coordinates 359511.82E,288453.92N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-2	∞	19-21	S-8	10/24	10-21-19-29 (N=40)	GM		Wet, dense, brownish-gray, coarse GRAVEL, little sand and silt (GLACIAL TILL)	PID=0
		24-26	S-9	12/24	13-16-19-29 (N=35)	SM		Wet, dense, brownish-gray, SAND, some gravel, little silt (GLACIAL TILL)	PID=0
								Top of Bedrock at 27.0 ft. See Core Boring Report for rock details.	
-3		30							
-8		35							
-13									



∞ - Water Level at Time of Drilling

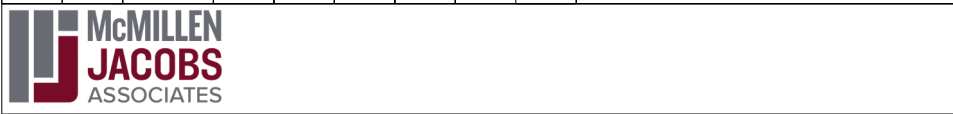
Boring B-5

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-5

Date(s) Drilled: 08/27/2019 - 08/27/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 35.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 26.8 ft / NGVD 1929	
Location: Intersection of Taft St. and Jenks Way	Coordinates: 359511.82E,288453.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
2	25								See Test Boring Report for Overburden Details						
		27-32	2	1	C-1	58/ 97%	47/ 78%		Strong, fresh, gray, medium-grained SANDSTONE	28.9	J	40	SR	5.00	FR
-3			2												



Boring B-5

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-5

Date(s) Drilled: 08/27/2019 - 08/27/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 35.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 26.8 ft / NGVD 1929	
Location: Intersection of Taft St. and Jenks Way	Coordinates: 359511.82E,288453.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
-8	35	27-32	4	1	C-1	58/ 97%	47/ 78%	Strong, fresh, gray, medium-grained SANDSTONE	30.5	J	40	SR	5.00	FR	
			30.6							J	40	SR	5.00	FR		
		32-35	3	1	C-2	32/ 90%	24/ 67%			32.6	J	40	SR	1.00	FR	
			33.7							J	30	R	5.00	FR		
-13									Bottom of borehole at 35.0 ft.							



Boring B-5

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits Project Location: Pawtucket, RI Project Number: 5980.0	Boring B-6
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Date(s) Drilled 08/29/2019 - 08/29/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 4.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic		Ground Surface Elevation/Datum
Location On Roosevelt Ave Ext. north of Jenks Way		Coordinates	Elevation Source Google Earth

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
							(ASPHALT)		
		0.5-2	S-1	10/18	9-9-11 (N=20)	SW	[Cross-hatch pattern]	Moist, medium dense, brown, coarse to fine SAND with gravel, trace silt (FILL)	
		2-4	S-2	15/24	5-5-6-39 (N=11)	SP	[Cross-hatch pattern]	Moist, medium dense, dark brown, medium to fine SAND, little gravel, trace silt. Trace brick fragments. Possible concrete in tip. (FILL)	
-5		5						Bottom of borehole at 4.0 ft.	
-10		10						Pieces of possible concrete in tip of sampler. Relocated to new location at Boring B-6A.	
-15		15							

	- Water Level at Time of Drilling	Boring B-6
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Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-6A

Date(s) Drilled 09/18/2019 - 09/18/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 31.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 25.4 ft / NGVD 1929	
Location On Roosevelt Ave Ext. north of Jenks Way	Coordinates 359521.28E,288557.54N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
21								Vacuum excavated from about 0 to 6 ft (FILL)	
		5							
		6-8	S-1	8/24	7-4-5-8 (N=9)	SM		Moist, loose, brown, medium to fine SAND, little silt. Black sand in tip of sampler. (FILL)	PID=0
		8-10	S-2	8/24	10-14-20-15 (N=34)	SP-SM		Moist, dense, brown to black, medium to fine SAND, trace silt (FILL)	PID=0
16	∇ 10								Water loss while drilling from 10-14 ft PID=0
		10-12	S-3	10/24	7-6-4-3 (N=10)	SP-SM		Wet, medium dense, dark brown, medium to fine SAND, little gravel, trace fines (FILL)	
11		14-16	S-4	8/24	12-5-13-9 (N=18)	SP-SM		Wet, medium dense, gray, SAND, some coarse to fine gravel, little silt. Pieces of glass. (FILL)	PID=0
6								Wet, very dense, gray, SAND and gravel, little silt (GLACIAL TILL)	



∇ - Water Level at Time of Drilling

Boring B-6A

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-6A

Date(s) Drilled 09/18/2019 - 09/18/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 31.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 25.4 ft / NGVD 1929	
Location On Roosevelt Ave Ext. north of Jenks Way	Coordinates 359521.28E,288557.54N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
		19-21	S-5	15/24	26-35-39-38 (N=74)				PID=0
						SM		Wet, very dense, gray, SAND and GRAVEL, little silt (GLACIAL TILL)	Rig Chatter
-1		24-24.1	S-6	1/1	50/1"	GW		Wet, very dense, gray, coarse to fine GRAVEL, little silt (GLACIAL TILL)	Rig Chatter
-4								Top of Bedrock at 26.0 ft. See Core Boring Report for rock details.	Rollerbit from 24.1 ft to 26 ft and hit refusal
-9									
-14									



∇ - Water Level at Time of Drilling

Boring B-6A

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-6A

Date(s) Drilled: 09/18/2019 - 09/18/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 31.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 25.4 ft / NGVD 1929	
Location: On Roosevelt Ave Ext. north of Jenks Way	Coordinates: 359521.28E,288557.54N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
1	25								See Test Boring Report for Overburden Details						
-4	26-31	3	3	C-1	59/98%	34/57%	xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx	Strong, fresh, gray, fine-grained SILTSTONE	26.5	J	40	R	1.00	FR	
									26.7	J	40	SR	1.00	FR	
									26.9	J	30	SR	1.00	SL	
		27.6							J	30	SR	1.00	FR		
		27.6							J	20	S	1.00	FR		
		27.9							J	40	S	1.00	SL		
		28.0							J	10	S	1.00	FR		
		28.2							J	40	SR	1.00	FR		
		28.7							J	40	S	1.00	FR		
		28.8							J	40	SR	1.00	FR		
29.0	J	30	SR	1.00	FR										
29.0	J	20	S	1.00	FR										
29.2	J	20	SR	5.00	FR										



Boring B-6A

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-6A

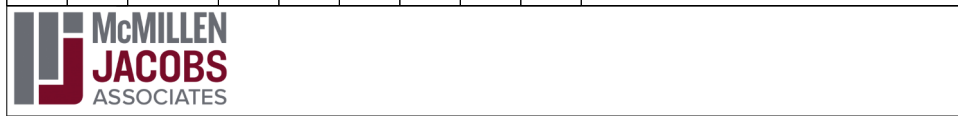
Date(s) Drilled: 09/18/2019 - 09/18/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
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Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 31.0 ft
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Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 25.4 ft / NGVD 1929
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Location: On Roosevelt Ave Ext. north of Jenks Way	Coordinates: 359521.28E,288557.54N	Elevation Source: Field Survey
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ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES						
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL	
		26-31	5	3	C-1	59/ 98%	34/ 57%	XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX	Strong, fresh, gray, fine-grained SILTSTONE	30.1	J	50	SR	5.00	FR		
										30.2	J	30	S	1.00	FR		
										30.6	J	30	SR	1.00	FR		
										30.7	J	40	SR	5.00	FR		
									Bottom of borehole at 31.0 ft.								



Boring B-6A

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-7

Date(s) Drilled 08/30/2019 - 08/30/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 29.2 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 23.3 ft / NGVD 1929	
Location On Roosevelt Ave Ext. across from National Grid Property	Coordinates 359529.70E,288817.39N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
							(ASPHALT)		
		0.5-2	S-1	11/18	5-11-17 (N=28)	SP-SM		Moist, medium dense, light brown/red, coarse to fine SAND, some gravel, trace silt (FILL)	PID=0
		2-4	S-2	16/24	11-11-7-6 (N=18)	SP-SM		Moist, medium dense, black, medium to fine SAND, little gravel, trace silt (FILL)	PID=0
19	∞	4-6	S-3	4/24	4-2-3-2 (N=5)	SP-SM		Wet, loose, black, medium to fine SAND, little gravel, trace silt (FILL)	
		6-8	S-4	6/24	1-2-1-0 (N=3)	GW		Wet, very loose, black, coarse to fine GRAVEL, little sand (FILL)	PID=0
14		8-10	S-5	8/24	1-1-18-6 (N=19)	GW-GM		Wet, medium dense, black, coarse to fine GRAVEL, trace sand and silt (FILL)	PID=0
		10-12	S-6	15/24	10-47-34-18 (N=81)	GW		Wet, very dense, dark brown decomposed wood. Bottom 3": Gray coarse to fine GRAVEL, some silt, little sand (FILL)	3 in split spoon sample. PID=0
9		14-16	S-7	13/24	8-9-24-36 (N=33)				PID=0
						SM		Wet, dense, light brown, medium to fine SAND, some gravel, little silt (GLACIOFLUVIAL)	Rig Chatter
4		19-20.8	S-8	15/22	21-35-52-50/4" (N=87)			Wet, very dense, light brown, medium to fine SAND, little gravel, trace silt (GLACIOFLUVIAL)	



∞ - Water Level at Time of Drilling

Boring B-7

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-7

Date(s) Drilled 08/30/2019 - 08/30/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 29.2 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 23.3 ft / NGVD 1929	
Location On Roosevelt Ave Ext. across from National Grid Property	Coordinates 359529.70E,288817.39N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
									PID=0
						SP		Wet, very dense, light brown, medium to fine SAND, little gravel, trace silt (GLACIOFLUVIAL)	
-1		24-24.08	S-9	1/1	80/1"				
		25				SC		Wet, very dense, gray, fine SAND and clay, some fractured rock (GLACIAL TILL)	Rig Chatter
-6		29-29.13	S-10	0/2	50/2"				
		30						Bottom of borehole at 29.2 ft.	
		35							
-11									
-16									



∇ - Water Level at Time of Drilling

Boring B-7

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-8

Date(s) Drilled 09/10/2019 - 09/10/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 25.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 31.1 ft / NGVD 1929	
Location Intersection of Roosevelt Ave. Ext. and Main St.	Coordinates 359697.13E,289110.39N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
27		5						Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	6/24	14-8-5-8 (N=13)	SM		Moist, stiff, brown, SAND, some silt, little gravel (FILL)	PID=0
22		8-10	S-2	9/24	7-4-4-5 (N=8)	SP		Wet, loose, brown, coarse to fine SAND, little gravel, trace silt (GLACIOFLUVIAL)	PID=0
	∇ 10	10-12	S-3	7/24	6-5-2-1 (N=7)	SM		Wet, loose, brown, SAND, some silt, little gravel (GLACIOFLUVIAL)	PID=0
17		14-14.08	S-4	1/1	50/1"				No casing advancement
		15				GW		Wet, very dense, gray, coarse to fine GRAVEL, trace silt (GLACIAL TILL)	Sampler refusal at 14.1 ft. Rollerbit from 14.1 ft to 16 ft.
12								See Core Boring Report for rock details	



∇ - Water Level at Time of Drilling

Boring B-8

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-8

Date(s) Drilled: 09/10/2019 - 09/10/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 25.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 31.1 ft / NGVD 1929	
Location: Intersection of Roosevelt Ave. Ext. and Main St.	Coordinates: 359697.13E,289110.39N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
17	15								See Test Boring Report for Overburden Details							
12	16-21		3	3	C-1	58/97%	16/27%		Strong, fresh, gray, medium-grained SANDSTONE	16.3	J	30	SR	5.00	FR	
			3							16.4	J	30	SR	10.0	FR	
										16.5	J	30	S	0	FR	
										16.8	J	40	R	1.00	FR	
										16.8	J	20	SR	10.0	FR	
										16.9	J	50	SR	0	FR	
										17.2	J	30	SR	10.0	FR	
										17.3	J	30	SR	0	FR	
										17.6	J	40	SR	5.00	FR	
										17.7	J	40	R	5.00	FR	
										17.8	J	40	SR	5.00	FR	
										17.9	J	40	SR	10.0	FR	
										18.0	J	50	R	0	FR	
										18.7	J	50	SR	10.0	FR	
										19.0	J	40	SR	0	FR	
										19.2	J	30	SR	5.00	FR	
										19.3	J	40	SR	5.00	FR	
										19.4	J	50	SR		FR	
										19.5	J	50	SR		FR	



Boring B-8

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-8

Date(s) Drilled: 09/10/2019 - 09/10/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 25.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 31.1 ft / NGVD 1929	
Location: Intersection of Roosevelt Ave. Ext. and Main St.	Coordinates: 359697.13E,289110.39N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
7	16-21	2	3	C-1	58/97%	16/27%	.....	Strong, fresh, gray, medium-grained SANDSTONE	19.8	J	20	SR	10.0	FR	
									20.0	J	30	SR	0	FR		
										J	30	SR	5.00	FR		
									20.6	J	10	SR	5.00	FR		
									20.7	J	30	SR	1.00	FR		
									21.1	J	10	SR	5.00	FR		
									21.2	J	50	SR	10.0	FR		
									21.5	J	40	SR	0	FR		
									21.6	J	40	SR	10.0	FR		
									21.7	J	50	S	0	FR		
	21.9	J	40	SR	10.0	FR										
	22.2	J	40	SR	0	FR										
	21-25	3	C-2	42/88%	11/23%	.....	Strong, fresh, gray, medium-grained SANDSTONE with conglomeratic material between 21-22.2 ft	5.00							
								5.00								
								5.00								
								5.00								
								5.00								
								5.00								
								5.00								
								5.00								
23.7								J	30	R	5.00	SL				
24.0								J	30	SR	1.00	FR				
25	1						Bottom of borehole at 25.0 ft.									
2																



Boring B-8

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-9

Date(s) Drilled 02/10/2020 - 02/10/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 39.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 28.0 ft / NGVD 1929	
Location Across Taft St. from charter school on Tidewater Site	Coordinates 359657.08E,286344.74N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
24								Vacuum excavated from about 0 to 6 ft (FILL)	
	5								
		6-8	S-1	6/24	7-16-19-19 (N=35)	SP		Moist, dense, brown, fine SAND little gravel, trace silt (FILL)	PID=0
19		8-10	S-2	20/24	13-16-13-9 (N=29)	SP		Top 7": Moist, brown, SAND, some gravel (FILL)	PID=0
	10								
						ML		Bottom 13": Moist, very stiff, light brown, SILT, trace sand (ALLUVIUM)	
14		14-16	S-3	6/24	15-11-5-5 (N=16)	ML		Moist, very stiff, brown, SILT, trace sand (ALLUVIUM)	PID=0
	15								
		17-19	S-4	20/24	6-3-2-3 (N=5)	ML		Wet, medium stiff, dark gray, clayey SILT (ALLUVIUM)	PID=0
9								Wet, medium stiff, dark gray, clayey SILT (ALLUVIUM)	



∇ - Water Level at Time of Drilling

Boring B-9

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits Project Location: Pawtucket, RI Project Number: 5980.0	Boring B-9
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Date(s) Drilled 02/10/2020 - 02/10/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 39.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 28.0 ft / NGVD 1929	
Location Across Taft St. from charter school on Tidewater Site	Coordinates 359657.08E,286344.74N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
		19-21	S-5	19/24	5-1-6-23 (N=7)	ML		Wet, medium stiff, dark gray, clayey SILT (ALLUVIUM)	PID=0
		21-23	S-6	16/24	19-28-19-26 (N=47)	SW		Moist, dense, orange brown, coarse to medium SAND, little gravel (GLACIAL TILL)	PID=0
4		23-25	S-7	16/24	42-38-50- 58 (N=88)	GM		Moist, very dense, gray, coarse to fine GRAVEL, some clayey silt, little sand (GLACIAL TILL)	PID=0
	25	25-27	S-8	16/24	62-44-37-52 (N=81)	SM		Moist, very dense, gray, medium to fine SAND and coarse to fine GRAVEL, little silt (GLACIAL TILL)	PID=0
		27-28.75	S-9	17/21	38-30-32-100/3" (N=62)	SM		Moist, very dense, gray, medium to fine SAND and coarse to fine GRAVEL, little clayey silt (GLACIAL TILL)	PID=0. Rock fragments in tip of sampler.
	-1								
	30							Top of Bedrock at 29.0 ft. See Core Boring Report for rock details.	
	-6								
	35								
	-11								



∇ - Water Level at Time of Drilling

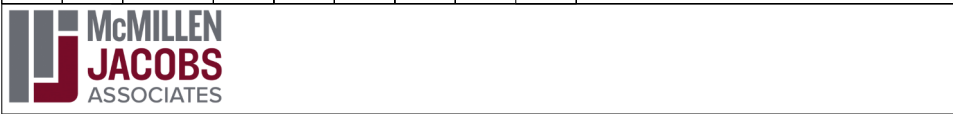
Boring B-9

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-9

Date(s) Drilled: 02/10/2020 - 02/10/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 39.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 28.0 ft / NGVD 1929	
Location: Across Taft St. from charter school on Tidewater Site	Coordinates: 359657.08E,286344.74N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
4	25								See Test Boring Report for Overburden Details						
-1		29-34	6	5	C-1	58/ 97%	41/ 68%	.....	Strong, slightly weathered, dark gray, medium-grained SANDSTONE						



Boring B-9

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-9

Date(s) Drilled: 02/10/2020 - 02/10/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 39.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 28.0 ft / NGVD 1929	
Location: Across Taft St. from charter school on Tidewater Site	Coordinates: 359657.08E,286344.74N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
-6	35	29-34	4	5	C-1	58/97%	41/68%	Dotted	Strong, slightly weathered, dark gray, medium-grained SANDSTONE	30.9	HJ	30				
			3							J	35	SR	0.50	SW	SL	
			31.8							J	30	SM	0.50	SW		
			32.0							HJ	40					
			32.3							J	40	SM	1.00	SW	SL	
		32.3	J	30	SM	0.50	SW	SL								
		32.5	J	30	SM	0.50	SW									
		32.7	J	30	SM	0.50	SW									
		32.8	J	30	SM	0.50	SW	SL								
		32.9	J	30	0.50	SW										
	33.2	J	30													
	33.3	HJ	30	SR	0.50	SW										
	33.6	J	30	SM	0.50	SW										
	33.7	HJ	30													
	33.8	J	25													
	34.1	HJ	40	SM	0.50	SW	SL									
	34.3	HJ	70													
	34.5	J	35													
	34.6	HJ	20	SR	0.50	SW										
	34.8	HJ	45													
35.1	J	50														
-11	34-39	2	5	C-2	60/100%	39/65%	Dotted	Strong, slightly weathered, dark gray, medium-grained SANDSTONE	36.0	J	40	SR	0.50	SW	SL	
		36.8							J	45	SR	0.50	SW	SL		
		37.0							J	40	SR	0.50	SW			
		37.2							J	35	SL	0.50	SW			
		37.7							J	65	SL	0.50	SW			
	37.8	J	35	SL	0.50	SW										
	38.0	F/S	40	SL	5.00	MW	CS									
	38.4	J	40	SM	0.50	SW	SL									
	38.5	J	40	SM	0.50	SW	SL									
	38.6	J	40	SM	0.50	SW	SL									
38.7	J	40	SM	0.50	SW	SL										
38.8	J	35	SR	0.50	SW											
								Bottom of borehole at 39.0 ft.								





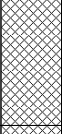



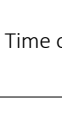



Boring B-9

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-10

Date(s) Drilled 02/05/2020 - 02/05/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 31.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 23.7 ft / NGVD 1929	
Location Southerly end of field on Tidewater Site	Coordinates 359996.52E,286103.11N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-19		5						Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	11/24	17-16-18-20 (N=34)	SP		Moist, dense, brown, medium SAND, trace gravel (FILL)	PID=0
		8-10	S-2	21/24	17-15-17-17 (N=32)	SP		Moist, dense, brown, medium SAND (FILL)	PID=0
14		10							
		10-12	S-3	9/24	15-10-12-16 (N=22)	SP		Moist, medium dense, dark brown, medium to fine SAND, little gravel, trace silt (FILL)	PID=0
		12-14	S-4	20/24	14-12-19-18 (N=31)	SP		Moist, dense, dark brown, medium to fine SAND, little gravel, trace silt (FILL)	PID=0
9		15							
		14-16	S-5	9/24	19-13-14-10 (N=27)	SP		Moist, medium dense, dark brown, medium to fine SAND, little gravel, trace silt (FILL)	PID=0
		16-18	S-6	4/24	11-10-12-11 (N=22)	SP		Moist, medium dense, dark brown, medium SAND, trace gravel and silt. Fragments of brick. (FILL)	PID=0. Rock fragments in tip of sampler.
4		18-20	S-7	12/24	19-23-30-46 (N=53)	SP		Moist, very dense, brown, coarse to fine SAND, some gravel, trace silt (FILL)	PID=0




∇ - Water Level at Time of Drilling

Boring B-10

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-10

Date(s) Drilled 02/05/2020 - 02/05/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 31.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 23.7 ft / NGVD 1929	
Location Southerly end of field on Tidewater Site	Coordinates 359996.52E,286103.11N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
∇		20-21	S-8	9/12	73-103 (Refusal)	GM		Wet, very dense, dark gray, coarse to fine GRAVEL, little sand and silt (GLACIAL TILL)	PID=3. Petroleum odor, oily appearance, rock fragments in tip of sampler.
-1		25							
-6		30							
-11		35							
-16									



∇ - Water Level at Time of Drilling

Boring B-10

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-10

Date(s) Drilled: 02/05/2020 - 02/05/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 31.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 23.7 ft / NGVD 1929	
Location: Southerly end of field on Tidewater Site	Coordinates: 359996.52E,286103.11N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
									See Test Boring Report for Overburden Details							
		21-26	3							21.3	J	65	SM	1.00	FR	
										21.7	J	30	R	1.00	SW	SI
			3							22.2	J	25	R		SW	
										22.8	J	45	SM		SW	
										23.2	J	60	VR	1.00	SW	PY
			4	4	C-1	56/93%	37/62%		Strong, slightly weathered, dark gray, medium-grained SANDSTONE	23.4	J	35	R	0.50	SW	
										23.7	J	35	R	0.25	SW	
										23.9	J	40	R	2.00	SW	
										24.4	J	40	R	1.00	SW	
			5							24.7	J	40	R	0.50	SW	
										24.9	J	45	R	2.00	SW	
										25.2	J	20	VR	2.00	SW	
			10							25.4	J	35	R		SW	
		26-31	2							27.2	J	50	SR	1.00	SW	CA
										27.6	HJ	70			SW	
			3							27.7	J	40	SR	2.00	SW	
				4	C-2	60/100%	52/87%		Strong, slightly weathered, dark gray, medium-grained SANDSTONE							
										28.9	J	45	SR	1.00	SW	SI
										29.0	J	50	SR	0.25	SW	
										29.1	J	40	SM	1.00	SW	
										29.4	J	45	SM	1.00	SW	
			2							29.8	J	35	SM	1.00	SW	



Boring B-10

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-10

Date(s) Drilled: 02/05/2020 - 02/05/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 31.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 23.7 ft / NGVD 1929	
Location: Southerly end of field on Tidewater Site	Coordinates: 359996.52E,286103.11N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
		26-31	3	4	C-2	60/100%	52/87%	.....	Strong, slightly weathered, dark gray, medium-grained SANDSTONE	30.0	J	35	SM	0.50	SW	
										30.5	J	25	SM	0.25	SW	
										30.7	J	40	SM	0.25	SW	
									Bottom of borehole at 31.0 ft.							

-11

35

-16



Boring B-10

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-11

Date(s) Drilled 02/07/2020 - 02/10/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 39.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 25.7 ft / NGVD 1929	
Location Tidewater Site	Coordinates 359825.47E,286216.96N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
								Vacuum excavated from about 0 to 1 ft: Encountered existing concrete tank foundation (1ft thick from 1-2ft below grade) (FILL)	
		2-4	S-1	24/24	20-23-42-21 (N=65)	SW		Moist, very dense, brown, medium to fine SAND, some gravel (FILL)	PID=0
21		4-6	S-2	12/24	20-22-56-36 (N=78)	SW		Moist, very dense, brown, medium to coarse SAND and gravel, trace silt (FILL)	Rig Chatter. PID=0
						SW		Moist, very dense, brown, medium to coarse SAND and gravel, trace silt (FILL)	
16		9-11	S-3	14/24	14-9-13-10 (N=22)	ML		Moist, very stiff, light brown SILT, trace fine sand, trace clay (ALLUVIUM)	PID=0
		13-15	S-4	17/24	7-3-8-8 (N=11)	ML		Moist, stiff, light brown, clayey SILT, trace sand (ALLUVIUM)	PID=0
11		15-17	S-5	7/24	19-22-16-16 (N=38)	GM		Moist, dense, brown, coarse to fine GRAVEL, some coarse to fine sand, little silt (GLACIOFLUVIAL)	PID=0
		17-19	S-6	12/24	15-10-10-12 (N=20)	GM		Moist, medium dense, brown, coarse to fine GRAVEL, some sand, little silt (GLACIOFLUVIAL)	PID=0
6									



∇ - Water Level at Time of Drilling

Boring B-11

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-11

Date(s) Drilled 02/07/2020 - 02/10/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 39.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 25.7 ft / NGVD 1929	
Location Tidewater Site	Coordinates 359825.47E,286216.96N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-1		19-21	S-7	10/24	14-15-9-10 (N=24)	SP-SM		Moist, medium dense, light brown, coarse to medium SAND, some gravel, trace silt (GLACIOFLUVIAL)	Rig Chatter. PID=0
		21-23	S-8	16/24	9-6-14-20 (N=20)	ML		Moist, very stiff, dark gray, clayey SILT, some sand (GLACIOFLUVIAL)	PID=0. Rock fragments in tip of sampler
		23-25	S-9	8/24	24-22-26-24 (N=48)	GM		Moist, dense, gray, coarse to fine GRAVEL, some sand, little clayey silt (GLACIAL TILL)	PID=0
		25-27	S-10	15/24	26-48-18-52 (N=66)	GM		Moist, very dense, gray, coarse to fine GRAVEL, some sand, little clayey silt (GLACIAL TILL)	PID=0. Rock fragments in tip of sampler
-4		30						Top of Bedrock at 29.0 ft. See Core Boring Report for rock details.	
-9		35							
-14								Bottom of borehole at 39.0 ft.	



∇ - Water Level at Time of Drilling

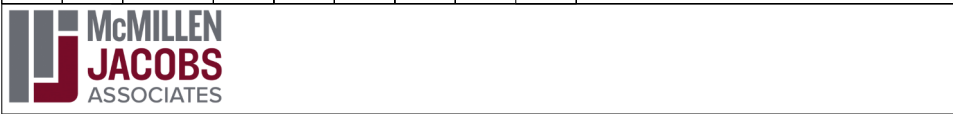
Boring B-11

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-11

Date(s) Drilled: 02/07/2020 - 02/10/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 39.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 25.7 ft / NGVD 1929	
Location: Tidewater Site	Coordinates: 359825.47E,286216.96N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
1	25								See Test Boring Report for Overburden Details						
-4		29-33	2	4	C-1	25/ 52%	5/ 10%	.....	Strong, moderately to completely weathered, dark gray, medium-grained SANDSTONE						



Boring B-11

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-11

Date(s) Drilled: 02/07/2020 - 02/10/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 39.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 25.7 ft / NGVD 1929	
Location: Tidewater Site	Coordinates: 359825.47E,286216.96N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
		29-33	1	4	C-1	25/52%	5/10%		Strong, moderately to completely weathered, dark gray, medium-grained SANDSTONE	30.5	J	45	R		MW	FE
										30.8	J	30	R		MW	FE
										31.0	J	15	R	1.00	SW	
										31.2	J	50	VR		MW	FE
										31.5	J	40	SR		MW	FE
			2													
									Split spoon sample attempted at 34 ft. with blow count of 50/0"							
										34.1	J	45	SR	1.00	SW	SI
			3							34.9	J	45	SM	1.00	SW	
										35.2	J	45	SR	2.00	SW	SI
			3							35.4	J	35	VR	2.00	SW	SI
										35.5	J	40	SR	0.50	SW	SI
										35.7	J	50	VR	0.50	SW	SI
		34-39	4	4	C-2	52/87%	41/68%		Strong, slightly weathered, gray, medium-grained SANDSTONE	36.2	J	45	SR	1.00	SW	
										37.0	J	40	SR	1.00	SW	
										37.3	J	50	VR	1.00	SW	
			4							37.7	J	55	SR	0.50	SW	
										38.0	J	40	SR	0.50	SW	
			4													
									Bottom of borehole at 39.0 ft.							








Boring B-11

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-12

Date(s) Drilled 02/11/2020 - 02/12/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 51.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 30.1 ft / NGVD 1929	
Location Across Taft St. from Tower St. on Tidewater Site	Coordinates 359643.34E,286494.92N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
26	5							Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	14/24	12-17-14-18 (N=31)	ML		Moist, hard, light brown SILT, little clay (ALLUVIUM)	PID=0
21		8-10	S-2	19/24	13-8-12-14 (N=20)	ML		Moist, very stiff, dark gray, clayey SILT (ALLUVIUM)	PID=0
16		14-16	S-3	11/24	4-8-7-7 (N=15)	ML		Moist, stiff, dark gray, clayey SILT (ALLUVIUM)	PID=0
11						ML		Moist, gray SILT (ALLUVIUM)	



∇ - Water Level at Time of Drilling

Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-12

Date(s) Drilled 02/11/2020 - 02/12/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 51.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 30.1 ft / NGVD 1929	
Location Across Taft St. from Tower St. on Tidewater Site	Coordinates 359643.34E,286494.92N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
6 25 1 30 4 9	∇	19-21	S-4	16/24	9-15-18-21 (N=33)	SP		Moist, dense, brown, fine to medium SAND, trace silt (ALLUVIUM)	PID=0
	23-25	S-5	12/24	24-14-16-20 (N=30)	CL		Moist, hard, light brown CLAY, little silt (GLACIAL TILL)	PID=0	
	25-27	S-6	16/24	34-64-65-54 (N=129)	GC		Moist, very dense, brown, clayey GRAVEL, little sand and silt (GLACIAL TILL)	Sampler would not open. PID=0.	
	27-28.75	S-7	4/21	34-69-48-100/3" (N=117)	GC		Moist, very dense, brown, clayey GRAVEL, little sand (GLACIAL TILL)	PID=0. Rock fragments lodged in tip of sampler.	
								Top of Bedrock at 29.0 ft. See Core Boring Report for rock details.	



∇ - Water Level at Time of Drilling

Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-12

Date(s) Drilled: 02/11/2020 - 02/12/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 51.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 30.1 ft / NGVD 1929	
Location: Across Taft St. from Tower St. on Tidewater Site	Coordinates: 359643.34E,286494.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
6	25								See Test Boring Report for Overburden Details						
1		29-34	3		C-1	9/15%	0/0%	.....	Weak, highly weathered, gray, medium-grained SANDSTONE						



Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-12

Date(s) Drilled: 02/11/2020 - 02/12/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 51.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 30.1 ft / NGVD 1929	
Location: Across Taft St. from Tower St. on Tidewater Site	Coordinates: 359643.34E,286494.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES						
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL	
-4	29-34		3		C-1	9/ 15%	0/ 0%	Dotted	Weak, highly weathered, gray, medium-grained SANDSTONE								
			4														
			1														
			1														
-4	35	34-37	2		C-2	13/ 36%	0/ 0%	Dotted	Weak, highly weathered, gray, medium-grained SANDSTONE								
				1													
				6													
-9	37-41		4		C-3	6/ 12%	0/ 0%	Dotted	Weak, highly weathered, gray, medium-grained SANDSTONE								



Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-12

Date(s) Drilled: 02/11/2020 - 02/12/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 51.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 30.1 ft / NGVD 1929	
Location: Across Taft St. from Tower St. on Tidewater Site	Coordinates: 359643.34E,286494.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES						
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL	
-14		37-41			C-3	6/12%	0/0%		Weak, highly weathered, gray, medium-grained SANDSTONE								
			2							41.4	J	35	SR	0.50	SW	SI	
				3						42.0	J	30	SM	0.50	SW		
										42.8	J	30	SM	0.50	SW		
		41-46		2	5	C-4	59/98%	53/88%		Strong, slightly weathered, dark gray, medium-grained SANDSTONE	43.6	J	20	SR	2.00	SW	SI
										44.2	F/S	30	SL	5.00	MW	CS	
				2						45.0	J	25	SM	0.50	SW		
										45.4	J		SM	0.50	SW		
										45.5	J	35		0.50	SW		
				2						46.1	J	35	SL	0.50	SW	PY	
										46.2	J	30	SL	0.50	SW		
										46.4	J	25	SR	0.50	SW		
				2						47.2	J	40	SR	0.50	SW		
	-19		46-51			C-5	59/98%	46/77%		Strong, slightly weathered, purple, medium-grained SANDSTONE	47.3	J	40	SM	0.50	SW	
									47.7	J	40	SM	0.50	SW	SL		
									49.4	HJ	20	SM	0.50	SW			
									49.4	J	30	SR	0.50	SW			
									49.6	J	40		0.50	SW			
				2													



Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-12

Date(s) Drilled: 02/11/2020 - 02/12/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 51.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 30.1 ft / NGVD 1929	
Location: Across Taft St. from Tower St. on Tidewater Site	Coordinates: 359643.34E,286494.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
		46-51	2	5	C-5	59/ 98%	46/ 77%	.....	Strong, slightly weathered, purple, medium-grained SANDSTONE	50.2 50.2 50.6	HJ J J	35 35 35	SM SR	0.50 0.50 0.50	SW SW	SL
									Bottom of borehole at 51.0 ft.							



Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-13

Date(s) Drilled 02/06/2020 - 02/06/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 21.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 9.7 ft / NGVD 1929	
Location Across Seekonk River from Festival Pier on Tidewater Site	Coordinates 360398.12E,286078.13N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
5	5							Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	3/24	75-86-54-12 (N=140)	GW		Moist, very dense, dark gray, coarse to fine GRAVEL, some sand, trace silt (FILL)	PID=0
0	10	8-10	S-2	20/24	2-5-6-2 (N=11)	SM		Moist, medium dense, dark gray, medium to fine SAND, little silt grading to coarse to fine GRAVEL, little silt. Fragments of brick. (FILL)	PID=0. Strong petroleum odor, oily sheen.
		10-12	S-4	1/24	7-4-5-6 (N=9)	GM		Moist, medium dense, dark gray, sandy GRAVEL, little silt (FILL)	PID=2 Rig Chatter
-5	15	14-16	S-5	13/24	30-16-17-26 (N=33)	GW		Wet, dense, dark gray, coarse to fine sandy GRAVEL, trace silt (FILL)	PID=0. Rock fragments in tip of sampler, strong petroleum odor.
-10								Wet, hard, grey/brown clayey SILT, trace fine sand (FILL)	PID>100. Very strong petroleum odor, oily sheen.




∇ - Water Level at Time of Drilling

Boring B-13

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-13

Date(s) Drilled 02/06/2020 - 02/06/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 21.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 9.7 ft / NGVD 1929	
Location Across Seekonk River from Festival Pier on Tidewater Site	Coordinates 360398.12E,286078.13N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
		19-21	S-6	11/24	19-19-23-18 (N=42)	ML		Wet, hard, grey/brown clayey SILT, trace fine sand (FILL)	
-15	25							Bottom of borehole at 21.0 ft.	
-20	30								
-25	35								
-30									



∇ - Water Level at Time of Drilling

Boring B-13

APPENDIX B
Rock Core Photographs

CORE PHOTOS



Test Boring B-1, Run C-1 & C-2 (10 ft to 21.75 ft)
Test Boring B-3, Run C-1 & C-2 (27 ft to 37 ft)

Project

NBC Phase 3 IIIA-4 and IIIA-5
Consolidation Conduits

Date

11/20/2019

Figure

B.1

CORE PHOTOS



Test Boring B-8, Run C-1 & C-2 (16 ft to 25 ft)
Test Boring B-6A, Run C-1 (26 ft to 31 ft)

Project

NBC Phase 3 IIIA-4 and IIIA-5
Consolidation Conduits

Date

11/20/2019

Figure

B.2

CORE PHOTOS



Test Boring B-5, Run C-1 & C-2 (27 ft to 35 ft)
 Test Boring B-4C, Run C-1 (30 ft to 35 ft)
 Test Boring B-2, Run C1 (29 ft to 34 ft)

Project NBC Phase 3 IIIA-4 and IIIA-5
 Consolidation Conduits

Date 11/20/2019 Figure B.3

CORE PHOTOS



Test Boring B-10, Run C-1 & C-2 (21 ft to 31 ft)
 Test Boring B-11, Run C-1 & C-2 (29 ft to 39 ft)

Project

NBC Phase 3 IIIA-4 and IIIA-5
 Consolidation Conduits

Date

2/25/2020

Figure

B.4

CORE PHOTOS



Test Boring B-9, Run C-1 & C-2 (29 ft to 39 ft)
 Test Boring B-12, Run C-4 & C-5 (41 ft to 51 ft)

Project

NBC Phase 3 IIIA-4 and IIIA-5 Consolidation Conduits

Date

2/25/2020

Figure

B.5

CORE PHOTOS



Test Boring B-12, C-1 (29 ft to 34 ft)

Project

NBC Phase 3 IIIA-4 and IIIA-5
Consolidation Conduits

Date

2/12/2020

Figure

B.6

CORE PHOTOS



Test Boring B-12, C-2 (34 ft to 37 ft)

Project

NBC Phase 3 IIIA-4 and IIIA-5
Consolidation Conduits

Date

2/12/2020

Figure

B.7

CORE PHOTOS



Test Boring B-12, C-3 (37 ft to 41 ft)

Project

NBC Phase 3 IIIA-4 and IIIA-5
Consolidation Conduits

Date

2/12/2020

Figure

B.8

APPENDIX C
Groundwater Observation Well Installation and Monitoring Reports



OBSERVATION WELL INSTALLATION REPORT

Well No.
B-2
Boring No.
B-2

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	S. Wilbur
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	9/4/2019-9/5/2019
DRILLER	Paul Fisher	WATER LEVEL	8.60

Ground El.	22.22 ft	Location	Middle of the field on Tidewater Site	<input checked="" type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Diagram	Type of protective cover/lock	Guard Pipe with Lock															
			Height of top of guard pipe above the ground surface	2.5 ft															
			Height of top of riser pipe above the ground surface	2 ft															
			Type of protective casing:	Guard Pipe															
			Length	5.0 ft															
			Inside Diameter	4.0 in															
			Depth of bottom of guard pipe/roadway box	2.5 ft															
			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Type of Seals</th> <th>Top of Seal (ft)</th> <th>Thickness (ft)</th> </tr> </thead> <tbody> <tr> <td>Grout</td> <td style="text-align: center;">0.0</td> <td style="text-align: center;">2.0</td> </tr> <tr> <td>Bentonite</td> <td style="text-align: center;">2.0</td> <td style="text-align: center;">1.0</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Type of Seals	Top of Seal (ft)	Thickness (ft)	Grout	0.0	2.0	Bentonite	2.0	1.0						
Type of Seals	Top of Seal (ft)	Thickness (ft)																	
Grout	0.0	2.0																	
Bentonite	2.0	1.0																	
0-14': Fill - Brown and gray, sands, silts, and gravel	0-2': Grout		Type of riser pipe:	Solid PVC															
			Inside diameter of riser pipe	2.0 in															
			Type of backfill around riser	Holliston Sand															
			Diameter of borehole	4.0 in															
			Depth to top of well screen	5.0 ft															
			Type of screen	Slotted PVC Schedule 40															
			Screen gauge or size of openings	0.01 in															
			Diameter of screen	2.0 in															
			Type of backfill around screen	Holliston Sand															
			Depth of bottom of well screen	15.0 ft															
		Bottom of Silt trap	- ft																
		Depth of bottom of borehole	34.0 ft																

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

(Not to Scale)

$$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$$

COMMENTS: _____



OBSERVATION WELL INSTALLATION REPORT

Well No.
B-3
Boring No.
B-3

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	S. Wilbur
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	9/9/2019
DRILLER	Ray Eastwood	WATER LEVEL	

Ground El.	37.45 ft	Location	Northwestern corner of the Tideawter Site	<input checked="" type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Type of protective cover/lock	Guard Pipe with Lock
		Height of top of guard pipe above the ground surface	2.5 ft
		Height of top of riser pipe above the ground surface	2 ft
		Type of protective casing:	Guard Pipe
		Length	5.0 ft
		Inside Diameter	4.0 in
		Depth of bottom of guard pipe/roadway box	2.5 ft
		<u>Type of Seals</u>	<u>Top of Seal (ft)</u>
		Grout	0.0
		Bentonite	12.5
		_____	_____
		_____	_____
		Type of riser pipe:	Solid PVC
		Inside diameter of riser pipe	2.0 in
		Type of backfill around riser	Holliston Sand
		Diameter of borehole	4.0 in
		Depth to top of well screen	16.5 ft
		Type of screen	Slotted PVC Schedule 40
		Screen gauge or size of openings	0.01 in
		Diameter of screen	2.0 in
		Type of backfill around screen	Holliston Sand
		Depth of bottom of well screen	26.5 ft
		Bottom of Silt trap	- ft
		Depth of bottom of borehole	37.0 ft

(Bottom of Exploration) (Numbers refer to depth from ground surface in feet)	(Not to Scale)
$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$	

COMMENTS: _____



OBSERVATION WELL INSTALLATION REPORT

Well No.
B-4C
Boring No.
B-4C

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	S. Wilbur
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	8/29/2019
DRILLER	Paul Fisher	WATER LEVEL	18.50

Ground El.	19.87 ft	Location	East side of Roosevelt, across from southern property extents of Masonic Temple	<input type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input checked="" type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Diagram Labels	Values	Units
		Type of protective cover/lock	Roadway Box Cover	
		Depth of roadway box below the ground surface	0.0	ft
		Depth of top of riser pipe below the ground surface	0.5	ft
		Type of protective casing:	Roadway Box	
		Length	0.5	ft
		Inside Diameter	6	in
		Depth of bottom of guard pipe/roadway box	0.5	ft
		Type of Seals	Top of Seal (ft)	Thickness (ft)
		Drill Cuttings	0.0	10.0
		Bentonite	10.0	2.0
		Type of riser pipe:	Solid PVC	
		Inside diameter of riser pipe	2.0	in
		Type of backfill around riser	Holliston Sand	
		Diameter of borehole	4.0	in
		Depth to top of well screen	14.0	ft
		Type of screen	Slotted PVC Schedule 40	
		Screen gauge or size of openings	0.01	in
		Diameter of screen	2.0	in
		Type of backfill around screen	Holliston Sand	
		Depth of bottom of well screen	24.0	ft
		Bottom of Silt trap	-	ft
		Depth of bottom of borehole	35.0	ft

(Bottom of Exploration) (Numbers refer to depth from ground surface in feet)	(Not to Scale)
$\text{Riser Pay Length (L1)} + \text{Length of screen (L2)} + \text{Length of silt trap (L3)} = \text{Pay length}$	

COMMENTS: _____



OBSERVATION WELL INSTALLATION REPORT

Well No.
B-7
Boring No.
B-7

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	S. Wilbur
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	8/30/2019
DRILLER	Paul Fisher	WATER LEVEL	8.40

Ground El.	23.28 ft	Location	West side Roosevelt Ave, across from National Grid Hydroelectric facility.	<input type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input checked="" type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Type of protective cover/lock	Roadway Box Cover															
0-14': Fill - brown and black, sand with silt; and gravel with silt	0-6': Drill Cuttings	Depth of roadway box below the ground surface	0.0 ft															
		Depth of top of riser pipe below the ground surface	0.3 ft															
		Type of protective casing:	Roadway Box															
		Length	0.5 ft															
		Inside Diameter	6.0 in															
		Depth of bottom of guard pipe/roadway box	0.5 ft															
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Type of Seals</th> <th>Top of Seal (ft)</th> <th>Thickness (ft)</th> </tr> </thead> <tbody> <tr> <td>Drill Cuttings</td> <td style="text-align: center;">0.0</td> <td style="text-align: center;">6.0</td> </tr> <tr> <td>Bentonite Seal</td> <td style="text-align: center;">6.0</td> <td style="text-align: center;">2.0</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Type of Seals	Top of Seal (ft)	Thickness (ft)	Drill Cuttings	0.0	6.0	Bentonite Seal	6.0	2.0						
Type of Seals	Top of Seal (ft)	Thickness (ft)																
Drill Cuttings	0.0	6.0																
Bentonite Seal	6.0	2.0																
	6-8': Bentonite Seal	Type of riser pipe:	Solid PVC															
		Inside diameter of riser pipe	2.0 in															
		Type of backfill around riser	Holliston Sand															
		Diameter of borehole	4.0 in															
		Depth to top of well screen	10.0 ft															
	8-20': Holliston Sand	Type of screen	Slotted PVC Schedule 40															
		Screen gauge or size of openings	0.01 in															
		Diameter of screen	2.0 in															
		Type of backfill around screen	Holliston Sand															
	24-29.2': Till - Gray, sands, clays, and gravel	Depth of bottom of well screen	20.0 ft															
	20-29.2': Drill Cuttings	Bottom of Silt trap	- ft															
		Depth of bottom of borehole	29.2 ft															

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

(Not to Scale)

$$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$$

COMMENTS: _____

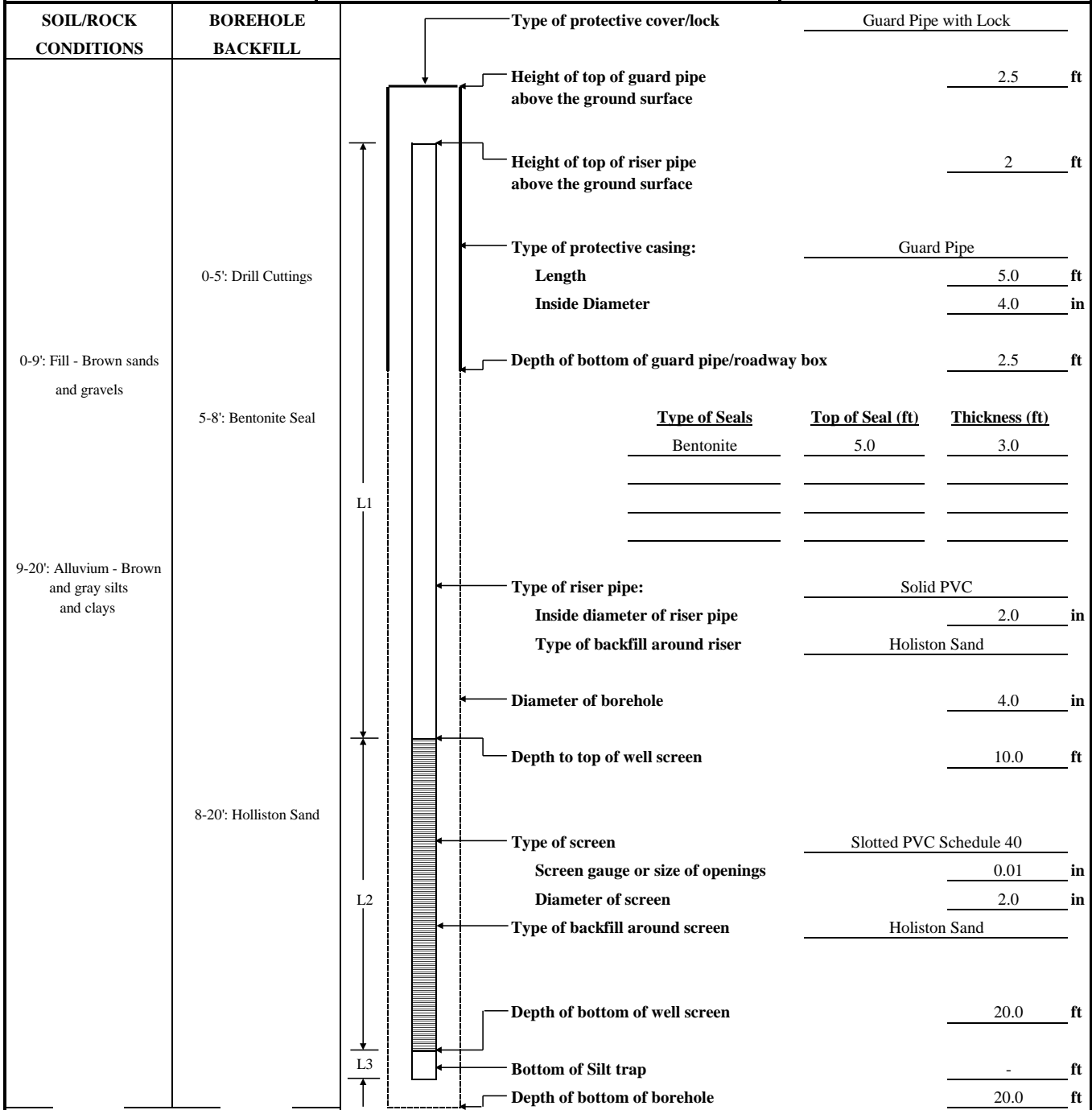


OBSERVATION WELL INSTALLATION REPORT

Well No.
B-9 (OW)
Boring No.
B-9

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	M. MacInnis
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	2/10/2020
DRILLER	John Boyd	WATER LEVEL	10.67'

Ground El.	28.04 ft	Location	Across Taft St. from charter school on Tidewater Site.	<input checked="" type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input type="checkbox"/>	Roadway Box



(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

(Not to Scale)

$$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$$

COMMENTS: _____

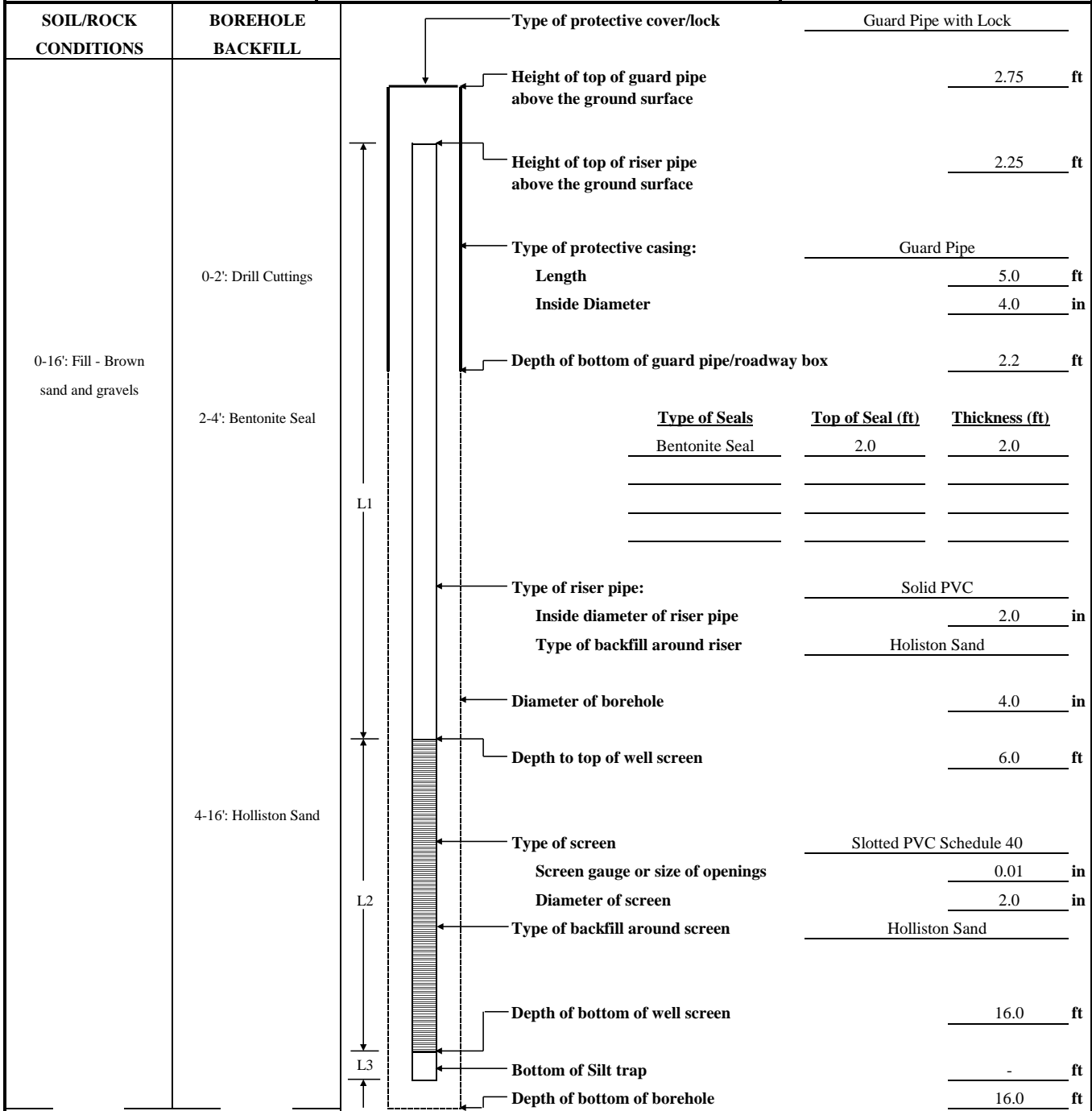


OBSERVATION WELL INSTALLATION REPORT

Well No.
B-10 (OW)
Boring No.
B-10

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	M. MacInnis
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	2/6/2020
DRILLER	Dave Sheldon	WATER LEVEL	10.42'

Ground El.	23.74 ft	Location	Southerly end of field on Tidewater Site.	<input checked="" type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input type="checkbox"/>	Roadway Box



(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

(Not to Scale)

$$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$$

COMMENTS: _____

APPENDIX D

Subsurface Investigations by Others

Table D.1 Summary of Existing Data by Others
NBC Phase III CSO Program - Consolidation Conduit IIIA4

Table D.2 Summary of Existing Data by Others
NBC Phase III CSO Program - Consolidation Conduit IIIA5

Table D.1

Summary of Existing Data By Others¹
 NBC Phase III CSO Program - Consolidation Conduit IIIA4

Project Reference Document	Boring ID	Northing ²	Easting ²	Elevation ³ Ground Surface	Total Depth of Boring (ft)	Elevation Bottom of Boring	Rock Core Data Available	Laboratory Data Available (Type) ⁴	Groundwater Monitoring Well	Elevation Groundwater Monitoring Well Screen Interval
NBC CSO Phase IIIA Contract No. 308.01C Geotechnical Data Report (Dec 2019)	B17-8	288429	359393	29.9	230.0	-200.1	x	GS, UCS, BTS	x	4.4 to -5.6
	B17-39	288259	359385	24.5	233.7	-209.2	x	GS, UCS, BTS	open hole readings	-
	B17-40	289233	359693	33.3	20.6	12.7	x	GS	-	-
	B17-41	287414	359505	12.8	25.0	-12.2	x	GS	-	-
	B17-45	288494	359452	28	47.4	-19.4	x	GS, PL, UCS	-	-
	B17-46	288470	359387	31.1	17.0	14.1	-	-	-	-
	B17-46A	288473	359387	30.9	43.2	-12.3	x	GS	-	-
Taft St - Pleasant St Branch Interceptor Section B Contract 18 (1950)	220	288143	359266	38.0	25.0	13.0	-	-	-	-
	221	288458	359283	30.0	18.0	12.0	-	-	-	-
	222	288781	359323	27.0	4.0	23.0	-	-	-	-
Bridge Replacement Pawtucket Bridge No. 550 I-95 Over the Seekonk River Volume Three Bridge Plans R.I. Contract 210-CB-004 (2010)	BH-10	287938	359336	40.0	14.4	25.6	-	-	-	-
	BH-11	287772	359333	48.1	20.7	27.4	-	-	drilling readings	-
	BH-12	287941	359413	14.9	31.0	-16.1	x	-	-	-
	BH-13	287868	359413	14.1	25.5	-11.4	x	-	-	-
	BH-14	287787	359414	13.3	29.5	-16.2	x	-	no readings	8.8 to -1.2
Division Street Bridge Project Contract Three R.I. Project No. I-01-(11) (1957)	BH32/BH32A	287904	359547	-12.0	24.0	-36.0	-	-	-	-
	BH33	287850	359543	-12.0	26.5	-38.5	-	-	-	-
	BH34	287800	359557	-12.3	22.0	-34.3	-	-	-	-
	BH35	287898	359459	3.0	24.0	-21.0	-	-	-	-
	BH36	287843	359456	3.0	26.5	-23.5	-	-	-	-
	BH37	287785	359461	3.5	17.0	-13.5	-	-	-	-
	BH72	287902	359355	25.5	22.0	3.5	-	-	-	-
	BH73	287816	359360	28.5	24.5	4.0	-	-	-	-
	BH102	287935	359457	5.0	10.5	-5.5	-	-	-	-

- Notes
1. Table D.1 includes a summary of data by others deemed relevant for inclusion into the NBC Phase III CSO Program, Consolidation Conduits IIIA4 and IIIA5, Geotechnical Data Report (GDR).
 2. Horizontal coordinates projected to Rhode Island Mainland State Plane, North American Datum (NAD), 1983. Locations of Taft St-Pleasant St and Division St Bridge borings are estimated based on visual review of the project reference documents indicated.
 3. Elevations referenced to the National Geodetic Vertical Datum (NGVD) 1929, in feet.
 4. Laboratory testing acronyms include GS=Grain Size Distribution, PL=Point Load, UCS=Unconfined Compressive Strength-Rock, BTS=Splitting (Brazilian) Tensile Strength.
 5. "x" indicates data available. "-" indicates no data included in project reference document.

Table D.2

Summary of Existing Data By Others¹
 NBC Phase III CSO Program - Consolidation Conduit IIIA5

Project Reference Document	Boring ID	Northing ²	Easting ²	Elevation ³ Ground Surface	Total Depth of Boring (ft)	Elevation Bottom of Boring	Rock Core Data Available	Laboratory Data Available (Type) ⁴	Groundwater Monitoring Well	Elevation Groundwater Monitoring Well Screen Interval
NBC CSO Phase IIIA Contract No. 308.01C Geotechnical Data Report (Dec 2019)	B17-41	287414	359505	12.8	25.0	-12.2	x	GS	-	-
	B17-42	285820	359764	42.9	30.6	12.3	-	GS	-	-
Taft St - Pleasant St Branch Interceptor Section B Contract 18 (1950)	212	285883	359896	39.0	28.0	11.0	-	-	-	-
	213	286224	359637	31.0	25.0	6.0	-	-	-	-
	214	286621	359523	32.6	21.0	11.6	-	-	-	-
	215	287097	359509	30.0	15.0	15.0	-	-	-	-
Tidewater Facilities (GZA Boring Program)	B-206	286636	359602	35.6	30.0	5.6	-	-	see note 6	15.6 to 26.6
	MW5/TB14	286405	359657	29.4	22.0	7.4	-	-		13.87 to 25.4
	MW7/TB-20	286424	359654	29.2	25.0	4.2	-	-		14.2 to 4.2
	B-208	286116	359934	26.4	20.0	6.4	-	-		16.4 to 6.4
	B-209	286066	360026	22.7	19.0	3.7	-	-		13.7 to 3.7

Notes

1. Table D.2 includes a summary of data by others deemed relevant for inclusion into the NBC Phase III CSO Program, Consolidation Conduits IIIA4 and IIIA5, Geotechnical Data Report (GDR).
2. Horizontal coordinates projected to Rhode Island Mainland State Plane, North American Datum (NAD), 1983. Locations of Taft St-Pleasant St and Tidewater borings B-26, B-208, and B-209 are estimated based on visual review of the project reference documents indicated.
3. Elevations referenced to the National Geodetic Vertical Datum (NGVD) 1929, in feet.
4. Laboratory testing acronyms include GS=Grain Size Distribution.
5. "x" indicates data available. "-" indicates no data included in project reference document.
6. Groundwater wells installed for analytical testing. No groundwater monitoring data available.

Phase IIIA-4 Historic Data

Pawtucket Tunnel RFP GDR



Pare Corporation
10 Lincoln Road, Suite 210
Foxboro, MA 02035
T: 508-543-1755
F: 508-543-1881

BORING NUMBER B17-8

PAGE 1 OF 1

TEST BORING REPORT

PROJECT NAME Narragansett Bay Commission Phase III CSO Program
CLIENT NBC/Stantec
CONTRACTOR New England Boring Contractors, Inc.

PROJECT NO. 13:308.00D/14106.02
START 2/23/2018
FINISH 3/9/2018
DRILLER NEBC
LOGGED BY MED/HMS
CHECKED BY SJM
ELEVATION 31.1
DATUM NGVD 1929
NORTHING 288425.051
EASTING 359394.337
LOCATION Jenks Way/Masonic Temple

	CASING	SAMPLER	BARREL	DRILLING EQUIPMENT & PROCEDURES
Type	Steel	Split Spoon	HQ3	Rig Make & Model: Mobile Drill B-52
Inside Diameter (in.)	4	1 3/8	2 3/8	Bit Type: 3 7/8" Tricone
Hammer Weight (lb.)	140	140	N/A	Drill Fluid: Water
Hammer Fall (in.)	30	30	N/A	Casing: 5" (20') / 4" (23.3')
				Hoist/Hammer: Automatic Hammer

TEST BORING REPORT - GINT STD US LAB.GDT - 9/12/19 12:26 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RII-PHASE III FIELD WORKBORING LOGS\14106.02 BORING LOGS-090319.GPJ

DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION (Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	DRILLING NOTES
0	31.1									
		4		S-1	/	0 - 2	SW		Moist, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt, trace brick. (FILL)	PID = 0.0 ppm (0'-2') 4" Topsoil. Hand excavated. Several cobbles. Composite environmental sample taken (0'-4'). (1) 8 oz. Amber, (1) VOA at 1'.
		6								
		100+	10-9-10-8 (19)	S-2	18 / 24	2 - 4	SW		Top 6": Moist, medium dense, brown, fine to coarse SAND, trace brick. (FILL) Middle 3": Gray, coarse GRAVEL. (FILL) Bottom 9": Tan, fine SAND, some silt, trace brick. (FILL)	PID = 2.2 ppm (2'-4')
5	26.1	10	12-10-8-10 (18)	S-3	15 / 24	4 - 6	SM		Moist, medium dense, tan, fine SAND, some silt, trace medium to coarse sand. (FILL)	PID = 6.4 ppm (4'-6') Composite environmental sample taken (4'-10').
		15								
		20	6-6-5-5 (11)	S-4	8 / 24	6 - 8	SM		Moist, medium dense, light tan, fine SAND, little silt, little medium to coarse sand, trace fine gravel.	PID = 4.2 ppm (6'-8') Red seam at mid recovery. Composite environmental sample taken (4'-11'). (1) 8 oz. Amber, (1) VOA at 5'.
		80								
		50	4-7-7-6 (14)	S-5	9 / 24	8 - 10	SM		Top 4": Moist, medium dense, tan, fine to medium SAND, some silt. (FILL) Middle 2": Gray, fractured coarse GRAVEL. (FILL) Bottom 3": Brown, fine to medium SAND, some silt, trace brick. (FILL)	PID = 0.2 ppm (8'-10')
10	21.1	63								
		50	6-3-4-3 (7)	S-6	0 / 24	10 - 12			No Recovery. Coarse gravel in tip.	Drilling color brown through zone.
		50								
		40	4-6-4-6 (10)	S-7	12 / 24	12 - 14	SP		Top 3": Dark Brown to black, fine to coarse SAND, little gravel, little silt. (Petroleum-like Odor). (FILL) Bottom 9": Brown to tan, fine to medium SAND, little silt. (FILL)	Top 3" PID = 0.4 ppm Bottom 9" PID = 0.8 ppm Environmental sample taken (12'-13'). (1) 8 oz. Amber, (1) VOA.
		40								
15	16.1	20	3-7-3-3 (10)	S-8	4 / 24	14 - 16	SP-SM		Moist, loose, dark brown, fine to medium SAND, little gravel, little silt, trace coarse sand. (FILL)	PID = 4.2 ppm
		20								
		75	60/0"	S-9	0 / 0	16 - 18			No Recovery. Split spoon refusal at 16'.	Driller advanced the roller bit through a boulder at approximately 16.5'.
		125								
		X							No Samples Taken.	
20	11.1	X								
		X								
		X								
		X								
		X								
		X								
		X								
		X	17-121/5"	S-10	9 / 11	22.7 - 23.6	GW		Wet, very dense, tan to gray, fine to coarse GRAVEL, some fine to coarse sand, trace silt.	Driller advanced the roller bit to 25'.

Bottom of borehole at 23.60 feet.

Driller advanced the roller bit to 25'.

WATER LEVEL DATA				SAMPLE IDENTIFICATION		REMARKS:
DATE/TIME	DEPTH (ft.) TO:			O Open End Rod	T Thin Wall Tube	
	BOTTOM OF CASING	BOTTOM OF HOLE	WATER			
2/26/2018 8:30:00 AM	16	16	15	U Undisturbed Sample	1. Hand excavated from 0'-2'.	
2/28/2018 8:00:00 AM	23.3	74.5	14.3	S Split Spoon	2. S-7: Top 3" was environmentally sampled. Bottom was taken for geotechnical sample.	
3/5/2018 8:45:00 AM	23.3	134.1	13.8	G Geoprobe	3. Coarse gravel in tip of S-8.	
3/6/2018 8:00:00 AM	23.3	159.2	11.8		4. Spin-shoe on the bottom of the 4" casing from 18 ft - no casing blows counted below this depth.	
3/9/2018 8:00:00 AM	23.3	219.9	9.3		5. Removed 20' of 5" casing and installed 4' casing down to approximately 23.3'.	
					6. "X" within casing blows indicates that blows were not counted at that interval.	



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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES															
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill									
35.0			- 39.9	- 8.8	100%	87%																				
35.5	2.5						1	x x x x	35.6	laminated 1-2 mm, fresh. - Bedding planes 40°-50° Strong to very strong, light gray, fine SANDSTONE, massive, fresh. (continued)	35.7	B	1	45	SM	F	None									
36.0																										
36.5	2.75						1	x x x x		Strong to very strong, purple and light gray, fine SANDSTONE interlaminated with Siltstone, laminated 1-2 mm, fresh. - Bedding planes 40°-50°.	36.8	B	1	45	SM	F	None									
37.0																										
37.5	2.75						4	x x x x			37.3	B	1	50	SM	F	None									
38.0																										
38.5																										
38.5	3.25						1	x x x x	37.9	Strong to very strong, purple SILTSTONE, massive, fresh.	38.4	B	1	40	SM	F	None									
39.0																										
39.5	3.5	C-5	39.9 - 45	- 8.8 - 13.9	58.5 96%	39 64%	0	x x x x	38.8	Strong to very strong, purple and gray, coarse SANDSTONE, massive, fresh.	38.8	B	1	40	SM	F	None									
40.0																										
40.5	2.5						1	x x x x	39.9	Strong to very strong, purple, fine SANDSTONE interlaminated with Siltstone, laminated 1-2 mm, fresh. - Bedding planes 40°-50°.	39.4	B	1	40	SM	F	None									
41.0																										
41.5	2.5						4	x x x x	40.6	Strong to very strong, purple, fine SANDSTONE, massive, fresh. - Orthogonal joint at 41.1'.	41.3	J	1	35	SM	F	None									
42.0																										
42.5	2.25						1	x x x x	41.4	Strong to very strong, purple SILTSTONE, laminated 1-2 mm, fresh. - Bedding planes 40°-50°.	41.6	B	1	40	SM	F	None									
43.0																										
43.5	2.5						1	x x x x	41.7	Strong to very strong, light gray, fine to medium SANDSTONE, massive, fresh.	41.9	J	1	40	SM	F	None									
44.0																										
44.5	2.25						3	x x x x	42.6	Strong to very strong, light gray, fine SANDSTONE, massive, fresh. - Quartz vein at 42.4', 1 mm±.	42.6	J	1	35	SM	F	None									
45.0																										
45.5	2.5						1	x x x x	43.9	Strong to very strong, purple SILTSTONE, laminated 1-2 mm, fresh.	43.4	J	1	40	SM	F	None									
46.0																										
46.5	4.75	C-6	45 - 50	- 13.9 - 18.9	60 100%	43 72%	4	x x x x	44.6	Strong to very strong, purple SILTSTONE, laminated 1-2 mm, fresh. - Bedding planes 40°-50°.	44.1	B	1	45	SM	F	None									
47.0																										
47.5	2.75						1	x x x x	44.3	Strong to very strong, light gray, fine to medium SANDSTONE, massive, fresh. - Orthogonal joint at 45.0'.	44.1-44.8	J	1	70	SM	F	None									
48.0																										
48.5	3						4	x x x x	45.3	Strong to very strong, purple and light gray SILTSTONE, laminated 1-2 mm, fresh. - Bedding planes 30°-40°. - Quartz vein at 46.0', 4 mm±.	45.0	J	1	40	SM	F	None									
49.0																										
49.5	2.75						1	x x x x	45.6	Strong to very strong, purple and light gray SILTSTONE, laminated 1-2 mm, fresh.	45.3	B	1-2	45	SM	F	None									
50.0																										
50.5	3						0	x x x x	46.0	Strong to very strong, purple and light gray SILTSTONE, laminated 1-2 mm, fresh. - Bedding planes 30°-40°. - Quartz vein at 46.0', 4 mm±.	45.6	B	1	40	SM	F	None									
51.0																										
51.5	3.5						1	x x x x	47.7	Strong to very strong, light gray and purple, fine SANDSTONE, massive, fresh.																
52.0																										
52.5	2.75						1	x x x x	48.5	Strong to very strong, purple and light gray SILTSTONE interlaminated with fine Sandstone, laminated 1-2 mm, fresh. - Bedding planes 40°-50°.	48.8	B	1-2	40	SM	F	None									
53.0																										
53.5	3.25						3	x x x x	49.1	Strong to very strong, purple and light gray SILTSTONE interlaminated with fine Sandstone, laminated 1-2 mm, fresh. - Bedding planes 40°-50°.	49.5	B	1	45	SM	F	None									
54.0																										
54.5	3.5	C-7	50 - 55	- 18.9 - 23.9	59 98%	59 98%	1	x x x x	49.6		49.6	B	1-2	40	SM	F	None									
55.0																										
55.5	2.75						1	x x x x	50.9		50.9	B	1-8	45	SM	F	None									
56.0																										
56.5	2.75						1	x x x x	51.1																	
57.0																										



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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES									
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill			
51.5																				
52.0	3						0			Strong to very strong, purple and light gray, fine to coarse SANDSTONE, massive, fresh. (continued)										
52.5							2	X X X X X X X X X	52.1	Strong to very strong, purple SILTSTONE interlaminated with fine Sandstone, laminated 1-2 mm, fresh.	52.1	J	1	40	SM	F	None			
53.0	2.75								52.8	- Bedding planes 40°-50°.	52.8	J	1-10	45	SM	F	None			
53.5							1		53.1 53.2	Strong to very strong, purple and light gray, fine to medium SANDSTONE, massive, fresh.	53.2	J	1	45	SM	F	None			
54.0	3									Strong to very strong, purple and light gray, conglomeratic SANDSTONE, massive, fresh.										
54.5							1		54.2	Strong to very strong, purple, fine SANDSTONE, massive, fresh.	54.2	J	1-10	45	SM	F	None			
55.0	4.25						0			Strong to very strong, gray, purple and white CONGLOMERATE, massive, fresh.										
55.5		C-8	55 - 59.7	-23.9 - -28.6	57 100%	57 100%			55.5	Strong to very strong, gray, purple and white, conglomeratic SANDSTONE, massive, fresh.										
56.0	3						0													
56.5							0													
57.0	3.25						0													
57.5							0													
58.0	3.25								58.0 58.2	Strong to very strong, gray, purple and white CONGLOMERATE, massive, fresh.	58.2	J	1	55	SM	F	None			
58.5							1			Strong to very strong, gray, purple and white, conglomeratic SANDSTONE, massive, fresh.										
59.0	3.25						0		59.0											
59.5							0													
60.0	3.75								59.7	Strong to very strong, gray, fine SANDSTONE, massive, fresh.										
60.5		C-9	59.7 - 64.5	-28.6 - -33.4	58 100%	54 93%				Strong to very strong, gray to purple CONGLOMERATE, massive, fresh.	60.2	J	1-3	20	SL/SM	F	None			
61.0	4						1													
61.5	4						2		61.4	Strong to very strong, gray, conglomeratic SANDSTONE, massive, fresh.	61.4 61.6	J J	1-3 1	45 30	SM/R SM/R	F F	None None			
62.0																				
62.5	4.25						1		62.4	Strong to very strong, gray, fine SANDSTONE, massive, fresh.	62.9	J	1-2	35	SR	F	None			
63.0									63.1	- Quartz vein with Pyrite near 63.0'.										
63.5	4.5						1			Strong to very strong, gray, conglomeratic SANDSTONE, massive, fresh.	63.3	J	1-2	40	SM	F	None			
64.0									63.9											
64.5	5						0		64.6	Strong to very strong, gray, fine to coarse SANDSTONE, massive, fresh.										
65.0		C-10	64.5 - 69.5	-33.4 - -38.4	60 100%	60 100%				Strong to very strong, gray CONGLOMERATE, massive, fresh.										
65.5	4						1		65.2	Strong to very strong, purple, fine SANDSTONE interbedded with SILTSTONE, bedded 10-20mm, fresh.	65.3	B	1-10	50	SM	F	None			
66.0																				
66.5	4						1	X X X X X X	66.2 66.5	- Bedding planes 40°-50°.	66.5	J	1-3	55	SR	F	None			
67.0										Strong to very strong, purple SILTSTONE, laminated 1-2 mm, fresh.										
67.5	4.25						0	X X X X X X X X X	67.3	- Bedding planes 50°.										
										Strong to very strong, purple, fine SANDSTONE, massive, fresh.										

2. Wash color gray/purple at ~56.0'.



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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES									
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill			
68.0																				
68.5	3.75						2		67.9 68.1	- Quartz vein 67.1', 1 mm±. Strong to very strong, purple SILTSTONE, laminated 1-2 mm, fresh.	68.2 68.8	J J	1 1	25 40	SM SR	F F	None None			
69.0										- Bedding planes 50°. Strong to very strong, gray, fine SANDSTONE, massive, fresh.										
69.5	3.5	C-11	69.5 - 74.5	-38.4 -43.4	60 100%	51 85%	1		68.9	(continued)	69.9	B	1-20	55	SM	SW	SI			
70.0										Strong to very strong, gray to purple CONGLOMERATE, massive, fresh.										
70.5	2.75						1		69.8	Strong to very strong, gray to purple, fine to medium SANDSTONE, massive, fresh.	70.5	B	1-10	50	SM	F	None			
71.0										Strong to very strong, purple and gray, fine SANDSTONE, laminated 3-5 mm, fresh.										
71.5	3.5						0		71.3	- Bedding planes 50°-60°.										
72.0										Strong to very strong, gray and purple, fine SANDSTONE, massive, fresh.	72.7 72.8	J J	1 1-2	30 40	SM SM	F SW	None SI			
72.5	3.75						2			- Quartz vein 73.1', 5-10 mm±. - Orthogonal joints at 73.2'.	73.0-73.3 73.2 73.9 73.9-74.1	J J J J	1 1 1 1-5	65 60 20 60	SM SM SM SR	F F F F	QZ None None None			
73.0																				
73.5	3.75						4													
74.0																				
74.5	4.5	C-12	74.5 - 79.2	-43.4 -48.1	57 100%	55 96%	1		74.6	Strong to very strong, gray, fine to coarse SANDSTONE, massive, fresh.	74.1	J	1-5	55	SM	F	None			
75.0																				
75.5	4						0													
76.0																				
76.5	3						0													
77.0																				
77.5	3						2		77.2	Strong to very strong, gray, fine SANDSTONE, thickly bedded 10-25 mm± to massive, fresh. - Quartz vein at 78.4', 4 mm±. - Orthogonal joints at 79.1'. - Bedding planes 50°.	77.7 77.8	B J	1 1	50 15	SM SR	F F	None None			
78.0																				
78.5	3.5						0													
79.0																				
79.5	4	C-13	79.2 - 84.3	-48.1 -53.2	61 100%	51 84%	4				79.1 79.1 79.2 79.8-80.1	J B B B	1 1 2 1-2	55 50 55 55	R SR SM SM	F F SW SW	QZ None None SI			
80.0																				
80.5	3.75						3		80.1	Strong to very strong, gray to purple, fine to medium SANDSTONE, massive, fresh. - Quartz marbling 80.1' to 80.3'.	80.0-80.3 80.2 80.4	J J J	1 1 1	55 45 50	SM SM SM	F F F	None None None			
81.0																				
81.5	4						0													
82.0																				
82.5	3.75						2		82.2	Strong to very strong, gray to purple, fine SANDSTONE, thickly bedded 10-25 mm± to massive, fresh. - Bedding planes 40° - 50°.	82.7 82.8	B B	1 1	50 50	SM SM	F SW	None None			
83.0																				
83.5	2.25						0													
84.0																				
84.5	3.25																			

3. Barrel blocked at ~84.0'.



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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES							
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill	
84.6		C-14	84.3 - 89.4	-53.2 - -58.3	59 97%	59 97%	1			Strong to very strong, gray to purple, fine SANDSTONE, thickly bedded 10-25 mm± to massive, fresh. - Bedding planes 40° - 50°. (continued)	84.0	B	1	55	SM	F	None	
85.0																		
85.5	4.5						1					85.4	B	1-3	50	SM	F	None
86.0																		
86.5	3.5						1		86.3	Strong to very strong, gray, fine to medium SANDSTONE, massive, fresh.	86.2-86.5	J	1-2	55	SM	F	SI	
87.0																		
87.5	4						1		87.1	- Quartz vein 86.9', 1-10 mm±. Strong to very strong, gray to purple, fine SANDSTONE, laminated 1-2 mm± to bedded 15-20mm±, fresh. - Bedding planes 50°-60°.	87.3	B	1	55	SM	F	None	
88.0																		
88.5	4						1					88.7	J	1-5	35	R	F	None
89.0																		
89.5	4	C-15	89.4 - 94.4	-58.3 - -63.3	60 100%	48 80%	0					-	-	-	-	-	-	-
90.0																		
90.5	3.75						2		90.4	Strong to very strong, gray, fine to medium SANDSTONE, bedding 10-20 mm±, fresh. - Bedding planes 45°.	90.1 90.3	J B	1 1	30 55	SM SM	F F	Fe None	
91.0																		
91.5	4.25						2		91.5	- Quartz vein at 91.4', 10 mm±. Strong to very strong, gray, fine SANDSTONE, massive, fresh.	91.1-91.7 91.4	J J	10 1	70 0	SM SM	SW F	OZ/CA None	
92.0																		
92.5	4						1		92.6	Strong to very strong, gray SILTSTONE, massive, fresh. - Quartz vein at 93.4', 3 mm±.	92.4	J	1	40	SR	F	None	
93.0																		
93.5	4.25						4				93.1-93.7 93.6 93.5-94.2 93.7-94.0	J J J J	1 - 1 1	75 30 80 65	SM VR SR SM	F F F F	OZ None None None	
94.0									93.8	Strong to very strong, gray, fine SANDSTONE, massive, fresh.								
94.5	4	C-16	94.4 - 99.4	-63.3 - -68.3	60 100%	55 92%	3		94.5	Strong to very strong, gray, fine to medium SANDSTONE, massive, fresh.	94.0 94.1 94.2	J J J	1 1 1	40 70 55	SM SM SM	F F F	None None None	
95.0									94.9	Strong to very strong, gray, fine to medium SANDSTONE with Siltstone interbedding, laminated 1-2 mm± to bedded 20mm±, fresh. - Quartz vein at 96.0', 1 mm±. - Quartz vein at 96.2', 1-10 mm±.								
95.5	3.25						0											
96.0																		
96.5	3.5						ECF (1±)				96.2 96.6-97.1 96.7 96.9-97.0	J J J ECF	1 - - -	30 65 25 -	SM SM SM SM	F F F F	None OZ OZ OZ	
97.0							4											
97.5	2.5						ECF (1±)		97.0	Strong to very strong, gray CONGLOMERATE, massive, fresh.	97.0-97.1	ECF	-	-	SM	F	OZ	
98.0							1		97.6	Strong to very strong, gray, fine to medium SANDSTONE, massive, fresh.								
98.5	3.25						0			- Quartz vein at 98.2', 2-5 mm±.								
99.0																		
99.5	3.5	C-17	99.4 - 104.5	-68.3 - -73.4	61 100%	61 100%	1				99.1	J	1-10	10	SR	F	None	
100.0																		
100.5	3						0											



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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
101.0										Strong to very strong, gray, fine to medium SANDSTONE, massive, fresh. - Quartz vein at 98.2', 2-5 mm±. (continued)							
101.5	3.25					0					-	-	-	-	-	-	-
102.0																	
102.5	3.5					0											
103.0																	
103.5	4					3		103.2		Strong to very strong, gray CONGLOMERATE, massive, fresh. - Orthogonal joints 103.4'. - Orthogonal joints around 104.8'. - Quartz vein 107.0', 5 mm±.	103.4 103.4 103.7-104.1	J J J	1 1 1	35 40 70	R SM VR	F SW F	None None None
104.0																	
104.5	5.5	C-18	104.5 - 109.5	-73.4 - -78.4	60 100%	48 80%	3				104.7 104.7 104.9	J J J	1-5 1 1-10	35 20 30	SR VR R	F F F	None None None
105.0																	
105.5	3.5					0											
106.0																	
106.5	6					0											
107.0																	
107.5	2.5					ECF (4±)		107.2		Strong, gray SILTSTONE, massive, fresh. - Orthogonal joints around 108.3'.	107.2-107.6 107.6	ECF J	- 1	- 50	SM SM	SW F	None None
108.0						5											
108.5	3.25					2					108.2 108.3	J J	1 1	60 65	SM SM	F F	None None
109.0																	
109.5	5	C-19	109.5 - 114.3	-78.4 - -83.2	58 100%	52 90%	2			- Quartz vein at 110', 2 mm±. - Orthogonal joints at 110', 113.8'.	109.5-109.7 109.7-110.0	J J	1 1	80 70	R SM	F F	None OZ
110.0											110.0 110.0 110.1-110.4 110.3	J J J J	1 1 1 1	50 35 65 45	SM SM SM SM	F F F F	OZ None OZ OZ
110.5	3					4											
111.0																	
111.5	4					0											
112.0																	
112.5	5					1					112.8-113.3	J	1	85	VR	F	None
113.0																	
113.5	4.25					3		113.3		Strong to very strong, dark gray SILTSTONE, laminated 1-2 mm, fresh. - Bedding planes 40°-50°. - Quartz vein at 114.6', 5 mm±. - Quartz vein at 114.9', 20 mm±.	113.2 113.8 113.8	J B J	1 1 1	55 45 40	SM SM SM	SW F F	None None None
114.0																	
114.5	3.5	C-20	114.3 - 119.3	-83.2 - -88.2	60 100%	48 80%	2				114.3 114.8	B J	1 1	50 30	SM SM	F F	None OZ
115.0																	
115.5	3.75					4		115.0		Strong to very strong, gray, fine SANDSTONE interlaminated with Siltstone, bedding 1-20 mm, fresh. - Bedding planes 50°. - Orthogonal joints around 115.6', 116.4'.	115.5-115.7 115.6 115.7 115.9-116.2	J B J B	1 1 1 1	60 50 30 50	SM SM SR SM	F SW F F	OZ None None None
116.0																	
116.5	3.75					4		116.5		Strong to very strong, gray, fine to coarse SANDSTONE, massive, fresh.	116.0-116.4 116.0 116.4 116.5	J J J J	1 1 1 1	75 45 55 55	SR SM SR SM	F F F F	None None None None
117.0																	

4. Core barrel blocked at ~107.2'. Moved casing up and down to unblock.



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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
117.5	6.25						1		117.5	Very strong, white QUARTZ, massive, fresh with fragments of gray, fine to coarse Sandstone	117.3	J	1	35	SR	F	None
118.0						0					-	-	-	-	-	-	-
118.5	7.5																
119.0																	
119.5	5	C-21	119.3 - 124.5	-88.2 - -93.4	62 100%	62 100%	ECF (3±)		119.3	Strong, gray, conglomeratic SANDSTONE, massive, fresh. - Quartz vein at 120.0', 10-35 mm±.	119.3-119.4	ECF	-	-	SM	F	OZ
120.0						3					-	-	-	-	-	-	-
120.5	5						0										
121.0																	
121.5	5.75						1				121.0	J	1-2	20	SR	F	None
122.0																	
122.5	4.5						1				122.7	J	1-5	40	SR	F	OZ
123.0									122.7	Strong to very strong, dark gray, fine SANDSTONE, massive, fresh.							
123.5	4.5					0					-	-	-	-	-	-	-
124.0																	
124.5	3.5	C-22	124.5 - 129.4	-93.4 - -98.3	59 100%	54 92%	2				124.0 124.8	J J	1-5 1	40 30	R SR	F F	None None
125.0																	
125.5	4						0		125.3	Strong to very strong, dark gray, fine SANDSTONE, laminated 1-2 mm, fresh. - Bedding planes 30°-40°.							
126.0									126.0								
126.5	4						1		126.6	Strong to very strong, dark gray, fine SANDSTONE, laminated 1-2 mm, fresh. - Bedding planes 40°-50°.	126.8	J	1	35	SM	F	OZ
127.0									126.6								
127.5	3.75						1				127.0	B	1	40	SM	F	None
128.0																	
128.5	5.75						0										
129.0																	
129.5	4.5	C-23	129.4 - 134.1	-98.3 - -103.0	56 100%	42 75%	0		129.6	Strong to very strong, dark gray, fine to medium SANDSTONE, massive, fresh.							
130.0											-	-	-	-	-	-	-
130.5	3.75						0										
131.0									130.9	Strong to very strong, dark gray, fine SANDSTONE, laminated 1-2 mm, fresh. - Bedding planes 50°. - Quartz vein 131.2', 2 mm±. - Orthogonal joints around 131.1'.							
131.5	3.5						3		131.4			131.0 131.2 131.7-132.0	J B J	1 1 1	40 50 60	SM SM R	F SW F	None OZ OZ
132.0																	
132.5	4						1		132.6	Strong to very strong, dark gray, fine SANDSTONE, massive, fresh.	132.6	J	1	45	R	F	None
133.0																	
133.5	4						3				133.0 133.1-133.4 133.3	J J J	1 1 1	45 75 45	SR SR SR	F F F	None OZ None

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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES							
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill	
134.0	5.75	C-24	134.1 - 139.1	-103.0 - -108.0	60 100%	54 90%	0			Strong to very strong, dark gray, fine SANDSTONE, massive, fresh. (continued)	-	-	-	-	-	-		
134.5																		
135.0	4.5									134.9	Strong, dark gray, fine to medium SANDSTONE interlaminated with Siltstone, fresh. - Bedding planes 50°-60°.	135.3	J	1	30	SM	F	PY
135.5									1									
136.0	4.5								0									
136.5							0											
137.0	4.75						0											
137.5							0											
138.0	2.75						5		138.0	Strong to very strong, dark gray, conglomeratic SANDSTONE, massive, fresh. - Quartz vein at 138.1', 7 mm±. - Orthogonal joints at 138.0'.	138.0	J	1	30	SM	F	None	
138.5									138.6		138.0	J	1	35	SM	F	QZ/PY	
139.0	3.75	C-25	139.1 - 144.2	-108.0 - -113.1	61 100%	55 90%	ECF (1±)				Strong to very strong, gray, fine SANDSTONE, massive, fresh. - Quartz marbling 139.0'-139.1'.	138.6	J	1	25	SR	F	None
139.5												138.7	J	1	25	SM	F	None
140.0	3.5								3			138.7	J	1	45	SM	F	SW
140.5							0				139.0-139.1	ECF	-	-	SM	SW	QZ	
141.0	6.75						1		141.1	Very strong, gray, conglomeratic SANDSTONE, massive, fresh. - Quartz vein at 142.7', 15 mm±.	139.4	J	10	20	VR	SW	None	
141.5							1				139.4-139.6	J	1	55	SM	SW	None	
142.0	7						1											
142.5							1											
143.0	4.75						1		143.2	Strong to very strong, gray, fine to coarse SANDSTONE, massive, fresh.								
143.5							1		143.5		143.5	J	1	35	SM	F	None	
144.0	5.5	C-26	144.2 - 149.1	-113.1 - -118.0	59 100%	59 100%	1		143.9	Strong, dark gray, fine SANDSTONE, massive, fresh.								
144.5																		
145.0	6.5							1		144.9	Strong to very strong, gray, fine to coarse SANDSTONE, massive, fresh.	144.9	J	1-2	30	SM	F	QZ
145.5							1		145.6	Strong, gray, fine to medium SANDSTONE, massive, fresh. - Orthogonal joints 145.0'.	145.0	J	1	55	SM	SW	QZ	
146.0	6						0		146.5	Very strong, gray CONGLOMERATE, massive, fresh. - Quartz vein at 146.3', 20 mm±.								
146.5																		
147.0	7						1		147.4	Strong to very strong, gray, conglomeratic SANDSTONE, massive, fresh.	147.3	J	1	15	SR	F	None	
147.5									147.7	Strong, dark gray SILTSTONE, laminated 1-2 mm, fresh. - Bedding planes 50°.								
148.0	7.25						1											
148.5																		
149.0	6.5	C-27	149.1 - 154.2	-118.0 - -123.1	61 100%	61 100%	0			Moderately strong, gray, CONGLOMERATE, massive, fresh. - Quartz vein at 147.8', 1-40 mm±.	148.2	J	1	40	SR	F	None	
149.5																		
150.0	6.75																	



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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES							
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill	
150.5	6.75						1			Moderately strong, gray, CONGLOMERATE, massive, fresh. - Quartz vein at 147.8', 1-40 mm±. (continued)	150.8	J	1-2	50	R	F	None	
151.0																		
151.5	7.25						1				151.9	J	1	45	SM	F	None	
152.0																		
152.5	7.25						0		152.2	Very strong, gray, conglomeratic SANDSTONE, massive, fresh.	-	-	-	-	-	-	-	
153.0																		
153.5	4.75	C-28	154.2 - 159.4	-123.1 - -128.3	60 97%	60 97%	0		152.8 153.0	Very strong, gray, CONGLOMERATE, massive, fresh.	153.5	J	1-2	10	SR	F	None	
154.0																		
154.5	4.5						0		153.5	Very strong, gray, fine to medium SANDSTONE, massive, fresh.	153.7							
155.0																		
155.5	4						3		154.7	Strong to very strong, gray, fine SANDSTONE, massive, fresh.	155.5-156.1 155.9 155.9	J J J	1 1 1	70 0 45	SR SR VR	F F F	None None None	
156.0																		
156.5	4.25						1		156.2	Strong to very strong, dark gray, fine SANDSTONE, massive, fresh.	156.7							
157.0																		
157.5	5						2		156.7	Strong to very strong, dark gray, fine SANDSTONE, laminated 1-2 mm to bedded 5-20 mm, fresh. - Bedding planes 30°-40°.	157.9	B B	1 1	40 35	SM SM	SW F	None None	
158.0																		
158.5	5.25						1		157.9	Strong to very strong, dark gray, fine to medium SANDSTONE, bedding 1-20 mm, fresh. - Bedding planes 30°-40°.	159.4							
159.0																		
159.5	5	C-29	159.4 - 164.5	-128.3 - -133.4	61 100%	46 75%	0		159.4	Strong to very strong, gray, fine to coarse SANDSTONE, massive, fresh.	160.2 160.3 160.4							
160.0																		
160.5	4.75						4		160.2	Strong to very strong, dark gray SILTSTONE, massive, fresh.	160.3 160.4							
161.0																		
161.5	5.25						1		160.4	Strong to very strong, gray, fine to coarse SANDSTONE, massive, fresh.	161.0							
162.0																		
162.5	4.25						0		161.0	Strong to very strong, dark gray SILTSTONE, laminated 1-2 mm, fresh. - Bedding planes at 30°-40°. - Orthogonal joints at 160.4'.	162.8							
163.0																		
163.5	5.25						2		163.1	Strong to very strong, dark gray, fine to medium SANDSTONE, massive, fresh. - Quartz marbling at 162.9'-163.0'.	163.0 163.3							
164.0																		
164.5	3.5	C-30	164.5 - 169.6	-133.4 - -138.5	61 100%	54.5 89%	2		164.5	Strong to very strong, dark gray SILTSTONE, laminated 1-2 mm, fresh. - Orthogonal joints 163.3'. - Bedding planes 40°-50°.	164.1-164.4 164.3							
165.0																		
165.5	4.25						1		165.0	Strong to very strong, gray, fine SANDSTONE, bedding 10-50 mm, fresh. - Quartz marbling 164.7' - 164.8'.	165.0							
166.0																		
166.5							0			Strong, dark gray, fine SANDSTONE, massive, fresh.								

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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
167.0										Strong, dark gray, fine SANDSTONE, massive, fresh. (continued)							
167.5	5.25						1				167.9	J	1	20	VR	F	None
168.0									167.8	Strong to very strong, gray, conglomeratic SANDSTONE, massive, fresh.							
168.5	5.25						3				168.8 168.8 168.9	J B B	1 1 1	25 40 45	VR SM SM	F SW F	OZ/PY PY None
169.0									168.7	Strong to very strong, dark gray SILTSTONE, laminated 1-2 mm, fresh.							
169.5	4.5	C-31	169.6 - 174.7	-138.5 - -143.6	61 100%	61 100%	1		169.2	- Bedding planes 40°-45°. - Orthogonal joints 168.8'.	169.4	J	1	55	SM	F	None
170.0									169.9	Strong to very strong, dark gray SILTSTONE, massive, fresh.							
170.5	3.5						0			Strong to very strong, dark gray, fine SANDSTONE, laminated 1-2 mm, fresh.							
171.0										- Bedding planes 40°-50°.							
171.5	3.75						4		171.3	- Quartz vein 171.3', 1-5 mm±.	171.2 171.2 171.3 171.6	B J B J	1 1 1 1	40 25 45 45	SR SM SR SR	SW F SW F	None None None OZ
172.0										Moderately strong to very strong, gray, conglomeratic SANDSTONE, massive, fresh.							
172.5	3.75						0			- Orthogonal joints around 173.2'.							
173.0																	
173.5	5.5						3				173.2 173.3 173.8	J J J	2 2 1-2	60 35 30	SR SR SR	F F SW	OZ None None
174.0																	
174.5	4.75	C-32	174.7 - 179.7	-143.6 - -148.6	60 100%	57.5 96%	0		174.5	Moderately strong to very strong, gray, fine to medium SANDSTONE, massive, fresh.							
175.0	5.5						0		175.2	Strong to very strong, gray, conglomeratic SANDSTONE, massive, fresh.							
176.0										- Quartz vein at 175.7', 5 mm±.							
176.5	4.75						1		176.2	Strong to very strong, gray, fine to coarse SANDSTONE, massive, fresh.	176.9	J	1-2	30	SM	F	OZ
177.0										- Quartz vein at 176.3', 20 mm±.							
177.5	5.5						1				177.1	J	1-5	25	SM	F	OZ
178.0																	
178.5	5.5						0		178.0	Strong to very strong, gray, fine to coarse SANDSTONE, massive, fresh.							
179.0									178.6	Strong to very strong, gray, conglomeratic SANDSTONE, massive, fresh.							
179.5	7	C-33	179.7 - 184.9	-148.6 - -153.8	62 100%	50 81%	1		179.2 179.4	Strong to very strong, dark gray SILTSTONE, massive, fresh.	179.3	J	1-30	60	VR	F	None
180.0																	
180.5	3.75						4		180.2	Strong to very strong, gray, conglomeratic SANDSTONE, massive, fresh.	180.1-180.4 180.2 180.4 180.7	J J J J	1-3 1 1 1-5	60 60 15 50	SR SM SM VR	F F F F	None OZ None None
181.0										Strong to very strong, dark gray, fine SANDSTONE, laminated 1 mm±, fresh.							
181.5	4						1			- Orthogonal joints around 180.4'. - Bedding planes 30°-40°.	181.0	S	1	25	SL	F	PY
182.0																	
182.5	3.75						4		182.0 182.6	Strong to very strong, gray, fine to medium SANDSTONE, massive, fresh.	182.3 182.3 182.4 182.6	J J J B	1-3 7 1-2 1-2	40 45 50 40	SM SR SM SR	F SW F F	PY OZ PY OZ
183.0										- Orthogonal joints around 182.3'. - Quartz vein at 182.4', 7 mm±.							

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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
183.5							1			Strong to very strong, dark gray, fine to medium SANDSTONE interlaminated with Siltstone, fresh. - Bedding planes 40°. (continued)	183.5	B	1-5	40	SR	F	PY
184.0	5								184.1								
184.5							0			Strong to very strong, dark gray, fine SANDSTONE, laminated 1-2 mm, fresh.	-	-	-	-	-	-	-
185.0	4.25	C-34	184.9 - 190	-153.8 - -158.9	59 97%	59 97%				- Bedding planes 30°-40°. - Quartz vein at 184.9'-185.5', 1 mm±, 85°. - Quartz vein at 185.4', 1-3 mm±.	185.6	J	1	25	SM	SW	OZ
185.5							1										
186.0	3.25																
186.5							0										
187.0	4																
187.5							0		187.1	Strong to very strong, dark gray, fine SANDSTONE, massive, fresh. - Quartz vein at 188.0', 1 mm±.							
188.0	3.5																
188.5							2				188.0	J	1	5	SM	F	OZ
189.0	5										188.5	J	1	5	SR	F	None
189.5							1		189.0	Strong to very strong, gray, conglomeratic coarse SANDSTONE, massive, fresh - Quartz vein at 189.0', 2 mm±.							
190.0	4.5	C-35	190 - 195.1	-158.9 - -164.0	61 100%	57 93%			190.0	Strong to very strong, gray, fine to medium SANDSTONE, massive, fresh.	189.0	J	1	40	SM	F	OZ
190.5							0										
191.0	4.25																
191.5							0										
192.0	4																
192.5							2				192.6-193.3	J	1	85	VR	F	OZ
193.0	4										192.9	J	1	0	SM	F	None
193.5							1										
194.0	4.5								193.7	Strong to very strong, gray CONGLOMERATE, massive, fresh.	193.4	J	1	20	SM	F	OZ
194.5							3		193.9								
195.0	4.25	C-36	195.1 - 200.1	-164.0 - -169.0	60 100%	60 100%			194.3	Strong to very strong, gray, fine SANDSTONE, massive, fresh.	194.2	J	1	50	SM	F	OZ
195.5							1		194.5	Strong to very strong, dark gray SILTSTONE, laminated 1-2 mm, fresh. - Bedding planes.	194.5	S	1	15	SL	F	OZ
196.0	3.5										194.9	J	1	5	SM	F	None
196.5							1		196.1	Strong to very strong, gray, fine SANDSTONE, massive, fresh.	195.4	S	1	20	SL	F	None
197.0	4								196.2	Strong to very strong, dark gray, CONGLOMERATE, massive, fresh.	196.1	J	1	20	SM	F	OZ
197.5							1		197.1	Strong to very strong, dark gray, fine SANDSTONE, laminated 1 mm±, fresh. - Bedding planes 20°-30°.							
198.0	4.5								197.2								
198.5							0		197.4	Strong to very strong, dark gray, CONGLOMERATE, massive, fresh.	197.5	S	1	20	SL	F	OZ
199.0	5								197.5								
199.5							0		197.7	Strong to very strong, dark gray SILTSTONE, massive, fresh.							
									199.5	Strong to very strong, dark gray							

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PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 9/12/19 12:23 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIP-HASE III FIELD WORK\BORING LOGS\14106.02 CORE BORING LOGS.GPJ




DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
200.0										SILTSTONE, massive, fresh.							
200.5	4.75	C-37	200.1 - 205	-169.0 - -173.9	59 100%	56 95%	0		200.2	Strong to very strong, dark gray, fine to coarse SANDSTONE, bedding 10-20 mm±, fresh.							
201.0									200.5	- Quartz vein at 198.6', 1-40 mm±.							
201.5	3.25						3		200.9	- Bedding planes 30°.							
202.0										Strong to very strong, dark gray, conglomeratic SANDSTONE, massive, fresh. (continued)	201.6-202.4	J	1	80	SR	F	OZ
202.5	4.5						1		201.9	Strong to very strong, dark gray, fine SANDSTONE, massive, fresh.	201.8	J	1	10	SR	F	None
203.0	4.5						1			Strong to very strong, dark gray, fine to medium SANDSTONE, massive, fresh.	201.9	J	1	0	VR	F	None
203.5	4.5						1			Strong to very strong, dark gray, fine to coarse SANDSTONE, massive, fresh.	202.7	S	1-2	10	SL	F	OZ
204.0	4.25						0			- Quartz vein at 200.3', 2 mm±.							
204.5	4.25						0		204.2	- Quartz vein at 200.6', 3 mm±.							
205.0	4.25	C-38	205 - 210	-173.9 - -178.9	60 100%	60 100%	0		205.1	Strong to very strong, dark gray, conglomeratic SANDSTONE, massive, fresh.							
205.5	3.25						1		205.7	- Quartz vein at 202.2'-202.5', 1 mm±, 65°.							
206.0	3.25						1		206.4	- Quartz vein at 203.0', 1 mm±.							
206.5	3.5						1		206.8	- Quartz vein at 203.1', 1 mm±.	206.1	J	1	15	SM	F	OZ
207.0	3.25						1			Strong to very strong, dark gray to black SILTSTONE, laminated 1-2 mm±, fresh.							
207.5	3.25						1		208.3	- Bedding planes 30°-40°.	207.8-208.6	J	1	80	SM	F	OZ/PY
208.0	3.25						1		208.6	Strong to very strong, dark gray to black SILTSTONE, laminated 1-2 mm±, fresh.							
208.5	3.5						0		209.2	- Bedding planes 30°-40°.	208.3	J	1	15	SM	F	None
209.0	3.5						0			Strong to very strong, dark gray, fine SANDSTONE, massive, fresh.							
209.5	5.5	C-39	210 - 214.8	-178.9 - -183.7	57 98%	34.5 59%	0			- Quartz vein at 207.0', 1 mm±.							
210.0	3.25						3			Strong to very strong, dark gray to black SILTSTONE, massive, fresh.							
210.5	3.25						3			Strong to very strong, dark gray, fine to medium SANDSTONE, laminated 1-2 mm±, fresh.							
211.0	4						5		211.7	- Bedding planes 30°-40°.	211.0	J	1	15	SR	F	OZ/PY
211.5	4						5			Strong to very strong, dark gray, fine SANDSTONE, massive, fresh.	211.1-211.9	J	1	80	SM	F	None
212.0	5.25						1		212.9	- Quartz vein at 209.4', 3 mm±.	211.6	J	1	30	SR	F	None
212.5	5.25						1			Strong to very strong, dark gray SILTSTONE, laminated 1-2 mm±m fresh.	212.0	J	1	15	SR	F	None
213.0	5.75						1			- Bedding planes 20°-30°.	212.0-212.2	J	1	60	SR	SW	None
213.5	5.75						1			- Quartz marbling 212.3'-212.5'.	212.4	J	1	50	SR	SW	None
214.0	4.75	C-40	214.8 - 219.9	-183.7 - -188.8	61 100%	51.5 94%	3			Strong to very strong, dark gray, conglomeratic SANDSTONE, massive, fresh.	212.6	J	1	30	VR	F	OZ
214.5	4.75						3			- Quartz vein at 212.0', 2 mm±.	212.6-212.9	J	1	60	SM	SW	None
215.0	4						3			- Quartz marbling 212.3'-212.5'.	213.0	S	1	30	SL	SW	PY
215.5	4						3			Strong to very strong, dark gray, conglomeratic SANDSTONE, massive, fresh.							
216.0	4						3		215.3	- Quartz vein at 214.7', 30 mm±.	214.2	J	1	50	SR	SW	None
							3		215.7	- Orthogonal joints 214.5'.	214.5	J	1	30	SR	SW	None
							3			Strong, dark gray, fine SANDSTONE, massive, fresh.	214.5	J	1	50	SR	SW	None
							3				215.4	J	2	55	SM	SW	None
							3				215.5	S	1	30	SL	F	None
							3				215.7	S	1	30	SL	F	None

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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES								
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill		
216.5	5.5						1			Strong to very strong, gray CONGLOMERATE, massive, fresh. - Quartz vein at 215.9', 10 mm±. - Quartz vein at 217.9', 5 mm±. (continued)	216.7	J	1	55	VR	F	None		
217.0							0												
217.5																			
218.0	5										218.0	J	1	50	VR	F	None		
218.5																			
219.0	3.25								219.0		Strong, dark gray, fine SANDSTONE, massive, fresh.	219.0	J	1	0	SR	F	None	
219.5																			
220.0	6.25	C-41	219.9 - 225.1	-188.8 - -194.0	61 100%	51.5 84%				Strong, gray, conglomeratic SANDSTONE, massive, fresh. Strong to very strong, gray, fine to coarse SANDSTONE, massive, fresh.	220.0	J	1	15	VR	SW	None		
220.5	3						220.0-220.4	J	1		65	SR	F	None					
221.0	4						220.6	J	1		0	VR	F	None					
221.5							2				221.0-221.4	J	1	70	SR	F	QZ		
222.0	5										221.4	J	1	60	R	F	None		
222.5																			
223.0	4.25						2		222.4		Strong, dark gray SILTSTONE with graphite interlamination, fresh. - Quartz vein at 222.6', 10 mm±. - Bedding planes 30°-40°.	222.1	J	1	55	SR	F	None	
223.5									222.6			222.5	J	1	45	SM	SW	SI	
224.0	4.5						3				Strong to very strong, dark gray, fine SANDSTONE, laminated 1-2 mm, fresh. - Bedding planes 30°-40°.	223.3	B	1	35	SM	SW	SI	
224.5												223.4	B	1	35	SM	SW	None	
225.0	3.75						3					223.7	B	1	35	SM	F	QZ	
225.5		C-42	225.1 - 230	-194.0 - -198.9	60 100%	45 75%				Strong, gray, fine to medium SANDSTONE, massive, fresh. Strong, dark gray to black SILTSTONE with graphite interlamination, fresh. - Bedding planes 30°. Strong to very strong, gray, fine SANDSTONE, laminated 1-2 mm, fresh. - Bedding planes 25°.	224.1	B	1	35	SR	F	None		
226.0	3						224.5	B	1		30	SM	SW	SI					
226.5							224.6	B	1		30	SM	SW	SI					
227.0	3.5						1		225.2			225.4	J	1	35	SM	F	None	
227.5									225.4			225.7	B	1	30	SM	SW	None	
228.0	3.5						5		226.0			226.1	B	1	25	SR	F	None	
228.5									227.0			227.0-227.1	ECF	-	-	SM	SW	None	
229.0	4						1		227.5			227.1	S	1	20	SL	SW	QZ	
229.5									228.0			227.3	J	1	50	SM	F	None	
230.0									228.0			227.8	J	1	45	SR	F	QZ	
230.5									228.5			228.0	B	1	40	SM	F	None	
231.0									229.0			229.1	S	1	25	SL	F	None	
231.5									229.5			229.2	J	1	30	SR	F	QZ	
232.0									230.0			Bottom of borehole at 230.0 feet.							
232.5																			

5. Boring was backfilled with cement bentonite grout from 230.0 feet to 38.4 feet. A groundwater monitoring well was installed from 38.4 feet to the ground surface. This well appeared to not function properly, and was removed in June 2019. The boring was backfilled with cement-bentonite grout to the ground surface. Please see the well installation log for additional details.



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TEST BORING REPORT

PROJECT NAME Narragansett Bay Commission Phase III CSO Program
CLIENT NBC/Stantec
CONTRACTOR New England Boring Contractors, Inc.

PROJECT NO. 13:308.00D/14106.02
START 8/2/2019
FINISH 8/8/2019
DRILLER NEBC
LOGGED BY MLP
CHECKED BY RKM/SJM

	CASING	SAMPLER	BARREL	DRILLING EQUIPMENT & PROCEDURES
Type	Steel	Split Spoon	HQ3	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	4/5	1 3/8	2 3/8	Bit Type: 4 7/8" Tricone / 3 7/8" Tricone
Hammer Weight (lb.)	140	140	N/A	Drill Fluid: Water
Hammer Fall (in.)	30	30	N/A	Casing: 5" (17.8") / 4" (19.0") Hoist/Hammer: Automatic Hammer

ELEVATION 24.6 **NORTHING** 2882698.809
DATUM NGVD 1929 **EASTING** 359379.301
LOCATION Masonic Temple Parking Lot

TEST BORING REPORT - GINT STD US LAB.GDT - 12/4/19 15:04 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS\14106.02 BORING LOGS-090319.GPJ

DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION (Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	DRILLING NOTES
0	24.6									
		26	17-15-	S-1	13 / 21	0.25 -	SP		Moist, dense, brown, fine to medium SAND, some fine to coarse gravel, trace coarse sand, trace silt. (FILL)	ASPHALT PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
		42	17-9/3"			2			Moist, medium dense, light brown, fine to medium SAND, trace coarse sand, trace fine gravel, trace silt. (FILL)	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
		32	11-6-6-	S-2	16 / 24	2 - 4	SP		Moist, loose, brown, fine to medium SAND, little fine to coarse gravel, trace coarse sand, trace silt, trace brick, trace asphalt. (FILL)	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
		35	4 (12)							
5	19.6	29	3-5-4-3	S-3	17 / 24	4 - 6	SP		Moist, medium dense, dark gray, fine to coarse SAND, some fine to coarse gravel, trace coarse sand, trace silt, trace glass, trace organics. (FILL)	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
		63	(9)							
		106	6-6-13-	S-4	15 / 24	6 - 8	SW		5A: Moist, medium dense, black, fine to medium SAND, some fine to coarse gravel, trace coarse sand, trace silt. (FILL) 5B: Moist, medium dense, tan, fine SAND, little fine to coarse gravel, trace coarse sand, trace silt.	A: PID = 4.8 ppm B: PID = 2.2 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
		X	13 (19)							
10	14.6	142	16-16-	S-5	13 / 24	8 - 10	SP		Wet, medium dense, brown to tan, fine SAND, some medium to coarse sand, trace fine gravel, trace silt.	PID = 0.0 ppm (10'-12') Composite environmental sample taken. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
		X	13-8 (29)							
		40	7-13-5-	S-6	7 / 24	10 - 12	SW	Wet, loose, brown, fine SAND, some silt, trace fine gravel.	PID = 1.3 ppm (12'-14')	
		45	4 (18)							
		55	5-4-4-5	S-7	8 / 24	12 - 14	SM	Wet, medium dense, brown to purple, fine SAND, some silt, some fine to coarse gravel.	PID = 0.2 ppm	
		X	(8)							
15	9.6	53	6-3-17-	S-8	12 / 24	14 - 16	SM	Wet, medium dense, gray/purple, weathered SANDSTONE recovered as fine to coarse GRAVEL, some fine to coarse sand, little silt.	PID = 0.8 ppm	
		113	31 (20)							
		117	14-15-	S-9	3 / 21	16 - 17.8				
		X	10-50/3"							
Bottom of borehole at 17.80 feet.										

WATER LEVEL DATA				SAMPLE IDENTIFICATION		REMARKS:
DATE/TIME	DEPTH (ft.) TO:			O Open End Rod T Thin Wall Tube U Undisturbed Sample S Split Spoon G Geoprobe		
	BOTTOM OF CASING	BOTTOM OF HOLE	WATER			
						1. "X" in the casing blows column indicates that blows were not counted at that interval.



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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES									
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill			
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0	3.5	C-1	17.8 - 21.3	6.7 - 3.2	41 - 98%	17 - 40%														
18.5																				
19.0	2.4																			
19.5																				
20.0	2.2																			
20.5	1.3																			
21.0																				
21.5	3.4	C-2	21.3 - 25.8	3.2 - -1.3	29 - 54%	18 - 33%														
22.0																				
22.5	2.2																			
23.0																				
23.5	2.2																			
24.0	1.9																			
24.5																				
25.0	2.2																			
25.5																				
26.0	4.5	C-3	25.8 - 28.7	-1.3 - -4.2	34 - 97%	27 - 77%														
26.5																				
27.0	3.4																			
27.5																				
28.0	2																			
28.5																				
29.0	2.7	C-4	28.7 - 33.1	-4.2 - -8.6	54 - 100%	44 - 83%														
29.5																				
30.0	2																			

REMARKS:

- Dip angles are measured from horizontal (i.e., perpendicular to core axis).
- Prior to coring, NEBC installed the 4" casing from the ground surface to approximately 17.8'.
- Wash color light purple.
- After the first core run, NEBC advanced the 4" diameter casing from 17.8' to 19.0' in attempt to prevent water loss.
- Little to no flush return from approximately 18.8'-38.3'. NEBC indicated that water was lost through the annulus between the 5" casing and 4" casing.

WATER LEVEL DATA

DATE/TIME	BOT. OF SOIL CASING (ft)	BOT. OF HOLE (ft)	WATER
8/5/2019 12:15:00 PM	17.8	17.8	3.8
8/6/2019 7:00:00 AM	19.0	38.2	14.8
8/7/2019 7:00:00 AM	19.0	113.6	11.0
8/8/2019 7:00:00 AM	19.0	182.3	16.5

GROUND SURFACE EL. 24.6

Note: Refer to the key sheets within the Geotechnical Design Report for the description of rock classification system codes.

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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES										
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill				
30.0																					
30.5	2						3		30.1	slightly weathered to fresh.	30.0-30.5	J	1-3	85	SR/R	SW	OZ				
31.0										Strong, light gray to light purple, fine to medium SANDSTONE, massive, slightly weathered to fresh.	30.5	J	1-3	30	SM/SR	SW	Fe				
31.5	2.9						2				30.6-30.9	J	1-3	0-75	R	SW	Fe				
32.0																					
32.5	1/5"						0														
33.0																					
33.5	2.7	C-5	33.1 - 38.3	-8.6 - -13.8	62 100%	58 94%	1		33.1	Strong, light gray to light green, conglomeratic SANDSTONE, massive, fresh.											
34.0																					
34.5	2.6						0														
35.0																					
35.5	2.3						0														
36.0																					
36.5	2.5						2		36.2	Strong, light gray to light purple, medium to coarse SANDSTONE, massive, fresh.	36.4-36.6	J	1	45	SR	SW	OZ/CH				
37.0									36.6	Strong, light gray to light purple, fine to medium SANDSTONE, laminated (1 mm±), fresh.	36.8	J	1	30	SR	SW	Fe				
37.5	3.2						1		37.6	- Bedding planes at 45°.	37.4	J	1-10	40	SR	F	None				
38.0										Strong, light gray to light purple, coarse SANDSTONE, massive, fresh.											
38.5	4.2	C-6	38.3 - 42.7	-13.8 - -18.2	55 100%	55 100%	0			- Quartz veins from 38.7'-39.2', 1-5 mm±.											
39.0																					
39.5	3.3						1		39.3	Moderately strong to strong, light gray to light purple, fine to medium SANDSTONE, laminated (1 mm±), fresh.	39.3	J	1	40	SM/SR	F	None				
40.0																					
40.5	3.2						0		40.1	- Bedding planes at 30°-35°.											
41.0										Strong, light gray, coarse SANDSTONE, massive, fresh.											
41.5	3.2						1		41.3	- Quartz veins, 1-7 mm±.											
42.0									41.4	Strong, light purple, fine SANDSTONE, laminated (1 mm±), fresh.	41.3	J	1	40	SR	F	OZ				
42.5	2.7						2		42.1	- Bedding planes at 35°.											
43.0										Strong, light gray, coarse SANDSTONE, massive, fresh.	42.3	J	1	40	SM	SW	None				
43.5	2.5	C-7	42.7 - 47.9	-18.2 - -23.4	60 97%	56 90%	0			- Quartz veins from 41.4'-41.7', 1 mm±.	42.8	J	1-3	40	SR	F	None				
44.0										Strong, light gray to light purple, fine to medium SANDSTONE, laminated (1-2 mm±), fresh.											
44.5	2.6						1		44.1	- Bedding planes at 35°-40°.											
45.0										Strong to very strong, light gray, medium to coarse SANDSTONE, massive, fresh.	44.0	J	1-5	40	SM	SW	OZ				
45.5	2.7						0		45.2	- Quartz veins from 44.2'-45.0', 2-10 mm±.											
46.0										Strong, light gray to light purple, fine to medium SANDSTONE, laminated (1-2 mm±), fresh.											
	2								46.3	- Bedding planes at 30°.											

6. Flush return blocked at approximately 33.1', the driller stopped the core run.
7. Flush returned at approximately 38.3'. Wash color light purple.
8. Wash color turned to light gray at approximately 38.5'.

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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
46.5											46.0 46.3	J J	1-3 1-10	35 35	SM/SR SR	SW SW	None None
47.0	2.4						2			Strong to very strong, light gray, medium to coarse SANDSTONE, massive, fresh. (continued)							
47.5							0			- Quartz veins from 47.0'-47.3', 1 mm±.							
48.0	2.5	C-8	47.9 - 53.1	-23.4 - -28.6	62 100%	62 100%			47.9	Moderately strong to strong, light gray, medium SANDSTONE interlaminated with fine Sandstone (1-2 mm±) to massive, fresh.	48.3	J	1	40	SM	SW	Fe
48.5							1			- Bedding planes at 30°-40° from 47.9'-48.4'.							
49.0	2.8																
49.5							1			- Bedding planes at 40°-50° from 49.4'-49.9'.	49.7	J	1	25	SR	F	QZ
50.0	2.6																
50.5							1				50.1	J	1	35	SR	SW	Fe
51.0	3.5																
51.5							1				51.7	J	1	25	SR	F	None
52.0	2.6																
52.5							0										
53.0	2.5	C-9	53.1 - 57.4	-28.6 - -32.9	51 98%	42 81%				- Bedding planes at 30°-40° from 53.1'-54.3'.							
53.5							0										
54.0	2.7									- Pyrite pockets from 53.8'-54.2', 1-3 mm±.							
54.5							2				54.4 54.4-54.7	J J	1 1	35 50	SR SR	F F	QZ QZ
55.0	2.5								54.6	Strong to very strong, light gray, medium SANDSTONE, massive, fresh.							
55.5							0			- Pyrite pockets from 54.6'-54.8', 1 mm±.							
56.0	3.1									- Orthogonal joints near 54.6'.							
56.5	1.9						1			- Quartz veins from 55.1'-56.1', 1-5 mm±.	56.5-56.9	J	1-2	65	SR	SW	None
57.0									56.7	Moderately strong to strong, light gray, fine to medium SANDSTONE, laminated (1-3 mm±) to massive, fresh.	57.0-57.1 57.2-57.4 57.6 57.6-57.8 57.8	J ECF J ECF J	1-10 - 2-3 - 2-5	45 - 40 - 10	SR SR SR SR SR	F MW F SW F	QZ QZ None QZ QZ
57.5	3.2	C-10	57.4 - 62.5	-32.9 - -38.0	60 98%	53 87%	ECF (7±)			- Bedding planes at 50°-60°.							
58.0							10			- Quartz veins from 57.0'-57.2', 1-7 mm±.							
58.5	2.5						0			- Bedding planes at 50°-70° from 57.8'-58.5'.							
59.0									58.6 58.9								
59.5	3.4									Strong, light gray, conglomeratic SANDSTONE, massive, fresh.	59.6 59.8	J J	1-3 1-5	40 15	SR SR	F F	None None
60.0							2			- Quartz veins 58.5'-58.9', 60 cm±.							
60.5	2.4						0			Strong, light gray, medium to coarse SANDSTONE interlaminated with fine Sandstone and Siltstone (1-2 mm±) to massive, fresh.							
61.0										- Quartz veins from 59.2'-59.5', 2 mm±.							
61.5	2.1						0			- Bedding planes at 40°-55° from 60.0'-60.6'.							
62.0										- Quartz veins from 60.8'-61.1', 1 mm±.							
62.5	3.5	C-11	62.5 - 67.5	-38.0 - -	61 100%	61 100%	0										

9. Flush return blocked at approximately 57.4'. The driller stopped the core run.



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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
63.0				-43.0						- Quartz veins from 62.5'-62.9', 2-5 mm±.							
63.5	3.2						0			- Bedding planes at 15°-30° from 62.5'-65.5'. (continued)							
64.0										- Quartz vein near 63.4', 7 mm±.							
64.5	2.7						0			- Quartz vein near 64.6', 1 mm±.							
65.0																	
65.5	3.5						0		65.5	- Quartz veins from 65.0'-65.2', 10 mm±.							
66.0										Strong, light gray, medium SANDSTONE, massive, fresh.							
66.5	3						0			- Quartz veins from 65.8'-67.0', 1-5 mm±.							
67.0																	
67.5	3.6	C-12	67.5 - 72.7	-43.0 - -48.2	61 98%	61 98%	0		67.5	Strong, light gray, conglomeratic SANDSTONE with Quartz, massive, fresh.							
68.0									67.8								
68.5	4.5						0		68.5	Strong, light gray, fine to coarse SANDSTONE, massive, fresh.							
69.0										- Quartz marbling from 67.9'-68.2'.							
69.5	7.1						1			Moderately strong to strong, light gray, conglomeratic SANDSTONE with Quartz, massive, fresh.	69.1	J	1-5	10	SR	F	OZ
70.0										- Quartz marbling from 68.5'-72.7'.							
70.5	7.5						0										
71.0																	
71.5	5.4						0										
72.0																	
72.5	8.2	C-13	72.7 - 77.8	-48.2 - -53.3	61 100%	61 100%	0		72.9	Strong, light gray, medium SANDSTONE, massive, fresh.							
73.0									73.2	- Quartz veins near 73.1', 5-10 mm±.	73.2	J	1-10	20	SR	F	OZ
73.5	7.6						1			Strong to very strong, light gray to white, conglomeratic SANDSTONE with Quartz, massive, fresh.							
74.0										- Quartz marbling from 73.2'-74.1'.	74.0-75.0 74.8	J J	1-5 1-5	80 15	SR SR	F F	OZ/PY OZ
74.5	5.6						2										
75.0																	
75.5	4.5						0										
76.0									75.9	Strong, light gray, coarse SANDSTONE with fine Sandstone interbeds (1-5 cm±), fresh.							
76.5	4.2						0			- Bedding planes at 30°-45°.							
77.0										- Quartz veins from 75.9'-77.2', 1-30 mm±.							
77.5	3.5	C-14	77.8 - 82.9	-53.3 - -58.4	60 98%	60 98%	1		77.5	Strong, light gray, medium to coarse SANDSTONE, massive, fresh.	77.1	J	1-3	30	SR	F	OZ
78.0																	
78.5	3.3						0		78.5	Strong to very strong, light gray, fine SANDSTONE interlaminated with Siltstone (1-2 mm±) to massive, slightly weathered to fresh.							
79.0																	

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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
79.5							1			- Quartz vein near 78.5', 5 mm±.	79.5	J	1	30	SR	SW	OZ/SI
80.0	3.2						0			- Bedding planes at 30°-40° from 79.0'-79.6'.							
80.5										- Quartz veins from 79.3'-79.4', 1-7 mm±. (continued)							
81.0	3.3																
81.5							0										
82.0	3.7																
82.5							0			- Bedding planes at 30°-40° from 82.2'-84.0'.							
83.0	3.4	C-15	82.9 - 88	-58.4 - -63.5	62 100%	62 100%											
83.5							1				83.9-84.0	J	1	45	SR	SW	OZ
84.0	4.2								84.0	Strong to very strong, light gray, medium to coarse SANDSTONE, massive, slightly weathered to fresh.	84.0-84.1	J	1	45	SR	SW	OZ
84.5							1			- Quartz veins from 84.1'-84.5'.							
85.0	3.2									- Quartz vein near 85.0', 5 mm±.							
85.5							0		85.3	Strong, light gray, coarse SANDSTONE, massive, fresh.							
86.0	3.9								85.9	- Quartz veins from 85.4'-86.0', 1-6 mm±.							
86.5							0		86.2	Strong, light gray, medium SANDSTONE, massive, fresh.							
87.0	3.7									Strong to very strong, light gray, medium to coarse SANDSTONE, massive, fresh.							
87.5							0			- Quartz veins from 86.5'-88.8', 2-15 mm±.							
88.0	2.8	C-16	88 - 93.2	-63.5 - -68.7	61 98%	57 92%				- Quartz veins from 87.7'-88.0', 1-10 mm±.	88.1-88.3 88.4	J J	1 1	75 35	SR SR	F F	PY PY
88.5							2			- Quartz veins from 88.4'-88.9', 1-6 mm±.							
89.0	2.7																
89.5							0										
90.0	2																
90.5							1			- Quartz veins from 90.6'-90.7', 1-2 mm±.	90.7	J	1-5	35	SR	SW	OZ
91.0	2.9																
91.5							0		91.2	Strong to very strong, light gray, medium to coarse SANDSTONE, massive, fresh.							
92.0	4.2									- Quartz veins from 91.2'-91.9', 1-2 mm±.	92.7	J	1-5	40	SR	F	OZ
92.5							1										
93.0	2.8	C-17	93.2 - 98.3	-68.7 - -73.8	62 100%	62 100%			93.0	Strong to very strong, light gray, coarse SANDSTONE, massive, fresh.	93.9	J	1-5	30	SR	F	OZ
93.5							1		93.7	- Conglomeratic Sandstone lens from 93.1'-93.2', 1 cm±.							
94.0	3.3						1			Moderately strong to strong, light gray, conglomeratic SANDSTONE, massive, slightly weathered to fresh.	94.4	J	1-5	40	SR/R	F	OZ
94.5										- Quartz vein near 94.4', 16 mm±.							
95.0	4.1						2			- Quartz veins from 95.1'-95.5', 2-30 mm±.	95.1-95.3 95.5	J J	1-10 1-10	45 30	SR SR	F F	OZ OZ

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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES							
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill	
96.0										- Quartz veins from 95.1'-95.5', 2-30 mm±. (continued)								
96.5	4.3						0											
97.0																		
97.5	5.1						1					97.1	J	1-10	20	SR	SW	OZ
98.0																		
98.5	4.4	C-18	98.3 - 103.3	-73.8 - -78.8	60 100%	60 100%	0											
99.0																		
99.5	5.2						0											
100.0																		
100.5	4.9						1					100.9	J	1-5	15	SR	SW	OZ
101.0																		
101.5	4.8						0											
102.0									101.9	Strong, light gray, medium to coarse SANDSTONE interlaminated (1-5 mm±) and interbedded (5-10 mm±) with fine Sandstone to massive, fresh.								
102.5	4.1						0											
103.0																		
103.5	4.1	C-19	103.3 - 108.4	-78.8 - -83.9	61 100%	59 97%	0		103.3	- Bedding planes at 40°-60° from 101.9'-102.5'. - Quartz veins near 101.9', 1-3 mm±.								
104.0																		
104.5	4.1						1		104.3	Strong to very strong, light gray, conglomeratic SANDSTONE, massive, fresh.								
105.0									104.8	Strong, light gray, medium SANDSTONE, massive, fresh								
105.5	6						2			Strong to very strong, light gray, conglomeratic SANDSTONE, massive, slightly weathered to fresh.		105.7 105.9	J J	1 1-5	20 40	SR SR	SW SW	OZ OZ
106.0																		
106.5	5.6						1		105.9	Strong to very strong, light gray, coarse SANDSTONE, massive, fresh.		106.8	J	1-5	20	SR	F	OZ
107.0																		
107.5	5.4						0		106.9	Strong to very strong, light gray, conglomeratic SANDSTONE, massive, fresh.								
108.0																		
108.5	5.8	C-20	108.4 - 113.6	-83.9 - -89.1	63 100%	63 100%	0											
109.0																		
109.5	5.8						1			- Quartz veins near 109.1', 3 mm±.		109.6	J	1	35	SR	F	OZ
110.0																		
110.5	4.3						1		110.2	Strong to very strong, light gray, medium SANDSTONE, massive, fresh.		110.6	J	1	30	SR	F	None
111.0																		
111.5	3						1			- Quartz veins near 110.4', 2 mm±.		111.5	J	1-10	25	SR	F	None
112.0																		

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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
112.5	5						0			- Quartz veins near 110.4', 2 mm±. (continued)	-	-	-	-	-	-	-
113.0							0			- Quartz veins near 113.3', 5 mm±.	-	-	-	-	-	-	-
113.5	5.2	C-21	113.6 - 118.6	-89.1 - -94.1	59 98%	55 92%	0		113.9	Strong, light gray, fine to medium SANDSTONE, laminated (1-2 mm±) to massive, fresh. - Bedding planes at 30°-40° from 113.9'-114.8'.	114.1-114.3	J	1-5	45	SR	F	OZ
114.0							1										
114.5	3.7						0			- Bedding planes at 40° from 115.5'-116.3'.	-	-	-	-	-	-	-
115.0							0										
115.5	4.7						0		116.3	Strong, light gray, medium SANDSTONE, massive, fresh.	116.1-116.3 116.2-116.3 116.5-116.7 116.7-117.0	J J J J	1 1 1 1-5	45 45 40 75	SR SR SR SR	F F F F	OZ OZ OZ OZ
116.0							4										
116.5	4.2						0		117.5	- Quartz vein near 117.2', 1 mm±. Strong to very strong, light gray, conglomeratic SANDSTONE, massive, fresh.	-	-	-	-	-	-	-
117.0							0										
117.5	6.1						0			- Quartz vein near 117.7', 20 mm±. - Quartz vein near 118.3', 3 mm±.	-	-	-	-	-	-	-
118.0							0										
118.5	7.2	C-22	118.6 - 123.6	-94.1 - -99.1	60 100%	60 100%	0										
119.0							0										
119.5	5.3						0										
120.0							0										
120.5	4.6						1		120.4	- Quartz veins from 120.0'-120.4', 1-10 mm±. Strong, light gray, fine to medium SANDSTONE, laminated (1-5 mm±), fresh.	120.2	J	1-20	35	SR	F	OZ
121.0							1										
121.5	5.6						1		121.1	- Bedding planes at 25°-35°. Strong, light gray, conglomeratic SANDSTONE, massive, fresh. - Quartz veins from 121.1'-121.6', 5-12 mm±.	121.1	J	1	30	SR	F	OZ
122.0							0										
122.5	5.3						0										
123.0							0										
123.5	6.7	C-23	123.6 - 128.6	-99.1 - -104.1	60 100%	60 100%	0										
124.0							1		124.2	Strong, light gray, medium SANDSTONE, laminated (1 mm±), fresh.	124.9	J	1	30	SR	F	OZ
124.5	4.5						0		125.0	- Bedding planes at 40°. - Quartz vein near 124.9', 25 mm±. Strong, light gray, medium SANDSTONE, massive, fresh.	-	-	-	-	-	-	-
125.0							0										
125.5	3.1						0										
126.0							0										
126.5	3.2						0										
127.0							1			- Quartz veins from 126.8'-127.3', 2-10 mm±.	127.6	J	1	30	SR	F	Fe
127.5	5.2						0										
128.0							0		128.4 128.6	- Quartz veins from 128.0'-128.2', 2 mm±. Strong, light gray, conglomeratic	-	-	-	-	-	-	-
128.5	4	C-24	128.6	-104.1	43	40	0										

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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
129.0			- 132.4	-	93%	87%				SANDSTONE, massive, fresh.							
129.5	5			-107.9			0		129.2	Strong to very strong, light gray, medium to coarse SANDSTONE, massive, fresh. (continued)	-	-	-	-	-	-	-
130.0									130.0	Strong to very strong, light gray, conglomeratic SANDSTONE, massive, fresh.							
130.5	4.1						0			Strong, light gray, medium to coarse SANDSTONE, massive, fresh.							
131.0									130.9	Strong, light gray, medium SANDSTONE interlaminated with fine Sandstone (1-2 mm±), slightly weathered to fresh.	131.5-131.7	J	1	50	SM	F	QZ/PY
131.5	4.6						2			- Bedding planes at 40°-50°.	131.8-132.0	J			SM	SW	None
132.0																	
132.5	4.4	C-25	132.4	-107.9	61	57	0		132.4	Strong, light gray, conglomeratic SANDSTONE, massive, fresh.	-	-	-	-	-	-	-
133.0			137.5	-	100%	93%											
133.5	4.4			-113.0			1				133.0	J	1	40	SR	F	QZ
134.0																	
134.5	5.4						0			- Quartz vein near 134.0', 6 mm±.							
135.0										Strong, light gray, medium SANDSTONE, massive, fresh.							
135.5	5.1						1				135.9	J	1-10	10	SR	F	QZ
136.0										- Quartz veins from 135.7'-136.0', 10-17 mm±.							
136.5	5.2						1		136.3	- Quartz veins near 136.2', 2-7 mm±.	136.3	J	1-5	35	SR	F	QZ
137.0										Strong, light gray, coarse SANDSTONE, massive, fresh.							
137.5	6.1	C-26	137.5	-113.0	63	63	1				137.0-137.2	J	1-5	45	SR	F	QZ
138.0			142.8	-	98%	98%											
138.5	5.6			-118.3			1				138.3	J	1-10	20	SR	F	QZ
139.0																	
139.5	6.6						0										
140.0																	
140.5	8.4						1		139.9	Strong, light gray, conglomeratic SANDSTONE, massive, fresh.	140.0	J	1	30	SR	F	QZ
141.0																	
141.5	6.8						0										
142.0																	
142.5							0										
143.0	6.3	C-27	142.8	-118.3	54	54											
143.5			147.6	-	93%	93%											
144.0	3.9			-123.1			0		143.3	Strong to very strong, light gray, medium to coarse SANDSTONE, massive, fresh.							
144.5																	
145.0	3.2						1				144.8-145.0	J	1-10	30	SR	F	QZ
										- Quartz marbling from 144.8'-145.4'.							

10. Flush return blocked at approximately 132.4'. The driller stopped the core run.



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DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
145.5	2						1		145.4	Strong to very strong, light gray, conglomeratic SANDSTONE, massive, fresh.	145.1-145.3	J	1-5	45	SR	F	OZ
146.0																	
146.5	2.1						0		146.6	Strong to very strong, light gray, medium to coarse SANDSTONE, massive, fresh.	-	-	-	-	-	-	-
147.0																	
147.5	3.5	C-28	147.6 - 152.6	-123.1 - -128.1	62 100%	62 100%	1		147.2	- Quartz veins near 147.2', 13 mm±.	147.1-147.3	J	1-10	45	SR	F	OZ
148.0																	
148.5	3.5						1		148.7		148.7	J	1-5	40	SR	F	OZ
149.0																	
149.5	3.2						1		149.7		149.7	J	1-5	35	SR	F	OZ
150.0																	
150.5	4						1		150.3	Strong to very strong, light gray, medium to coarse SANDSTONE, massive, fresh.	150.3-150.6	J	1-5	45	SR	F	OZ
151.0																	
151.5	4.3						0		151.1	Strong, light gray, conglomeratic SANDSTONE, massive, fresh.	-	-	-	-	-	-	-
152.0																	
152.5	5.3	C-29	152.6 - 157.9	-128.1 - -133.4	62 97%	62 97%	0		152.6		-	-	-	-	-	-	-
153.0																	
153.5	3.8						1		153.2		153.2-153.9	J	1-5	75	SR	F	PY/OZ
154.0																	
154.5	4.5						1		154.5		154.5	J	1	35	SR	F	OZ
155.0																	
155.5	4.2						1		155.2		155.2-155.4	J	1	35	SR	F	None
156.0																	
156.5	5						0		156.5	Strong to very strong, light gray, medium SANDSTONE, massive, fresh.	-	-	-	-	-	-	-
157.0																	
157.5	4.5	C-30	157.9 - 162.9	-133.4 - -138.4	62 100%	62 100%	0		157.5		-	-	-	-	-	-	-
158.0																	
158.5	4.5						0		158.5		-	-	-	-	-	-	-
159.0																	
159.5	3.8						0		159.5		-	-	-	-	-	-	-
160.0																	
160.5	3.9						1		160.5	Strong, light gray, fine SANDSTONE interlaminated with Siltstone (1-2 mm±), slightly weathered to fresh. - Bedding planes at 40°-50°.	160.0	J	1	35	SR	F	None
161.0																	
161.5							1		161.5		161.7	J	1	35	SR	SW	None

(Continued Next Page)



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CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 12/4/19 14:59 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIP PHASE III FIELD WORK\BORING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES									
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill			
162.0	4.6																			
162.5							0		162.4	Strong, light gray, medium to coarse SANDSTONE, massive, fresh.	-	-	-	-	-	-	-			
163.0	3.4	C-31	162.9 - 168.1	-138.4 - -143.6	61 98%	57 92%	0													
163.5							0													
164.0	3.5																			
164.5							2					164.4 - 164.7	J	1-15	30	SR	F	QZ	None	
165.0	3.1						0													
165.5							0													
166.0	3.4																			
166.5							3					166.3 - 166.9	J	1	15	SR	F	None	None	None
167.0	3.7																			
167.5							0													
168.0	3.7	C-32	168.1 - 172.3	-143.6 - -147.8	50 100%	47 94%	1		168.4	Strong, light gray, fine to medium SANDSTONE interlaminated with Siltstone (1-2 mm±) to massive, slightly weathered to fresh. - Bedding planes at 30°-40° from 168.4'-169.7'. - Bedding planes at 30°-40° from 171.1'-173.7'. - Orthogonal joints near 173.7'. - Quartz veins from 174.8'-175.9', 1-10 mm±. - Bedding planes at 40°-50° from 175.2'-176.9'.	168.4	J	1-10	20	SR	F	QZ			
168.5							1					169.6	J	1-5	30	SR	F	QZ/PY		
169.0	4.2						1													
169.5							0													
170.0	3.5						0													
170.5	3.5						0													
171.0							0													
171.5	1.4/3"						0													
172.0							0													
172.5	4	C-33	172.3 - 177.3	-147.8 - -152.8	60 100%	55 92%	0													
173.0							2				173.6 - 173.7-174.0	J	1	30	SR	F	None	QZ		
173.5	2.7						2													
174.0							2				174.0-174.4 - 174.7	J	1	50	SR	F	QZ	PY/QZ		
174.5	3.4						2													
175.0							1				175.8-176.0	J	1	40	SR	F	QZ			
175.5	3.1						1													
176.0							2				176.1 - 176.9	J	1	30	SR	F	PY	None		
176.5	2.5						2													
177.0							1		176.9											
177.5	4	C-34	177.3 - 182.3	-152.8 - -157.8	60 100%	59 98%	1		176.9	Strong, light gray, fine to medium SANDSTONE interlaminated with Siltstone and Graphite (1-2 mm±), slightly weathered to fresh. - Bedding planes at 30°-45°.	177.0	J	1	30	SM	SW	None			
178.0																				

11. Flush return blocked at approximately 172.3'. The driller stopped the core run.



CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 12/4/19 14:59 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIP PHASE III FIELD WORKING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
178.5	2.5						0			- Quartz veins near 177.7', 1-5 mm±. - Quartz veins near 178.1', 1 mm±. <i>(continued)</i>	-	-	-	-	-	-	-
179.0										- Quartz veins near 178.3', 1 mm±.							
179.5	2.6						0		179.2	Strong to very strong, light gray, conglomeratic SANDSTONE, massive, slightly weathered to fresh.							
180.0										- Quartz veins from 179.6'-181.2', 1-3 mm±.							
180.5	2.6						0										
181.0																	
181.5	4.5						2				181.2-181.5 181.3	J J	1-5 1-5	55 30	SR SR	SW SW	OZ OZ
182.0																	
182.5	3.5	C-35	182.3 - 187.3	-157.8 - -162.8	61 100%	58 97%	0										
183.0																	
183.5	3						3			- Quartz veins from 183.4'-186.5', 1-10 mm±.	183.3-183.7 183.6 183.8	J J J	1-5 1 1-5	55 30 40	SR SR SR	SW SW SW	OZ OZ OZ
184.0																	
184.5	3.7						1				184.3	J	1-10	35	SR	SW	OZ
185.0																	
185.5	3.6						0										
186.0																	
186.5	3.3						1				186.0-186.2	J	1-10	60	SR	SW	OZ
187.0																	
187.5	4.3	C-36	187.3 - 189.7	-162.8 - -165.2	28 96.5%	25 86%	2				187.0-187.1 187.9	J J/S	1-5 1	40 30	SR SL/SM	SW SW	OZ OZ
188.0																	
188.5	4						1				188.8-189.0	J/S	1	45	SL/SM	MW/SW	OZ/SA
189.0	2.3/5"								188.9	Moderately strong to strong, light gray, fine SANDSTONE, laminated (1 mm±), slightly weathered to fresh. - Bedding planes at 40°. - Quartz veins, 1-5 mm±.	189.1-189.3	J	1	45	SR	SW	OZ
189.5																	
190.0	4.2	C-37	189.7 - 193.6	-165.2 - -169.1	47 100%	32 68%	0										
190.5									190.2	Strong, light gray, medium to coarse SANDSTONE interlaminated with Graphite (1 mm±), slightly weathered to fresh. - Bedding planes at 50°-60°. - Quartz veins, 1-20 mm±.							
191.0	4.7										191.1-191.4 191.3-191.5 191.5-191.7 191.7-192.0	J/S J J/S J	1-10 1-10 1-5 1-5	55 45 45 50	SL/SR SR SR SR	SW SW SW SW	OZ OZ OZ OZ
191.5									191.6	Strong, gray, fine to medium SANDSTONE interlaminated with Graphite (1-2 mm±), slightly weathered to fresh. - Bedding planes at 30°-45°.							
192.0	3.9						4				192.0-192.2 192.0-192.3 192.5 192.8	J J J J	1-5 1-10 1-5 1	50 50 30 40	SR SR SR SR	SW SW F F	OZ OZ OZ OZ
192.5																	
193.0	4.2						4										
193.5																	
194.0	4.5	C-38	193.6 - 196.7	-169.1 - -172.2	36 97%	35 94.5%	3			- Quartz veins from 193.6'-194.0', 1-6 mm±.	193.1 193.6-193.7 193.7	J J J	1-4 1-2 1	25 50 30	SR SR SR	SW F F	None OZ OZ
194.5							0										

12. Flush return blocked at approximately 189.7', the driller stopped the core run.
 13. Flush return blocked at approximately 193.6', the driller stopped the core run.



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CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 12/4/19 14:59 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIP-HASE III FIELD WORKING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES								
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill		
195.0	4.1								194.8	Strong, light gray, medium SANDSTONE, massive, fresh. - Quartz veins from 194.8'-195.9', 1-7 mm±.									
195.5	4					0													
196.0							1				196.8	J	1-20	20	SR	SW/F	OZ		
196.5	4.1	C-39	196.7 - 201.3	-172.2 - -176.8	47 85% 33 60%				196.7	Strong, gray, fine SANDSTONE interlaminated with Graphite (1-2 mm±), slightly weathered to fresh. - Bedding planes at 20°-30°. - Quartz veins from 196.7'-199.3', 1-5 mm±.									
197.0	2.5					0													
197.5	2.5						2				198.3 198.6	J J	1-20 1-5	20 25	SR SR	F SW	OZ OZ		
198.0																			
198.5	4						2				199.6 199.6-200.0	J J	1-25 1-5	20 75	SR SR	MW/SW F	SA/SI OZ		
199.0																			
199.5	2.2						ECF (7±)				200.0 200.0-200.2 200.2-200.3 200.3-200.8	J J J ECF	1 1 1 -	10 80 50 -	SR SR SR SR	F SW SW MW/SW	OZ OZ OZ OZ		
200.0							10		200.8	Lost Core. No Recovery.									
200.5	4.5	C-40	201.3 - 204.6	-176.8 - -180.1	39 98% 36 90%		1		201.3	Strong, gray, fine SANDSTONE interlaminated with Graphite (1 mm±), slightly weathered to fresh. - Bedding planes at 30°-35°. - Quartz veins from 201.3'-204.0', 1-5 mm±.	201.3-201.5	J	2-5	60	SR	SW	OZ		
201.0	3.7						2					202.1 202.5-202.7	J J	1 1	35 45	SR SR/R	SW SW	OZ OZ/SA	
201.5																			
202.0	3.3						0		203.3	Strong, gray, fine to medium SANDSTONE, massive, slightly weathered to fresh.									
202.5	1.6/4"																		
203.0	4.4	C-41	204.6 - 208.6	-180.1 - -184.1	47 98% 31 65%		2		204.6	- Slightly weathered from 204.4'-204.5'. Strong, gray, fine SANDSTONE interlaminated with Siltstone and Graphite (1 mm±), fresh. - Bedding planes at - Quartz veins from 204.6'-205.0', 1-5 mm±.	204.4 204.5	J J	1-5 1-5	30 30	SR SR	SW SW	None None		
203.5																			
204.0	3.3						0												
204.5	4.2						ECF (4±)		206.3	- Quartz veins from 206.0'-206.2', 5-10 mm±. Strong, gray SILTSTONE interlaminated with Graphite (1 mm±), moderately weathered to fresh. - Bedding planes at 30°-35°. - Moderately to slightly weathered from 206.7'-206.9'. - Moderately strong from 206.7'-206.9'.	206.0 206.2 206.3 206.5-206.8 206.7-206.9 206.7-207.0 206.8-207.0	J J J J ECF J J	1 1 1 1-10 - 2-5 1-10	35 30 30 55 - 50 55	SR SR SR SR SWSR SR SR	SW SW SW SW MW/SW SW	OZ OZ OZ PY OZ/SI OZ		
205.0	3.9						1				207.9	J	1	30	SR	SW	None		
205.5																			
206.0	4.5	C-42	208.6 - 213.4	-184.1 - -188.9	60 100% 60 100%		3				208.1 208.5 208.6	J J J	1-10 1 1	15 15 10	SR SR SR	SW SW SW	OZ None None		
206.5																			
207.0	3.5						0												
207.5																			
208.0	3.7						0			- Quartz veins from 210.2'-211.1', 1-10 mm±.									
208.5																			
209.0																			
209.5																			
210.0																			
210.5																			
211.0																			

14. Flush return blocked at approximately 196.7', the driller stopped the core run.
 15. Flush return blocked at approximately 201.3', the driller stopped the core run.



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CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 12/4/19 14:59 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIP-HASE III FIELD WORK\BORING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES							
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill	
211.5	3.2						0		211.1	Moderately strong to strong, gray, fine to medium SANDSTONE interlaminated with Siltstone and Graphite (1-2 mm±), slightly weathered to fresh. - Bedding planes at 30°-40°. - Siltstone interlaminations from 211.1'-214.0'. (continued) - Quartz veins from 213.7'-215.6', 1-15 mm±. - Graphite interlaminations from 214.2'-217.8'. - Quartz veins from 216.4'-218.0', 1-10 mm±. - Moderately strong from 218.1'-218.2'. Strong, gray, fine to coarse SANDSTONE, massive, slightly weathered to fresh. - Quartz veins, 1 mm±. Strong, gray, conglomeratic SANDSTONE, massive, slightly weathered. Very weak to moderately strong, dark gray, fine SANDSTONE interlaminated with Graphite and Siltstone (1 mm±), highly weathered to slightly weathered. - Bedding planes at 0°-20°. - Very weak from 219.2'-219.3' and 219.8'-220.1'. - Highly to moderately weathered from 219.2'-219.3' and 219.8'-220.1'. Lost Core. No Recovery. Strong, gray, conglomeratic SANDSTONE, massive, slightly weathered to fresh. - Quartz veins from 222.5'-223.2', 1-40 mm±. - Quartz veins from 223.7'-225.3', 1-15 mm±. Strong, light gray, medium SANDSTONE, massive, fresh.	-	-	-	-	-	-		
212.0																		
212.5	2.6						1					213.9	J	1	40	SR	F	OZ
213.0																		
213.5	3.2	C-43	213.4 - 218.7	-188.9 - -194.2	63 98%	55 86%	0											
214.0																		
214.5	3.5						0											
215.0																		
215.5	3.5						0											
216.0																		
216.5	3.6						2				217.8 217.9	J J	1-10 1	30 40	SM SR	SW SW	OZ OZ	
217.0																		
217.5	3.3						ECF (4±)				218.1 218.1-218.2 218.2-218.4 218.5 219.0	J ECF J J J	1-20 - 1-5 1-20 1	30 - 55 15 15	SR SR SR SR SR	F SW F F SW	None OZ OZ OZ None	
218.0							7											
218.5	3.7	C-44	218.7 - 221.8	-194.2 - -197.3	18 49%	4 11%	>10		218.2		219.0-219.2 219.1-219.3 219.3 219.6 219.7 219.8	J ECF J J J J	1 - 5-10 1-10 1-5 2-20	35 - 10 20 15 5	SR SR SR SR SR SR	SW HW/MW MW MW/SW SW SW	None OZ None OZ None OZ	
219.0									218.9		219.8-220.0	ECF	-	-	SR	HW/MW	OZ	
219.5	3.8						N/A		219.2		220.0-220.1 220.1	ECF J	- 2-10	- 35	SR SR	HW/MW SW	OZ OZ	
220.0									220.2									
220.5	4.5						N/A											
221.0																		
221.5	4	C-45	221.8 - 223.7	-197.3 - -199.2	23 100%	18 78%	0		221.8		223.2-223.4 223.5-223.7 223.8	J J J	1 1-30 1-5	40 40 25	SR SR SR	SW SW F	OZ OZ OZ	
222.0	3.2						3											
222.5																		
223.0	3.1	C-46	223.7 - 228.8	-199.2 - -204.3	58 95%	54 88.5%	0											
223.5																		
224.0	3.1						0											
224.5																		
225.0	3.1						0											
225.5									225.3									
226.0	3.2						0											
226.5																		
227.0	3								226.7									
227.5							2											

16. No recovery between the depths of 220.0'-221.8'. The driller performed shorter core runs in attempt to improve core recovery.



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CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 12/4/19 14:59 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIP PHASE III FIELD WORK\BORING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES						
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill
228.0	3.6									Strong, gray, conglomeratic SANDSTONE, slightly weathered to fresh.	228.2	J	1-5	40	SM	SW	OZ
228.5							0		228.1	- Quartz veins from 226.7'-227.8', 1-7 mm±. (continued)							
229.0	3.3	C-47	228.8 - 233.7	-204.3 - -209.2	59 100%	59 100%				- Quartz vein from 228.0'-228.1', 20-25 mm±.							
229.5							0			Moderately strong to strong, gray, fine SANDSTONE interlaminated with Graphite (1-5 mm±), slightly weathered to fresh.							
230.0	3.1									- Bedding planes at 30°-40°.							
230.5							0			- Quartz veins from 228.9'-231.1', 1-20 mm±.							
231.0	3									- Moderately weathered from 229.2'-229.3', near 229.6' and from 230.6'-231.0'.							
231.5							0		231.3	- Moderately weathered near 229.6'.							
232.0	2.4									- Moderately strong near 229.6'.							
232.5							0			- Moderately weathered from 230.6'-231.0'.							
233.0	2.5									- Moderately strong from 230.6'-231.0'.							
233.5										Strong, gray, medium SANDSTONE interlaminated with Siltstone (1-2 mm±) to massive, fresh.							
234.0										- Quartz veins from 231.9'-233.5', 1-10 mm±.							
234.5										- Bedding planes at 30°-40° from 232.3'-233.7'.							
235.0										Bottom of borehole at 233.7 feet.							
235.5																	
236.0																	
236.5																	
237.0																	
237.5																	
238.0																	
238.5																	
239.0																	
239.5																	
240.0																	
240.5																	
241.0																	
241.5																	
242.0																	
242.5																	
243.0																	
243.5																	
244.0																	



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BORING NUMBER B17-40

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TEST BORING REPORT

PROJECT NAME Narragansett Bay Commission Phase III CSO Program
CLIENT NBC/Stantec
CONTRACTOR New England Boring Contractors, Inc.

PROJECT NO. 13:308.00D/14106.02
START 5/11/2018
FINISH 5/11/2018
DRILLER NEBC
LOGGED BY HMS
CHECKED BY SJM

	CASING	SAMPLER	BARREL	DRILLING EQUIPMENT & PROCEDURES
Type	Steel	Split Spoon	HQ3	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	5	1 3/8	2 3/8	Bit Type: 4 7/8" Tricone
Hammer Weight (lb.)	140	140	N/A	Drill Fluid: Water
Hammer Fall (in.)	30	30	N/A	Casing: 5" Hoist/Hammer: Automatic Hammer

ELEVATION 33.3 **NORTHING** 289232.91
DATUM NGVD 1929 **EASTING** 359692.649
LOCATION Main Street at Roosevelt

TEST BORING REPORT - GINT STD US LAB.GDT - 8/6/19 11:11 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS\14106.02 BORING LOGS.GPJ

DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION (Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	DRILLING NOTES
0	33.3								6" Pavement	
		X							Moist, medium dense, fine to coarse SAND, some fine gravel, little silt, trace coarse gravel.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
		X	43-12-11-7 (23)	S-1	4 / 24	0.5 - 2.5	SM			
		X							Moist, medium dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
		X	10-9-10-10 (19)	S-2	10 / 24	2.5 - 4.5	SW			
5	28.3	X							Moist, dense, brown, fine to coarse SAND, some fine to coarse gravel, trace silt.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
		X	9-8-29 (37)	S-3	17 / 18	4.5 - 6	SW			
		X							Moist, very dense, brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
		X	33-21-44-31 (65)	S-4	16 / 24	6 - 8	GW-GM			
		X							Moist/wet, dense, brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs. Water level at approximately 9.5'.
10	23.3	X	31-17-18-10 (35)	S-5	15 / 24	8 - 10	GW-GM			
		X							Wet, dense, brown, coarse GRAVEL, some fine to coarse sand, little fine gravel, trace silt.	PID = 0.0 ppm
		X	13-17-14-13 (31)	S-6	10 / 24	10 - 12	GW			
		X							Wet, medium dense, brown, fine to coarse SAND, some fine gravel, little silt, trace coarse gravel.	PID = 0.0 ppm
		X	6-5-17-48 (22)	S-7	9 / 24	12 - 14	SM			
									Wet, very dense, gray, weathered SANDSTONE recovered as fine to coarse gravel, little fine to coarse sand, trace silt.	PID = 0.0 ppm Obstruction/possible Bedrock at 14'.
			105	S-8	4 / 8	14 - 14.2			Bottom of borehole at 14.20 feet.	

WATER LEVEL DATA				SAMPLE IDENTIFICATION		REMARKS: 1. "X" within casing blows indicates blows were not counted at that interval.
DATE/TIME	DEPTH (ft.) TO:			O Open End Rod T Thin Wall Tube U Undisturbed Sample S Split Spoon G Geoprobe		
	BOTTOM OF CASING	BOTTOM OF HOLE	WATER			



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BORING NUMBER B17-40

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CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 8/6/19 11:27 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES									
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill			
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.2										Weathered Rock - No Sample Taken										
14.5	3																			
15.0		C-1	14.6 - 17.4	18.7 - 15.9	34 100%	26.5 78%				14.6	Strong, gray, conglomeratic SANDSTONE, massive, fresh. - Quartz vein at 16.7', 15 mm±. - 'Vuggy' 1-3 mm ± diameter at 16.6'-16.7'.									
15.4												15.4	J	1	30	R	F	None		
15.5	4						2					15.7	J	1	50	R	SW	Fe		
16.0																				
16.5	3.25						2					16.5	J	1-10	60	SR	SW	Fe		
16.6												16.9	J	1	30	SR	SW	Fe		
17.0																				
17.5	5.5	C-2	17.4 - 20.6	15.9 - 12.7	38 100%	23 61%	3			16.7	Strong, gray, fine to coarse SANDSTONE, bedded 10-20 mm± to massive, fresh. - Bedding planes at 30°-40°. - Quartz vein at 18.1', 15 mm±.									
17.2												17.2	B	1	30	SR	SW	Fe/QZ		
17.6												17.6	J	5	40	VR	F	None		
17.9												17.9	B	1	30	R	F	None		
18.0																				
18.5	3						1					18.5	B	1	30	SR	F	None		
19.0																				
19.5	2.75						4					19.2	B	1	30	SR	SW	Fe		
19.3												19.3	J	10	25	R	SWRS	Si		
19.7												19.7	J	1	25	R	SW	Fe		
19.9												19.9	B	1	30	SR	SW	Fe		
20.0																				
20.5																				
21.0										Bottom of borehole at 20.6 feet.										
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				
24.5																				
25.0																				

REMARKS:

- Dip angles are measured from horizontal (i.e., perpendicular to the core axis).
- Flush return blocked at ~17.6'. Driller moved casing up and down to unblock.
- Boring was backfilled with cement bentonite grout from 20.6 feet to the ground surface. No groundwater monitoring well was installed.

WATER LEVEL DATA

DATE/TIME	BOT. OF SOIL CASING (ft)	BOT. OF HOLE (ft)	WATER

GROUND SURFACE EL. 33.3

Note: Refer to the key sheets within the Geotechnical Design Report for the description of rock classification system codes.



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BORING NUMBER B17-41

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TEST BORING REPORT

PROJECT NAME Narragansett Bay Commission Phase III CSO Program
CLIENT NBC/Stantec
CONTRACTOR New England Boring Contractors, Inc.

PROJECT NO. 13:308.00D/14106.02
START 5/3/2018
FINISH 5/4/2018
DRILLER NEBC
LOGGED BY HMS
CHECKED BY SJM

	CASING	SAMPLER	BARREL	DRILLING EQUIPMENT & PROCEDURES
Type	Steel	Split Spoon	HQ3	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	4	1 3/8	2 3/8	Bit Type: 3 7/8" Tricone
Hammer Weight (lb.)	140	140	N/A	Drill Fluid: Water
Hammer Fall (in.)	30	30	N/A	Casing: 4" Hoist/Hammer: Automatic Hammer

ELEVATION 12.8 **NORTHING** 287414.433
DATUM NGVD 1929 **EASTING** 359504.663
LOCATION Taft Street near Division Street Bridge

TEST BORING REPORT - GINT STD US LAB.GDT - 8/6/19 11:11 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS\14106.02 BORING LOGS.GPJ

DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION (Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	DRILLING NOTES
0	12.8								Approximately 9" Pavement.	9" PAVEMENT
		X								
		10	9-10-12-72 (22)	S-1	15 / 24	0.75 - 2.75	SW-SM		A: Wet, medium dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt. B: Wet, very dense, purple/brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt.	1A: PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs. 1B: PID = 0.0 ppm
		18							No Recovery.	
		97	146	S-2	0 / 6	2.75 - 3.25				
5	7.8	X	28-9-7-3 (16)	S-3	8 / 24	4 - 6	GW		Wet, medium dense, purple/brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
		X	3-3-4-7 (7)	S-4	5 / 24	6 - 8	GW		Wet, loose, brown, coarse GRAVEL, some fine gravel, little fine to coarse sand, trace silt.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
		X	3-2-7-17 (9)	S-5	5 / 24	8 - 10	SW-SM		Wet, loose, brown, fine to coarse SAND and fine coarse GRAVEL, little silt.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
10	2.8	X	6-3-8-19 (11)	S-6	3 / 24	10 - 12	GW		Wet, medium dense, brown, coarse GRAVEL, little fine to coarse sand, trace silt, trace fine gravel.	PID = 0.0 ppm
		X	14-10-16-18 (26)	S-7	13 / 24	12 - 14	GW-GM		Wet, medium dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt.	PID = 0.0 ppm
		X	22-23-33-39 (56)	S-8	11 / 24	14 - 16	GW		Wet, very dense, tan/gray, fine to coarse GRAVEL, little fine to coarse sand, trace silt, trace clay. (Possible weathered Sandstone)	PID = 0.0 ppm
		X	27-56-87-51 (143)	S-9	19 / 24	16 - 18	SW		A: Wet, very dense, gray, fine to coarse SAND, some fine gravel, trace coarse gravel. B: Wet, very dense, gray, fine to coarse GRAVEL and fine to coarse SAND, little silt. (Possible weathered Sandstone)	PID = 0.0 ppm
			103/4"	S-10	2 / 4	18 - 18.3			Wet, very dense, gray, weathered SANDSTONE recovered as fine to coarse gravel, trace fine to coarse sand, trace silt.	PID = 0.0 ppm
Bottom of borehole at 18.30 feet.										

WATER LEVEL DATA				SAMPLE IDENTIFICATION		REMARKS:
DATE/TIME	DEPTH (ft.) TO:			O Open End Rod T Thin Wall Tube U Undisturbed Sample S Split Spoon G Geoprobe		
	BOTTOM OF CASING	BOTTOM OF HOLE	WATER			
						1. No casing blows for the first foot. NEBC set and reset casing to make sure casing was plum. 2. Used 140 lb. hammer for casing blows from 2'-4'. 3. Starting at 4', NEBC used the kelly and weight of the drilling to advance casing. 4. NEBC determined weathered bedrock began at approximately 18.3'. NEBC advanced roller bit to competent rock at approximately 21.1'. 5. "X" within casing blows indicates blows were not counted at that interval.



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BORING NUMBER B17-41

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CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 8/6/19 11:27 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIP PHASE III FIELD WORKBORING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES									
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill			
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
18.5										Weathered Rock - No Sample Taken										
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5	2.5	C-1	21.1 - 25	-8.3 - -12.2	47 100%	37 79%	1		21.1	Strong, gray, conglomeratic SANDSTONE, massive, fresh. - Quartz vein at 21.5', 5 mm±. - Quartz vein at 22.1', 3 mm±. - Quartz vein at 22.2', 2 mm±.	21.3	J	1	45	SR	F	None			
22.0	4.75						3				22.0 22.5 22.7	J J J	1 1 1	45 45 45	R SM SM	SW F F	Fe None None			
22.5	2.5																			
23.0																				
23.5	2.75						1		23.0	Strong, gray/blue, fine to coarse SANDSTONE interlaminated with Siltstone, fresh. - Bedding planes at 40°-50°.	23.3	B	1	45	SM	F	None			
24.0																				
24.5	1.5						ECF (4±)				24.0 24.2 24.7 24.8-24.9	B B B ECF	1 1 1 -	45 40 45 -	SR SM SM SR	F SW SW SW	None Fe SI Fe			
25.0							7													
25.5										Bottom of borehole at 25.0 feet.										
26.0																				
26.5																				
27.0																				
27.5																				
28.0																				
28.5																				
29.0																				
29.5																				
30.0																				

REMARKS:

- Dip angles are measured from horizontal (i.e., perpendicular to the core axis).
- Wash color white.
- Flush return blocked at approximately 22.8'. Driller moved casing up and down to unblock.
- Boring was backfilled with cement bentonite grout from 25.0 feet to the ground surface. No groundwater monitoring well was installed.

WATER LEVEL DATA

DATE/TIME	BOT. OF SOIL CASING (ft)	BOT. OF HOLE (ft)	WATER

GROUND SURFACE EL. 12.8

Note: Refer to the key sheets within the Geotechnical Design Report for the description of rock classification system codes.



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BORING NUMBER B17-45

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TEST BORING REPORT

PROJECT NAME Narragansett Bay Commission Phase III CSO Program
CLIENT NBC/Stantec
CONTRACTOR New England Boring Contractors, Inc.

PROJECT NO. 13:308.00D/14106.02
START 4/2/2019
FINISH 4/2/2019
DRILLER NEBC
LOGGED BY JPN
CHECKED BY RKM/SJM

	CASING	SAMPLER	BARREL	DRILLING EQUIPMENT & PROCEDURES
Type	Steel	Split Spoon	NX	Rig Make & Model: Diedrich D-120
Inside Diameter (in.)	4	1 3/8	1 7/8	Bit Type: 3 7/8" Tricone
Hammer Weight (lb.)	300	140	N/A	Drill Fluid: Water
Hammer Fall (in.)	30	30	N/A	Casing: 4" Hoist/Hammer: Automatic/Safety Hammer

ELEVATION 28.4 **NORTHING** 288479.475
DATUM NGVD 1929 **EASTING** 359446.389
LOCATION Jenks Way

TEST BORING REPORT - GINT STD US LAB.GDT - 8/22/19 08:36 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS\14106.02 BORING LOGS.GPJ

DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION (Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	DRILLING NOTES
0	28.4								9" Asphalt.	9" ASPHALT
		X								
		35	16-11-6/3"	S-1	10 / 15	0.75 - 2	SW		Moist, medium dense, brown, fine to coarse SAND, trace fine gravel, trace silt. (FILL)	PID = 0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
		25	10-21-11-6 (32)	S-2	13.5 / 24	2 - 4	SP-SM		Moist, dense, brown, fine to medium SAND, little coarse sand, little silt, little fine gravel. (FILL)	PID = 0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
5	23.4	20	5-5-3-5 (8)	S-3	4 / 24	4 - 6	SW-SM		Wet, loose, brown, fine to coarse SAND, some silt, little fine gravel. (FILL)	PID = 0 ppm (4'-6') Driller pushed sample 1±. Composite environmental sample taken (4'-8'). (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
		11	20-10-5-3 (15)	S-4	5 / 24	6 - 8	SP-SM		Wet, medium dense, brown to gray, fine SAND and SILT, trace medium to coarse sand, little fine to coarse gravel. (FILL)	PID = 0.3 ppm (6'-8') Casing sunk with spoon blows.
		X								
		100	2-3-4-2 (7)	S-5	9 / 24	8 - 10	SW-SM		Wet, loose, brown to gray, fine to coarse SAND, little silt, some fine to coarse gravel, trace glass. (FILL)	PID = 0 ppm (8'-10') Composite environmental sample taken (8'-12'). (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
10	18.4	4								
		7	3-2-6-40 (8)	S-6	7 / 24	10 - 12	GP		Wet, loose, brown to gray, fine to coarse GRAVEL and fine to coarse SAND, trace ceramic, trace silt. (FILL)	PID = 0 ppm (10'-12')
		11								
		X	14-11-7-7 (18)	S-7	12 / 24	12 - 14	GW-GM		Wet, medium dense, brown to gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt.	PID = 0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
		X								
15	13.4	11	0-2-3-9 (5)	S-8	9 / 24	14 - 16	SW-SM		Wet, loose, brown to gray SAND, some silt, little fine to coarse gravel.	PID = 0 ppm
		80								
		95	6-6-7-4 (13)	S-9	16 / 24	16 - 18	SP-SM SP		9A: Bottom 8": Wet, medium dense, brown, fine to coarse SAND, little silt, trace fine to coarse gravel. 9B: Top 8": Wet, medium dense, brown to gray, fine to coarse SAND, some silt, some fine to coarse gravel.	PID = 0 ppm
		83								
		108	23-35-28-18 (63)	S-10	12 / 24	18 - 20	GW-GM		Moist, very dense, brown to gray, fine to coarse GRAVEL, some fine to coarse sand, little silt.	PID = 0 ppm
20	8.4	70								
		70	22-21-18-17 (39)	S-11	19 / 24	20 - 22	SW-SM		11A: Top 7": Wet, dense, brown to gray, fine to coarse SAND, little fine to coarse gravel, trace silt. 11B: Bottom 12": Wet, dense, brown to gray, fine to coarse SAND, some silt, little fine to coarse gravel.	PID = 0 ppm
		84								
		96	25-49-79-105 (128)	S-12	24 / 24	22 - 24	SM		Wet, very dense, reddish brown/gray, fine to coarse SAND, some fine gravel, little silt.	PID = 0 ppm
		99								
25	3.4	76	60-57-		15	24			Wet, very dense, reddish brown/gray, fine to coarse SAND and SILT, little fine to coarse gravel.	

WATER LEVEL DATA

SAMPLE IDENTIFICATION

REMARKS:

DATE/TIME	DEPTH (ft.) TO:		
	BOTTOM OF CASING	BOTTOM OF HOLE	WATER

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

1. Boring was backfilled with cement bentonite grout from the bottom of the borehole to a depth of 4'. The borehole was backfilled to the surface with 3 bags of bentonite chips, one 50 lb. bag of dry concrete mix, and 10"± of asphalt patch.

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TEST BORING REPORT

DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION (Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	DRILLING NOTES
25	34									
		136	44-36 (101)	S-13	7 / 24	- 26	SM			PID = 0 ppm
			200/1"	S-14 S-15	4 / 1	26 - 26.1 26.1 - 28.3	SW-SM		Wet, very dense, gray to brown, medium to coarse SAND, some silt, little fine sand, trace fine gravel. Rollerbit refusal.	PID = 0 ppm

Bottom of borehole at 28.30 feet.

TEST BORING REPORT - GINT STD US LAB.GDT - 8/22/19 08:36 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIIP-HASE III FIELD WORKBORING LOGS\14106.02 BORING LOGS.GPJ



CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 9/10/19 16:46 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIP-HASE III FIELD WORK\BORING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in%)	RQD (in%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES														
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill								
25.0																									
25.5										See Test Boring Report															
26.0																									
26.5																									
27.0																									
27.5																									
28.0																									
28.5	5.3	C-1	28.3 - 32.8	0.1 - -4.4	54 100%	27 50%	N/A		28.3		Strong, purple, fine to medium SANDSTONE, massive, slightly weathered to fresh. - Quartz vein near 28.6'. - Orthogonal joints near 28.7' and 28.9'.	28.4-28.6 J 1-2 60 SM 28.5 J 1-2 25 SM/SR 28.7 J 3-7 33 SR 28.7 J 3-7 30 SR 28.9 J 1-3 20 SR/R 28.9 J 1-3 45 SM	F F F F F F F	None None None None None None											
29.0																									
29.5	6.5						2					29.4-29.5 J 1-3 45 SR 29.9 J 1-3 40 SM	F F	None None											
30.0	6.6																								
30.5							3		30.5	Strong, purple/gray, conglomeratic SANDSTONE, laminated (1-5 mm±), slightly weathered to fresh. - Bedding planes at 40°. - Orthogonal joints near 31.1'.	30.1 J 1-3 40 SM 30.2 J 1-4 30 SM/SR 30.7 B 1-3 35 SM/SR	F F F	None None None												
31.0	5.2						6				31.1 J 1-5 20 SR 31.1 J 1-3 40 SM 31.3 J 1-10 45 SM 31.6 B 1-5 40 SM/SR 31.7 B 1-3 30 SW 31.9 J 1-5 20 SR	F F F F F	None None OZ OZ OZ												
32.0	5.6																								
32.5							3		32.0	Strong, purple, fine to medium SANDSTONE, laminated (<1 mm±), slightly weathered to fresh. - Bedding planes at 30°.	32.1 B 1-2 40 SM/SR 32.2 B 1-2 40 SM 32.6 J 1-3 21 SM	SW/F SW F	None None None												
33.0	7.5	C-2	32.8 - 37.5	-4.4 - -9.1	57 100%	51 91%																			
33.5							4																		
34.0	5.3																								
34.5							0																		
35.0	4.6																								
35.5							1																		
36.0	5																								
36.5							2																		
37.0	5																								
37.5	5.75	C-3	37.5 - 42.4	-9.1 - -14.0	59 100%	53 94%			36.7 36.8	Strong, purple/gray, conglomeratic SANDSTONE, massive, fresh. Strong, purple/gray, medium SANDSTONE, massive, slightly weathered to fresh.	37.4 J 1 20 SM 37.7-37.9 J/S 1-6 60 S/SR 37.8-37.9 J/S 1-5 50 SL/SR	F F F	None OZ OZ												
38.0							3																		
38.5	5.6						2																		
39.0																									
39.5	5						2																		
40.0									39.7																

REMARKS:

1. Dip angles are measured from horizontal (i.e., perpendicular to the core axis).

WATER LEVEL DATA

DATE/TIME	BOT. OF SOIL CASING (ft)	BOT. OF HOLE (ft)	WATER

GROUND SURFACE EL. 28.4

Note: Refer to the key sheets within the Geotechnical Design Report for the description of rock classification system codes.

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CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 9/10/19 16:46 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIP PHASE III FIELD WORKING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES										
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill				
40.0																					
40.5	5.5						0				Strong, purple, fine SANDSTONE, laminated to massive, slightly weathered to fresh. -Bedding planes at 30° from 41.3'-41.7'. (continued)	-	-	-	-	-	-	-	-	-	-
41.0							ECF (7±)				- Laminated from 41.3'-41.7', 1-2 mm±.	41.7	J	1-5	15	SR	SW	None			
41.5	5.2											41.7-42.0	ECF	-	-	SR	SW	OZ			
42.0							10					41.9-42.0	J	1-3	60	SR	SW	None			
42.5									42.0		Transitioning to strong, purple/gray, conglomeratic SANDSTONE, massive, fresh.	41.95-42.0	J	1-3	65	SR	SW	None			
43.0		C-4	42.4 - 47.4	-14.0 - -19.0	60 100%	48 80%	1					42.0-42.2	J	1-3	65	SR	SW	None			
43.5							2					43.3	J	1	30	SR/R	SW/F	None			
44.0												43.9	J	1	30	SM	SW	None			
44.5							0					-	-	-	-	-	-	-	-	-	
45.0	2.9																				
45.5							3				- Orthogonal joints near 45.1'. Strong, purple to purple/gray, medium SANDSTONE interlaminated with fine Sandstone (1 mm±), slightly weathered to fresh.	45.0	J	1-2	30	SR	SW/F	None			
46.0									45.4			45.1-45.2	J	1-2	50	SR	SW/F	OZ			
46.5							5				- Bedding planes at 30°-50°.	45.6	B	1	40	SR	SW	None			
47.0												46.2	J	1-10	40	SM	SW	None			
47.5							ECF (6±)				- Orthogonal joints near 47.0'.	46.4-46.6	B	1-5	50	SM	SW	OZ			
48.0							9				Bottom of borehole at 47.4 feet.	46.7-46.9	J	1-2	60	SM	SW/F	None			
48.5												46.8-47.0	J	1	60	SM	F	None			
49.0												46.9-47.0	J	1-5	80	SR/R	SW/F	None			
49.5												47.0-47.4	J	1-5	80	SR/R	SW/F	None			
50.0												47.1	J	1	20	SM	F	None			
50.5												47.2	J	1	30	SM	SW	None			
51.0												47.2-47.4	ECF	-	-	SM	SW	OZ			
51.5																					
52.0																					
52.5																					
53.0																					
53.5																					
54.0																					
54.5																					
55.0																					
55.5																					
56.0																					

2. Boring was backfilled with cement-bentonite grout from the bottom of the boring to the ground surface. No groundwater monitoring well was installed.



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BORING NUMBER B17-46

PAGE 1 OF 1

TEST BORING REPORT

PROJECT NAME Narragansett Bay Commission Phase III CSO Program
CLIENT NBC/Stantec
CONTRACTOR New England Boring Contractors, Inc.

PROJECT NO. 13:308.00D/14106.02
START 4/3/2019
FINISH 4/4/2019
DRILLER NEBC
LOGGED BY JPN
CHECKED BY RKM/SJM

	CASING	SAMPLER	BARREL	DRILLING EQUIPMENT & PROCEDURES
Type	Steel	Split Spoon	NX	Rig Make & Model: Diedrich D-120
Inside Diameter (in.)	4	1 3/8	1 7/8	Bit Type: 3 7/8" Tricone Bit
Hammer Weight (lb.)	300	140	N/A	Drill Fluid: Water
Hammer Fall (in.)	30	30	N/A	Casing: 4" Hoist/Hammer: Automatic/Safety Hammer

ELEVATION 31.1 **NORTHING** 288470.367
DATUM NGVD 1929 **EASTING** 359386.873
LOCATION Jenks Way

TEST BORING REPORT - GINT STD US LAB.GDT - 8/6/19 11:11 - Y:\JOBS\14 JOBS\14.106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS\14106.02 BORING LOGS.GPJ

DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION (Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	DRILLING NOTES
0	31.1								10" Asphalt. (FILL)	10" ASPHALT
		X								
		24	14-25	S-1	10 / 12	1 - 2	SW		Wet, medium dense, brown, medium to coarse SAND, some fine to coarse gravel, little fine sand. (FILL)	PID = 0.1 ppm (1'-2') Composite environmental sample taken 1'-4'. (1) 8 oz. Amber, (1) 4 oz. Amber, VOAs. PID = 0.1 ppm (2'-4')
		54 36	12-24-24-25 (48)	S-2	15 / 24	2 - 4	SW		Wet, dense, brown, medium to coarse SAND, some fine to coarse gravel, little fine sand, trace silt. (FILL)	
5	26.1	23	10-7-7-6 (14)	S-3	15 / 24	4 - 6	SP-SM		Wet, medium dense, brown, fine to medium SAND and SILT, trace fine gravel. (FILL)	PID = 0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 4 oz. Amber, VOAs.
		15								
		43	3-2-3-23 (5)	S-4	9 / 24	6 - 8	SW		Wet, loose, brown, fine to coarse SAND, some fine to coarse gravel, trace silt. (FILL)	PID = 0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 4 oz. Amber, VOAs.
		28								
		29	6-3-2-3 (5)	S-5	12 / 24	8 - 10	SP-SM		Wet, loose, brown, fine to coarse SAND, some silt, little fine to coarse gravel, trace ceramic pieces, trace brick. (FILL)	PID = 0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 4 oz. Amber, VOAs.
10	21.1	27								
		X								
		46/0"	3-3-5-100/5"	S-6	18 / 23	10 - 11.9	SW		Wet, loose, brown, fine to coarse SAND and fine GRAVEL. (FILL)	PID = 0 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 4 oz. Amber, VOAs.
		N/A							OBSTRUCTION	Unmarked 30" sewer (RCP).
		N/A								
		N/A								
	16.1	N/A	18-28-28-21/5"	S-7	5 / 23	15.1 - 17	SP		Wet, very dense, brown, fine to medium SAND, trace fine gravel, trace coarse sand.	PID = 0 ppm
		N/A							Bottom of borehole at 17.00 feet.	

WATER LEVEL DATA				SAMPLE IDENTIFICATION		REMARKS:
DATE/TIME	DEPTH (ft.) TO:			O Open End Rod	T Thin Wall Tube	
	BOTTOM OF CASING	BOTTOM OF HOLE	WATER			
				U Undisturbed Sample	S Split Spoon	1. Spoon refusal at approximately 11.9'. 2. Bottom of casing was at approximately 11.9' at the end of day 4/3/19. 3. Driller cored from 11.9'-12.1' in 2.5 minutes. 4. Depth to the inside bottom of the obstruction is approximately 14.9'. Driller cored from 14.9'-15.1' in 5 minutes. 5. "X" within casing blows indicates blows were not counted at that interval. 6. NEBC backfilled the boring with two 50 lb. bags of bentonite chips from 11'± to near the ground surface. Approximately 2 gallons of cement grout were added at the surface.
				G Geoprobe		



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BORING NUMBER B17-46A

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TEST BORING REPORT

PROJECT NAME Narragansett Bay Commission Phase III CSO Program
CLIENT NBC/Stantec
CONTRACTOR New England Boring Contractors, Inc.

PROJECT NO. 13:308.00D/14106.02
START 5/17/2019
FINISH 5/18/2019
DRILLER NEBC
LOGGED BY MLP
CHECKED BY SJM

	CASING	SAMPLER	BARREL	DRILLING EQUIPMENT & PROCEDURES
Type	Steel	Split Spoon	HQ3	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	4	1 3/8	2 3/8	Bit Type: 3 7/8" Tricone
Hammer Weight (lb.)	140	140	N/A	Drill Fluid: Water
Hammer Fall (in.)	30	30	N/A	Casing: 4" Hoist/Hammer: Automatic Hammer

ELEVATION 30.9 **NORTHING** 288472.737
DATUM NGVD 1929 **EASTING** 359387.178
LOCATION Jenks Way (2.5' north of B17-46)

TEST BORING REPORT - GINT STD US LAB.GDT - 8/6/19 11:11 - Y:\JOBS\14 JOBS\14.106.02 NBC PHASE III CSO CER-RIP/PHASE III FIELD WORK/BORING LOGS\14106.02 BORING LOGS.GPJ

DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION (Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	DRILLING NOTES
0	30.9									
5	25.9	X X X X							Hand excavated for the first 5' due to concerns over underground utilities. No soil samples were taken.	PID = 0.3 ppm Environmental sample was taken from the sidewall between 0'-1.5'. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs. PID = 0.2 ppm Environmental sample was taken from the sidewall between 1.5'-3'. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs.
10	20.9	X X X X X X		4-4-3-5 (7) 4-5-3-5 (8) 6-4-2-2 (6) 2-2-3-2 (5) 3-2-5-5 (7)	S-1 S-2 S-3 S-4 S-5	13 / 24 5 / 24 1 / 24 7 / 24 13 / 24	5 - 7 7 - 9 9 - 11 11 - 13 13 - 15	SW SP SP SP-SM ML	Moist, loose, brown, fine to coarse SAND, trace fine to coarse gravel, little silt. (FILL) Wet, loose, light brown, fine to medium SAND, trace coarse sand, trace fine gravel, trace silt. (FILL) Wet, loose, light brown, fine to coarse SAND, trace coarse sand, trace fine gravel, trace silt. (FILL) Wet, loose, light brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, trace brick. (FILL) Wet, medium, dark brown/black SILT, some fine to coarse sand, some fine to coarse gravel, trace glass, trace plastic. (FILL)	PID = 0.3 ppm Environmental sample taken. (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs. PID = 0.3 ppm (7'-9') Composite environmental sample taken (7'-13'). (1) 8 oz. Amber, (1) 2 oz. Amber, (3) VOAs. PID = 0.3 ppm (9'-11) PID = 0.3 ppm (11'-13')
15	15.9	X X		19-14-28-19 (42) 12-10-21-23 (31)	S-6 S-7	12 / 24 14 / 24	15 - 17 17 - 19	SW GM	Wet, dense, brown, fine to coarse SAND, some fine to coarse gravel, trace silt. Wet, dense, brown/orange, fine to coarse GRAVEL, some fine to coarse sand, some silt.	PID = 0.7 ppm PID = 0.5 ppm
20	10.9	X X X		26-18-21-16 (39) 18-24-17-13 (41)	S-8 S-9	7 / 24 10 / 24	19 - 21 21 - 23	GW GW	Wet, dense, brown, fine to coarse GRAVEL, little fine to coarse sand, trace silt. Wet, dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt.	PID = 0.1 ppm PID = 0.0 ppm
				59'3"	S-10	3 / 3	23 - 23.3	GP	Weathered SANDSTONE recovered as wet, very dense, brown, fine to medium SAND and coarse GRAVEL, little silt, sandstone in tip.	SPT Refusal at 23.3'.

Bottom of borehole at 23.30 feet.

WATER LEVEL DATA				SAMPLE IDENTIFICATION		REMARKS:
DATE/TIME	DEPTH (ft.) TO:			O Open End Rod T Thin Wall Tube U Undisturbed Sample S Split Spoon G Geoprobe		
	BOTTOM OF CASING	BOTTOM OF HOLE	WATER			
						1. Elevation is based on milled pavement. 2. "X" within casing blows indicates blows were not counted at that interval. 3. Driller spun casing from 5'-7', 13'-16', and 19'-21'. 4. *Driller advanced the rollerbit ahead of the casing. 5. Boring was backfilled on 5/18/19 with cement bentonite grout from the bottom of the borehole to the ground surface.



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BORING NUMBER B17-46A

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CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 8/6/19 11:27 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES									
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill			
20.0																				
20.5										See Test Boring Report										
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5	3.2	C-1	23.3 - 26.4	7.6 - 4.5	29.5 80%	21.5 58%	N/A		23.3	Strong, gray, conglomeratic SANDSTONE, massive, slightly weathered to fresh.	23.8	J	1-3	15	SR	SW	Fe			
24.0									23.8	Lost Core. No Recovery.										
24.5	4						N/A		24.4	Strong, gray to light purple, fine to medium SANDSTONE, laminated (1-5 mm±) and massive, slightly weathered to fresh.	24.4-24.5	ECF	-	-	SR	SM	SW	Fe		
25.0											24.5	J	1-3	30	SM	SW	Fe			
25.5											24.6	J	0-1	40	SM/SL	SW	Fe			
26.0											24.8	J	1	30	SR	SW	Fe			
26.5	3						0			- Bedding planes at 40°-50°.										
27.0										- Orthogonal joints near 24.7'.										
27.5	3.5	C-2	26.4 - 31.4	4.5 - -0.5	60 100%	60 100%	1			- Conglomeratic Sandstone interbedded near 24.9', 2-4 cm±.	26.1	J	1-2	25	SR	SW	None			
28.0																				
28.5	4.7						1		27.3	Very strong, gray, conglomeratic SANDSTONE, massive, fresh.	27.0	J	1	40	SMSR	SW	Fe			
29.0							0													
29.5																				
30.0							0													
30.5																				
31.0							0													
31.5	5.2	C-3	31.4 - 36	-0.5 - -5.1	55 100%	55 100%	0		31.1	Very strong, gray, medium to coarse SANDSTONE, massive, fresh.										
32.0									31.5	Very strong, gray, conglomeratic SANDSTONE, massive, fresh.										
32.5	5.7						0													
33.0																				
33.5	6.2						1				33.8	J	1	40	SR	F	None			
34.0																				
34.5	5.7						0													
35.0																				

REMARKS:

1.*The water level was influenced by the soil casing being sealed into bedrock.

WATER LEVEL DATA

DATE/TIME	BOT. OF SOIL CASING (ft)	BOT. OF HOLE (ft)	WATER
5/18/2019 8:10:00 AM	23.3	28.3	3.4*

GROUND SURFACE EL. 30.9

Note: Refer to the key sheets within the Geotechnical Design Report for the description of rock classification system codes.

(Continued Next Page)



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BORING NUMBER B17-46A

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CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 8/6/19 11:27 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS\14106.02 CORE BORING LOGS.GPJ

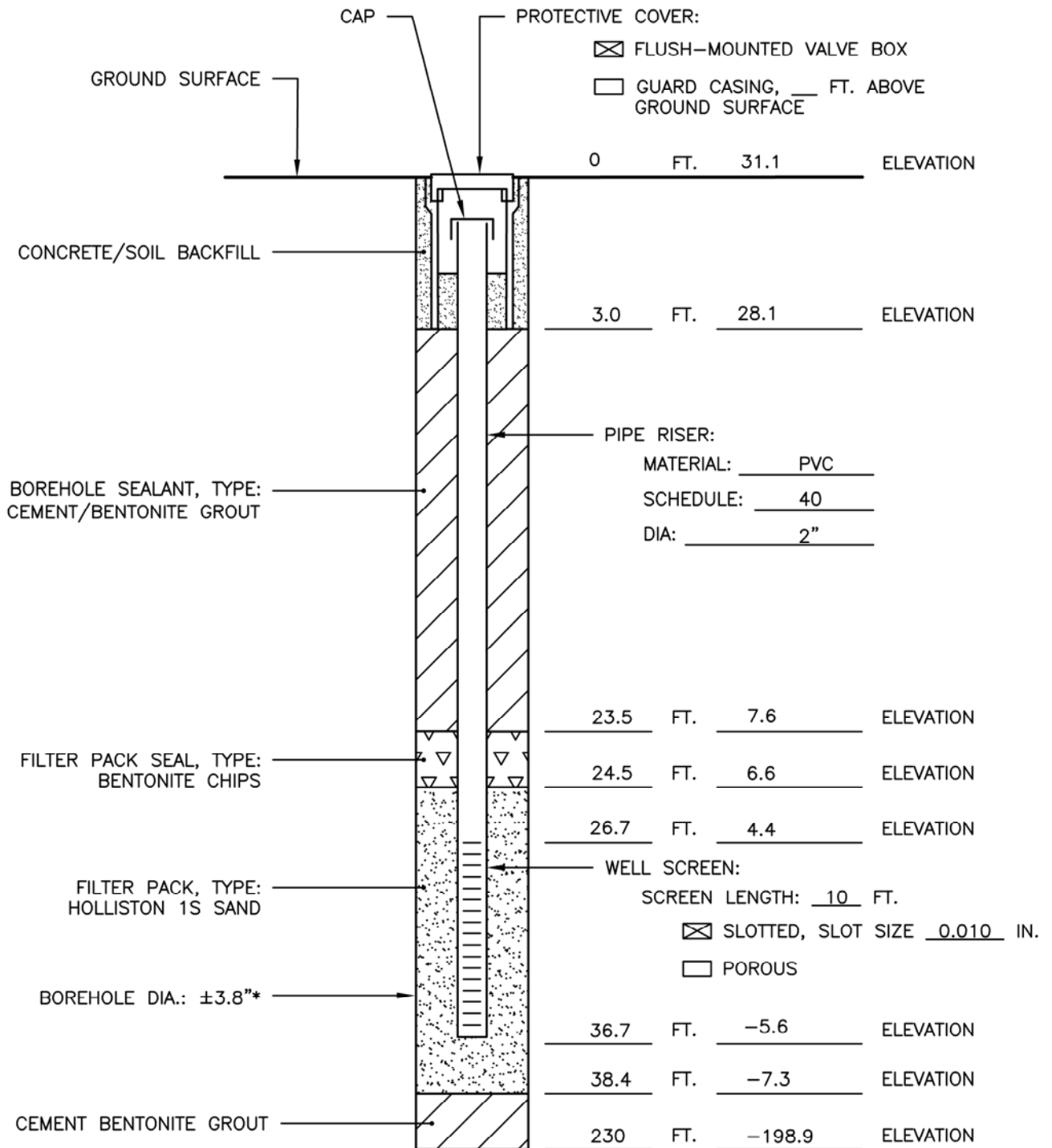
DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES								
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill		
35.0																			
35.5	5						0			Very strong, gray, conglomeratic SANDSTONE, massive, fresh. <i>(continued)</i>	-	-	-	-	-	-	-	-	-
36.0	4	C-4	36 - 41.2	-5.1 - -10.3	61 98%	57 92%	1		35.6	Very strong, gray, medium to coarse SANDSTONE, massive, fresh.									
36.5							1		36.4	Strong, gray to purple, fine SANDSTONE, laminated (1 mm±), slightly weathered to fresh. - Bedding planes at 20°-30°.	36.0-36.6	J	1-3	75	SR	F	QZ/Fe		
37.0	4						1												
37.5							1												
38.0	2.8						2												
38.5							0												
39.0	3.9						0												
39.5							0												
40.0	5						0												
40.5							0												
41.0	4.4	C-5	41.2 - 43.2	-10.3 - -12.3	24 100%	18.5 77%	1												
41.5							1												
42.0	4						2			- Quartz veins from 42.2'-42.6', 1 mm±.	42.0 42.2	J J	1-2 1	40 40	SR SWSR	SW SW	Fe Fe		
42.5							2												
43.0										Bottom of borehole at 43.2 feet.									
43.5																			
44.0																			
44.5																			
45.0																			
45.5																			
46.0																			
46.5																			
47.0																			
47.5																			
48.0																			
48.5																			
49.0																			
49.5																			
50.0																			
50.5																			
51.0																			

2. Boring was backfilled with cement-bentonite grout from the bottom of the boring to the ground surface. No groundwater monitoring well was installed.



WELL/PIEZOMETER INSTALLATION SKETCH

Project Name NBC CSO PHASE III WELL/PIEZO NO. B17-8
 Pare Project Number 14106.02 Sheet 1 of 1
 Field Engineer H. Shanks/R. Muganga Date 1-30-19, 2-4-19, and 2-5-19



Remarks:

*At the beginning of the day on 2/4/19, grout was measured at approximately 30.7 feet below ground. New England Boring Contractors advanced a 5-inch diameter roller bit to approximately 38.4 feet.



WELL/PIEZOMETER WATER LEVEL RECORD

Project Name NBC CSO Phase III

WELL/PIEZO. NO. B17-8

Project Number 14106.02

Sheet 1 **of** 1

Reference⁽¹⁾ Ground Surface

Ref. Elev. 31.1 NGVD 29

Foundation Sensed Rock Elevation minus +/- 10 feet

Location Description⁽²⁾ Masonic Temple

Date	Time	Read By	Depth to Water (ft)	Elevation of Water (ft)	Remarks
03-19-18	-	SMA	14.6	16.5	Open Boring (Packer Testing)
03-22-18	-	JMC	12.2	18.9	Open Boring (Packer Testing)
04-05-18	10:45	JMC	13.0	18.1	Open Boring
05-01-18	1:10	HMS	12.6	18.5	Open Boring
05-18-18	4:00	HMS	13.2	17.9	Open Boring
05-29-18	9:10	HMS	13.1	18.0	Open Boring
06-12-18	9:30	HMS	13.2	17.9	Open Boring
07-25-18	8:40	JMC	13.3	17.8	Open Boring
11-02-18	-	MM	13.6	17.5	Open Boring
11-28-18	3:10	MM	13.9	17.2	Open Boring
12-26-18	9:55	HMS	13.7	17.4	Open Boring
01-23-19	2:15	JMC	13.9	17.2	Open Boring
02-07-19	10:20	HMS	17.8	13.3	Groundwater Well
03-18-19	10:30	RKM	17.6	13.5	Groundwater Well
04-09-19	11:45	JMC	17.9	13.2	Groundwater Well
04-23-19	2:45	HP	17.5	13.6	Groundwater Well; measured before well development.
04-24-19	9:50	HP	17.8	13.3	Groundwater Well; measured before well development.

(1) Normally, the top of protective casing.

(2) Street intersection, address, etc.



WELL/PIEZOMETER WATER LEVEL RECORD

Project Name NBC CSO Phase III

WELL/PIEZO. NO. B17-8

Project Number 14106.02

Sheet 1 **of** 1

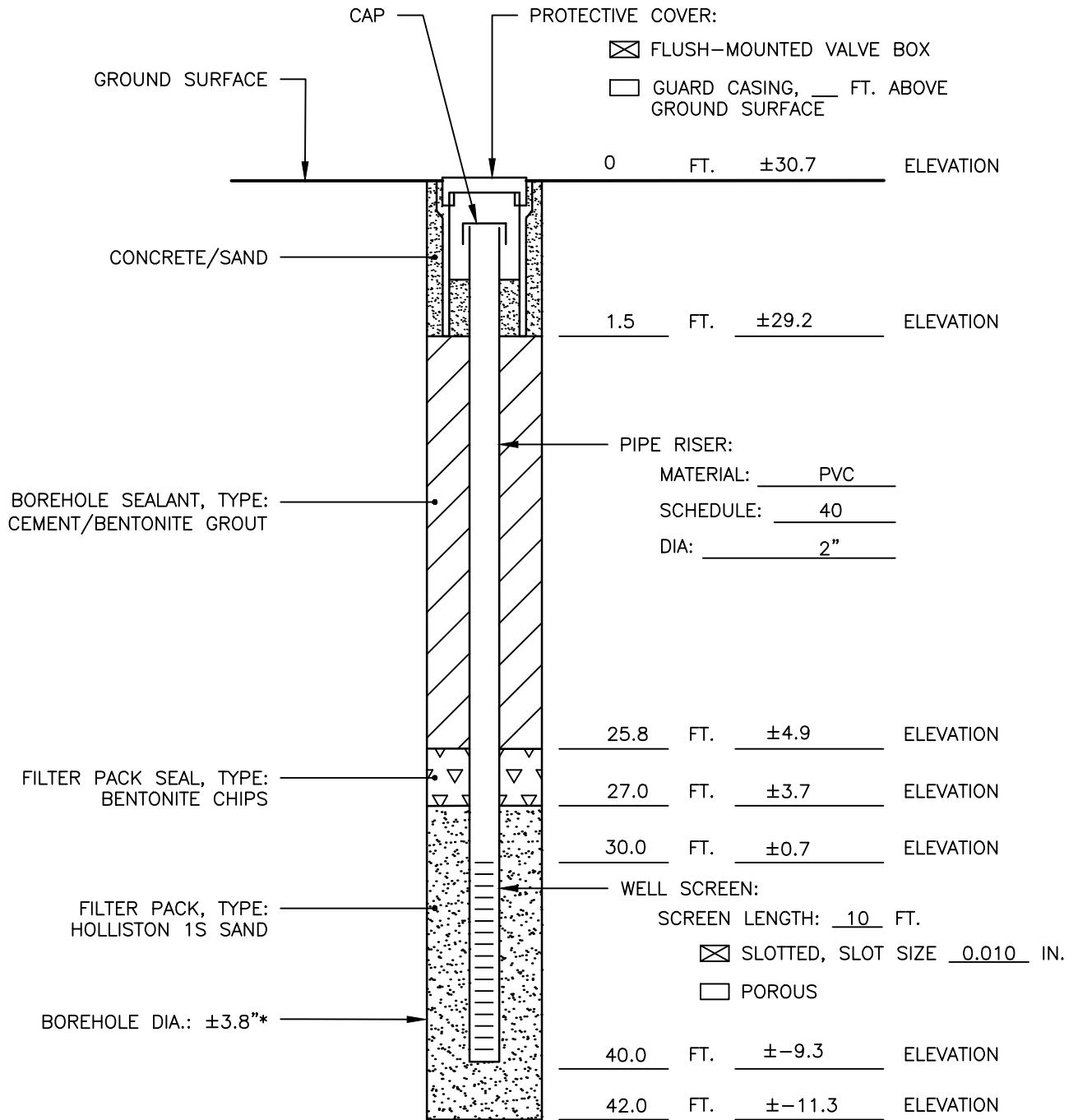
Date	Time	Read By	Depth to Water (ft)	Elevation of Water (ft)	Remarks
04-25-19	9:00	HP	19.8	11.3	Groundwater Well; measured before well development.
04-26-19	9:50	HP	19.65	11.45	Groundwater Well; measured before well development.
05-09-19	12:15	JPN	17.3	13.8	Groundwater Well
05-15-19	9:10	HP	17.4	13.7	Groundwater Well

(1) Normally, the top of protective casing. (2) Street intersection, address, etc.



WELL/PIEZOMETER INSTALLATION SKETCH

Project Name NBC CSO PHASE III WELL/PIEZO NO. B17-8A
 Pare Project Number 14106.02 Sheet 1 of 1
 Field Engineer R. Lozinski Date 6-11-19



Remarks:
 The original well (B17-8) has been removed and a new well (B17-8A) installed.



WELL/PIEZOMETER WATER LEVEL RECORD

Project Name NBC CSO Phase III

WELL/PIEZO. NO. B17- 8A

Project Number 14106.02

Sheet 1 of 1

Reference⁽¹⁾ Ground Surface

Ref. Elev. 30.7 NGVD 29

Foundation Sensed Rock Elevation +/- 10 feet.

Location Description⁽²⁾ Masonic Temple

Date	Time	Read By	Depth to Water (ft)	Elevation of Water (ft)	Remarks
07-01-19	12:40	RAL	18.0	12.7	Groundwater Well; ¼-inch diameter vent installed.
07-19-19	12:50	JPN	16.4	14.3	Vented Groundwater Well; measured before well development.
08-01-19	9:20	MLP	17	13.7	Vented Groundwater Well; measured before well development.
08-01-19	12:05	MLP	16.3	14.4	Vented Groundwater Well; measured before well development.
08-02-19	11:50	JPN	18.2	12.5	Vented Groundwater Well; measured before well development.
08-05-19	7:30	JPN	18.0	12.7	Vented Groundwater Well; measured before well development.
08-06-19	7:30	HMS	18.7	12.0	Vented Groundwater Well; measured before well development.
08-09-19	7:15	MLP	17.9	12.8	Vented Groundwater Well; measured before well development.
08-14-19	2:30	JPN	17.5	13.2	Vented Groundwater Well; measured before well development.
08-15-19	5:00	JPN	18.4	12.3	Vented Groundwater Well; measured before well development.
08-22-19	3:30	HP	17.5	13.2	Vented Groundwater Well; measured before well sampling.
09-03-19	4:50	JPN	17.7	13.0	Groundwater Well; ¼-inch diameter vent installed.
11-14-19	3:07	RAL	17.8	12.9	Groundwater Well; ¼-inch diameter vent installed.

(1) Normally, the top of protective casing.

(2) Street intersection, address, etc.



WELL/PIEZOMETER WATER LEVEL RECORD

Project Name NBC CSO Phase III

WELL/PIEZO. NO. B17-39

Project Number 14106.02

Sheet 1 **of** 1

Reference⁽¹⁾ Ground Surface

Ref. Elev. 32.0 NGVD 29

Foundation Sensed N/A

Location Description⁽²⁾ Masonic Temple

Date	Time	Read By	Depth to Water (ft)	Elevation of Water (ft)	Remarks
08-12-19	7:00	JPN	3.5	28.5	Open Boring (Packer Testing)
08-13-19	7:00	JPN	3.5	28.5	Open Boring (Packer Testing)
08-14-19	7:00	JPN	5.0	27.0	Open Boring (Packer Testing)
09-03-19	4:50	JPN	11.8	20.2	Open Boring

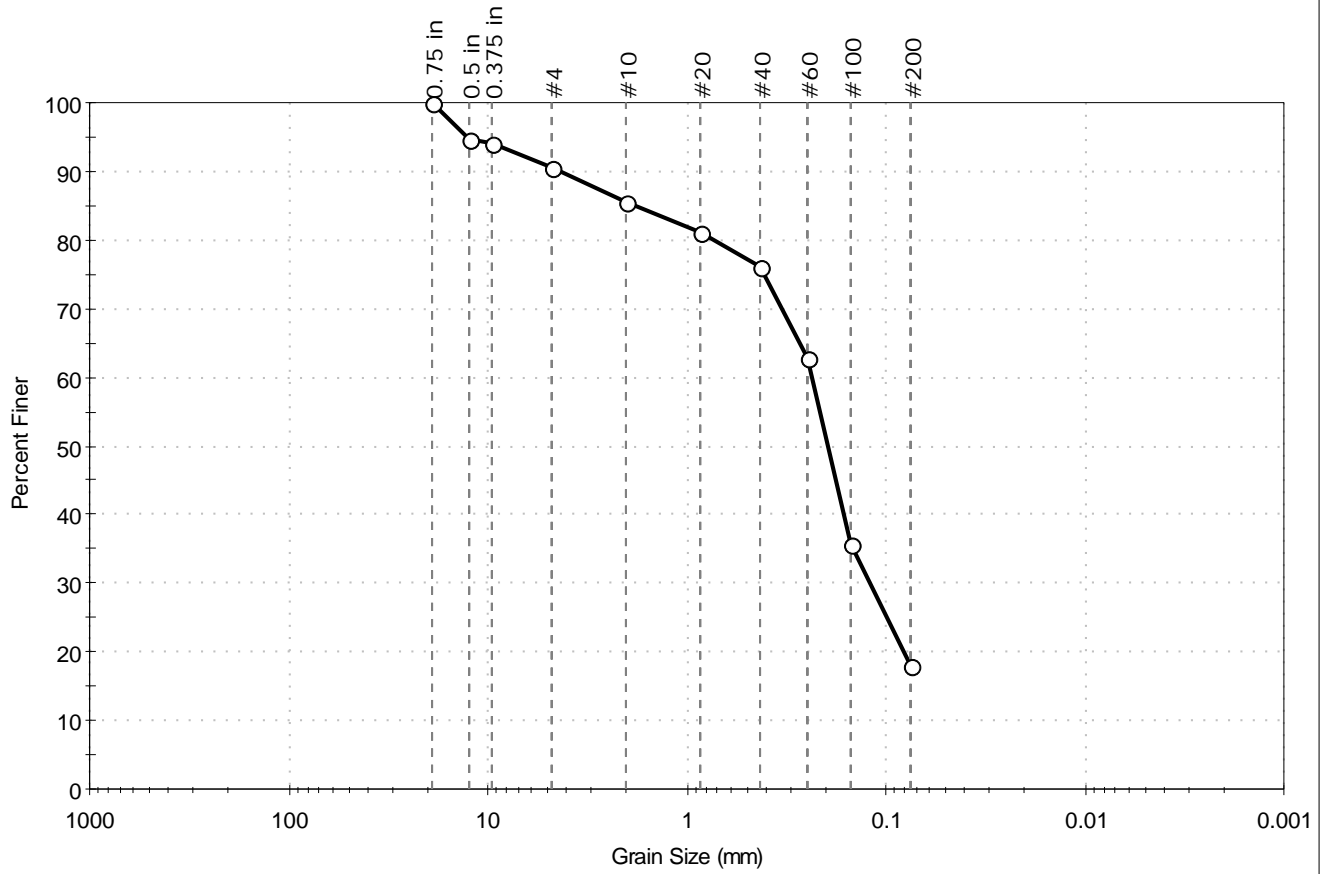
(1) Normally, the top of protective casing.

(2) Street intersection, address, etc.



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-8	Sample Type:	jar
Sample ID:	S-4	Test Date:	05/29/18
Depth :	6-8	Checked By:	emm
		Test Id:	456249
Test Comment:	---		
Visual Description:	Moist, pale brown silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	9.6	72.3	18.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	95		
0.375 in	9.50	94		
#4	4.75	90		
#10	2.00	85		
#20	0.85	81		
#40	0.42	76		
#60	0.25	63		
#100	0.15	36		
#200	0.075	18		

<u>Coefficients</u>	
D ₈₅ = 1.8218 mm	D ₃₀ = 0.1201 mm
D ₆₀ = 0.2369 mm	D ₁₅ = N/A
D ₅₀ = 0.1964 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

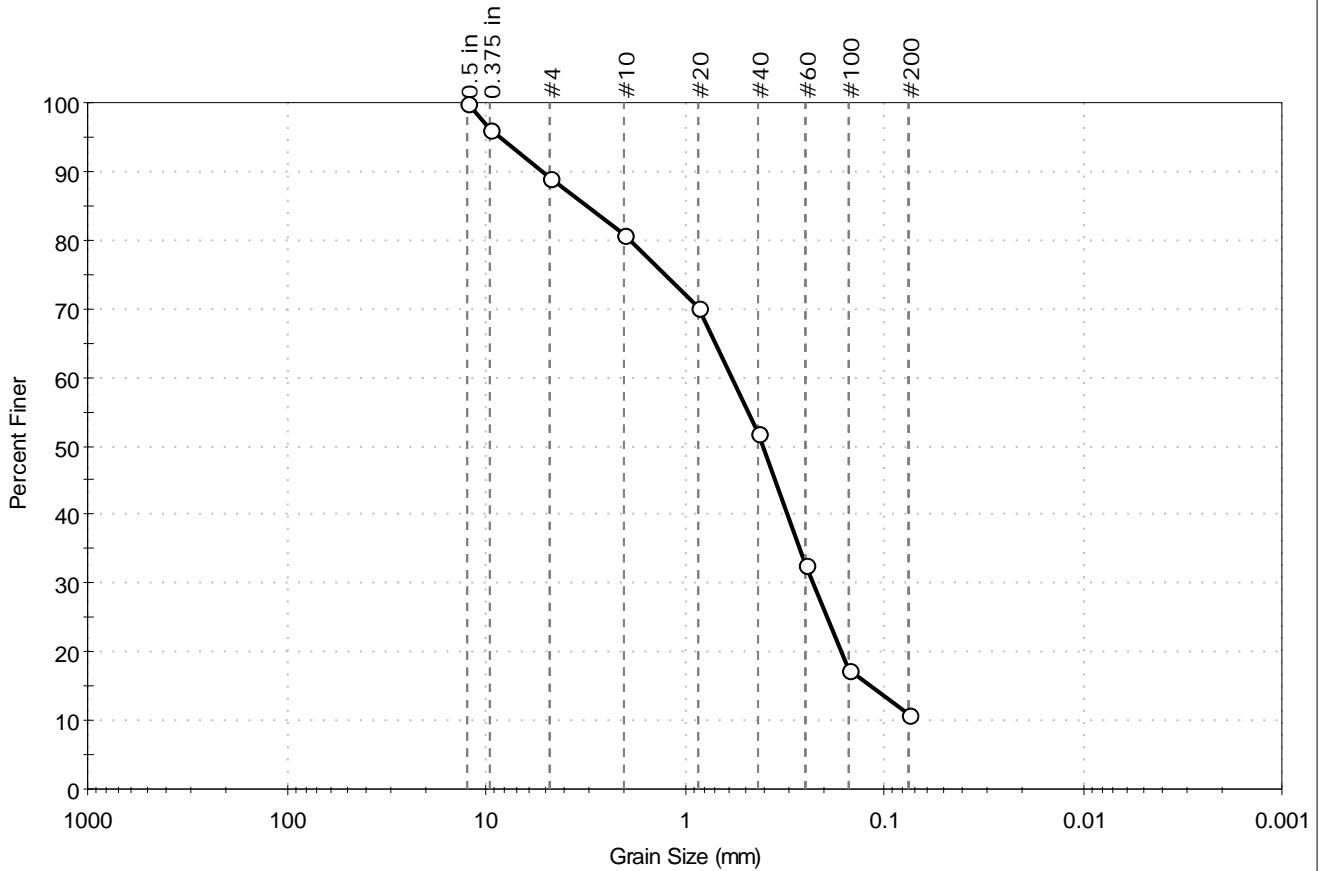
<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Gravel and Sand (A-2-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI	Boring ID: B17-8	Sample Type: jar
	Sample ID: S-8	Test Date: 05/29/18
	Depth : 14-16	Test Id: 456250
Test Comment: ---	Tested By: jbr	Checked By: emm
Visual Description: Moist, very dark brown sand with silt		
Sample Comment: ---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	11.0	78.1	10.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	96		
#4	4.75	89		
#10	2.00	81		
#20	0.85	70		
#40	0.42	52		
#60	0.25	33		
#100	0.15	17		
#200	0.075	11		

<u>Coefficients</u>	
D ₈₅ = 3.1141 mm	D ₃₀ = 0.2290 mm
D ₆₀ = 0.5781 mm	D ₁₅ = 0.1162 mm
D ₅₀ = 0.4032 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

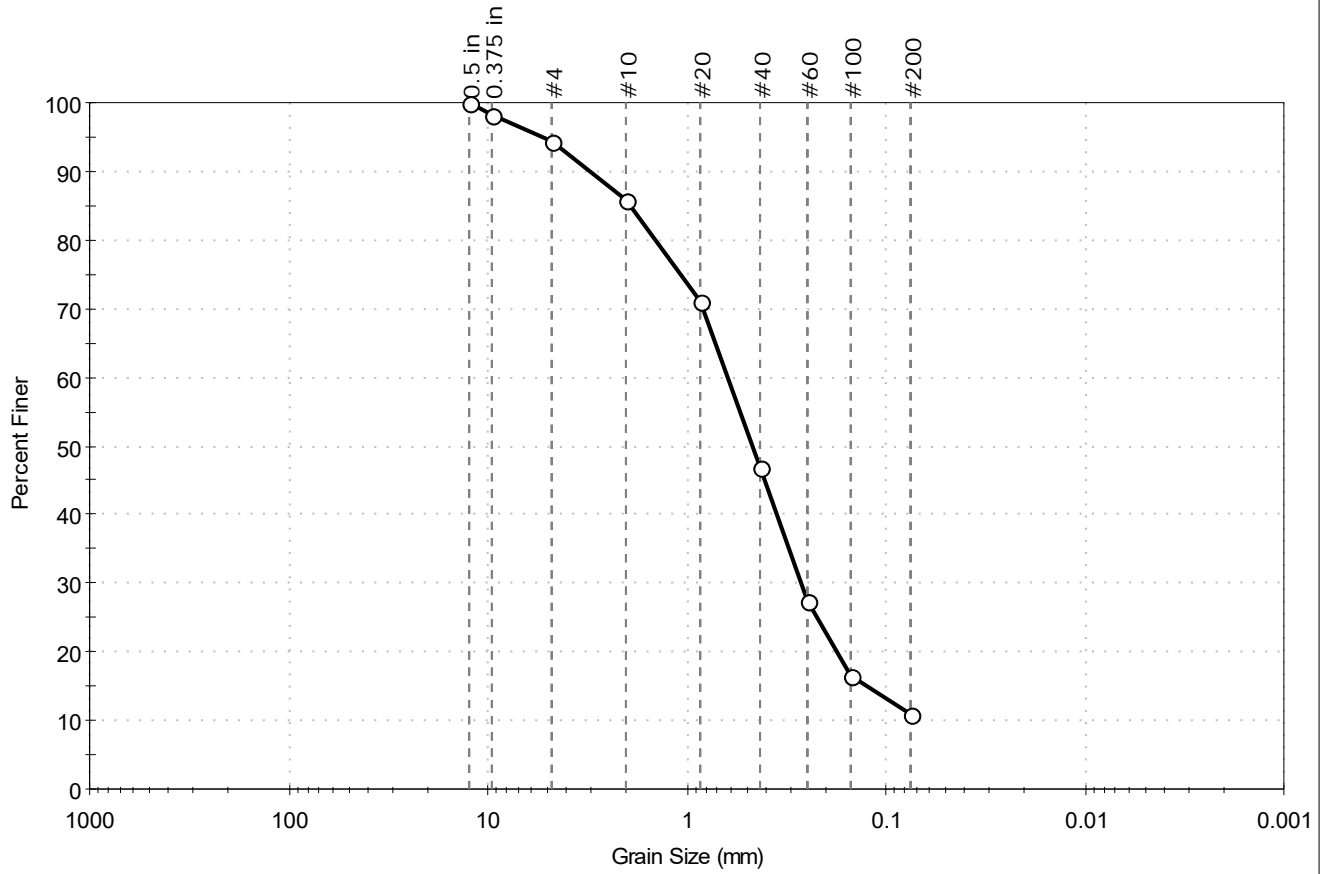
<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Gravel and Sand (A-2-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-308335	
Project: NBC Phase III CSO CER	Tested By: ckg	
Location: Pawtucket, RI	Sample Type: jar	Checked By: bfs
Boring ID: B17-39	Test Date: 08/28/19	Test Id: 519879
Sample ID: S-2 (2 jars)	Visual Description: Moist, olive brown sand with silt	
Depth: 2-4	Sample Comment: ---	

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	5.5	83.7	10.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	98		
#4	4.75	94		
#10	2.00	86		
#20	0.85	71		
#40	0.42	47		
#60	0.25	27		
#100	0.15	16		
#200	0.075	11		

<u>Coefficients</u>	
D ₈₅ = 1.8953 mm	D ₃₀ = 0.2683 mm
D ₆₀ = 0.6192 mm	D ₁₅ = 0.1258 mm
D ₅₀ = 0.4640 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

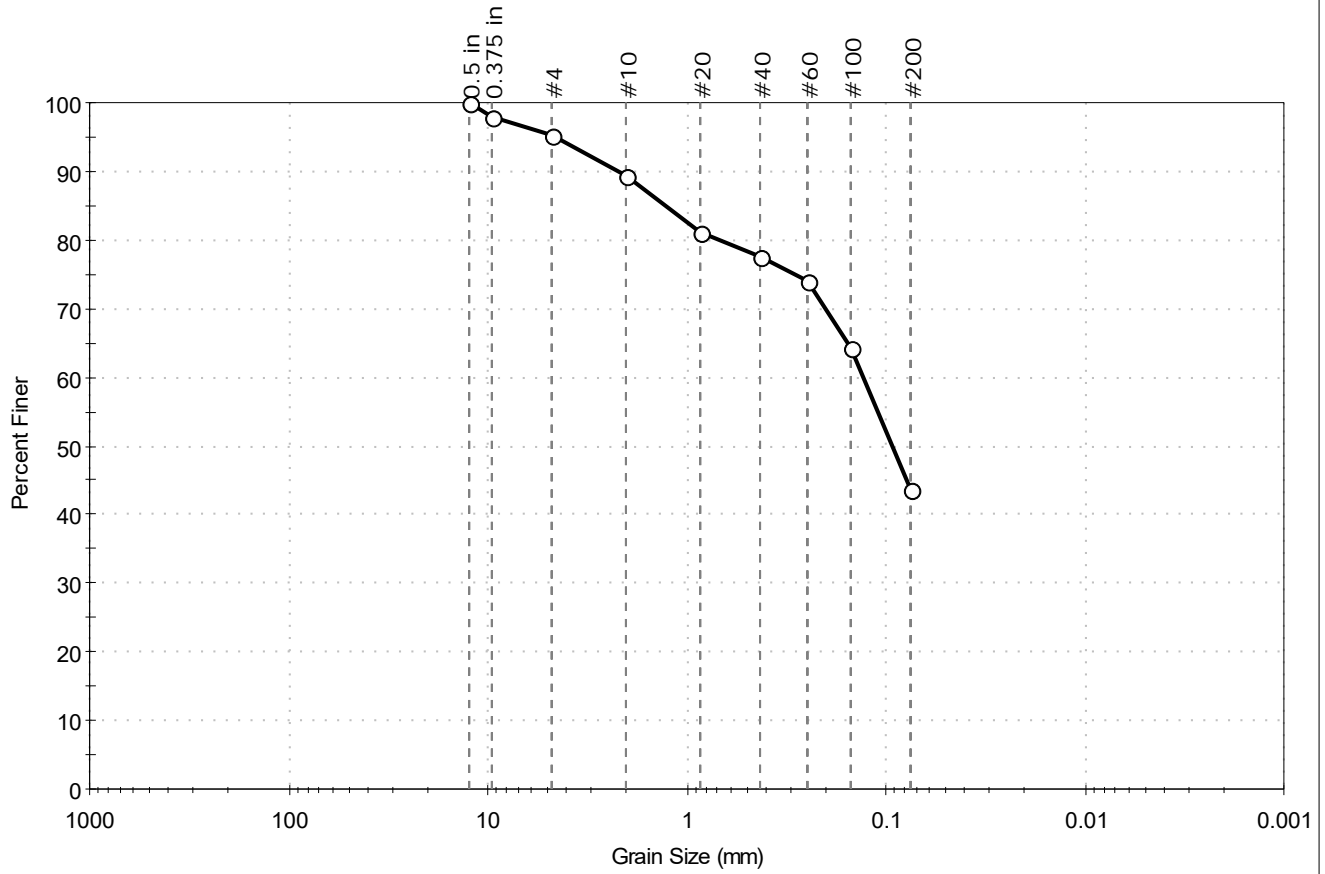
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project: NBC Phase III CSO CER	Location: Pawtucket, RI	Project No: GTX-308335
Boring ID: B17-39	Sample Type: jar	Tested By: ckg	Checked By: bfs
Sample ID: S-6	Test Date: 08/28/19	Test Id: 519880	
Depth: 10-12			
Test Comment: ---			
Visual Description: Moist, brown silty sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	4.9	51.5	43.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	98		
#4	4.75	95		
#10	2.00	89		
#20	0.85	81		
#40	0.42	77		
#60	0.25	74		
#100	0.15	64		
#200	0.075	44		

<u>Coefficients</u>	
D ₈₅ = 1.2663 mm	D ₃₀ = N/A
D ₆₀ = 0.1299 mm	D ₁₅ = N/A
D ₅₀ = 0.0928 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

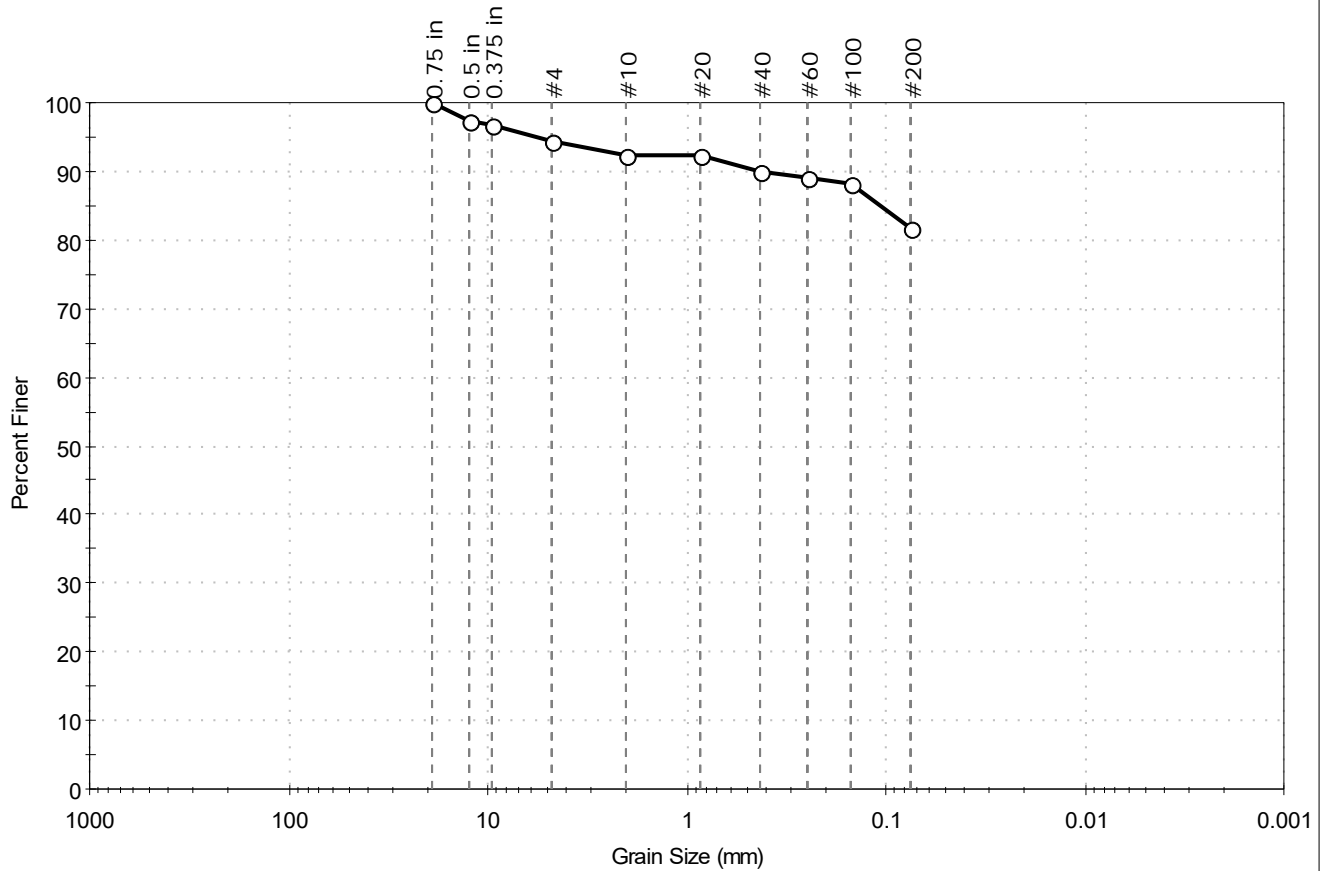
<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Soils (A-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-308335
Project: NBC Phase III CSO CER	
Location: Pawtucket, RI	
Boring ID: B17-39	Sample Type: jar
Sample ID: S-8 (3 jars)	Test Date: 08/28/19
Depth: 14-16	Test Id: 519881
Test Comment: ---	Tested By: ckg
Visual Description: Moist, dark yellowish brown clay with sand	Checked By: bfs
Sample Comment: Removed one unrepresentative 1" rock weighting 57.57 g	

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	5.6	12.7	81.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	97		
0.375 in	9.50	97		
#4	4.75	94		
#10	2.00	92		
#20	0.85	92		
#40	0.42	90		
#60	0.25	89		
#100	0.15	88		
#200	0.075	82		

Coefficients

D ₈₅ = 0.1058 mm	D ₃₀ = N/A
D ₆₀ = N/A	D ₁₅ = N/A
D ₅₀ = N/A	D ₁₀ = N/A
C _u = N/A	C _c = N/A

Classification

ASTM	Lean CLAY with Sand (CL)
AASHTO	Silty Soils (A-4 (5))

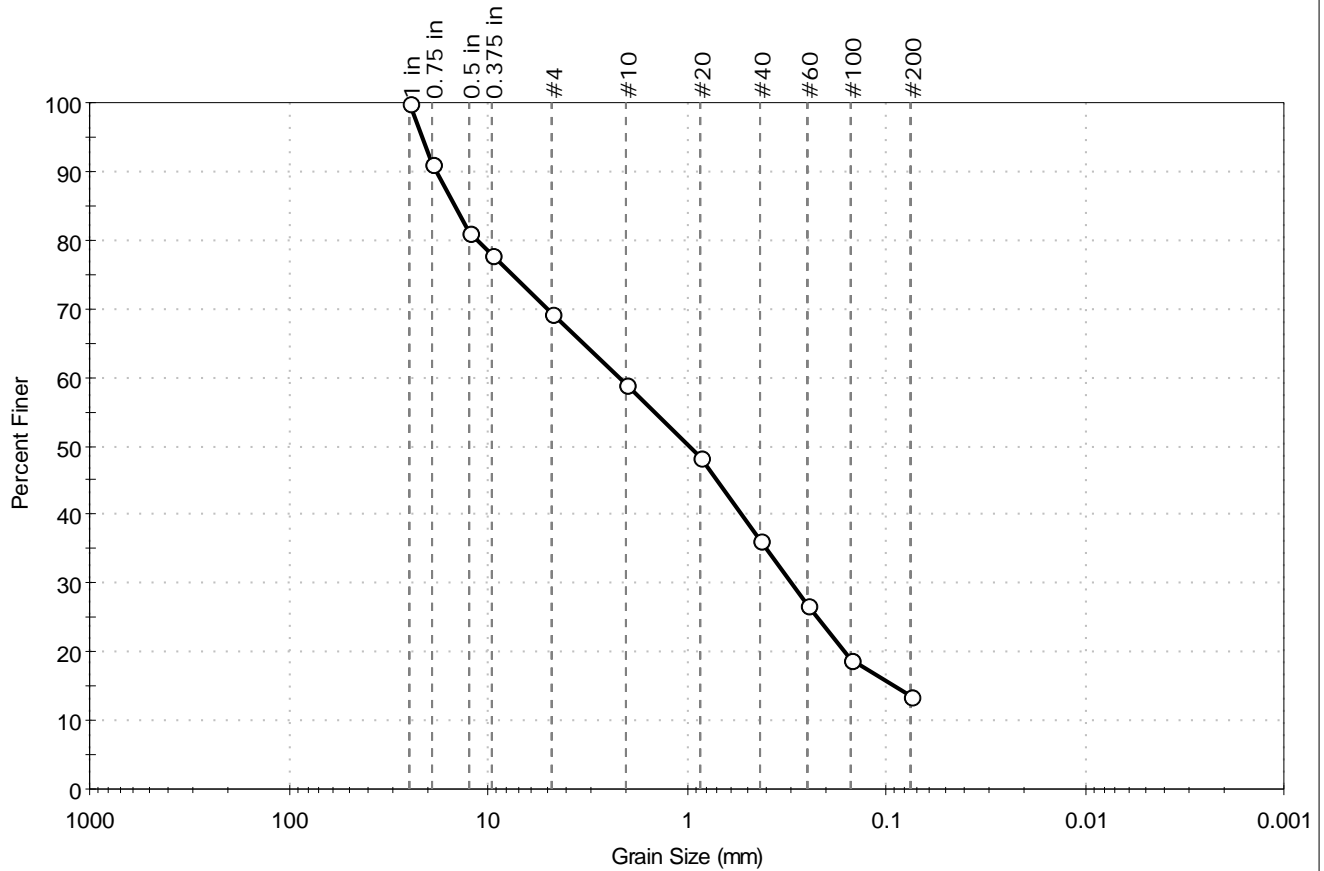
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR
 Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-40	Sample Type:	jar
Sample ID:	S-1	Test Date:	05/29/18
Depth :	0.5-2.5	Checked By:	emm
		Test Id:	456240
Test Comment:	---		
Visual Description:	Moist, dark brown silty sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	30.7	55.8	13.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	91		
0.5 in	12.50	81		
0.375 in	9.50	78		
#4	4.75	69		
#10	2.00	59		
#20	0.85	48		
#40	0.42	36		
#60	0.25	27		
#100	0.15	19		
#200	0.075	13		

<u>Coefficients</u>	
D ₈₅ = 14.6318 mm	D ₃₀ = 0.2979 mm
D ₆₀ = 2.1787 mm	D ₁₅ = 0.0914 mm
D ₅₀ = 0.9768 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

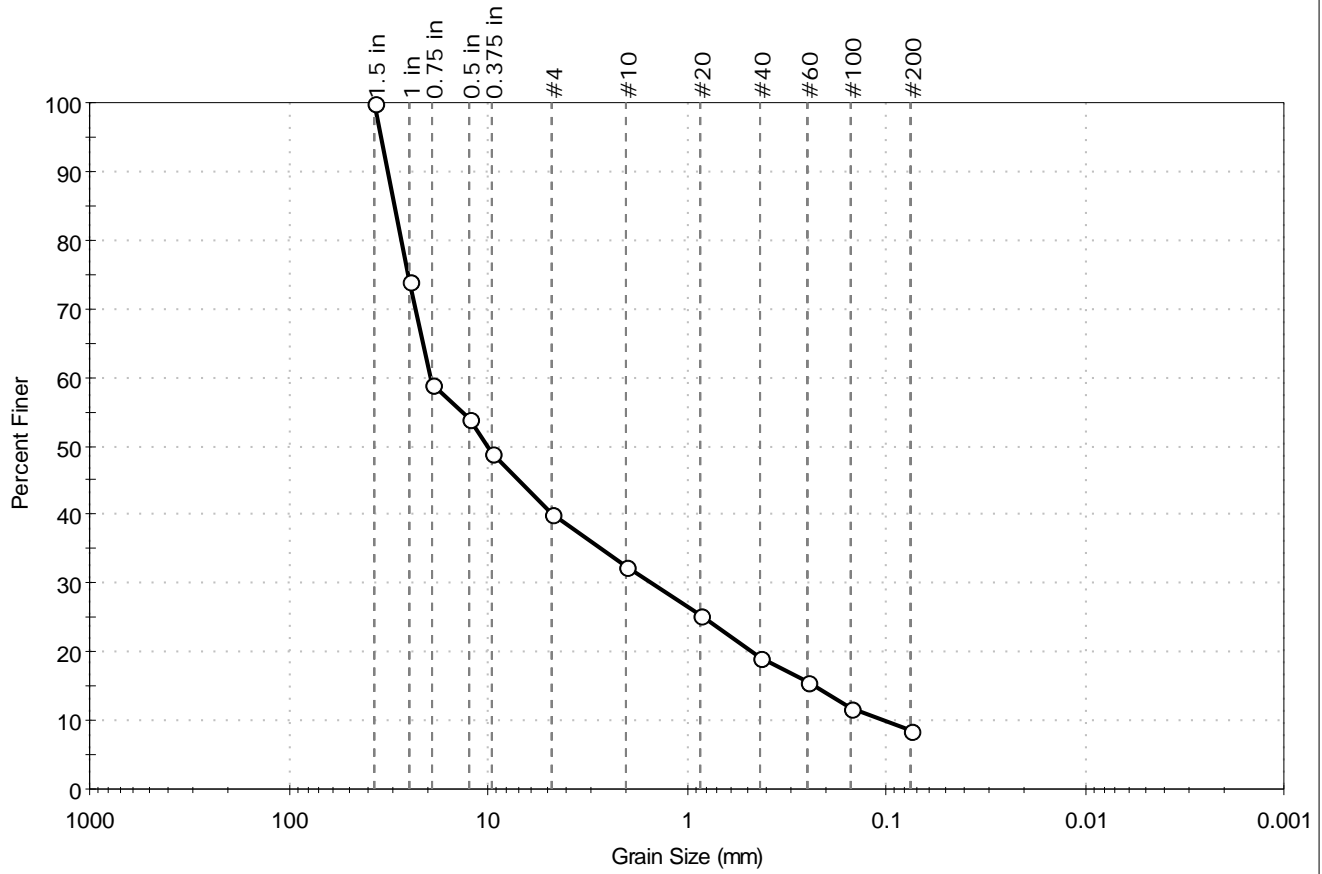
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-40	Sample Type:	jar
Sample ID:	S-4	Test Date:	05/29/18
Depth :	6-8	Checked By:	emm
		Test Id:	456241
Test Comment:	---		
Visual Description:	Moist, dark gray gravel with silt and sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	59.7	31.8	8.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	74		
0.75 in	19.00	59		
0.5 in	12.50	54		
0.375 in	9.50	49		
#4	4.75	40		
#10	2.00	33		
#20	0.85	25		
#40	0.42	19		
#60	0.25	15		
#100	0.15	12		
#200	0.075	8.5		

<u>Coefficients</u>	
D ₈₅ = 29.6316 mm	D ₃₀ = 1.4707 mm
D ₆₀ = 19.3202 mm	D ₁₅ = 0.2331 mm
D ₅₀ = 10.0961 mm	D ₁₀ = 0.1026 mm
C _u = 188.306	C _c = 1.091

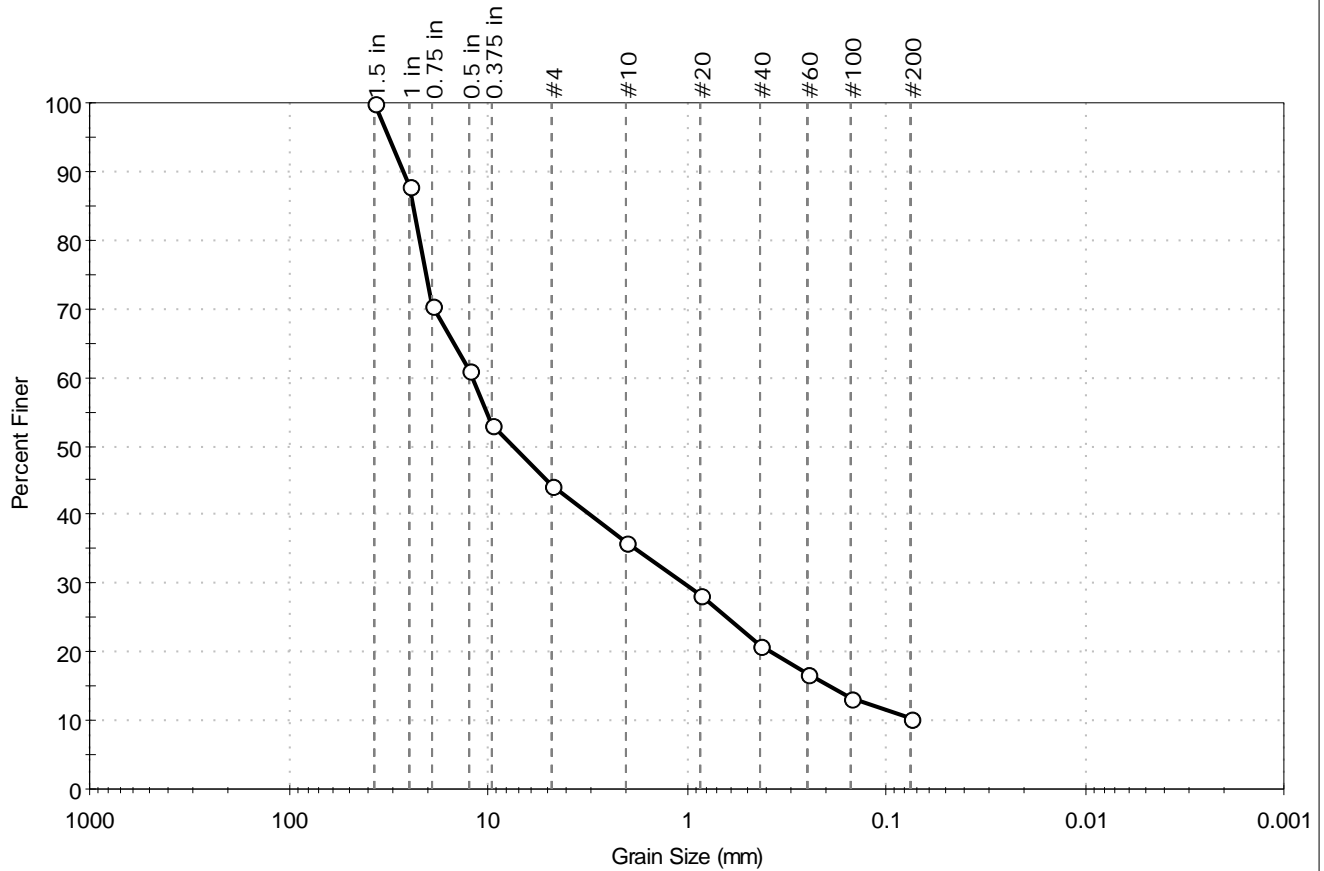
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-40	Sample Type:	jar
Sample ID:	S-5	Test Date:	06/14/18
Depth :	8-10	Checked By:	emm
		Test Id:	457943
Test Comment:	---		
Visual Description:	Moist, gray gravel with silt and sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	55.8	34.0	10.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	88		
0.75 in	19.00	71		
0.5 in	12.50	61		
0.375 in	9.50	53		
#4	4.75	44		
#10	2.00	36		
#20	0.85	28		
#40	0.42	21		
#60	0.25	17		
#100	0.15	13		
#200	0.075	10		

<u>Coefficients</u>	
D ₈₅ = 23.9120 mm	D ₃₀ = 1.0329 mm
D ₆₀ = 12.0447 mm	D ₁₅ = 0.1898 mm
D ₅₀ = 7.4379 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

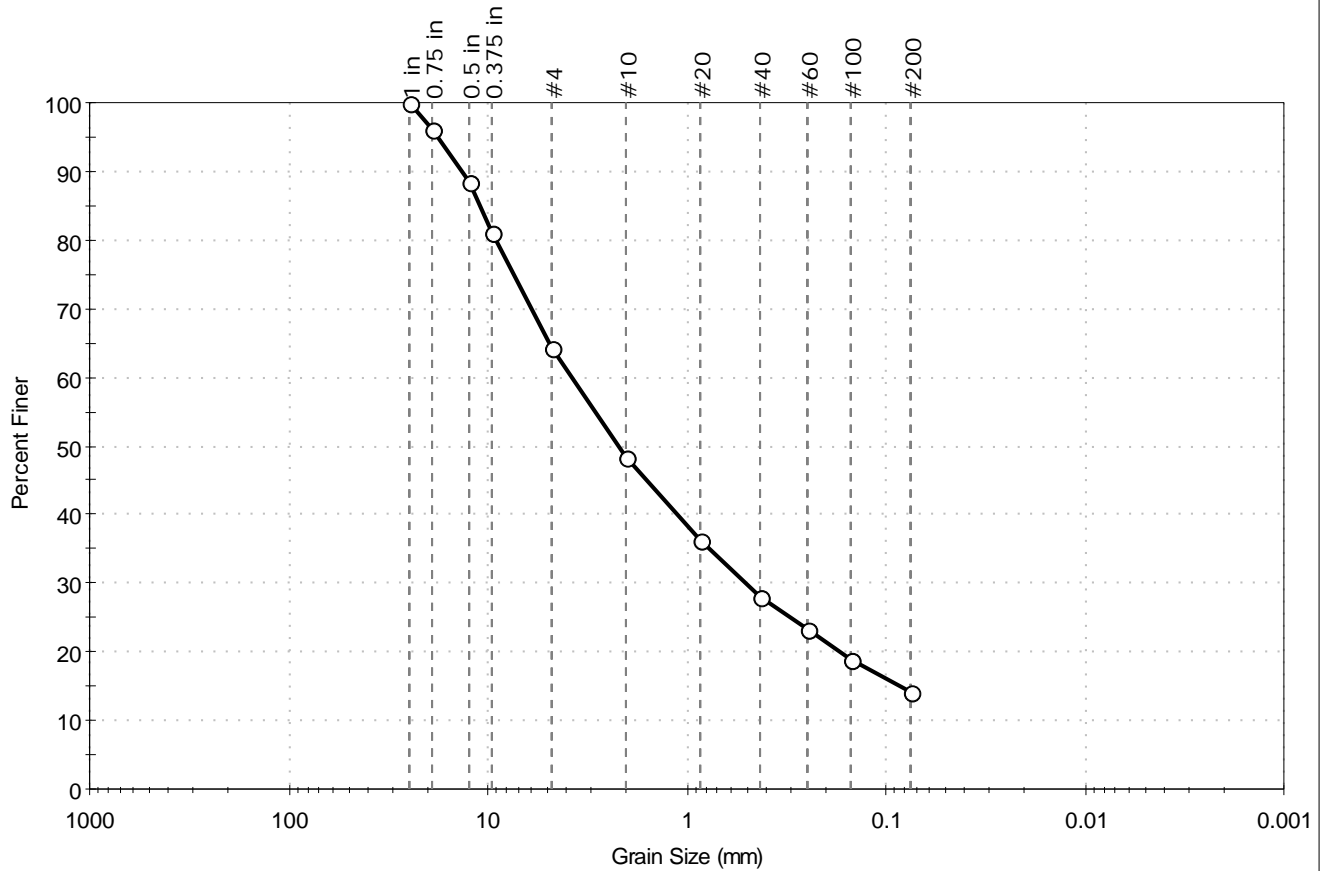
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-40	Sample Type:	jar
Sample ID:	S-7	Test Date:	05/29/18
Depth :	12-14	Checked By:	emm
		Test Id:	456242
Test Comment:	---		
Visual Description:	Moist, dark brownish gray silty sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	35.8	50.1	14.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	96		
0.5 in	12.50	89		
0.375 in	9.50	81		
#4	4.75	64		
#10	2.00	48		
#20	0.85	36		
#40	0.42	28		
#60	0.25	23		
#100	0.15	19		
#200	0.075	14		

<u>Coefficients</u>	
D ₈₅ = 10.9462 mm	D ₃₀ = 0.4969 mm
D ₆₀ = 3.7774 mm	D ₁₅ = 0.0855 mm
D ₅₀ = 2.1870 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

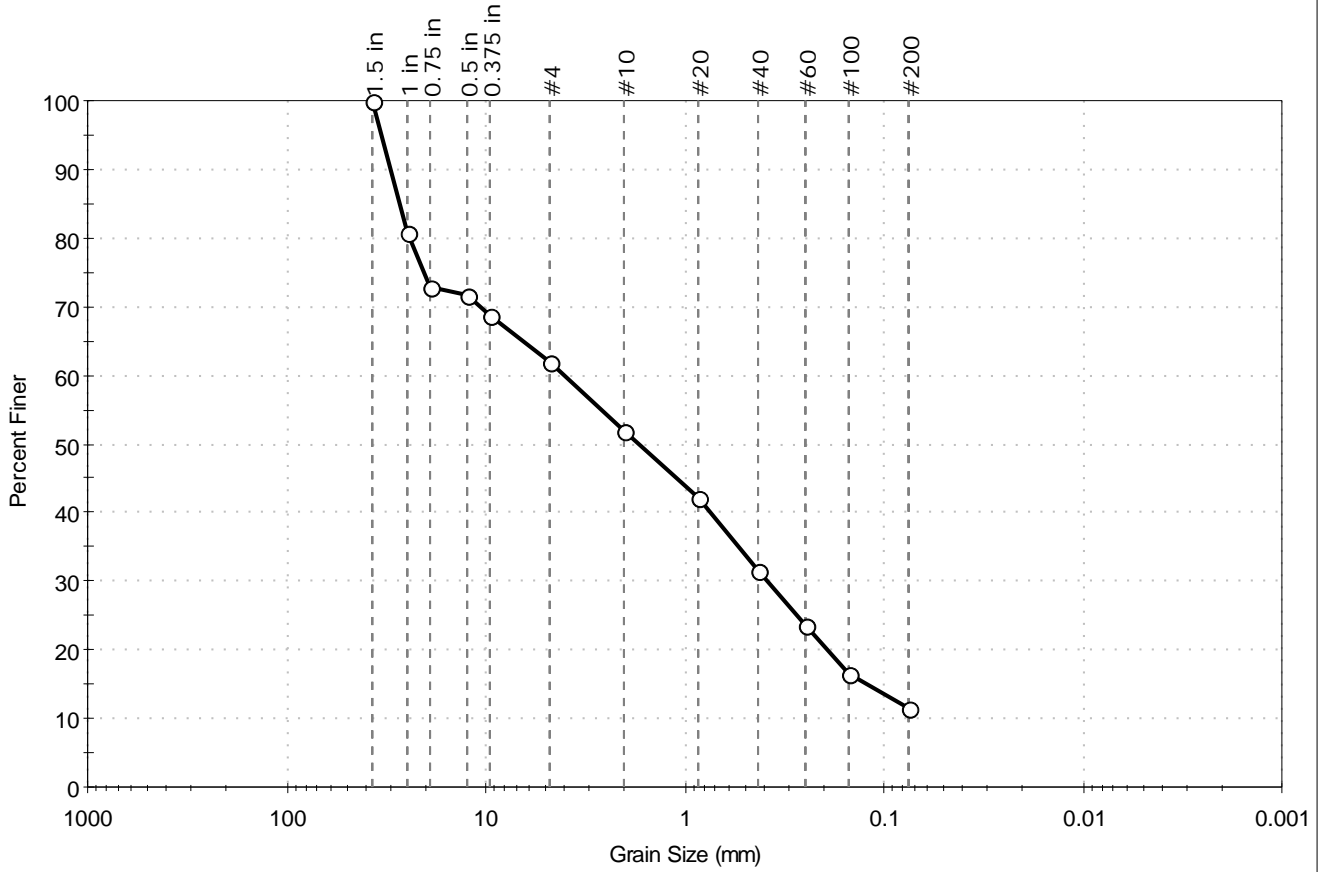
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-a (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-41	Sample Type:	jar
Sample ID:	S-1A	Test Date:	05/29/18
Depth :	0.75-2.75	Checked By:	emm
Test Comment:	---		
Visual Description:	Moist, dark grayish brown sand with silt and gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	38.2	50.2	11.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	81		
0.75 in	19.00	73		
0.5 in	12.50	72		
0.375 in	9.50	69		
#4	4.75	62		
#10	2.00	52		
#20	0.85	42		
#40	0.42	32		
#60	0.25	24		
#100	0.15	17		
#200	0.075	12		

<u>Coefficients</u>	
D ₈₅ = 27.3599 mm	D ₃₀ = 0.3803 mm
D ₆₀ = 4.0503 mm	D ₁₅ = 0.1202 mm
D ₅₀ = 1.6817 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

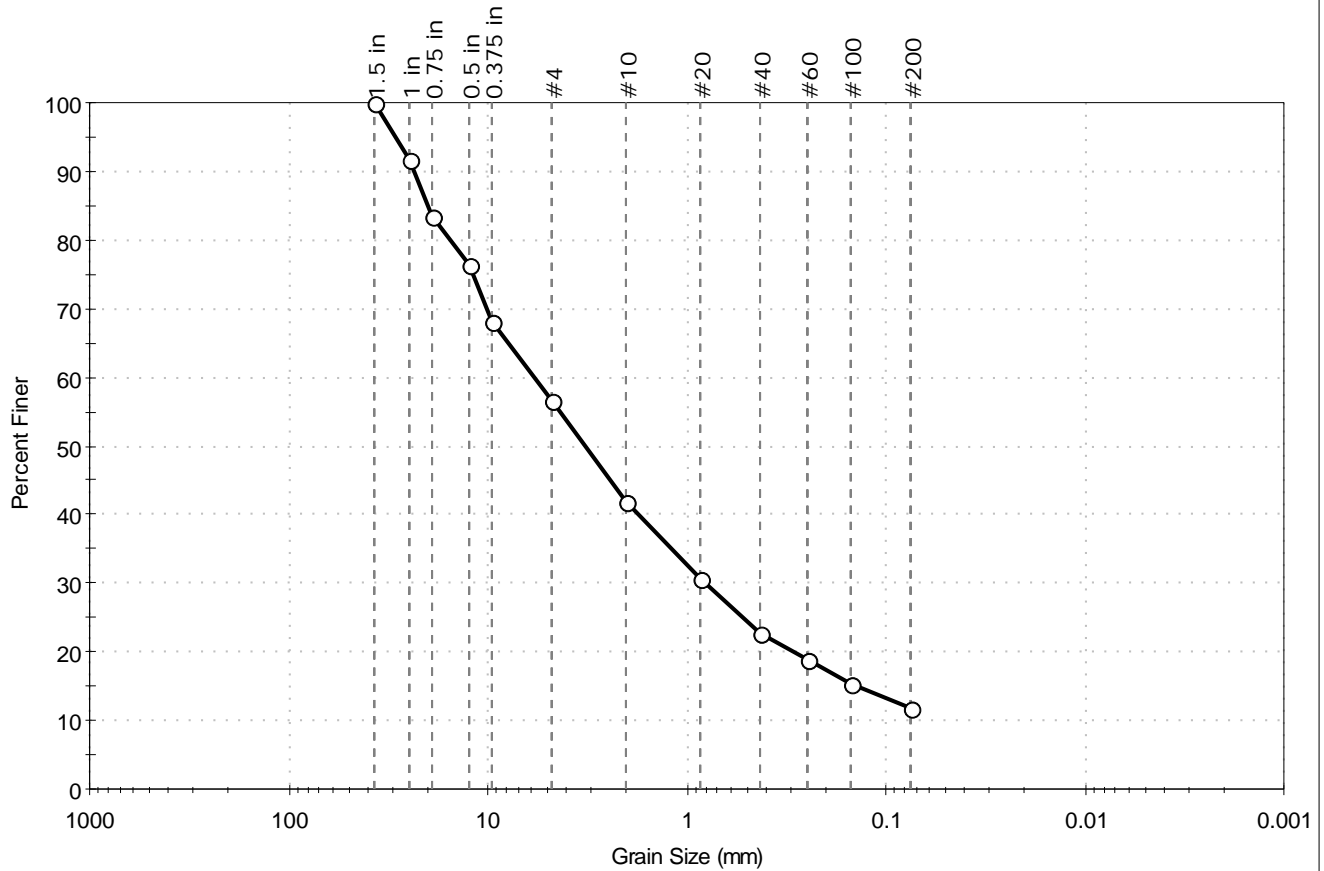
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI	Sample Type: jar	Tested By: jbr
Boring ID: B17-41	Test Date: 05/29/18	Checked By: emm
Sample ID: S-5	Test Id: 456244	
Depth : 8-10		
Test Comment: ---		
Visual Description: Moist, dark brown sand with silt and gravel		
Sample Comment: ---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	43.2	45.0	11.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	92		
0.75 in	19.00	84		
0.5 in	12.50	77		
0.375 in	9.50	68		
#4	4.75	57		
#10	2.00	42		
#20	0.85	31		
#40	0.42	23		
#60	0.25	19		
#100	0.15	15		
#200	0.075	12		

<u>Coefficients</u>	
D ₈₅ = 19.9511 mm	D ₃₀ = 0.8089 mm
D ₆₀ = 5.8038 mm	D ₁₅ = 0.1408 mm
D ₅₀ = 3.2100 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

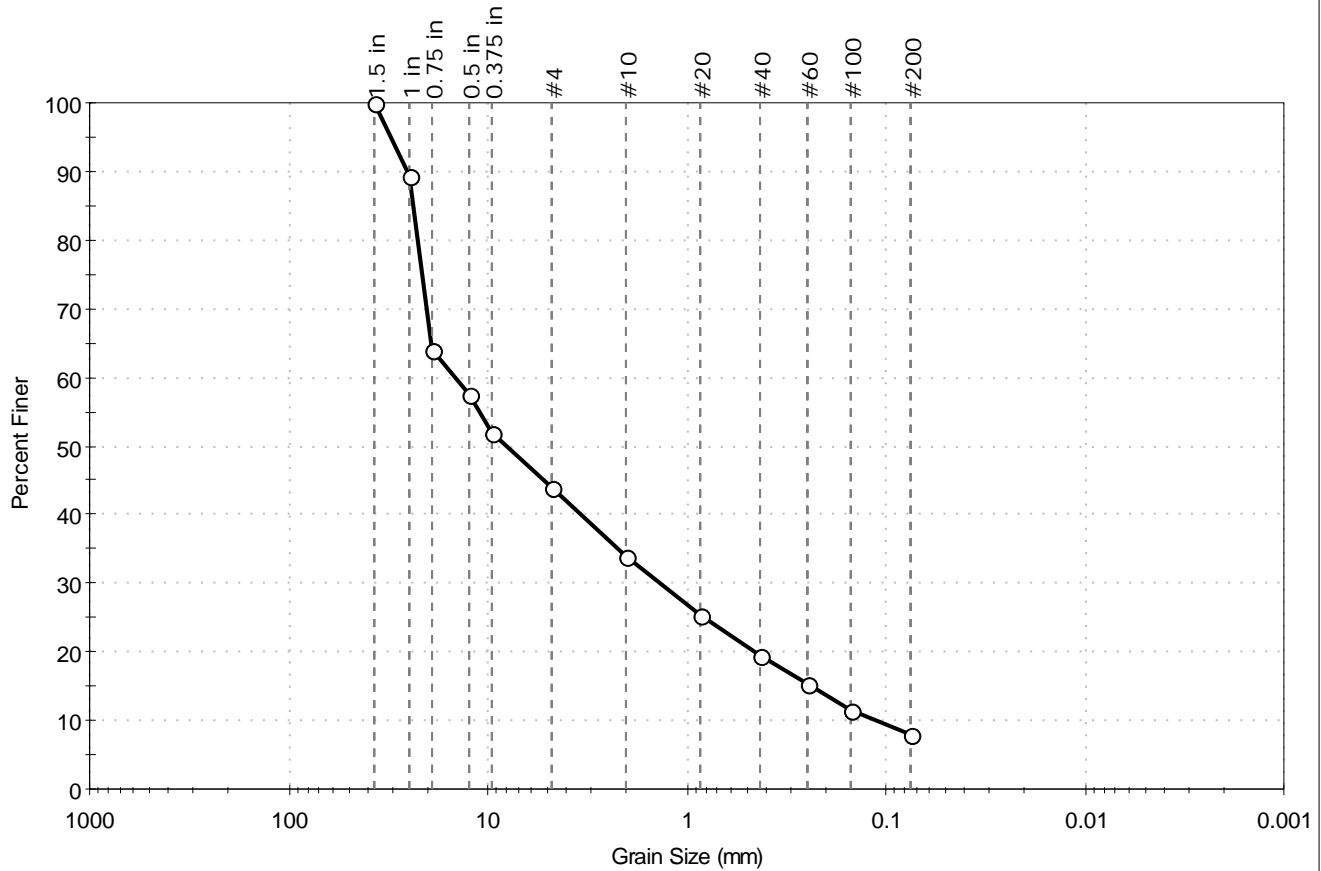
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-41	Sample Type:	jar
Sample ID:	S-7	Test Date:	06/14/18
Depth :	12-14	Checked By:	emm
		Test Id:	457944
Test Comment:	---		
Visual Description:	Moist, redish dark gray gravel with silt and sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	56.2	35.8	8.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	89		
0.75 in	19.00	64		
0.5 in	12.50	58		
0.375 in	9.50	52		
#4	4.75	44		
#10	2.00	34		
#20	0.85	25		
#40	0.42	19		
#60	0.25	15		
#100	0.15	12		
#200	0.075	8.0		

<u>Coefficients</u>	
D ₈₅ = 23.8175 mm	D ₃₀ = 1.3494 mm
D ₆₀ = 14.6163 mm	D ₁₅ = 0.2358 mm
D ₅₀ = 8.0521 mm	D ₁₀ = 0.1103 mm
C _u = 132.514	C _c = 1.129

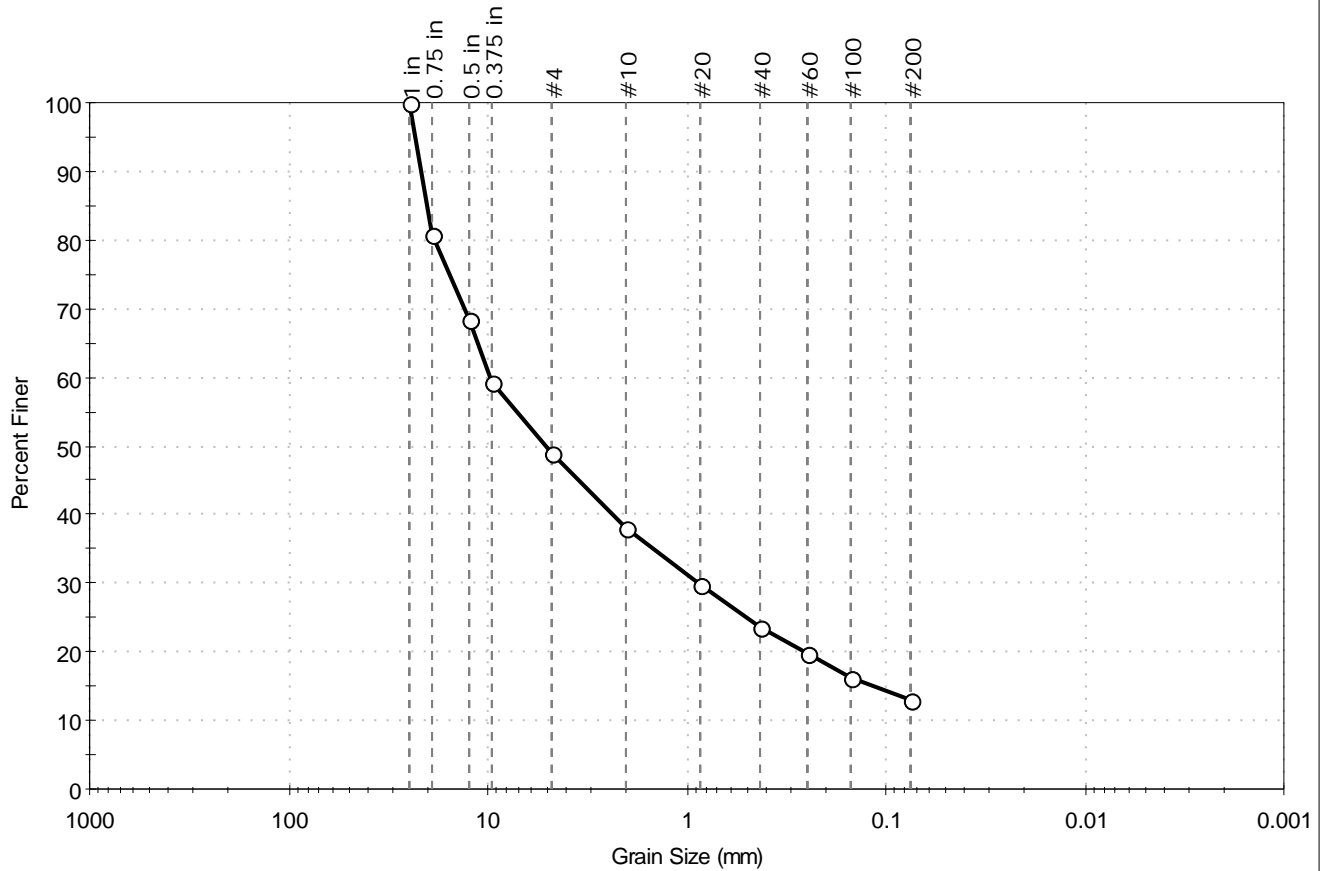
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-41	Sample Type:	jar
Sample ID:	S-9B	Test Date:	05/29/18
Depth :	16-18	Checked By:	emm
		Test Id:	456245
Test Comment:	---		
Visual Description:	Moist, light olive gray silty gravel with sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	51.1	36.0	12.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	81		
0.5 in	12.50	68		
0.375 in	9.50	59		
#4	4.75	49		
#10	2.00	38		
#20	0.85	30		
#40	0.42	24		
#60	0.25	20		
#100	0.15	16		
#200	0.075	13		

<u>Coefficients</u>	
D ₈₅ = 20.1677 mm	D ₃₀ = 0.8700 mm
D ₆₀ = 9.6751 mm	D ₁₅ = 0.1153 mm
D ₅₀ = 5.1114 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

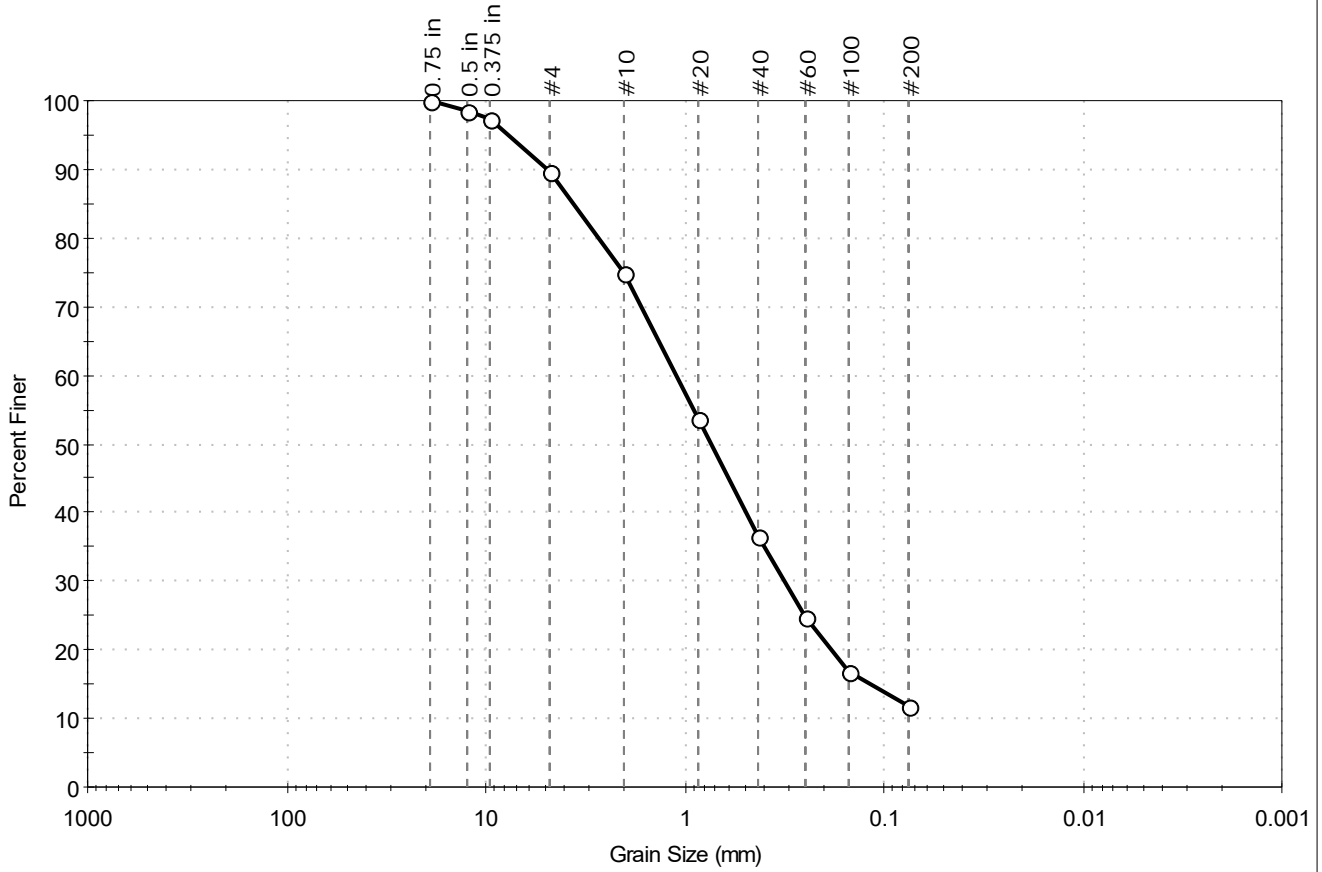
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-a (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-308335
Project: NBC Phase III CSO CER	
Location: Pawtucket, RI	
Boring ID: B17-45	Sample Type: jar
Sample ID: S-2	Test Date: 05/31/19
Depth: 2-4	Test Id: 505998
Test Comment: ---	Tested By: ckg
Visual Description: Moist, grayish brown sand with silt	Checked By: bfs
Sample Comment: ---	

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	10.3	78.0	11.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	99		
0.375 in	9.50	97		
#4	4.75	90		
#10	2.00	75		
#20	0.85	54		
#40	0.42	36		
#60	0.25	25		
#100	0.15	17		
#200	0.075	12		

<u>Coefficients</u>	
D ₈₅ = 3.5991 mm	D ₃₀ = 0.3170 mm
D ₆₀ = 1.0926 mm	D ₁₅ = 0.1165 mm
D ₅₀ = 0.7310 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

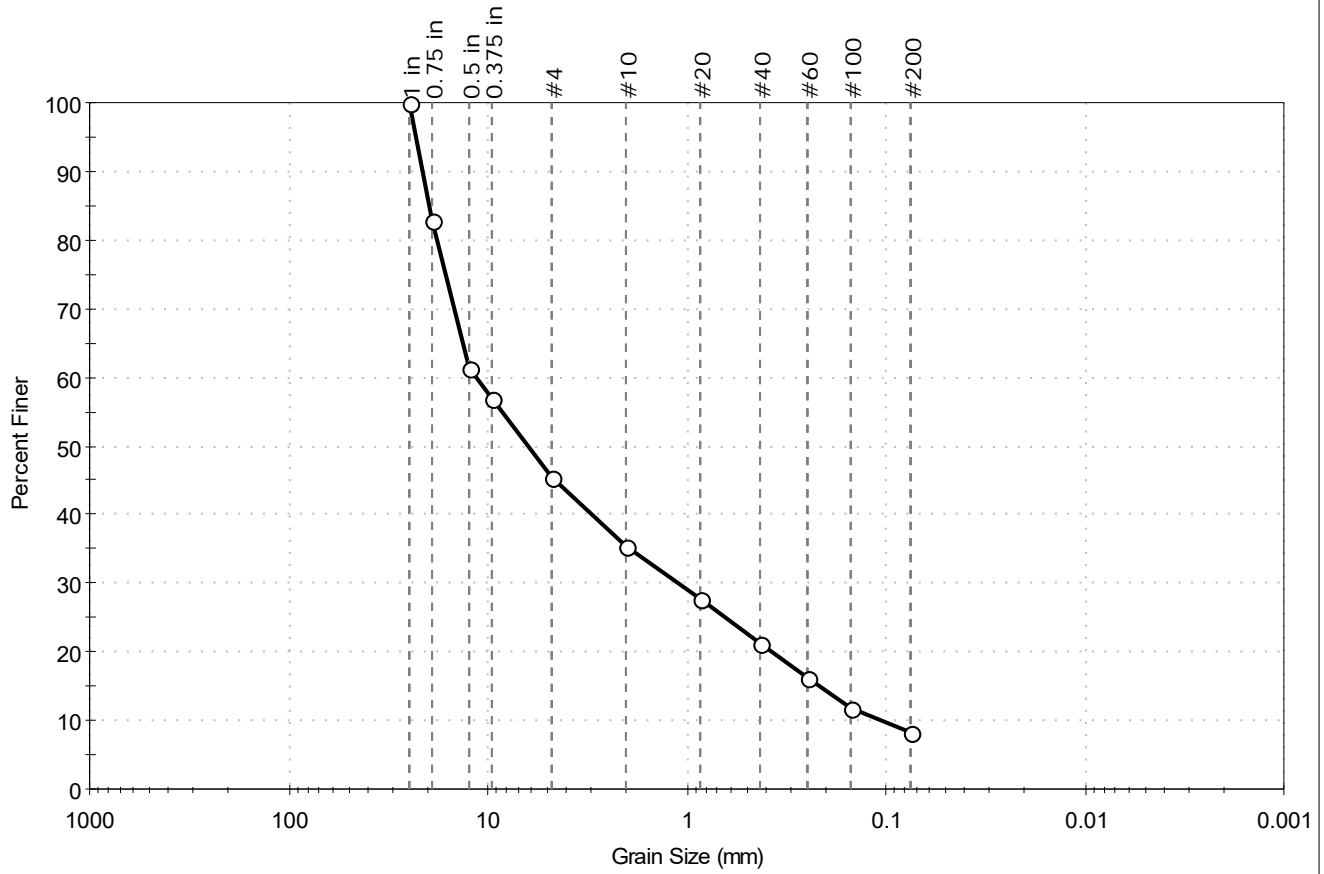
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description
 Sand/Gravel Particle Shape : ANGULAR
 Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-308335	
Project: NBC Phase III CSO CER	Tested By: ckg	
Location: Pawtucket, RI	Sample Type: jar	Checked By: bfs
Boring ID: B17-45	Test Date: 05/31/19	Test Id: 505999
Sample ID: S-7	Visual Description: Moist, dark yellowish brown gravel with silt and sand	
Depth: 12-14	Sample Comment: ---	

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	54.7	36.9	8.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	83		
0.5 in	12.50	61		
0.375 in	9.50	57		
#4	4.75	45		
#10	2.00	35		
#20	0.85	28		
#40	0.42	21		
#60	0.25	16		
#100	0.15	12		
#200	0.075	8.4		

<u>Coefficients</u>	
D ₈₅ = 19.6743 mm	D ₃₀ = 1.1015 mm
D ₆₀ = 11.5270 mm	D ₁₅ = 0.2196 mm
D ₅₀ = 6.2553 mm	D ₁₀ = 0.1052 mm
C _u = 109.572	C _c = 1.001

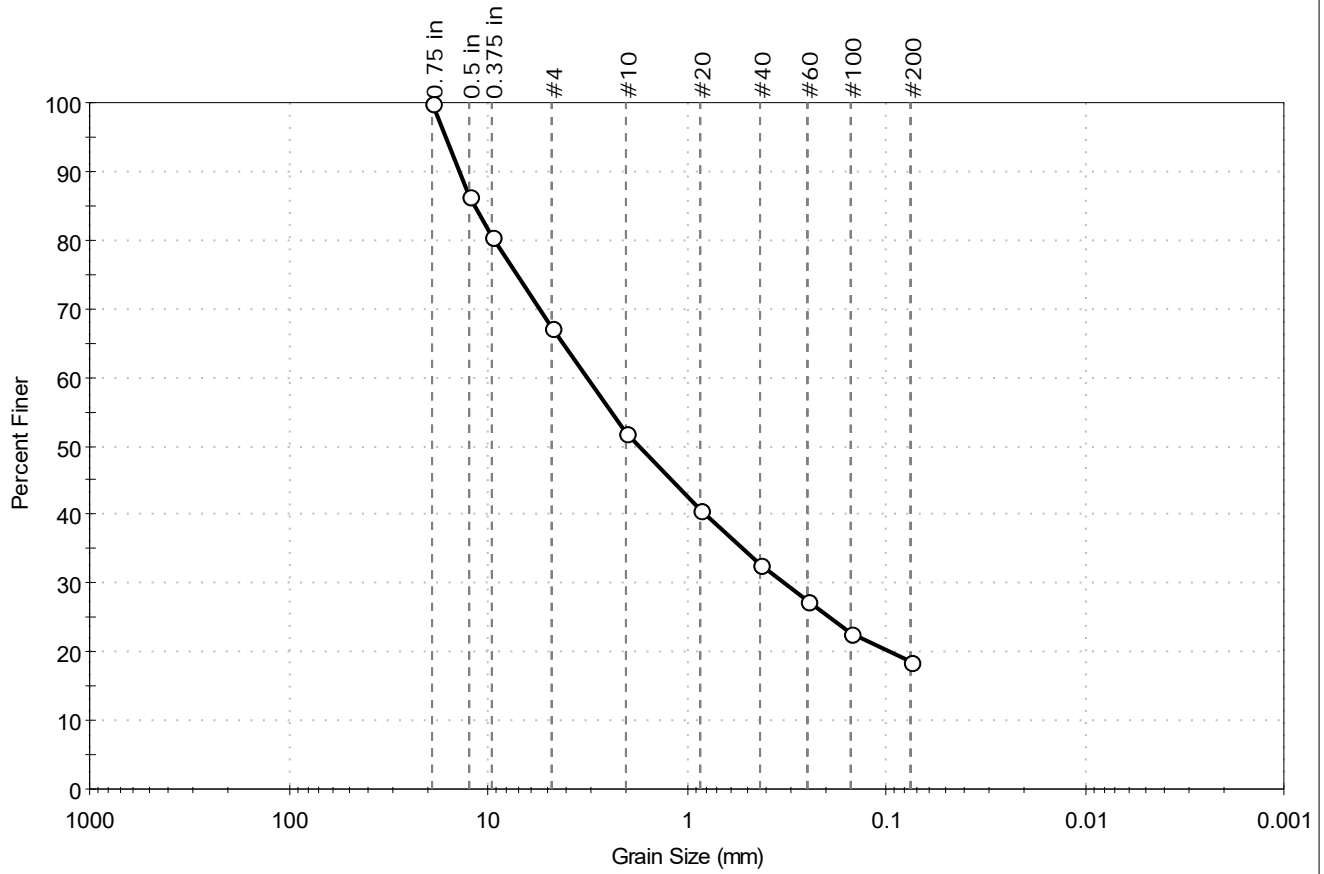
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-308335
Project: NBC Phase III CSO CER	
Location: Pawtucket, RI	
Boring ID: B17-45	Sample Type: jar
Sample ID: S-12 (2 jars)	Test Date: 05/31/19
Depth: 22-24	Test Id: 506000
Test Comment: ---	Tested By: ckg
Visual Description: Moist, yellowish brown silty sand with gravel	Checked By: bfs
Sample Comment: ---	

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	32.7	48.8	18.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	86		
0.375 in	9.50	81		
#4	4.75	67		
#10	2.00	52		
#20	0.85	41		
#40	0.42	33		
#60	0.25	27		
#100	0.15	23		
#200	0.075	18		

<u>Coefficients</u>	
D ₈₅ = 11.6864 mm	D ₃₀ = 0.3230 mm
D ₆₀ = 3.1512 mm	D ₁₅ = N/A
D ₅₀ = 1.7279 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

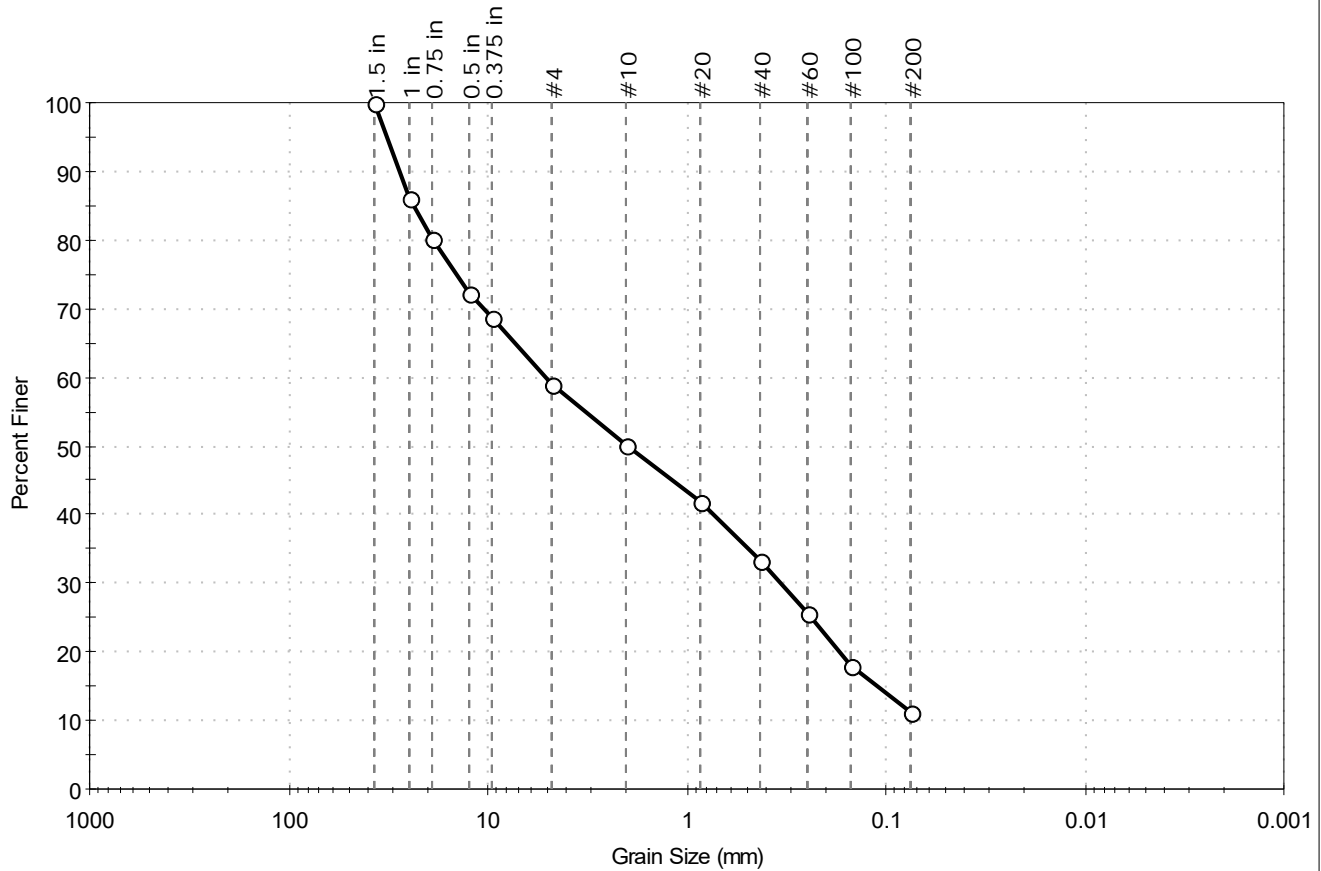
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-308335	
Project: NBC Phase III CSO CER		
Location: Pawtucket, RI	Sample Type: jar	Tested By: ckg
Boring ID: B17-46A	Test Date: 05/31/19	Checked By: bfs
Sample ID: S-4	Test Id: 506001	
Depth: 11-13		
Test Comment: ---		
Visual Description: Moist, yellowish brown sand with silt and gravel		
Sample Comment: ---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	41.0	47.9	11.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	86		
0.75 in	19.00	80		
0.5 in	12.50	72		
0.375 in	9.50	69		
#4	4.75	59		
#10	2.00	50		
#20	0.85	42		
#40	0.42	33		
#60	0.25	26		
#100	0.15	18		
#200	0.075	11		

<u>Coefficients</u>	
D ₈₅ = 23.7257 mm	D ₃₀ = 0.3383 mm
D ₆₀ = 5.0952 mm	D ₁₅ = 0.1108 mm
D ₅₀ = 1.9779 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

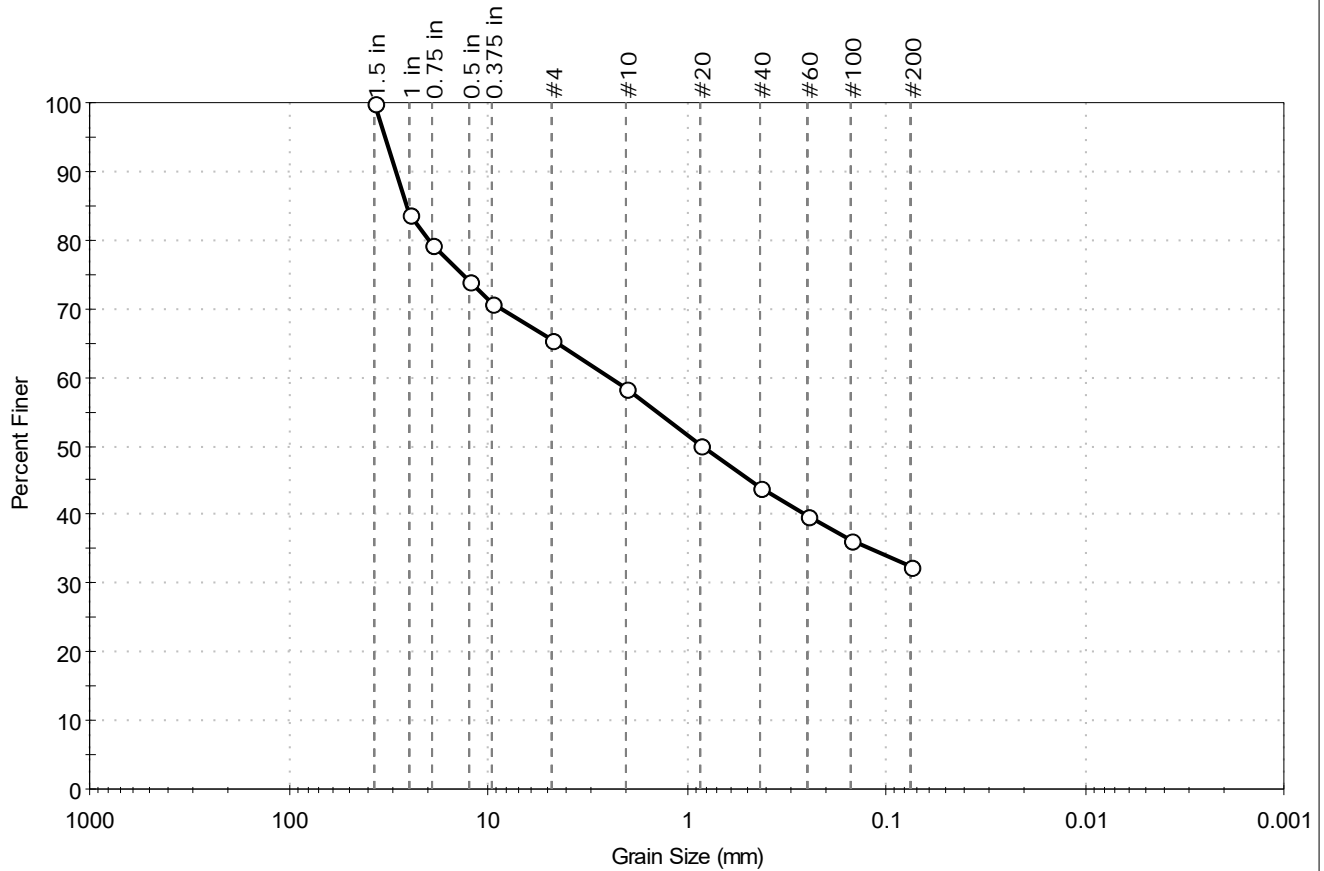
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III CSO CER		
Location:	Pawtucket, RI	Project No:	GTX-308335
Boring ID:	B17-46A	Sample Type:	jar
Sample ID:	S-7 (2 jars)	Test Date:	05/31/19
Depth :	17-19	Test Id:	506002
Test Comment:	---		
Visual Description:	Moist, yellowish brown silty gravel with sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	34.6	32.9	32.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	84		
0.75 in	19.00	79		
0.5 in	12.50	74		
0.375 in	9.50	71		
#4	4.75	65		
#10	2.00	58		
#20	0.85	50		
#40	0.42	44		
#60	0.25	40		
#100	0.15	36		
#200	0.075	33		

<u>Coefficients</u>	
D ₈₅ = 25.8103 mm	D ₃₀ = N/A
D ₆₀ = 2.4632 mm	D ₁₅ = N/A
D ₅₀ = 0.8247 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Gravel and Sand (A-2-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD

Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI		
Boring ID: B17-8	Sample Type: cylinder	Tested By: smd
Sample ID: ---	Test Date: 06/22/18	Checked By: jsc
Depth : 28.0-28.8 ft	Test Id: 459781	
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm) psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-45	28.52-28.61 ft	2.40	1.02	288	3.11	1.76	*	0.952	*	19	*



 <p>Before</p>	 <p>After</p>	<p>Discontinuity Failure * Invalid Test - Specimen did not fail from point to point.</p>
--	--	--

- Notes:
- Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.
 - The reported thickness (L) is the average of three measurements.
 - The reported diameter(D) is the average of three measurements.
 - De = the equivalent core diameter
 - Is = the uncorrected point load strength index
 - F = the size correction factor
 - Is(50) = the size corrected point load strength index

Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI	Boring ID: B17-8	Sample Type: cylinder
	Sample ID: ---	Test Date: 06/22/18
	Depth : 35.7-36.8 ft	Test Id: 459813
Test Comment: ---	Tested By: smd	
Visual Description: ---	Checked By: jsc	
Sample Comment: ---		

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm) psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-46	35.73-35.82 ft	2.40	1.01	3,154	3.08	1.75	*	0.949	*	18	*



 <p>Before</p>	 <p>After</p>	<p>Discontinuity Failure * Invalid Test - Specimen did not fail from point to point.</p>
--	--	--

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.
 The reported thickness (L) is the average of three measurements.
 The reported diameter(D) is the average of three measurements.
 De = the equivalent core diameter
 Is = the uncorrected point load strength index
 F = the size correction factor
 Is(50) = the size corrected point load strength index

Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow	Tested By: smd	
Location: Pawtucket, RI	Sample Type: cylinder	Checked By: jsc
Boring ID: B17-8	Test Date: 06/22/18	Test Id: 459782
Sample ID: ---	Depth : 35.7-36.8 ft	
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm) psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-47	35.83-36.92 ft	2.40	1.00	2,887	3.06	1.75	944	0.948	895	18	17,000

 <p>Before</p>	 <p>After</p>	<p>Discontinuity Failure</p>
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- Notes:
- Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.
 - The reported thickness (L) is the average of three measurements.
 - The reported diameter(D) is the average of three measurements.
 - De = the equivalent core diameter
 - Is = the uncorrected point load strength index
 - F = the size correction factor
 - Is(50) = the size corrected point load strength index

Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI	Sample Type: cylinder	Tested By: tlm
Boring ID: B17-39	Test Date: 09/16/19	Checked By: smd
Sample ID: ---	Test Id: 519883	
Depth : 39.3-40.8		
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
40.02 - 40.12 ft	ST-68	1.13	2.41	0.47	871	204	3



Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.



The reported diameter(D) is the average of three measurements.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
(See attached photographs)

Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow	Tested By: tlm	
Location: Pawtucket, RI	Sample Type: tube	Checked By: smd
Boring ID: B17-45	Test Date: 06/07/19	Test Id: 506047
Sample ID: ---	Depth : 29-29.4	
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm) psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-319	29.0 - 29.4 ft	1.99	1.08	866	2.74	1.66	316	0.925	292	19	6,000



 <p>Before</p>	 <p>After</p>	<p>Intact material and Discontinuity Failure</p>
--	--	--

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.
 The reported thickness (L) is the average of three measurements.
 The reported diameter(D) is the average of three measurements.
 De = the equivalent core diameter
 Is = the uncorrected point load strength index
 F = the size correction factor
 Is(50) = the size corrected point load strength index

Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI	Boring ID: B17-45	Sample Type: tube
	Sample ID: ---	Test Date: 06/07/19
	Depth : 29.4-30	Test Id: 506048
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm) psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-320	29.81 - 29.89 ft	1.99	1.01	1,097	2.54	1.60	431	0.910	392	18	7,760



 <p>Before</p>	 <p>After</p>	<p>Intact material and Discontinuity Failure</p>
--	--	--

- Notes:
- Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.
 - The reported thickness (L) is the average of three measurements.
 - The reported diameter(D) is the average of three measurements.
 - De = the equivalent core diameter
 - Is = the uncorrected point load strength index
 - F = the size correction factor
 - Is(50) = the size corrected point load strength index

Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI	Boring ID: B17-45	Sample Type: tube
	Sample ID: ---	Test Date: 06/07/19
	Depth : 42.4-43.4	Test Id: 506049
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm) psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-321	42.83 - 42.92 ft	1.99	1.08	461	2.74	1.66	168	0.925	155	19	3,190


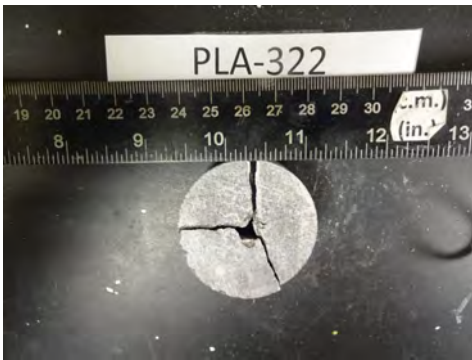
 <p>Before</p>	 <p>After</p>	<p>Intact material and Discontinuity Failure</p>
--	--	--

- Notes:
- Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.
 - The reported thickness (L) is the average of three measurements.
 - The reported diameter(D) is the average of three measurements.
 - De = the equivalent core diameter
 - Is = the uncorrected point load strength index
 - F = the size correction factor
 - Is(50) = the size corrected point load strength index

Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI	Boring ID: B17-45	Sample Type: tube
	Sample ID: ---	Test Date: 06/07/19
	Depth : 42.4-43.4	Test Id: 506076
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm) psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-322	42.93 - 43.01 ft	1.99	1.03	3,138	2.62	1.62	1199	0.915	1098	19	22,800

 <p>PLA-322</p> <p>Before</p>	 <p>PLA-322</p> <p>After</p>	<p>Intact Material Failure</p>
---	---	--------------------------------

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

Is(50) = the size corrected point load strength index



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	---	Sample Type:	---
Sample ID:	---	Test Date:	06/29/18
Depth :	---	Tested By:	pas
		Checked By:	jsc
		Test Id:	459770

**Bulk Density and Compressive Strength
of Rock Core Specimens by ASTM D7012 Method C**

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
B17-8	---	28.07-28.51ft	176	3511	2	Yes	---
B17-8	---	77.90-78.34ft	172	8759	2	Yes	---
B17-8	---	104.90-105.32 ft	168	15603	1	Yes	---
B17-8	---	132.01-132.43 ft	171	12909	1	Yes	---
B17-8	---	151.31-151.74 ft	170	2500	2	Yes	---
B17-8	---	159.45-159.88 ft	169	10800	1	Yes	---
B17-8	---	174.11-174.55 ft	170	3947	2	Yes	---

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.
 All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.
 The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
 (See attached photographs)

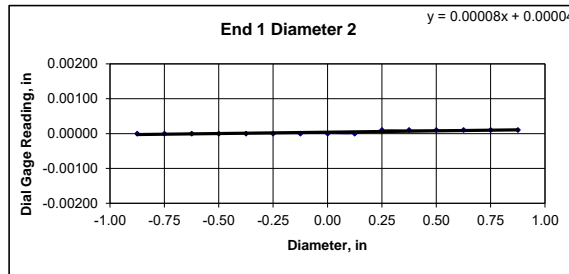
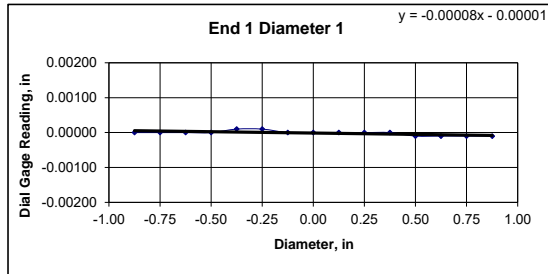


Client:	Pare Corpoartion	Test Date:	6/26/2018
Project Name:	NBC Phase III- Sewer Overflow	Tested By:	meo/trm
Project Location:	Pawtucket, RI	Checked By:	jsc
GTX #:	307508		
Boring ID:	B17-8		
Sample ID:	---		
Depth:	28.07-28.51 ft		
Visual Description:	See photographs		

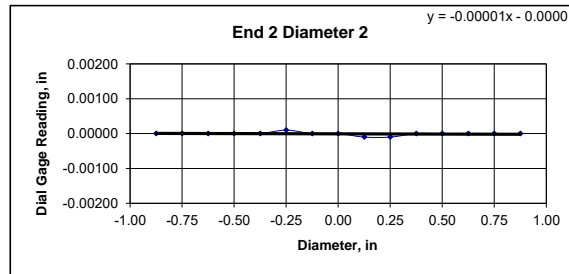
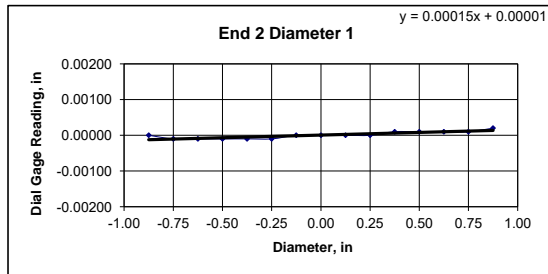
UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY				DEVIATION FROM STRAIGHTNESS (Procedure S1)			
	1	2	Average	Maximum gap between side of core and reference surface plate: Is the maximum gap \leq 0.02 in.? YES			
Specimen Length, in:	4.75	4.75	4.75	Maximum difference must be < 0.020 in.			
Specimen Diameter, in:	2.40	2.40	2.40	Straightness Tolerance Met? YES			
Specimen Mass, g:	993.22						
Bulk Density, lb/ft ³ :	176						
Length to Diameter Ratio:	2.0	Minimum Diameter Tolerance Met? YES	Length to Diameter Ratio Tolerance Met? YES				

END FLATNESS AND PARALLELISM (Procedure FP1)															
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00010	-0.00010
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
	Difference between max and min readings, in: 0° = 0.00020 90° = 0.00010														
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00000	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010	0.00010	0.00020
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000
	Difference between max and min readings, in: 0° = 0.0003 90° = 0.0002 Maximum difference must be < 0.0020 in. Difference = \pm 0.00015														
	Flatness Tolerance Met? YES														



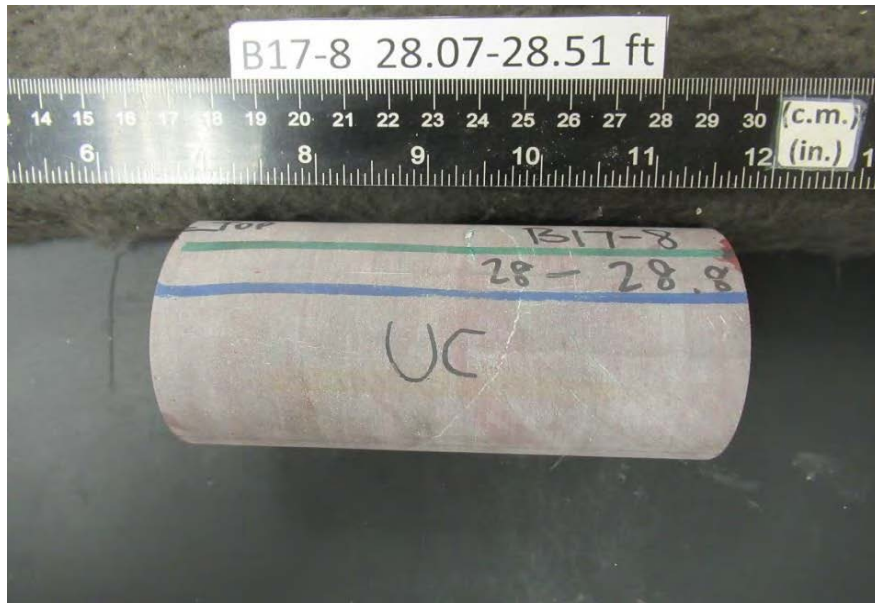
DIAMETER 1	
End 1:	Slope of Best Fit Line: 0.00008 Angle of Best Fit Line: 0.00442
End 2:	Slope of Best Fit Line: 0.00015 Angle of Best Fit Line: 0.00851
Maximum Angular Difference:	0.00409
Parallelism Tolerance Met? Spherically Seated	YES



DIAMETER 2	
End 1:	Slope of Best Fit Line: 0.00008 Angle of Best Fit Line: 0.00442
End 2:	Slope of Best Fit Line: 0.00001 Angle of Best Fit Line: 0.00082
Maximum Angular Difference:	0.00360
Parallelism Tolerance Met? Spherically Seated	YES

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						Maximum angle of departure must be \leq 0.25°	
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?		
Diameter 1, in	0.00020	2.400	0.00008	0.005	YES		
Diameter 2, in (rotated 90°)	0.00010	2.400	0.00004	0.002	YES	Perpendicularity Tolerance Met? YES	
END 2							
Diameter 1, in	0.00030	2.400	0.00013	0.007	YES		
Diameter 2, in (rotated 90°)	0.00020	2.400	0.00008	0.005	YES		

Client:	Pare Corpoartion
Project Name:	NBC Phase III- Sewer Overflow
Project Location:	Pawtucket, RI
GTX #:	307508
Test Date:	6/26/2018
Tested By:	trm
Checked By:	jsc
Boring ID:	B17-8
Sample ID:	---
Depth, ft:	28.07-28.51



After cutting and grinding



After break



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	---	Sample Type:	---
Sample ID:	---	Test Date:	09/05/19
Depth :	---	Tested By:	tlm
		Checked By:	smd
		Test Id:	519892

**Bulk Density and Compressive Strength
of Rock Core Specimens by ASTM D7012 Method C**

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
B17-39	---	28.0 - 28.45 ft	174	2865	2	Yes	---
B17-39	---	39.56 - 40.01 ft	180	6377	2	Yes	---
B17-39	---	52.0-52.45 ft.	174	4911	1	Yes	---
B17-39	---	69.71 - 70.16 ft	165	7599	2	Yes	---
B17-39	---	94.63 - 95.08 ft	167	5963	2	Yes	---
B17-39	---	111.74 - 112.19 ft	174	9335	3	Yes	---
B17-39	---	137.59 - 138.04 ft	167	13706	3	Yes	---

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.
 All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.
 The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
 (See attached photographs)



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-39	Sample Type:	cylinder
Sample ID:	---	Test Date:	09/05/19
Depth :	167-167.7	Test Id:	519893
Test Comment:	---		
Visual Description:	See photograph(s)		
Sample Comment:	---		

**Bulk Density and Compressive Strength
of Rock Core Specimens by ASTM D7012 Method C**

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
B17-39	---	167.18 - 167.63 ft	169	10824	3	Yes	---

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.
 All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.
 The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
 (See attached photographs)

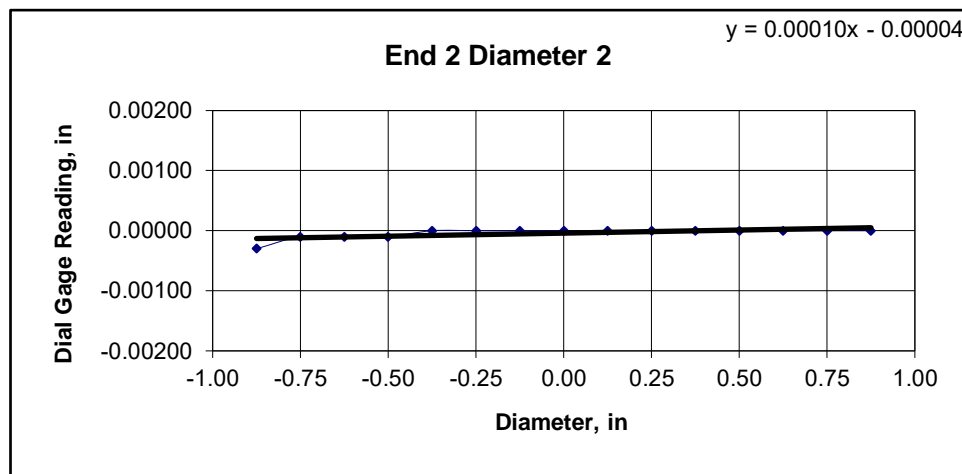
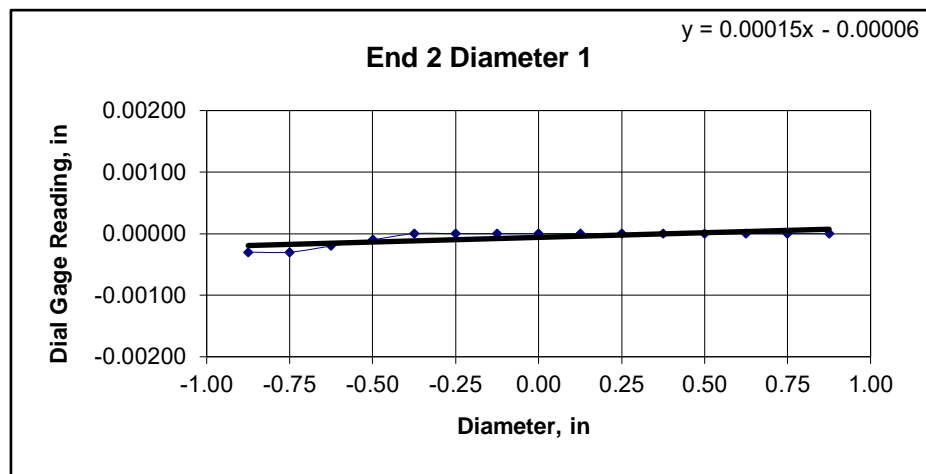
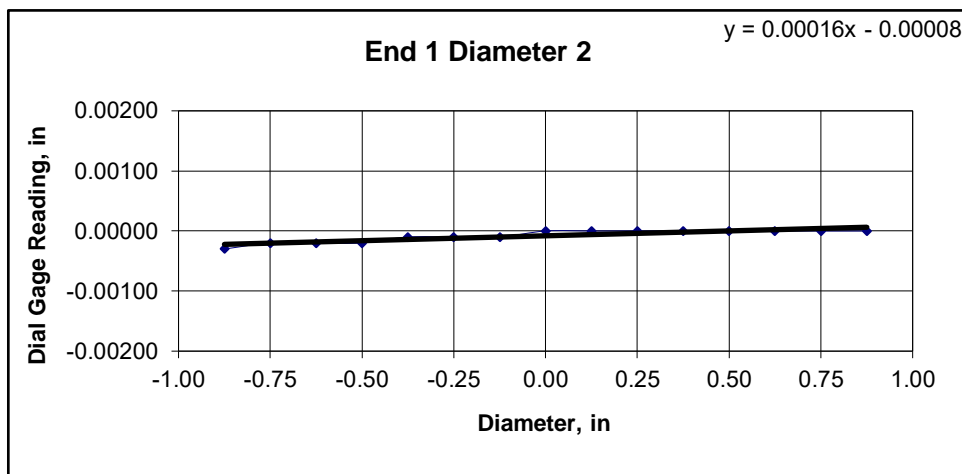
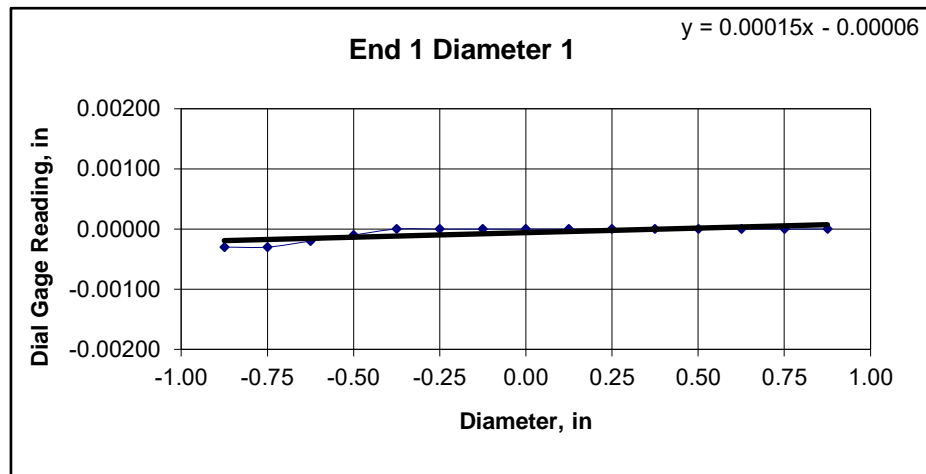


Client:	Pare Corporation	Test Date:	9/4/2019
Project Name:	NBC Phase III -Sewer Overflow	Tested By:	jck
Project Location:	Pawtucket, RI	Checked By:	smd
GTX #:	307508		
Boring ID:	B17-39		
Sample ID:	---		
Depth:	28.0-28.45 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY			DEVIATION FROM STRAIGHTNESS (Procedure S1)		
	1	2	Average	Maximum gap between side of core and reference surface plate: Is the maximum gap \leq 0.02 in.? YES	
Specimen Length, in:	5.33	5.33	5.33	Maximum difference must be < 0.020 in.	
Specimen Diameter, in:	2.40	2.40	2.40	Straightness Tolerance Met? YES	
Specimen Mass, g:	1104.85				
Bulk Density, lb/ft ³ :	174	Minimum Diameter Tolerance Met? YES			
Length to Diameter Ratio:	2.2	Length to Diameter Ratio Tolerance Met? YES			

END FLATNESS AND PARALLELISM (Procedure FP1)															
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00030	-0.00020	-0.00020	-0.00020	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Difference between max and min readings, in: 0° = 0.00030 90° = 0.00030														
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00030	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Difference between max and min readings, in: 0° = 0.0003 90° = 0.0003 Maximum difference must be < 0.0020 in. Difference = \pm 0.00015														
	Flatness Tolerance Met? YES														

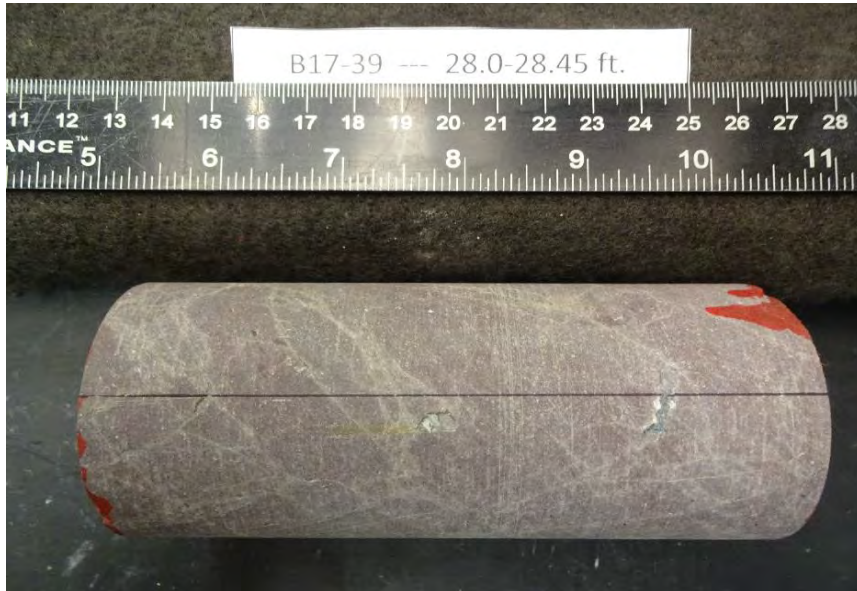


DIAMETER 1	
End 1:	Slope of Best Fit Line: 0.00015 Angle of Best Fit Line: 0.00868
End 2:	Slope of Best Fit Line: 0.00015 Angle of Best Fit Line: 0.00868
Maximum Angular Difference:	0.00000
Parallelism Tolerance Met? YES Spherically Seated	

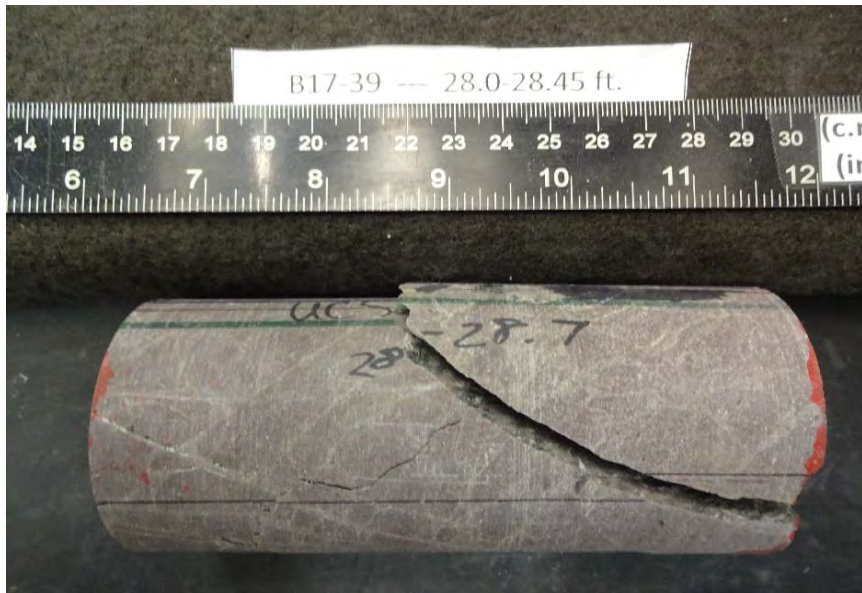
DIAMETER 2	
End 1:	Slope of Best Fit Line: 0.00016 Angle of Best Fit Line: 0.00933
End 2:	Slope of Best Fit Line: 0.00010 Angle of Best Fit Line: 0.00589
Maximum Angular Difference:	0.00344
Parallelism Tolerance Met? YES Spherically Seated	

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						Maximum angle of departure must be \leq 0.25°
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?	
Diameter 1, in	0.00030	2.400	0.00013	0.007	YES	
Diameter 2, in (rotated 90°)	0.00030	2.400	0.00013	0.007	YES	Perpendicularity Tolerance Met? YES
END 2						
Diameter 1, in	0.00030	2.400	0.00013	0.007	YES	
Diameter 2, in (rotated 90°)	0.00030	2.400	0.00013	0.007	YES	

Client:	Pare Corporation
Project Name:	NBC Phase III -Sewer Overflow
Project Location:	Pawtucket, RI
GTX #:	307508
Test Date:	9/4/2019
Tested By:	jck
Checked By:	smd
Boring ID:	B17-39
Sample ID:	---
Depth, ft:	28.0-28.45



After cutting and grinding



After break

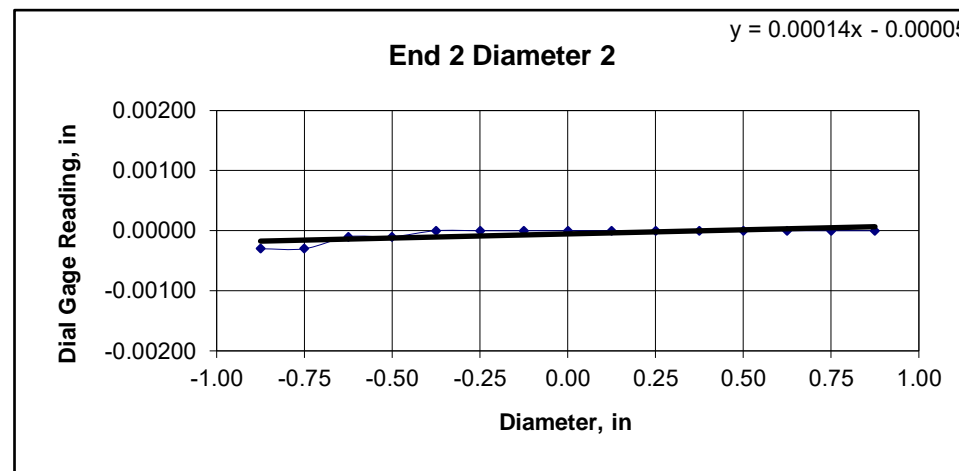
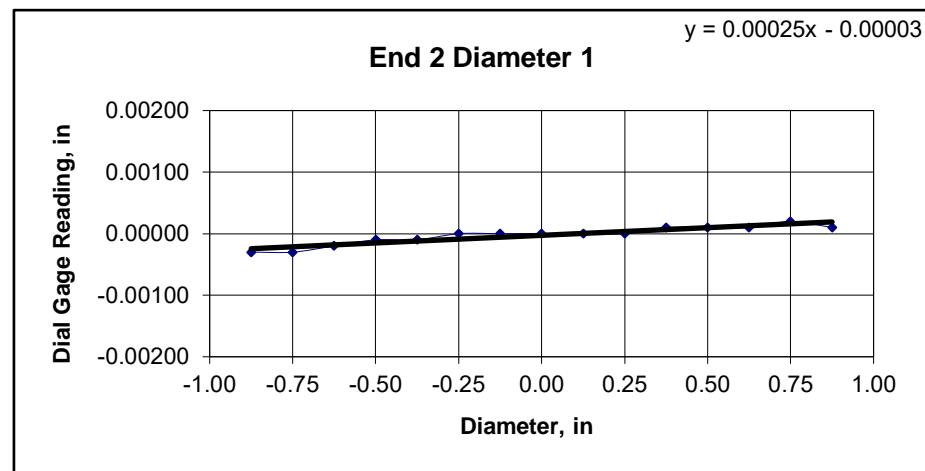
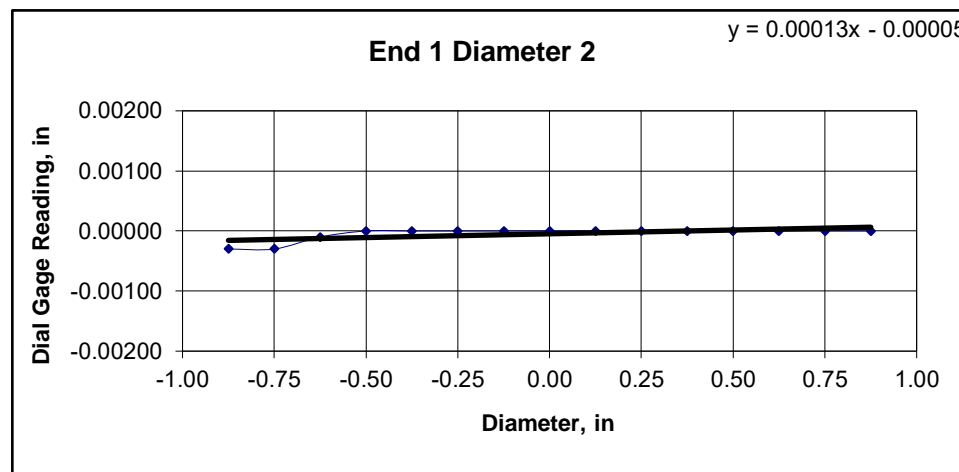
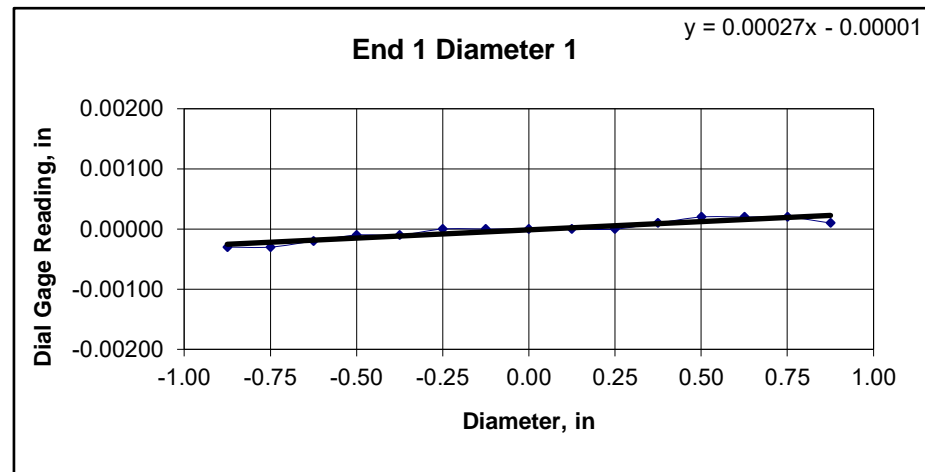


Client:	Pare Corporation	Test Date:	9/4/2019
Project Name:	NBC Phase III -Sewer Overflow	Tested By:	jck
Project Location:	Pawtucket, RI	Checked By:	smd
GTX #:	307508		
Boring ID:	B17-39		
Sample ID:	---		
Depth:	39.56-40.01 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY				DEVIATION FROM STRAIGHTNESS (Procedure S1)			
	1	2	Average	Maximum gap between side of core and reference surface plate:			
Specimen Length, in:	5.45	5.45	5.45	Is the maximum gap \leq 0.02 in.? YES			
Specimen Diameter, in:	2.40	2.41	2.41	Maximum difference must be $<$ 0.020 in.			
Specimen Mass, g:	1169.39			Straightness Tolerance Met? YES			
Bulk Density, lb/ft ³ :	180						
Length to Diameter Ratio:	2.3						
		Minimum Diameter Tolerance Met?	YES				
		Length to Diameter Ratio Tolerance Met?	YES				

END FLATNESS AND PARALLELISM (Procedure FP1)															
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00030	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00020	0.00020	0.00020	0.00010
Diameter 2, in (rotated 90°)	-0.00030	-0.00030	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Difference between max and min readings, in:														
	0° = 0.00050							90° = 0.00030							
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00030	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010	0.00020	0.00010
Diameter 2, in (rotated 90°)	-0.00030	-0.00030	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Difference between max and min readings, in:														
	0° = 0.0005							90° = 0.0003							
	Maximum difference must be $<$ 0.0020 in. Difference = \pm 0.00025														
	Flatness Tolerance Met? YES														

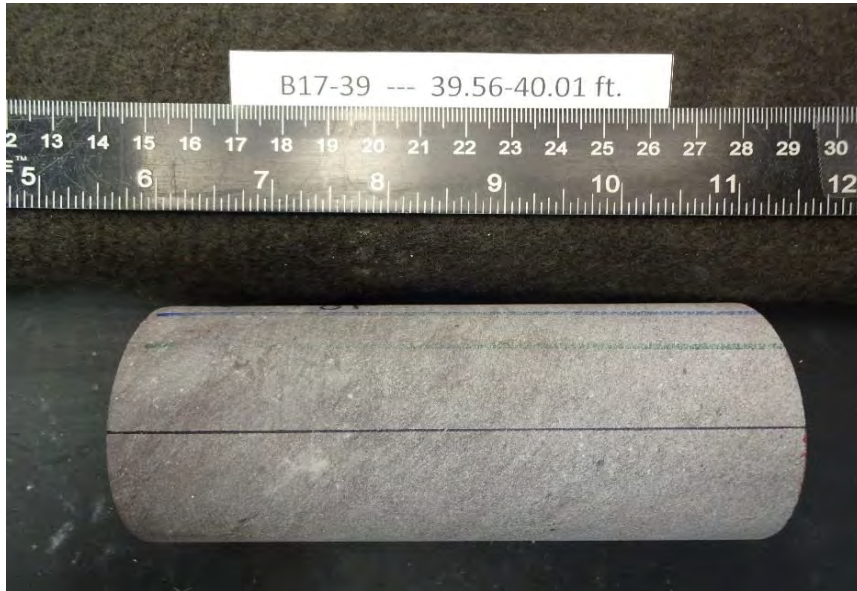


DIAMETER 1	
End 1:	
Slope of Best Fit Line:	0.00027
Angle of Best Fit Line:	0.01572
End 2:	
Slope of Best Fit Line:	0.00025
Angle of Best Fit Line:	0.01424
Maximum Angular Difference:	0.00147
Parallelism Tolerance Met? Spherically Seated	YES

DIAMETER 2	
End 1:	
Slope of Best Fit Line:	0.00013
Angle of Best Fit Line:	0.00720
End 2:	
Slope of Best Fit Line:	0.00014
Angle of Best Fit Line:	0.00786
Maximum Angular Difference:	0.00065
Parallelism Tolerance Met? Spherically Seated	YES

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						Maximum angle of departure must be \leq 0.25°	
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?		
Diameter 1, in	0.00050	2.405	0.00021	0.012	YES		
Diameter 2, in (rotated 90°)	0.00030	2.405	0.00012	0.007	YES	Perpendicularity Tolerance Met? YES	
END 2							
Diameter 1, in	0.00050	2.405	0.00021	0.012	YES		
Diameter 2, in (rotated 90°)	0.00030	2.405	0.00012	0.007	YES		

Client:	Pare Corporation
Project Name:	NBC Phase III -Sewer Overflow
Project Location:	Pawtucket, RI
GTX #:	307508
Test Date:	9/4/2019
Tested By:	jck
Checked By:	smd
Boring ID:	B17-39
Sample ID:	---
Depth, ft:	39.56-40.01



After cutting and grinding



After break



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	---	Sample Type:	---
Sample ID:	---	Test Date:	06/12/19
Depth :	---	Tested By:	tlm
		Checked By:	smd
		Test Id:	506118

**Bulk Density and Compressive Strength
of Rock Core Specimens by ASTM D7012 Method C**

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
B17-45	---	30.37 - 30.73 ft	173	4565	2	Yes	---
B17-45	---	42.49 - 42.82 ft	172	5692	1	Yes	---

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.
 All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.
 The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
 (See attached photographs)

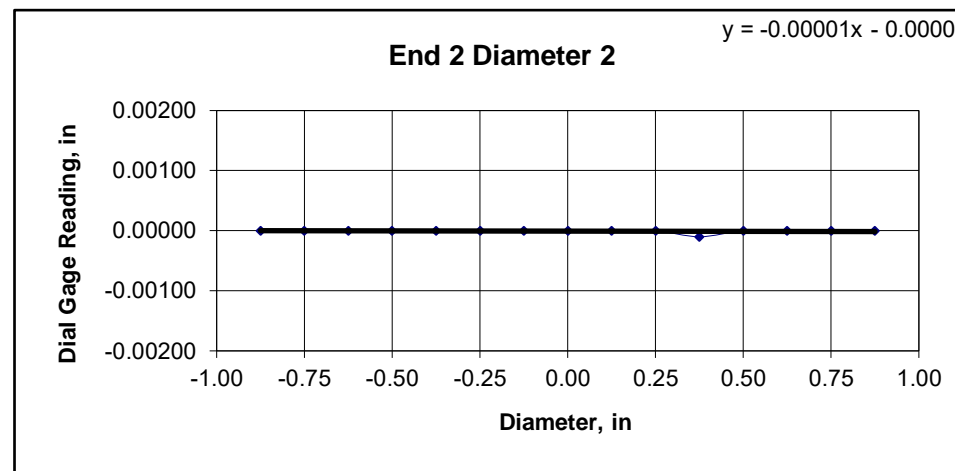
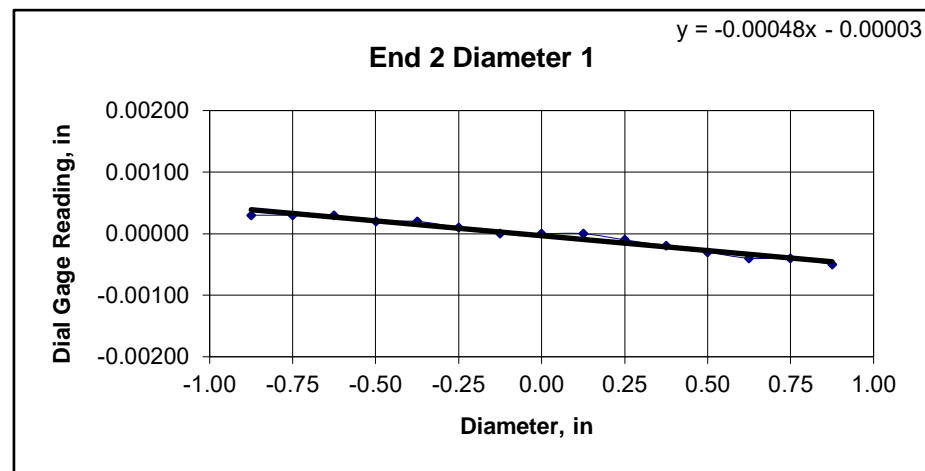
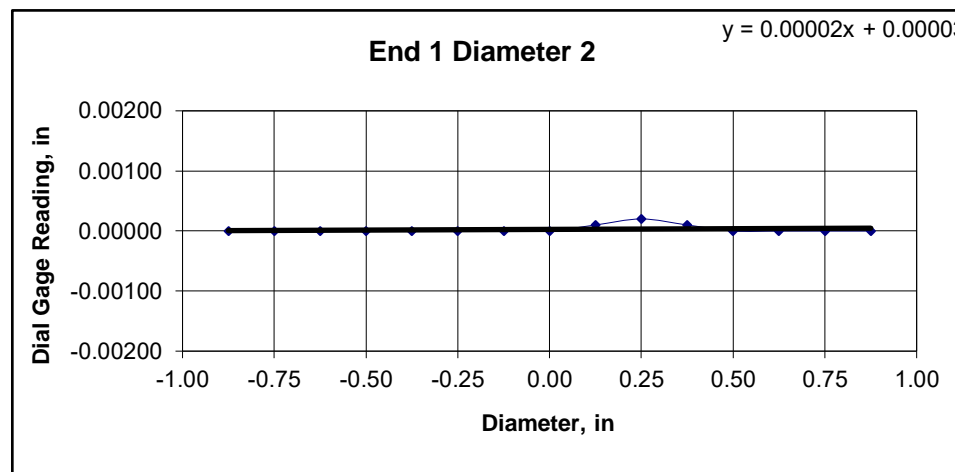
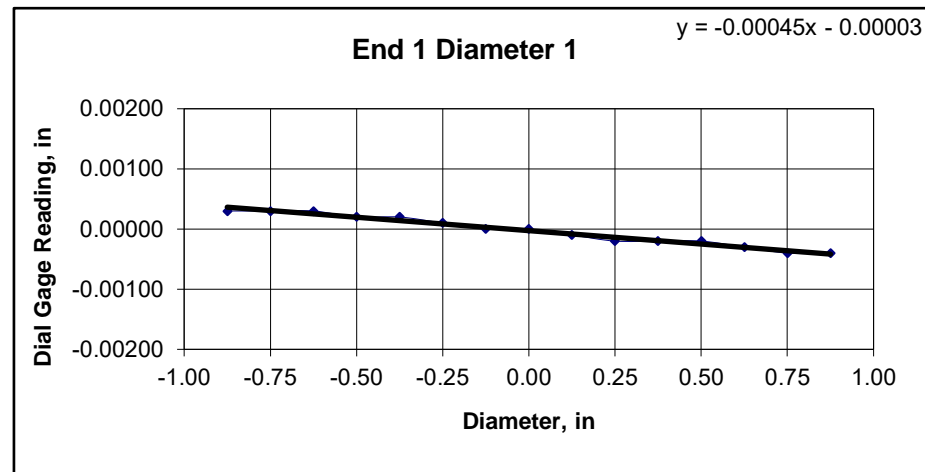


Client:	Pare Corporation	Test Date:	6/19/2019
Project Name:	NBC Phase III -Sewer Overflow	Tested By:	jck
Project Location:	Pawtucket, RI	Checked By:	jsc
GTX #:	307508		
Boring ID:	B17-45		
Sample ID:	---		
Depth:	30.37-30.73 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY				DEVIATION FROM STRAIGHTNESS (Procedure S1)			
	1	2	Average	Maximum gap between side of core and reference surface plate:			
Specimen Length, in:	3.97	3.96	3.97	Is the maximum gap \leq 0.02 in.? YES			
Specimen Diameter, in:	1.98	1.99	1.99	Maximum difference must be $<$ 0.020 in.			
Specimen Mass, g:	556.89			Straightness Tolerance Met? YES			
Bulk Density, lb/ft ³ :	173						
Length to Diameter Ratio:	2.0						
		Minimum Diameter Tolerance Met? YES					
		Length to Diameter Ratio Tolerance Met? YES					

END FLATNESS AND PARALLELISM (Procedure FP1)															
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00030	0.00030	0.00030	0.00020	0.00020	0.00010	0.00000	0.00000	-0.00010	-0.00020	-0.00020	-0.00020	-0.00030	-0.00040	-0.00040
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00020	0.00010	0.00000	0.00000	0.00000	0.00000
	Difference between max and min readings, in:														
	0° = 0.00070							90° = 0.00020							
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00030	0.00030	0.00030	0.00020	0.00020	0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00030	-0.00040	-0.00040	-0.00050
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	0.00000	0.00000	0.00000	0.00000
	Difference between max and min readings, in:														
	0° = 0.0008							90° = 0.0001							
	Maximum difference must be $<$ 0.0020 in. Difference = \pm 0.00040														
															Flatness Tolerance Met? YES

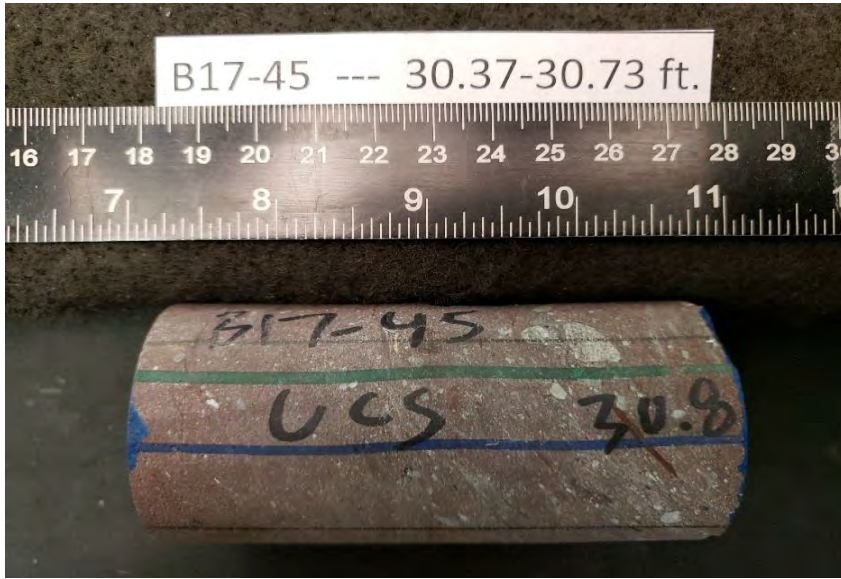


DIAMETER 1	
End 1:	
Slope of Best Fit Line:	0.00045
Angle of Best Fit Line:	0.02554
End 2:	
Slope of Best Fit Line:	0.00048
Angle of Best Fit Line:	0.02767
Maximum Angular Difference:	0.00213
Parallelism Tolerance Met? YES	
Spherically Seated	

DIAMETER 2	
End 1:	
Slope of Best Fit Line:	0.00002
Angle of Best Fit Line:	0.00131
End 2:	
Slope of Best Fit Line:	0.00001
Angle of Best Fit Line:	0.00049
Maximum Angular Difference:	0.00082
Parallelism Tolerance Met? YES	
Spherically Seated	

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						Maximum angle of departure must be \leq 0.25°	
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?		
Diameter 1, in	0.00070	1.985	0.00035	0.020	YES		
Diameter 2, in (rotated 90°)	0.00020	1.985	0.00010	0.006	YES		
						Perpendicularity Tolerance Met? YES	
END 2							
Diameter 1, in	0.00080	1.985	0.00040	0.023	YES		
Diameter 2, in (rotated 90°)	0.00010	1.985	0.00005	0.003	YES		

Client:	Pare Corporation
Project Name:	NBC Phase III -Sewer Overflow
Project Location:	Pawtucket, RI
GTX #:	307508
Test Date:	6/18/2019
Tested By:	jck
Checked By:	jsc
Boring ID:	B17-45
Sample ID:	---
Depth, ft:	30.37-30.73



After cutting and grinding



After break

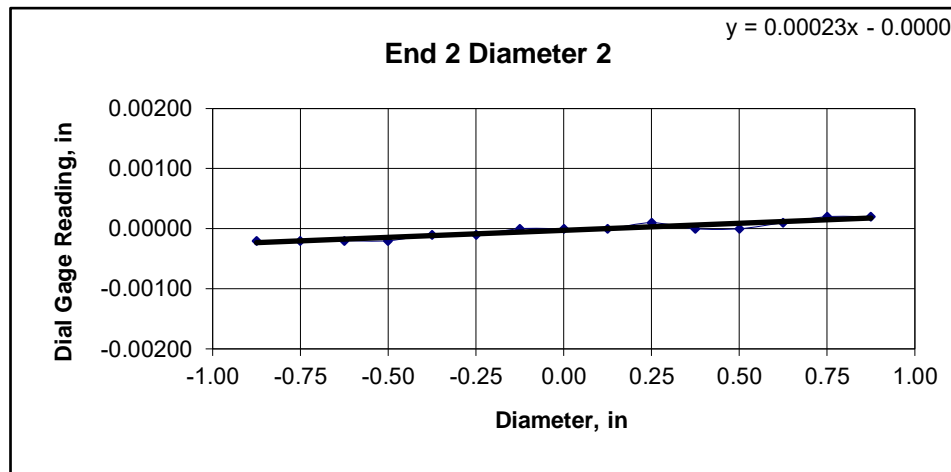
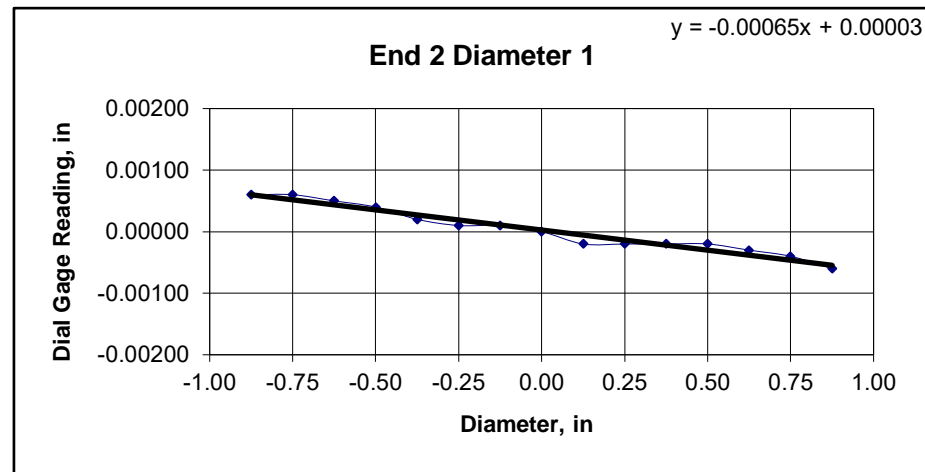
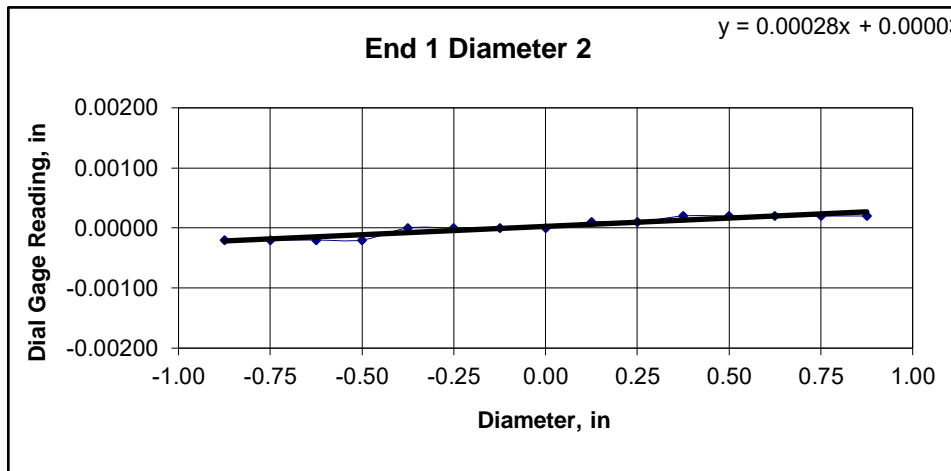
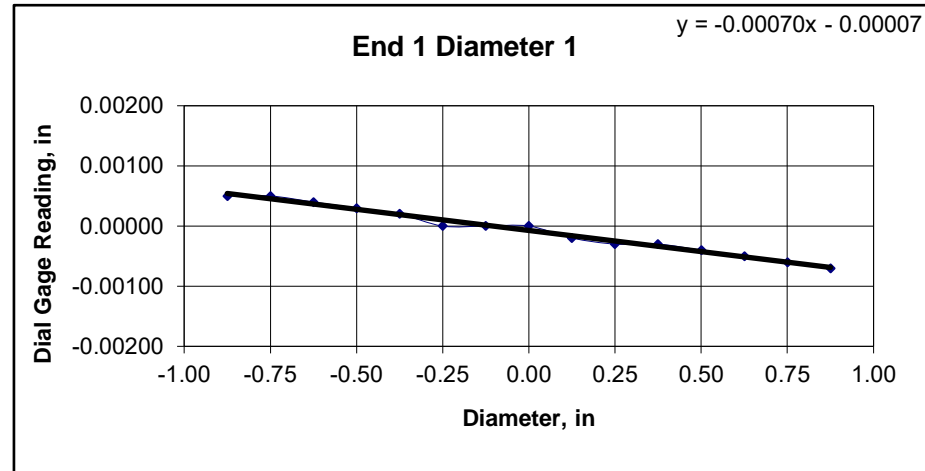


Client:	Pare Corporation	Test Date:	6/6/2019
Project Name:	NBC Phase III -Sewer Overflow	Tested By:	cmh
Project Location:	Pawtucket, RI	Checked By:	jsc
GTX #:	307508		
Boring ID:	B17-45		
Sample ID:	---		
Depth:	42.49-42.82 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY				DEVIATION FROM STRAIGHTNESS (Procedure S1)			
	1	2	Average	Maximum gap between side of core and reference surface plate:			
Specimen Length, in:	3.91	3.91	3.91	Is the maximum gap \leq 0.02 in.? YES			
Specimen Diameter, in:	1.98	1.98	1.98	<i>Maximum difference must be < 0.020 in.</i>			
Specimen Mass, g:	546.03			Straightness Tolerance Met? YES			
Bulk Density, lb/ft ³ :	172						
Length to Diameter Ratio:	2.0						
		Minimum Diameter Tolerance Met?	YES				
		Length to Diameter Ratio Tolerance Met?	YES				

END FLATNESS AND PARALLELISM (Procedure FP1)															
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00050	0.00050	0.00040	0.00030	0.00020	0.00000	0.00000	0.00000	-0.00020	-0.00030	-0.00030	-0.00040	-0.00050	-0.00060	-0.00070
Diameter 2, in (rotated 90°)	-0.00020	-0.00020	-0.00020	-0.00020	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00020	0.00020	0.00020	0.00020	0.00020
	Difference between max and min readings, in:														
	0° = 0.00120							90° = 0.00040							
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00060	0.00060	0.00050	0.00040	0.00020	0.00010	0.00010	0.00000	-0.00020	-0.00020	-0.00020	-0.00020	-0.00030	-0.00040	-0.00060
Diameter 2, in (rotated 90°)	-0.00020	-0.00020	-0.00020	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00010	0.00000	0.00000	0.00010	0.00020	0.00020
	Difference between max and min readings, in:														
	0° = 0.0012							90° = 0.0004							
	<i>Maximum difference must be < 0.0020 in.</i>														
															Difference = \pm 0.00060
															Flatness Tolerance Met? YES



DIAMETER 1	
End 1:	
Slope of Best Fit Line:	0.00070
Angle of Best Fit Line:	0.04027
End 2:	
Slope of Best Fit Line:	0.00065
Angle of Best Fit Line:	0.03749
Maximum Angular Difference:	0.00278
Parallelism Tolerance Met? Spherically Seated	YES

DIAMETER 2	
End 1:	
Slope of Best Fit Line:	0.00028
Angle of Best Fit Line:	0.01588
End 2:	
Slope of Best Fit Line:	0.00023
Angle of Best Fit Line:	0.01342
Maximum Angular Difference:	0.00246
Parallelism Tolerance Met? Spherically Seated	YES

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						<i>Maximum angle of departure must be \leq 0.25°</i>
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?	
Diameter 1, in	0.00120	1.980	0.00061	0.035	YES	
Diameter 2, in (rotated 90°)	0.00040	1.980	0.00020	0.012	YES	Perpendicularity Tolerance Met? YES
END 2						
Diameter 1, in	0.00120	1.980	0.00061	0.035	YES	
Diameter 2, in (rotated 90°)	0.00040	1.980	0.00020	0.012	YES	

Client:	Pare Corporation
Project Name:	NBC Phase III -Sewer Overflow
Project Location:	Pawtucket, RI
GTX #:	307508
Test Date:	6/10/2019
Tested By:	jck
Checked By:	jsc
Boring ID:	B17-45
Sample ID:	---
Depth, ft:	42.49-42.82



After cutting and grinding



After break



Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow	Tested By: smd	
Location: Pawtucket, RI	Sample Type: cylinder	Checked By: jsc
Boring ID: B17-8	Test Date: 06/28/18	Test Id: 459777
Sample ID: ---	Depth : 46.6-47.3 ft	
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
47.11-47.20 ft	St-13	1.02	2.40	0.42	5,229	1,370	2



Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
(See attached photographs)

Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI		
Boring ID: B17-39	Sample Type: cylinder	Tested By: tlm
Sample ID: ---	Test Date: 09/16/19	Checked By: smd
Depth : 39.3-40.8	Test Id: 519883	
Test Comment: ---		
Visual Description: ---		
Sample Comment: ---		

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
40.02 - 40.12 ft	ST-68	1.13	2.41	0.47	871	204	3



Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
(See attached photographs)

**SEISMIC REFRACTION SURVEY
NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW PROJECT
PAWTUCKET MAIN TUNNEL SECTION
PAWTUCKET, RHODE ISLAND**

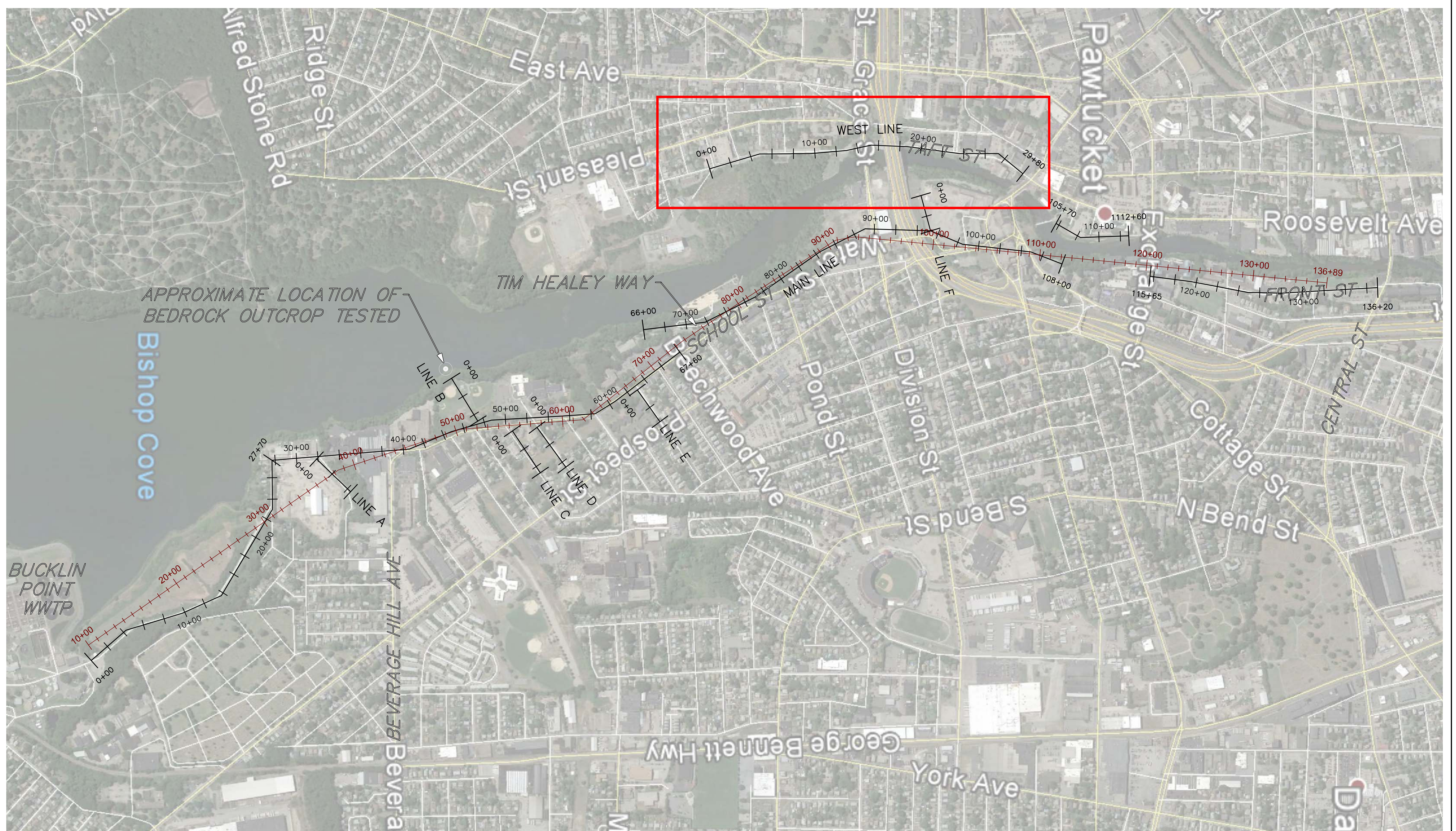
Prepared for:

Stantec
260 West Exchange Street, Suite 001
Providence, Rhode Island 02903

Prepared by:

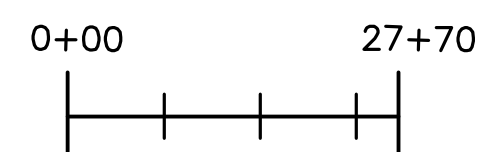
Hager-Richter Geoscience, Inc.
8 Industrial Way - D10
Salem, New Hampshire 03079

File 17J33
November, 2017



APPROXIMATE LOCATION OF BEDROCK OUTCROP TESTED

LEGEND



SEISMIC LINE



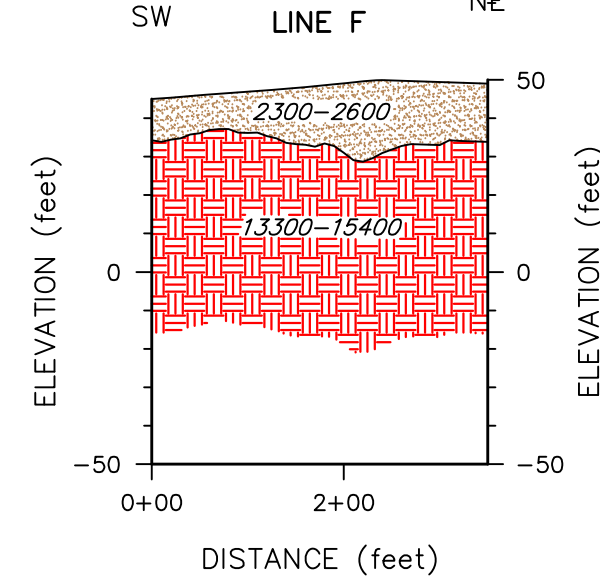
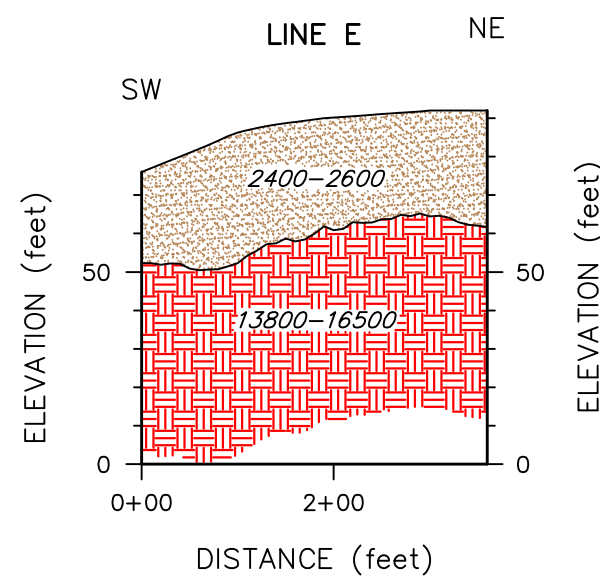
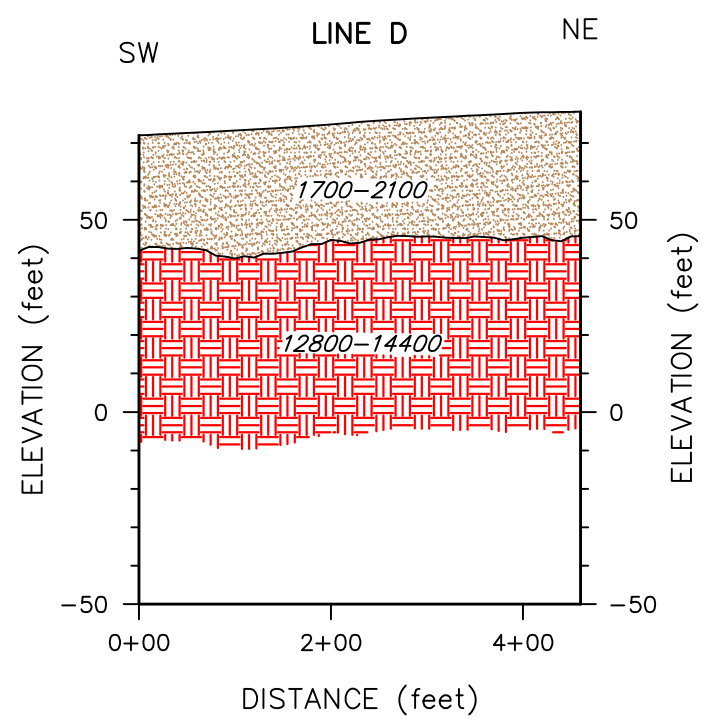
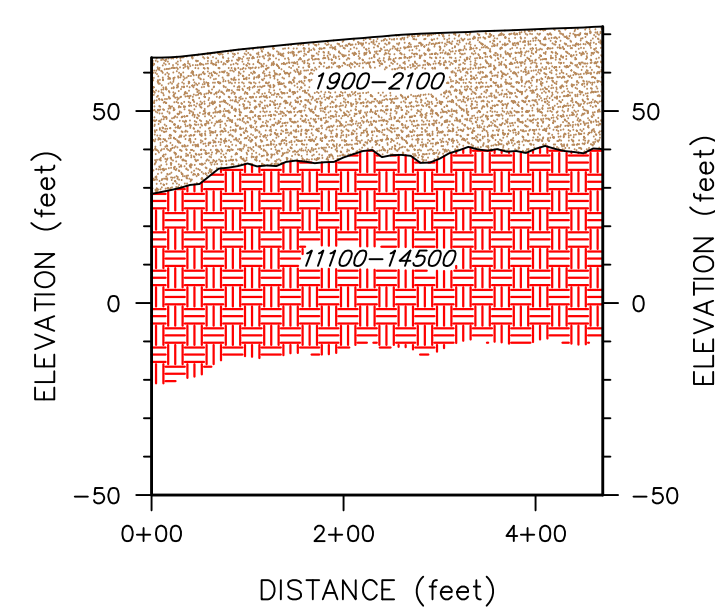
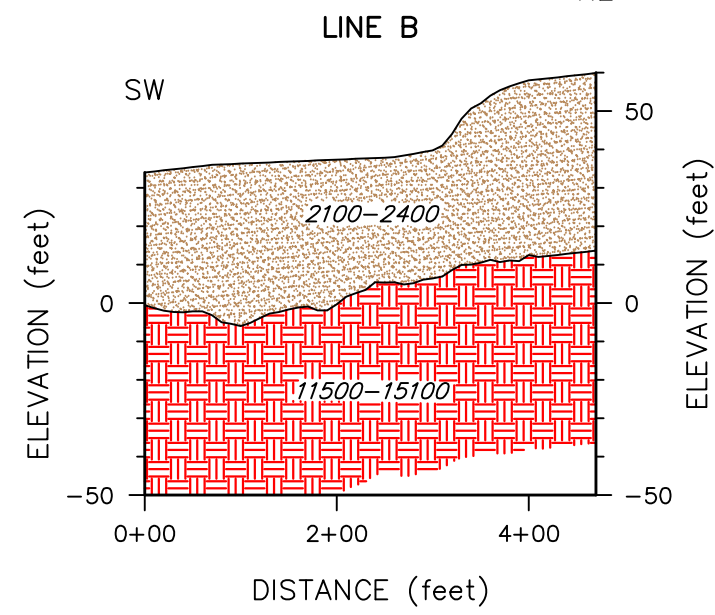
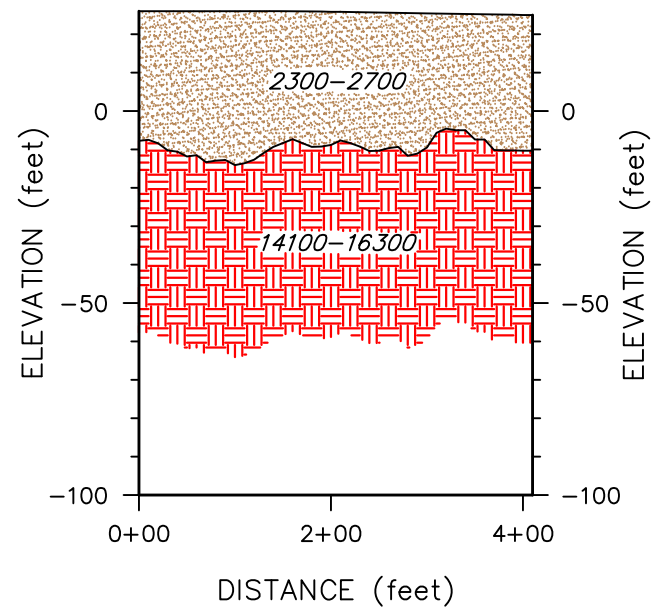
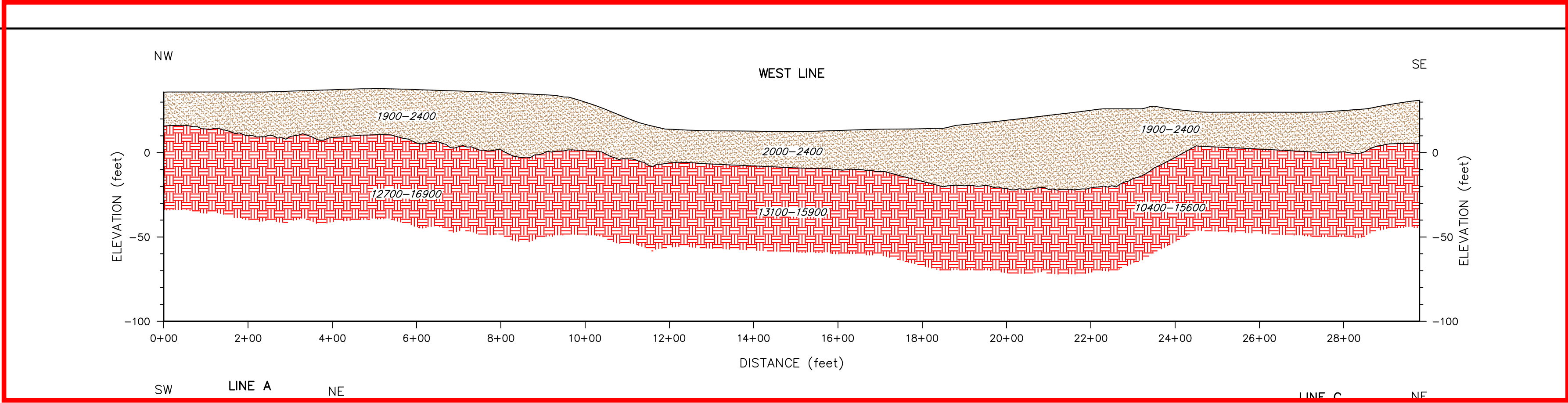
MAIN LINE TUNNEL - ALTERNATIVE SA ALIGNMENT PER STANTEC

NOTE:
Modified from Google Earth Pro aerial photograph.

PLATE 1
SEISMIC LINE LOCATIONS
NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW PROJECT
PAWTUCKET MAIN TUNNEL SECTION
PAWTUCKET, RHODE ISLAND

FILE 17J33 | NOVEMBER, 2017

HAGER-RICHTER
SALEM, NH | FORDS, NJ



NOTES:

1. Estimated accuracy (standard deviation) of depth of bedrock is $\pm 10\%$ or 2 feet, whichever is greater.
2. The depths determined for bedrock are depths of competent rock; weathered and/or fractured bedrock might occur at shallower depths.
3. Surface elevations determined from plans provided by Stantec. Vertical datum is NGVD 1929.
4. Data were analyzed using the Generalized Reciprocal Method.

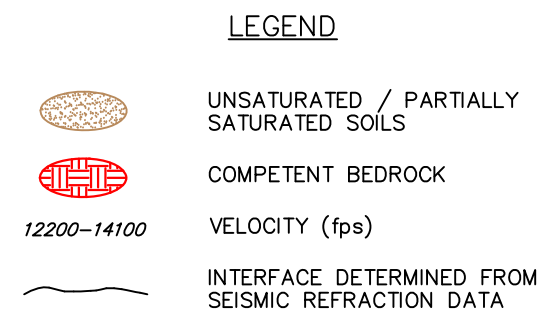
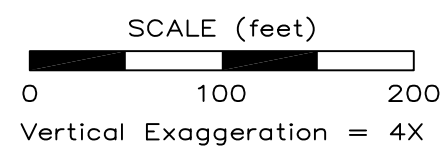


PLATE 3
 SEISMIC PROFILES – WEST LINE &
 CROSS LINES
 NARRAGANSETT BAY COMMISSION
 COMBINED SEWER OVERFLOW PROJECT
 PAWTUCKET MAIN TUNNEL SECTION
 PAWTUCKET, RHODE ISLAND

FILE 17J33 | NOVEMBER, 2017

HAGER-RICHTER
 SALEM, NH | FORDS, NJ

Pawtucket Bridge No. 550

FED. ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	RI	RD-0550(003) RD-0550(004) RD-0550(005)	2010	1	196

INDEX - VOLUME 3 BRIDGE PLANS

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	INDEX OF DRAWINGS
3	STANDARD PLAN SYMBOLS
4-7	BRIDGE GENERAL NOTES SHEET 1 - 4
8	KEY PLAN
9-12	BRIDGE PHASE CONSTRUCTION PLAN SHEET 1 - 4
13-22	BRIDGE PHASE CONSTRUCTION SECTIONS SHEET 1-10
23-24	WSE WRAP FACE RETAINING WALLS SHEET 1-2
25-32	DEMOLITION PLAN SHEET 1 - 8
33	PRECAST CONC. BARRIER
	LIGHT STD. BARRIER
34	FOUNDATIONS FOR OVERHEAD SIGNS
35	TRANSITION BARRIER DETAILS
36-37	SITE AND SUBSURFACE EXPLORATION
	LOCATION PLAN SHEET 1 - 2
38-40	TEST BORINGS B1 - B31
60-61	INSTRUMENTATION LOCATION PLAN SHEET 1 - 2
62	INSTRUMENTATION DETAILS
63-64	SUMMARY SOIL CLASSIFICATION PLAN 1 - 2
65-79	PLEASANT STREET BRIDGE NO. 1551
80-131	PAWTUCKET BRIDGE NO. 550
132-148	WATER STREET BRIDGE NO. 552
149-164	SCHOOL STREET OFF-RAMP BRIDGE NO. 553
165-181	SCHOOL STREET BRIDGE NO. 554
182-196	RETAINING WALLS

STATE OF RHODE ISLAND



DEPARTMENT OF TRANSPORTATION

PLANS, PROFILES AND SECTIONS OF PROPOSED

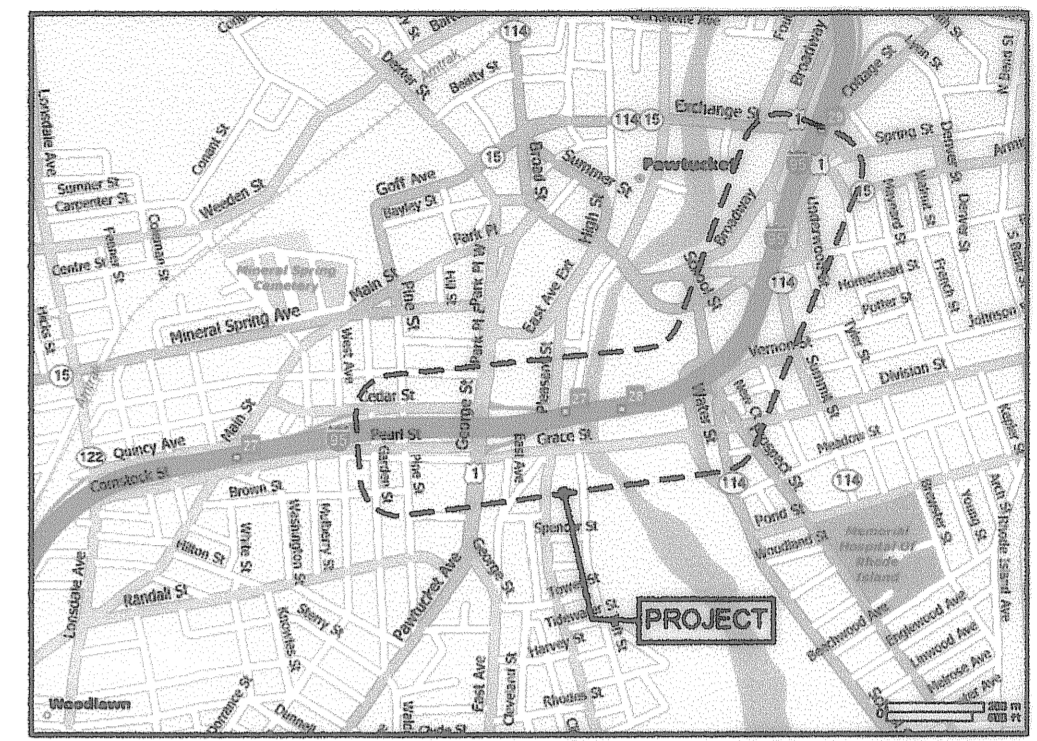
BRIDGE REPLACEMENT

PAWTUCKET BRIDGE NO. 550 I-95 OVER THE SEEKONK RIVER VOLUME 3 BRIDGE PLANS

PROJECT LIMITS

GARDEN STREET BRIDGE TO EXCHANGE STREET BRIDGE
PAWTUCKET, RHODE ISLAND
COUNTY OF PROVIDENCE

R.I. CONTRACT NO. 2010-CB-004
F.A. PROJECT NOS. BRO-0550(003), IM-0550(004), IMG-0550(005)
LENGTH = 0.90 MILES



LOCATION MAP

SEE VOLUME 1 FOR HIGHWAY PLANS
SEE VOLUME 2 FOR HIGHWAY CROSS-SECTIONS AND PROFILES
VOLUME 3 BRIDGE PLANS:
BRIDGE PHASING, BRIDGE DEMOLITION,
SUBSURFACE EXPLORATION
PLEASANT STREET BRIDGE NO. 1551
PAWTUCKET BRIDGE NO. 550
WATER STREET BRIDGE NO. 552
SCHOOL STREET OFF-RAMP BRIDGE NO. 553
SCHOOL STREET BRIDGE NO. 554
RETAINING WALLS

SEE VOLUME 4 FOR ELECTRICAL AND ARCHITECTURAL PLANS
SEE VOLUME 5 FOR BRIDGE PLANS:
GARDEN STREET NO. 547
PINE STREET BRIDGE NO. 548
GEORGE STREET BRIDGE NO. 549

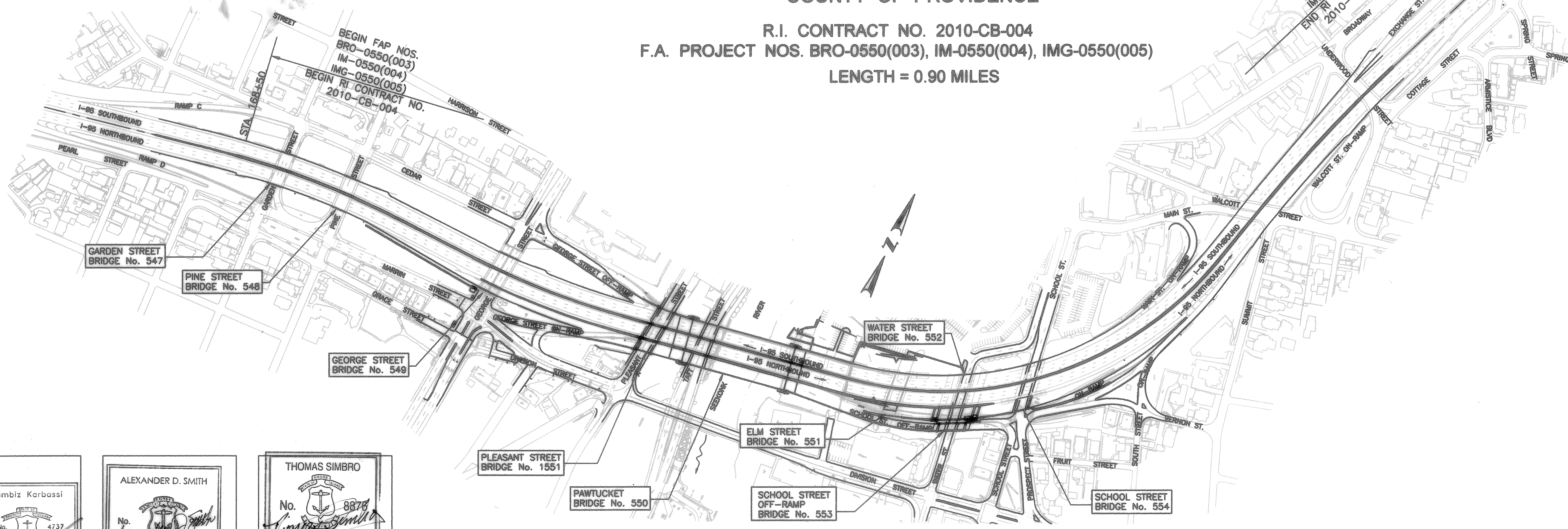
SEE VOLUME 6 FOR HIGHWAY PLANS

R.I. STANDARD SPECIFICATIONS AND STANDARD DETAILS

SPECIFICATIONS TO GOVERN THIS PROJECT ARE THE R.I. STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2004 EDITION, WITH ALL REVISIONS, AND THE STATE AND FEDERAL SPECIAL PROVISIONS INCLUDED IN THE CONTRACT DOCUMENTS. STANDARD DETAILS FOR THIS PROJECT ARE R.I. STANDARD DETAILS, 1998 EDITION, WITH ALL REVISIONS.

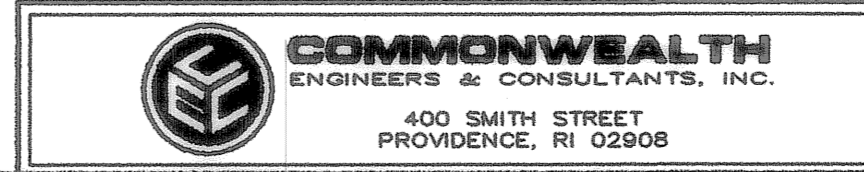
DESIGN DESIGNATION I-95

2010 AADT = 184,600 V.P.D.
2030 AADT = 244,200 V.P.D.
2010 DHV = 14,400 V.P.H.
2030 DHV = 19,000 V.P.H.
D = 50/50
K = 7.8%
T = 13.1%
V = 50 MPH



LAYOUT PLAN
SCALE: 1"=200'

BASE OF LEVELS
NGVD 1929 VERTICAL
RI PLANE COORDINATE SYSTEM
NAD 1983 HORIZONTAL



--	--	--

COMMONWEALTH ENGINEERS & CONSULTANTS, INC. SHEETS 1-35, 55-182, 184-196
HALEY & ALDRICH, INC. SHEETS 36-52, 183
WRIGHT-PIERCE SHEETS 53-54

Contract Number 2010-CB-004
Volume Number 3
Number of Sheet G-1
Total Sheets 196

R.I. DEPARTMENT OF TRANSPORTATION

APPROVED: *[Signature]* 3/26/10
DEPUTY CHIEF ENGINEER DATE

APPROVED: *[Signature]* 3/22/10
CHIEF ENGINEER DATE

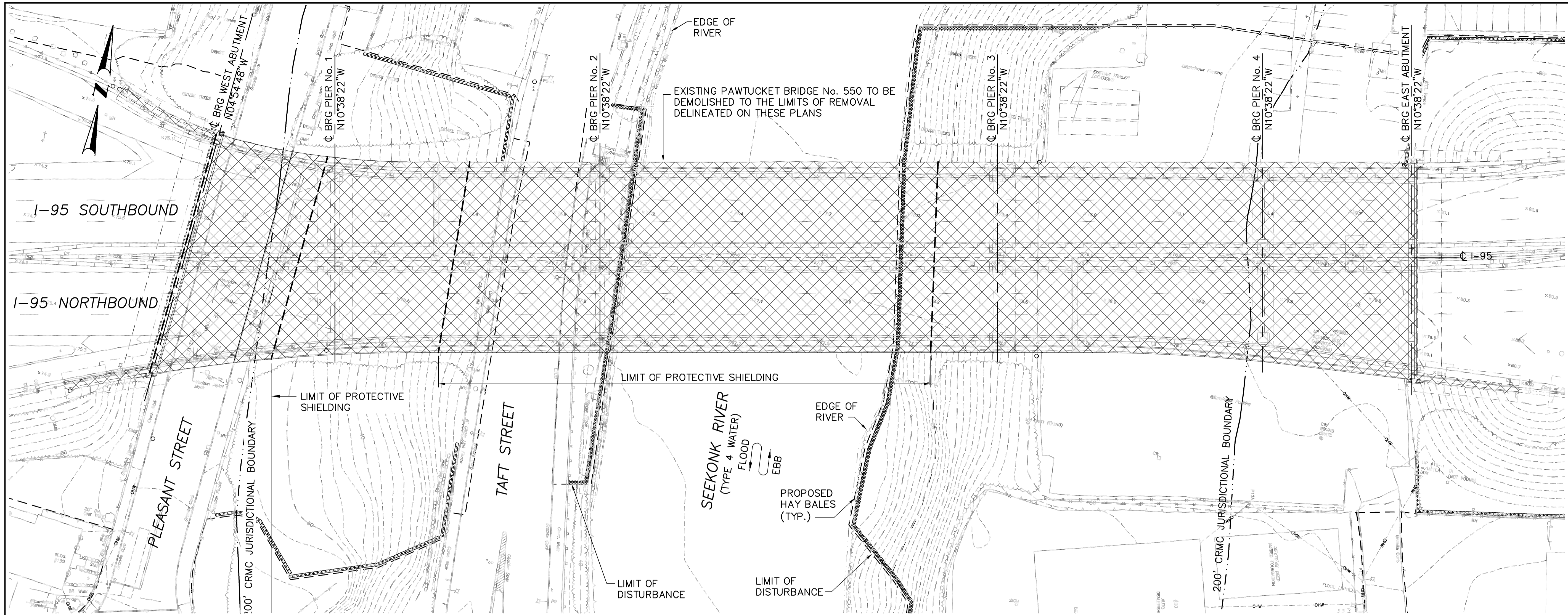
APPROVED: *[Signature]* 3/29/10
DIRECTOR DATE

US DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

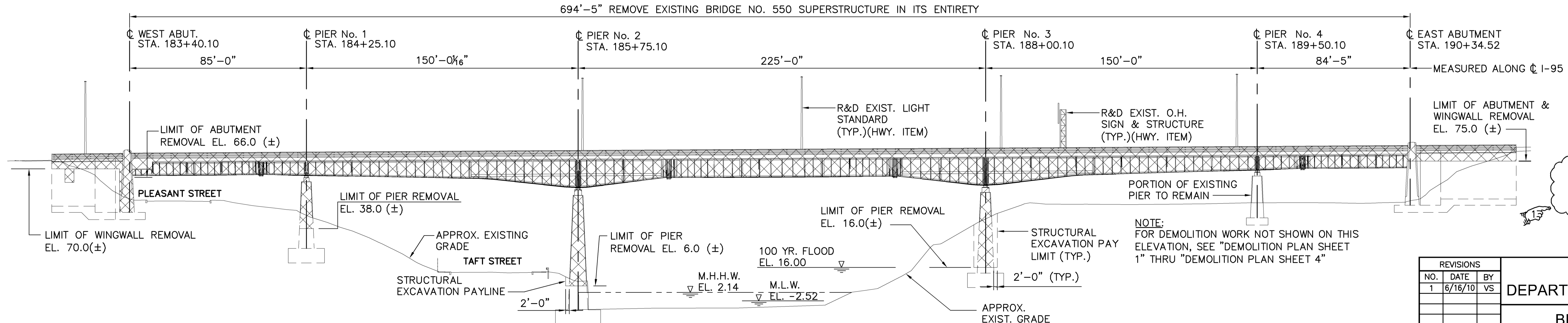
APPROVED: *[Signature]* 4/7/10
DIVISION ADMINISTRATOR DATE

NOTES: R-1

- THE LIMITS OF REMOVAL SHOWN ON THESE PLAN SHEETS DEPICTS THE PORTIONS OF THE EXISTING BRIDGE TO BE DEMOLISHED UNDER THIS CONTRACT. THE DEMOLITION WILL BE PERFORMED IN PHASES AS IDENTIFIED BY THE BRIDGE PHASE CONSTRUCTION SHEETS.
- PLANS AND DETAILS SHOWN ON THE DEMOLITION PLANS ARE ILLUSTRATIVE TO DEPICT THE LIMITS OF REMOVAL. THE CONTRACTOR IS REFERRED TO THE ORIGINAL CONSTRUCTION PLANS FOR THE COMPOSITION AND DETAILS OF THE SUPERSTRUCTURE AND SUBSTRUCTURE ELEMENTS.
- UNLESS NOTED OTHERWISE, ALL AREAS DISTURBED DURING DEMOLITION AND REMOVAL WORK SHALL BE BACKFILLED WITH COMMON BORROW AND RESTORED TO THEIR ORIGINAL CONDITION.
- ALL ELEVATIONS ARE IN FEET AND REFERENCE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29).
- PORTIONS OF THE SUBSTRUCTURES TO REMAIN SHALL BE FINISH GRADED TO WITHIN A TOLERANCE OF ±6 INCHES OF REMOVAL DEPTH. ALL EXISTING CONCRETE IS ASSUMED TO CONTAIN STEEL REINFORCEMENT. UNLESS NOTED OTHERWISE, ALL PROTRUDING REINFORCEMENT SHALL BE CUT FLUSH TO THE LIMIT OF REMOVAL.
- THE DEMOLITION LIMITS SHOWN ON THESE DRAWINGS INDICATE MINIMUM LIMITS OF REMOVAL. WHERE PORTIONS OF EXISTING SUBSTRUCTURES ARE INDICATED TO REMAIN (AND NOT RE-USED), OR WHERE EXISTING SUBSTRUCTURES ARE TO BE ABANDONED IN PLACE, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, REMOVE AND DISPOSE THESE ELEMENTS TO FACILITATE THE DEMOLITION OR CONSTRUCTION OPERATIONS.
- DISPOSITION OF DEMOLITION MATERIAL TO BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND ALL OTHER APPLICABLE REGULATIONS.
- THE FILL MATERIAL USED TO BACKFILL VOIDS RESULTING FROM BELOW GRADE DEMOLITION SHALL BE COMMON BORROW.



EXISTING BRIDGE PLAN
SCALE: 1"=30'



EXISTING SOUTH ELEVATION - (LOOKING NORTH)
SCALE: 1"=30'

LEGEND
DENOTES AREAS TO BE REMOVED & DISPOSED (REFER TO SECTIONS FOR DETAILED LIMITS OF REMOVAL)

REVISIONS		
NO.	DATE	BY
1	6/16/10	VS

ADDENDUM No. 4

RHODE ISLAND
DEPARTMENT OF TRANSPORTATION

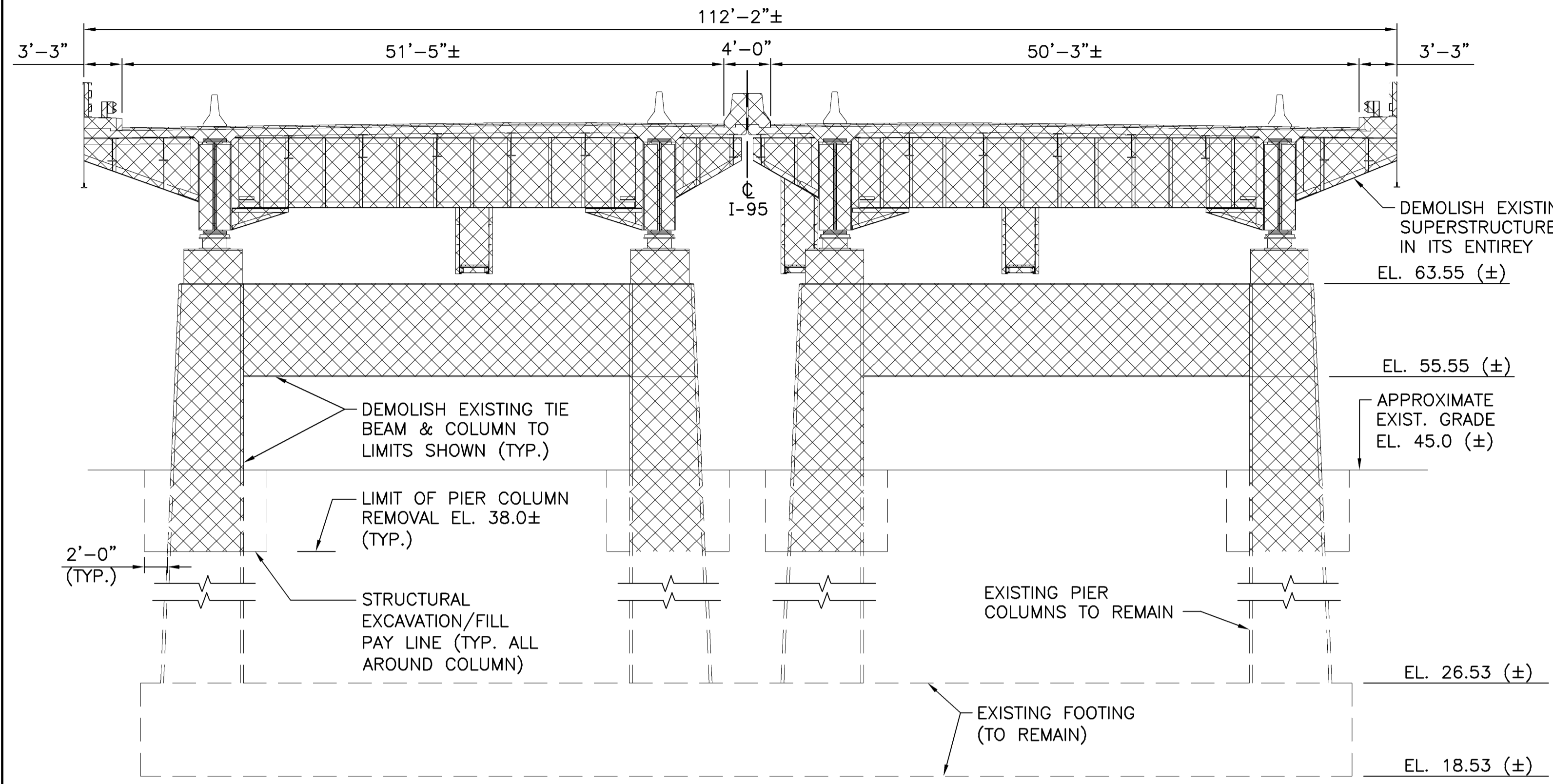
BRIDGE REPLACEMENT
PAWTUCKET BRIDGE NO. 550

PAWTUCKET, RHODE ISLAND

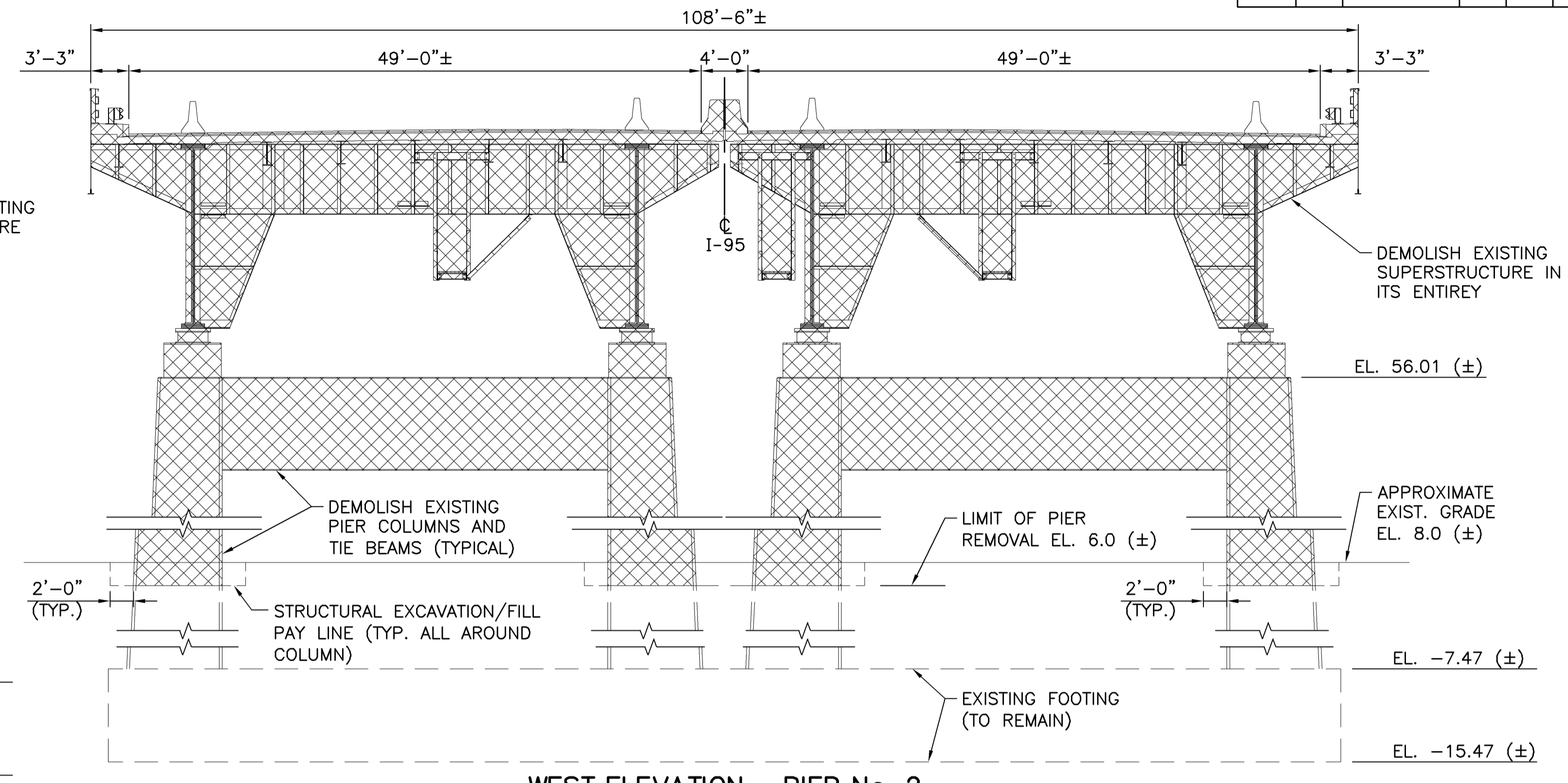
DEMOLITION PLAN SHEET 1
PLAN AND ELEVATION
BRIDGE No. 550

SCALE AS SHOWN SHEET DESIGNATION G-25

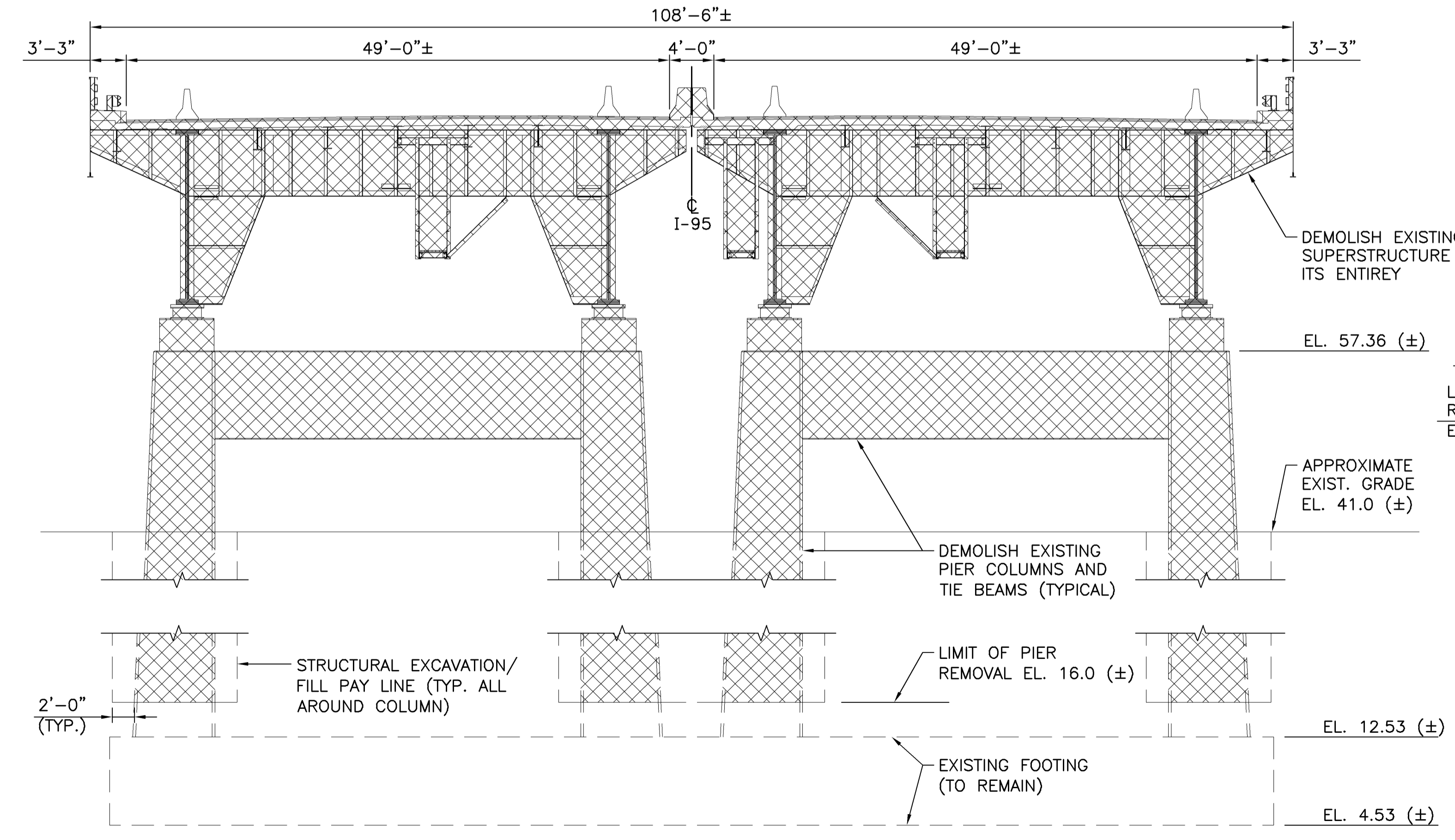




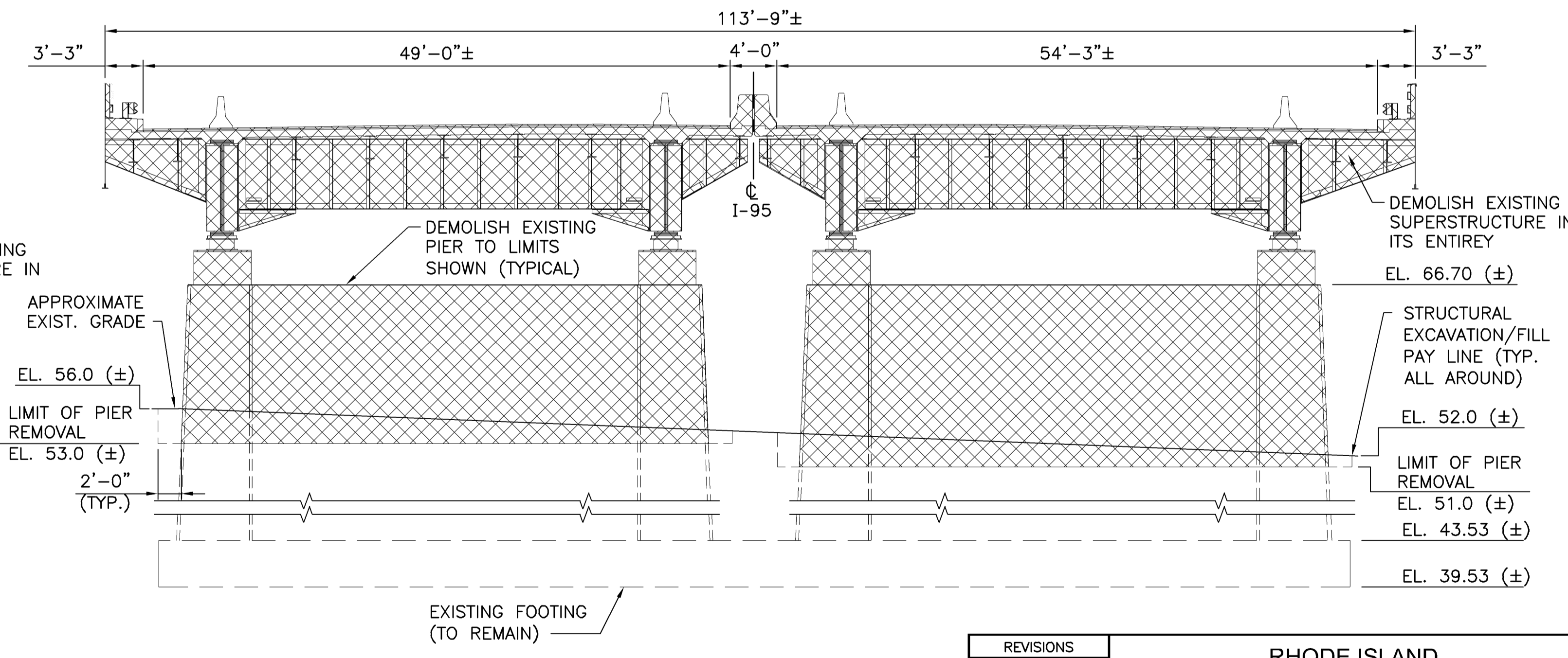
WEST ELEVATION - PIER No. 1
SCALE: 1/8"=1'-0"



WEST ELEVATION - PIER No. 2
SCALE: 1/8"=1'-0"



WEST ELEVATION - PIER No. 3
SCALE: 1/8"=1'-0"



WEST ELEVATION - PIER No. 4
SCALE: 1/8"=1'-0"

NOTE:
1. FOR APPLICABLE NOTES, REFER TO "DEMOLITION PLAN SHEET 1".

LEGEND
[Cross-hatched box] DENOTES AREAS TO BE REMOVED & DISPOSED



REVISIONS		
NO.	DATE	BY

RHODE ISLAND
DEPARTMENT OF TRANSPORTATION

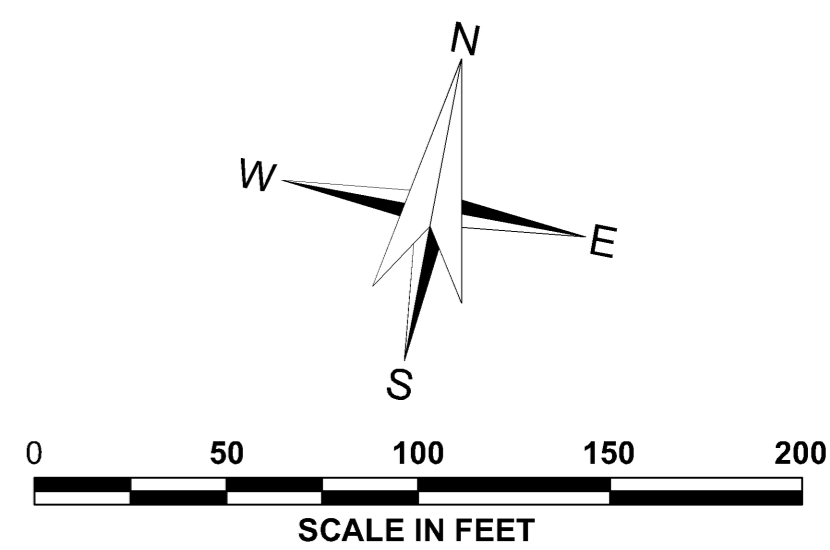
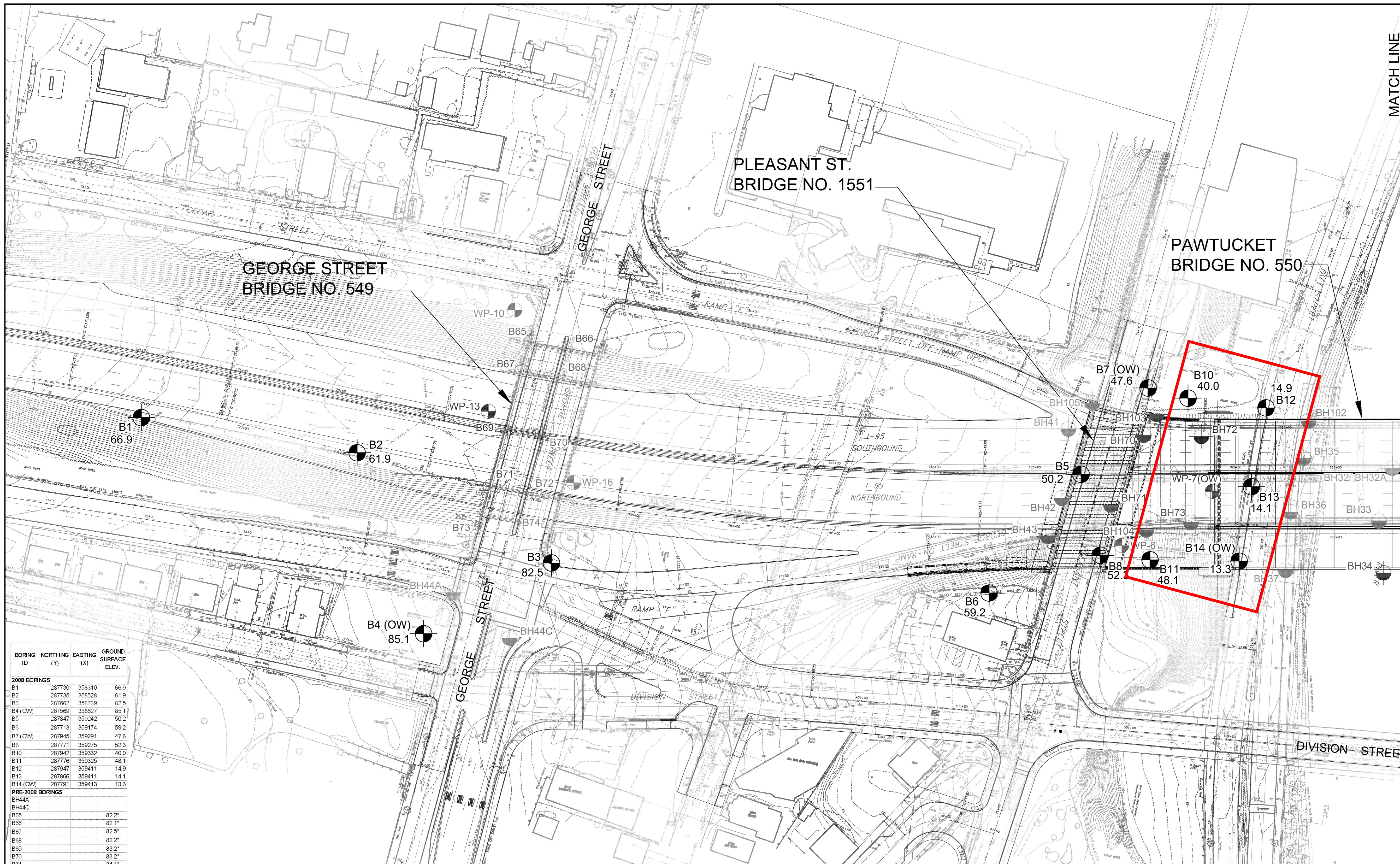
BRIDGE REPLACEMENT
PAWTUCKET BRIDGE NO. 550

PAWTUCKET, RHODE ISLAND

DEMOLITION PLAN SHEET 2
PIER REMOVAL
BRIDGE No. 550

SCALE AS SHOWN SHEET DESIGNATION G-26

- LEGEND:**
- B1 66.9 DESIGNATION, LOCATION AND GROUND SURFACE ELEVATION OF TEST BORING DRILLED BY NEW HAMPSHIRE BORING, INC. OF LONDONDERRY, NEW HAMPSHIRE IN MARCH AND APRIL 2008 IN CONNECTION WITH THE REPLACEMENT OF BRIDGE 550.
 - B-1 DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING MONITORED BY GEO TEK ENGINEERING INC. OF PROVIDENCE, RHODE ISLAND IN JULY 2001 IN CONNECTION WITH THE VERNON STREET ON-RAMP SAFETY IMPROVEMENTS. (SEE NOTE 6.)
 - B65 DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY ALLSTATE DRILLING CO. OF EAST PROVIDENCE, RHODE ISLAND IN JANUARY AND FEBRUARY 1961 IN CONNECTION WITH THE CONSTRUCTION OF THE EXISTING GEORGE STREET BRIDGE (SEE NOTE 6).
 - BH15 DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY AMERICAN DRILLING COMPANY OF EAST PROVIDENCE, RHODE ISLAND IN CONNECTION WITH THE CONSTRUCTION OF THE EXISTING BRIDGE 550, SCHOOL STREET BRIDGE, WATER STREET BRIDGE, AND ELM STREET BRIDGE (SEE NOTE 6).
 - WP-6 DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING MONITORED BY WRIGHT-PIERCE OF PROVIDENCE, RHODE ISLAND IN DECEMBER 2008, FEBRUARY 2009 AND JULY 2009.
 - ELEVATION CONTOUR OF EXISTING GROUND SURFACE
 - (OW) DENOTES OBSERVATION WELL INSTALLED IN COMPLETED BOREHOLE



BORING ID	NORTHING (Y)	EASTING (X)	GROUND SURFACE ELEV.
2008 BORINGS			
B1	287730	358310	66.9
B2	287735	358528	61.9
B3	287662	358739	82.5
B4 (OW)	287599	358627	85.1
B5	287847	359242	50.2
B6	287713	359174	59.2
B7 (OW)	287945	359291	47.6
B8	287771	359275	52.3
B10	287942	359332	40.0
B11	287776	359325	48.1
B12	287947	359411	14.9
B13	287866	359411	14.1
B14 (OW)	287791	359413	13.3
PRE-2008 BORINGS			
BH44A			
BH44C			
B65			82.2'
B66			82.1'
B67			82.5'
B68			82.2'
B69			83.2'
B70			83.2'
B71			84.1'
B72			83.5'
B73			83.6'
B74			83.6'
BH82			2.5'
BH82A			2.5'
BH83			2.5'
BH84			2.5'
BH85			7.5'
BH86			7.5'
BH87			8.0'
BH41			50.5'
BH42			51.5'
BH43			52.2'
BH70			44.5'
BH71			50.0'
BH72			30.0'
BH73			33.0'
BH102			7.5'
BH103			42.5'
BH104			42.0'
BH105			49.5'

NOTES:

1. EXISTING SITE CONDITIONS, CONTOURS OF EXISTING GROUND SURFACE ELEVATIONS AND LOCATION AND ORIENTATION OF EXISTING SITE FEATURES ARE TAKEN FROM THE ELECTRONIC AUTOCAD FILE STRUCTUT_PHASE-1D.dwg" RECEIVED BY HALEY & ALDRICH FROM COMMONWEALTH ENGINEERS & CONSULTANTS, INC. ON 14 FEBRUARY 2008.
2. PROPOSED SITE CONDITIONS AND THE LOCATION AND ORIENTATION OF PROPOSED SITE FEATURES ARE TAKEN FROM THE ELECTRONIC AUTOCAD FILE "SCHOOL STREET OPEN.dwg" RECEIVED BY HALEY & ALDRICH FROM COMMONWEALTH ENGINEERS & CONSULTANTS ON 25 JANUARY 2008.
3. LOCATIONS OF HISTORIC TEST BORINGS ARE APPROXIMATE AND WERE ESTIMATED FROM HISTORIC PLANS. LOCATIONS OF WRIGHT-PIERCE BORINGS ARE APPROXIMATE AND WERE PROVIDED IN ELECTRONIC FORMAT FROM COMMONWEALTH ENGINEERS & CONSULTANTS, INC. ON 3 DECEMBER 2009. LOCATIONS OF RECENT TEST BORINGS WERE DETERMINED IN THE FIELD BY CROSSMAN ENGINEERING, INC. USING ELECTRONIC DISTANCE MEASUREMENT AND TRIANGULATION METHODS RELATIVE TO FIXED REFERENCE POINTS.
4. COORDINATE GRID SYSTEM USED IS THE RHODE ISLAND STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM OF 1983 (NAD 83).
5. ELEVATIONS ARE IN FEET AND REFERENCE THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29).
6. RECENT SUBSURFACE EXPLORATIONS WERE MONITORED IN THE FIELD BY HALEY & ALDRICH PERSONNEL.
7. REFER TO PROJECT GEOTECHNICAL DATA REPORT (DATED FEBRUARY 2008), APPENDIX B FOR LOGS OF RECENT TEST BORINGS (HALEY & ALDRICH), APPENDIX C FOR LOGS OF HISTORIC TEST BORINGS (OTHERS), APPENDIX D FOR OBSERVATION WELL INSTALLATION AND GROUNDWATER MONITORING REPORTS, AND APPENDIX F FOR LOGS OF TEST BORINGS BY WRIGHT-PIERCE.

HALEY & ALDRICH
 465 Medford Street, Suite 2200
 Boston, MA 02129-1400
 Phone: 617.886.7400
 Fax: 617.886.7600
 HaleyAldrich.com

REVISIONS		
NO.	DATE	BY

**RHODE ISLAND
 DEPARTMENT OF TRANSPORTATION**

**BRIDGE REPLACEMENT
 PAWTUCKET BRIDGE NO. 550**

PAWTUCKET, RHODE ISLAND

**SITE AND SUBSURFACE
 EXPLORATION LOCATION PLAN**

SHEET 1 OF 2

SCALE AS SHOWN SHEET DESIGNATION G-36

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B10 Sheet 1 of 2
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BR0-BCDR(009) Date Start : 2/29/08 Date End : 2/29/08

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B11 Sheet 1 of 2
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BR0-BCDR(009) Date Start : 2/29/08 Date End : 2/29/08

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B12 Sheet 1 of 3
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BR0-BCDR(009) Date Start : 2/29/08 Date End : 2/29/08

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B12 Sheet 3 of 3
Location (C/T) : PAWTUCKET RIDOT Database ID # :

Methods Used to Determine Borehole Coordinates and Elevation : 2 / Survey

Methods Used to Determine Borehole Coordinates and Elevation : 2 / Survey

Methods Used to Determine Borehole Coordinates and Elevation : 2 / Survey

Methods Used to Determine Borehole Coordinates and Elevation : 2 / Survey

Drilling Firm : New Hampshire Boring, Inc. Project No. :
Drilling Foreman : Todd Pentecost

Drilling Firm : New Hampshire Boring, Inc. Project No. :
Drilling Foreman : Todd Pentecost

Drilling Firm : New Hampshire Boring, Inc. Project No. :
Drilling Foreman : Don Dunklee

Drilling Firm : New Hampshire Boring, Inc. Project No. :
Drilling Foreman : Don Dunklee

Drilling Rig Make & Model : Diedrich D-50
Drilling Methods and Tools
Casing Size : 4 in Hollow Stem Auger Flight OD : (in)
Methods Used to Advance Casing : Driven (300 lbs) Push Roller Bit Spin Open Hole

Drilling Rig Make & Model : Diedrich D-50
Drilling Methods and Tools
Casing Size : 4 in Hollow Stem Auger Flight OD : (in)
Methods Used to Advance Casing : Driven (300 lbs) Push Roller Bit Spin Open Hole

Drilling Rig Make & Model : Acker AD II
Drilling Methods and Tools
Casing Size : 4 in Hollow Stem Auger Flight OD : (in)
Methods Used to Advance Casing : Driven (300 lbs) Push Roller Bit Spin Open Hole

Drilling Rig Make & Model : Acker AD II
Drilling Methods and Tools
Casing Size : 4 in Hollow Stem Auger Flight OD : (in)
Methods Used to Advance Casing : Driven (300 lbs) Push Roller Bit Spin Open Hole

Soils/Rock Sampling :
SPT Hammer Type Donut Safety Automatic Trip Other
Hammer Wt : 140 (lbs) Hammer Fall : 30 (in)
Split Spoon Sampler : Barrel Length : 24 Barrel ID : 1.375 (in) Barrel OD : 2 (in)

Soils/Rock Sampling :
SPT Hammer Type Donut Safety Automatic Trip Other
Hammer Wt : 140 (lbs) Hammer Fall : 30 (in)
Split Spoon Sampler : Barrel Length : 24 Barrel ID : 1.375 (in) Barrel OD : 2 (in)

Soils/Rock Sampling :
SPT Hammer Type Donut Safety Automatic Trip Other
Hammer Wt : 140 (lbs) Hammer Fall : 30 (in)
Split Spoon Sampler : Barrel Length : 24 Barrel ID : 1.375 (in) Barrel OD : 2 (in)

Soils/Rock Sampling :
SPT Hammer Type Donut Safety Automatic Trip Other
Hammer Wt : 140 (lbs) Hammer Fall : 30 (in)
Split Spoon Sampler : Barrel Length : 24 Barrel ID : 1.375 (in) Barrel OD : 2 (in)

Bedrock Core Barrel Type : ID/OD : (in) Core Diameter : (in)

Bedrock Core Barrel Type : ID/OD : (in) Core Diameter : (in)

Bedrock Core Barrel Type : ID/OD : (in) Core Diameter : (in)

Bedrock Core Barrel Type : ID/OD : (in) Core Diameter : (in)

Groundwater Monitoring : Well Screen Depth from : (ft) to (ft)

Groundwater Monitoring : Well Screen Depth from : (ft) to (ft)

Groundwater Monitoring : Well Screen Depth from : (ft) to (ft)

Groundwater Monitoring : Well Screen Depth from : (ft) to (ft)

Soil/Rock Samples Delivered to :
Name : Haley & Aldrich, Inc. Date :
Address : One Davol Square, Providence, RI 02903

Soil/Rock Samples Delivered to :
Name : Haley & Aldrich, Inc. Date :
Address : One Davol Square, Providence, RI 02903

Soil/Rock Samples Delivered to :
Name : Haley & Aldrich, Inc. Date :
Address : One Davol Square, Providence, RI 02903

Soil/Rock Samples Delivered to :
Name : Haley & Aldrich, Inc. Date :
Address : One Davol Square, Providence, RI 02903

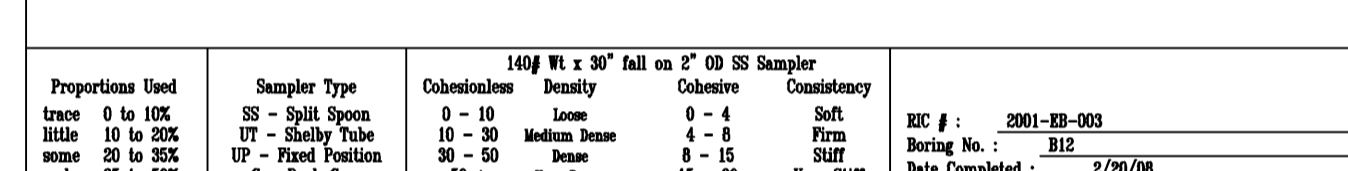
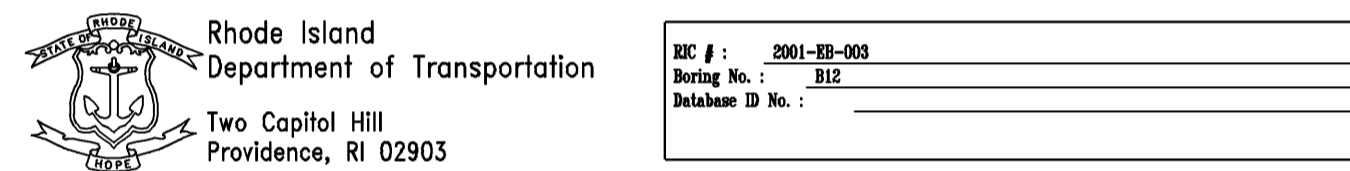
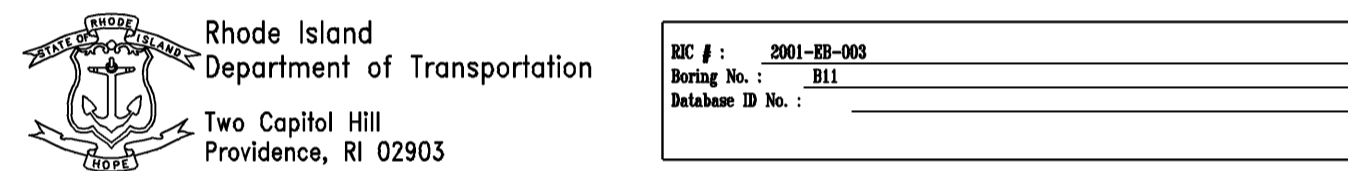
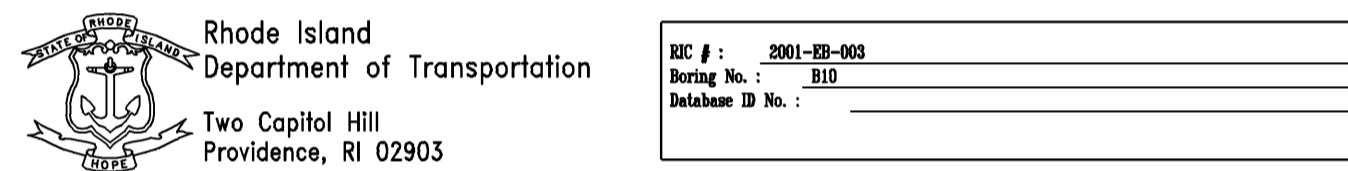


Table with columns for Proportions Used, Sampler Type, Cohesiveness, Density, Consistency, and Date Completed.

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B10 Sheet 2 of 2
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BR0-BCDR(009) Date Start : 2/29/08 Date End : 2/29/08

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B11 Sheet 2 of 2
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BR0-BCDR(009) Date Start : 2/29/08 Date End : 2/29/08

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B12 Sheet 2 of 3
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BR0-BCDR(009) Date Start : 2/29/08 Date End : 2/29/08

Table with columns for Depth, Sampler Type, Pen. Rec., Depth, Blow per ft., SOIL AND ROCK SAMPLE DESCRIPTION, and STRATUM DESCRIPTION.

Table with columns for Depth, Sampler Type, Pen. Rec., Depth, Blow per ft., SOIL AND ROCK SAMPLE DESCRIPTION, and STRATUM DESCRIPTION.

Table with columns for Depth, Sampler Type, Pen. Rec., Depth, Blow per ft., SOIL AND ROCK SAMPLE DESCRIPTION, and STRATUM DESCRIPTION.

REMARKS: 1. Groundwater not recorded. 2. Possible Top of Bedrock at 14.2 ft. 3. Split spoon refusal at 14.4 ft.

REMARKS: 1. Split spoon refusal at 20.7 ft.

REMARKS: 1. Groundwater not recorded.

Table with columns for Proportions Used, Sampler Type, Cohesiveness, Density, Consistency, and Date Completed.

Table with columns for Proportions Used, Sampler Type, Cohesiveness, Density, Consistency, and Date Completed.

Table with columns for Proportions Used, Sampler Type, Cohesiveness, Density, Consistency, and Date Completed.

REVISIONS table with columns NO., DATE, BY. Below it, RHODE ISLAND DEPARTMENT OF TRANSPORTATION BRIDGE REPLACEMENT PAWTUCKET BRIDGE NO. 550 TEST BORINGS B10, B11, B12. SHEET DESIGNATION G-41.

HALEY & ALDRICH, INC. 465 Medford Street, Suite 2200 Boston, MA 02129-1400 Phone: 617.886.7400 Fax: 617.886.7600 haleyaldrich.com

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B13 Sheet 1 of 2
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BRD-BCDR(009) Date Start : 2/20/08 Date End : 2/20/08
Bridge/Road # : Bridge No. 550/1-95 N Coord. : 287,886 PL
Design Consult Co. : Commonwealth Engineers & Consultants E Coord. : 359,411 PL
Geotech Consult Co. : Haley & Aldrich, Inc. Ground Surface Elev., Ft. : 14.1
Inspector Name/Co. : David Palileo / Haley & Aldrich, Inc. Elevation Datum : NAD83

Methods Used to Determine Borehole Coordinates and Elevation :
2 / Survey

Drilling Firm : New Hampshire Boring, Inc. Project No. :
Drilling Foreman : Barry Wordell

Drilling Rig Make & Model :
Model : CMR 75
Drilling Methods and Tools
Casing Size : 3 in Hollow Stem Auger Flight OD : (in)
Methods Used to Advance Casing :
Driven (300 lbs) Push Roller Bit Spin Open Hole
Drill Rod Size : (lbs) Wt./Ft. (lbs)

Soils/Rock Sampling :
SPT Hammer Type Donut Safety Automatic Trip Other _____
Hammer Wt : 140 (lbs) Hammer Fall : 30 (in)
Split Spoon Sampler : Barrel Length : 24 Barrel ID: 1.375 (in) Barrel OD : 2 (in)
Shoe ID: 1.375 (in) Shoe OD : 2 (in)
Liner Type : Brass Stainless Steel Plastic Spring Core Catcher
Undisturbed Samplers :
Shelby Tube : Length : (in) ID/OD : (in)
Fixed Piston Sampler Type : Length : (in) ID/OD : (in)
Other : Length : (in) ID/OD : (in)

Bedrock Core Barrel Type : Standard double tube ID/OD : 2/2.8 (in) Core Diameter : 2 (in)

Groundwater Monitoring : Well Screen Depth from : (ft) to (ft)

Soil/Rock Samples Delivered to :
Name : Haley & Aldrich, Inc. Date :
Address : One Davol Square, Providence, RI 02903

Rhode Island Department of Transportation
Two Capitol Hill Providence, RI 02903
RIC # : 2001-EB-003
Boring No. : B13
Database ID No. :

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B14(W) Sheet 1 of 3
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BRD-BCDR(009) Date Start : 2/20/08 Date End : 2/21/08
Bridge/Road # : Bridge No. 550/1-95 N Coord. : 287,791 PL
Design Consult Co. : Commonwealth Engineers & Consultants E Coord. : 359,413 PL
Geotech Consult Co. : Haley & Aldrich, Inc. Ground Surface Elev., Ft. : 13.3
Inspector Name/Co. : David Palileo / Haley & Aldrich, Inc. Elevation Datum : NAD83

Methods Used to Determine Borehole Coordinates and Elevation :
2 / Survey

Drilling Firm : New Hampshire Boring, Inc. Project No. :
Drilling Foreman : Barry Wordell

Drilling Rig Make & Model :
Model : CMR 75
Drilling Methods and Tools
Casing Size : 3 in Hollow Stem Auger Flight OD : (in)
Methods Used to Advance Casing :
Driven (300 lbs) Push Roller Bit Spin Open Hole
Drill Rod Size : (lbs) Wt./Ft. (lbs)

Soils/Rock Sampling :
SPT Hammer Type Donut Safety Automatic Trip Other _____
Hammer Wt : 140 (lbs) Hammer Fall : 30 (in)
Split Spoon Sampler : Barrel Length : 24 Barrel ID: 1.375 (in) Barrel OD : 2 (in)
Shoe ID: 1.375 (in) Shoe OD : 2 (in)
Liner Type : Brass Stainless Steel Plastic Spring Core Catcher
Undisturbed Samplers :
Shelby Tube : Length : (in) ID/OD : (in)
Fixed Piston Sampler Type : Length : (in) ID/OD : (in)
Other : Length : (in) ID/OD : (in)

Bedrock Core Barrel Type : Standard double tube ID/OD : 2/2.8 (in) Core Diameter : 2 (in)

Groundwater Monitoring : Well Screen Depth from : 4.5 (ft) to 14.5 (ft)

Soil/Rock Samples Delivered to :
Name : Haley & Aldrich, Inc. Date :
Address : One Davol Square, Providence, RI 02903

Rhode Island Department of Transportation
Two Capitol Hill Providence, RI 02903
RIC # : 2001-EB-003
Boring No. : B14(W)
Database ID No. :

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B14(W) Sheet 3 of 3
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BRD-BCDR(009) Date Start : 2/20/08 Date End : 2/21/08
Bridge/Road # : Bridge No. 550/1-95 N Coord. : 287,791 PL
Design Consult Co. : Commonwealth Engineers & Consultants E Coord. : 359,413 PL
Geotech Consult Co. : Haley & Aldrich, Inc. Ground Surface Elev., Ft. : 13.3
Inspector Name/Co. : David Palileo / Haley & Aldrich, Inc. Elevation Datum : NAD83

Table with columns: Depth (ft), Sampler Type, Sampler Details, Soil and Rock Sample Description, Depth of Stratum Change (ft), and Stratum Description. Includes data for samples SS-1 through SS-7 and C-4, C-5, C-6, C-7.

Table with columns: Proportions Used, Sampler Type, Colloidal Density, Consistency, and Remarks. Includes data for various soil types and sampler types.

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B15(W) Sheet 8 of 9
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BRD-BCDR(009) Date Start : 2/25/08 Date End : 2/26/08
Bridge/Road # : Bridge No. 550/1-95 N Coord. : 287,887 PL
Design Consult Co. : Commonwealth Engineers & Consultants E Coord. : 359,411 PL
Geotech Consult Co. : Haley & Aldrich, Inc. Ground Surface Elev., Ft. : 52.7
Inspector Name/Co. : Scott Shay / Haley & Aldrich, Inc. Elevation Datum : MGSUR

Table with columns: Depth (ft), Sampler Type, Sampler Details, Soil and Rock Sample Description, Depth of Stratum Change (ft), and Stratum Description. Includes data for samples SS-1 through SS-7 and C-4, C-5, C-6, C-7.

Table with columns: Proportions Used, Sampler Type, Colloidal Density, Consistency, and Remarks. Includes data for various soil types and sampler types.

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B13 Sheet 2 of 2
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BRD-BCDR(009) Date Start : 2/20/08 Date End : 2/20/08
Bridge/Road # : Bridge No. 550/1-95 N Coord. : 287,886 PL
Design Consult Co. : Commonwealth Engineers & Consultants E Coord. : 359,411 PL
Geotech Consult Co. : Haley & Aldrich, Inc. Ground Surface Elev., Ft. : 14.1
Inspector Name/Co. : David Palileo / Haley & Aldrich, Inc. Elevation Datum : NAD83

Borehole Location Description: Taft Street
Sampler: Unless otherwise noted, soil sampler consists of a 2 in. split spoon driven using a 140 lb hammer, 30 in. fall.
Casing: Unless otherwise noted, casing is driven using 300 lb hammer, falling 24 in.

Table with columns: Depth (ft), Sampler Type, Sampler Details, Soil and Rock Sample Description, Depth of Stratum Change (ft), and Stratum Description. Includes data for samples SS-1 through SS-7 and C-4, C-5, C-6, C-7.

Table with columns: Proportions Used, Sampler Type, Colloidal Density, Consistency, and Remarks. Includes data for various soil types and sampler types.

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B14(W) Sheet 2 of 3
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BRD-BCDR(009) Date Start : 2/20/08 Date End : 2/21/08
Bridge/Road # : Bridge No. 550/1-95 N Coord. : 287,791 PL
Design Consult Co. : Commonwealth Engineers & Consultants E Coord. : 359,413 PL
Geotech Consult Co. : Haley & Aldrich, Inc. Ground Surface Elev., Ft. : 13.3
Inspector Name/Co. : David Palileo / Haley & Aldrich, Inc. Elevation Datum : NAD83

Borehole Location Description: Taft Street
Sampler: Unless otherwise noted, soil sampler consists of a 2 in. split spoon driven using a 140 lb hammer, 30 in. fall.
Casing: Unless otherwise noted, casing is driven using 300 lb hammer, falling 24 in.

Table with columns: Depth (ft), Sampler Type, Sampler Details, Soil and Rock Sample Description, Depth of Stratum Change (ft), and Stratum Description. Includes data for samples SS-1 through SS-7 and C-4, C-5, C-6, C-7.

Table with columns: Proportions Used, Sampler Type, Colloidal Density, Consistency, and Remarks. Includes data for various soil types and sampler types.

RIDOT Project Pawtucket Bridge No. 550 Replacement BORING # : B15(W) Sheet 1 of 3
Location (C/T) : PAWTUCKET RIDOT Database ID # :
RIC # : 2001-EB-003 FAP # : BRD-BCDR(009) Date Start : 2/25/08 Date End : 2/28/08
Bridge/Road # : Bridge No. 550/1-95 N Coord. : 287,887 PL
Design Consult Co. : Commonwealth Engineers & Consultants E Coord. : 359,411 PL
Geotech Consult Co. : Haley & Aldrich, Inc. Ground Surface Elev., Ft. : 52.7
Inspector Name/Co. : Scott Shay / Haley & Aldrich, Inc. Elevation Datum : MGSUR

Methods Used to Determine Borehole Coordinates and Elevation :
2 / Survey

Drilling Firm : New Hampshire Boring, Inc. Project No. :
Drilling Foreman : Don Dunklee

Drilling Rig Make & Model :
Model : Acker AD II
Drilling Methods and Tools
Casing Size : 4 in Hollow Stem Auger Flight OD : (in)
Methods Used to Advance Casing :
Driven (300 lbs) Push Roller Bit Spin Open Hole
Drill Rod Size : (lbs) Wt./Ft. (lbs)

Soils/Rock Sampling :
SPT Hammer Type Donut Safety Automatic Trip Other _____
Hammer Wt : 140 (lbs) Hammer Fall : 30 (in)
Split Spoon Sampler : Barrel Length : 24 Barrel ID: 1.375 (in) Barrel OD : 2 (in)
Shoe ID: 1.375 (in) Shoe OD : 2 (in)
Liner Type : Brass Stainless Steel Plastic Spring Core Catcher
Undisturbed Samplers :
Shelby Tube : Length : (in) ID/OD : (in)
Fixed Piston Sampler Type : Length : (in) ID/OD : (in)
Other : Length : (in) ID/OD : (in)

Bedrock Core Barrel Type : Standard double tube ID/OD : 2/2.8 (in) Core Diameter : 2 (in)

Groundwater Monitoring : Well Screen Depth from : 10 (ft) to 20 (ft)

Soil/Rock Samples Delivered to :
Name : Haley & Aldrich, Inc. Date :
Address : One Davol Square, Providence, RI 02903

Rhode Island Department of Transportation
Two Capitol Hill Providence, RI 02903
RIC # : 2001-EB-003
Boring No. : B15(W)
Database ID No. :

REVISIONS table with columns NO., DATE, BY.
RHODE ISLAND DEPARTMENT OF TRANSPORTATION
BRIDGE REPLACEMENT PAWTUCKET BRIDGE NO. 550
PAWTUCKET, RHODE ISLAND
TEST BORINGS B13, B14, B15
SCALE --- SHEET DESIGNATION G-42

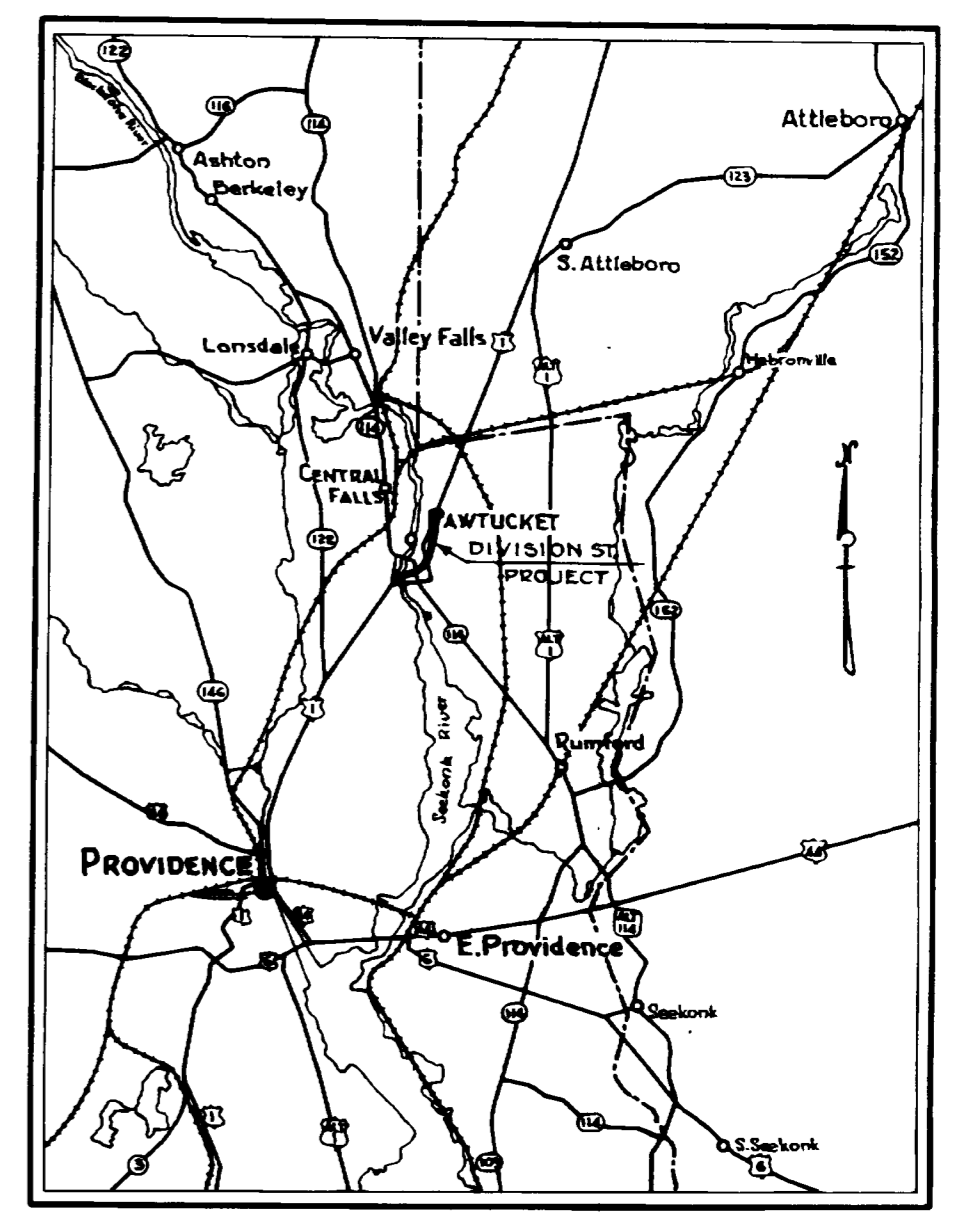


HALEY & ALDRICH, INC.
465 Medford Street, Suite 2200
Boston, MA 02129-1400
Phone: 617.886.7400
Fax: 617.886.7600
HaleyAldrich.com

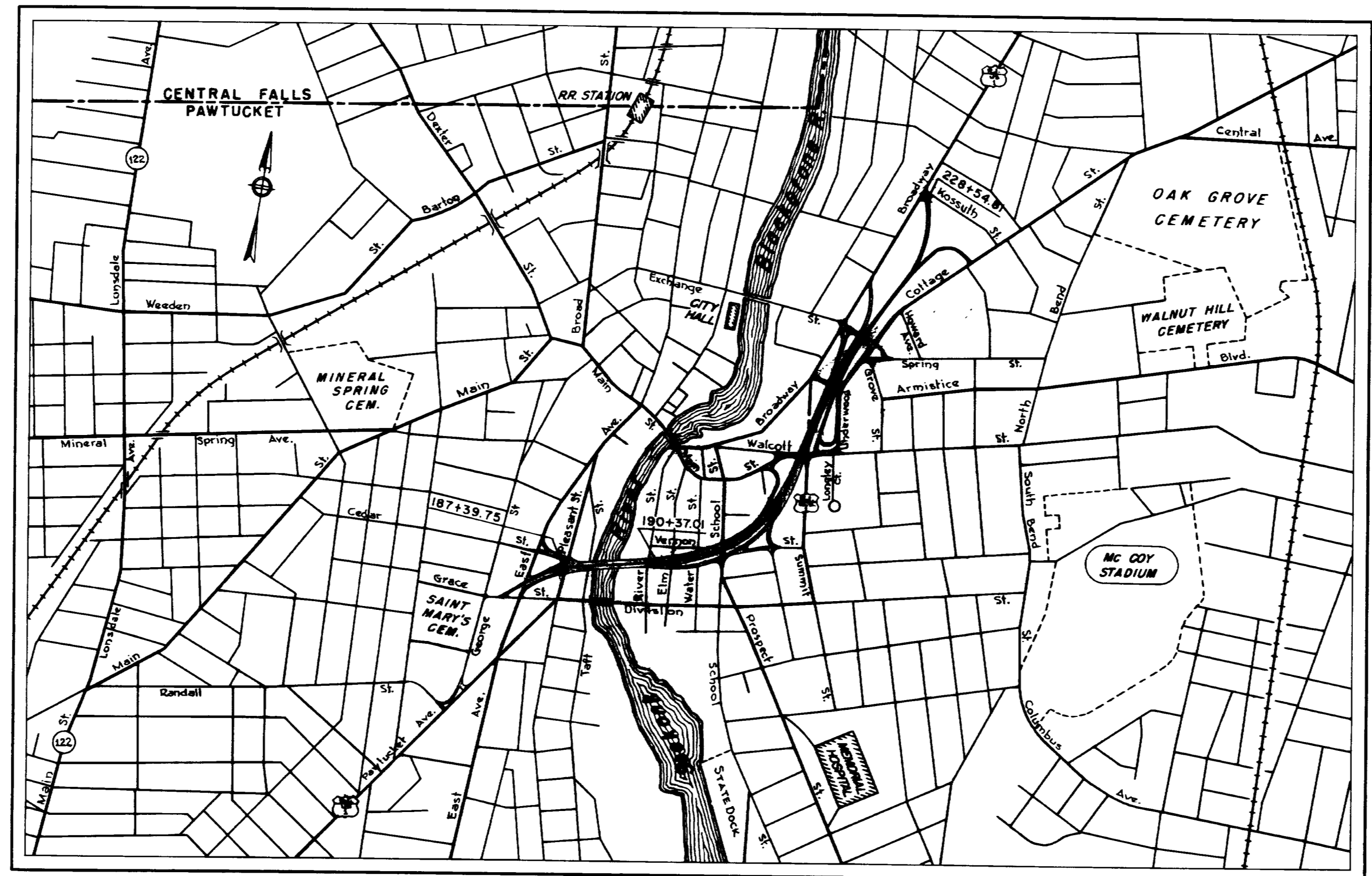
FED. ROAD DIV. NO.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET NO.	SHEETS
1	R. I.				

STATE OF RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS
DIVISION OF ROADS AND BRIDGES

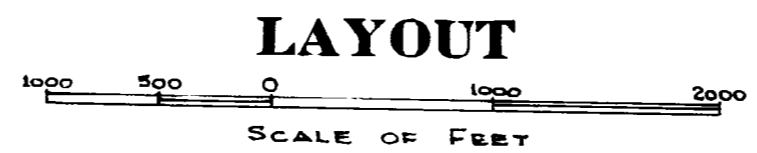
PLAN, PROFILE AND SECTIONS OF PROPOSED
STATE HIGHWAY



KEY PLAN



DIVISION ST. PROJECT
CONTRACT THREE
R.I.F.A. PROJECT NO. I-01 (II) LENGTH .723 MILES



SCALES OF DRAWINGS

Plans, - - 1 inch = 50 feet
Profiles, - 1 inch = 40 feet Horizontal
 " - 1 inch = 4 feet Vertical
Cross Sections, 1 inch = 10 feet

BASE OF LEVELS
PAWTUCKET MEAN HIGH WATER

CONVENTIONAL SIGNS

<ul style="list-style-type: none"> STATE LINE COUNTY LINE TOWN LINE CITY LINE CENTER LINE BIWAY LINE EDGE OF PAVEMENT EDGE OF TRAVELED WAY INSTRUMENTS (SOLID) SEWER MARK ELECTRIC RAILWAY SEWER RAILWAY FENCE (WOOD) FENCE (WIRE) FENCE (WIRE STAKE) FENCE (WIRELESS) STONE WALL CONCRETE WALL RETAINING WALL (CONCRETE) RETAINING WALL (STONE) BRUSH STEEL BRUSH SWAMP 	<ul style="list-style-type: none"> PIPE CULVERT (IN PLAN) PIPE CULVERT (IN PROFILE) BOX CULVERT (IN PLAN) BOX CULVERT (IN PROFILE) STONE CULVERT (IN PLAN) STONE CULVERT (IN PROFILE) MINOR HYDRANT (UPSIDE) HYDRANT (DOWN) CATCH BASIN STREAM DITCH POND LEDGE BOULDER WATER OR GAS GATE TEL. POLE BUILDING CEMETERY FIRE BOX BRUSH STEEL BRUSH SWAMP 	
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R. I. DEPARTMENT OF PUBLIC WORKS
DIVISION OF ROADS AND BRIDGES

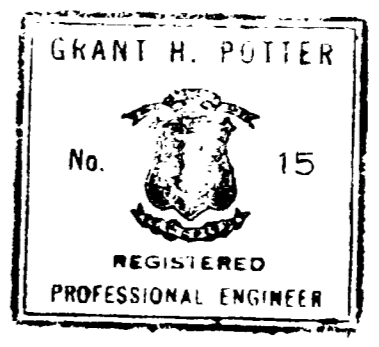
APPROVED _____ 4-25-57
PRINCIPAL HIGHWAY ENGINEER DATE

APPROVED _____ 4/26/57
PUBLIC WORKS CONTROLLER DATE

APPROVED _____ 4-25-57
DIRECTOR DATE

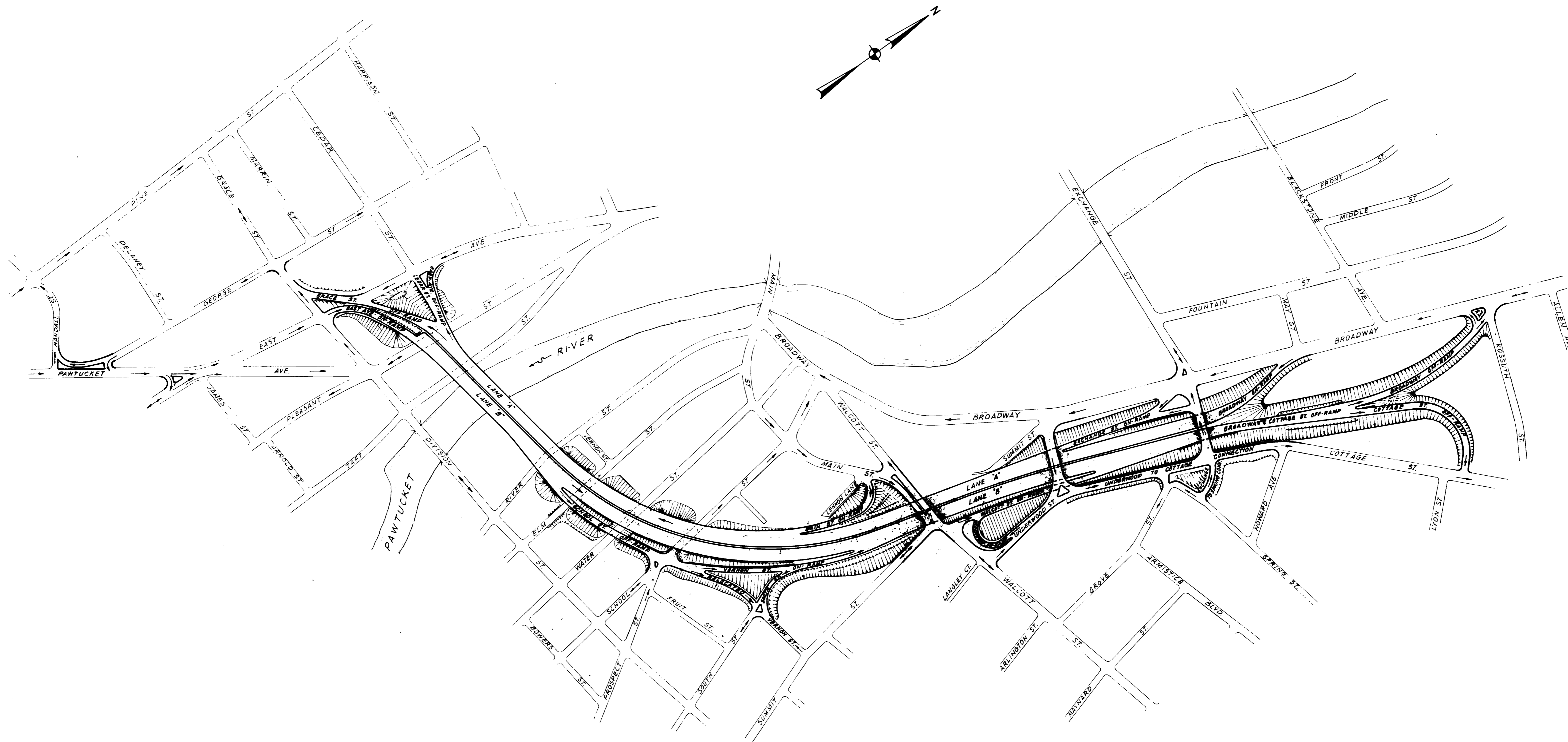
DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

APPROVED _____
DISTRICT ENGINEER DATE



Contract Number 5753
Number of Sheet 1
Total Sheets 223

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	R. I.	I-01-(III)	57	3	223



CONSTRUCTION CONTRACT THREE

RHODE ISLAND
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF ROADS AND BRIDGES
DIVISION STREET PROJECT
 R. I. PROJECT NO. I-01-(III)
 PAWTUCKET RHODE ISLAND




GENERAL PLAN

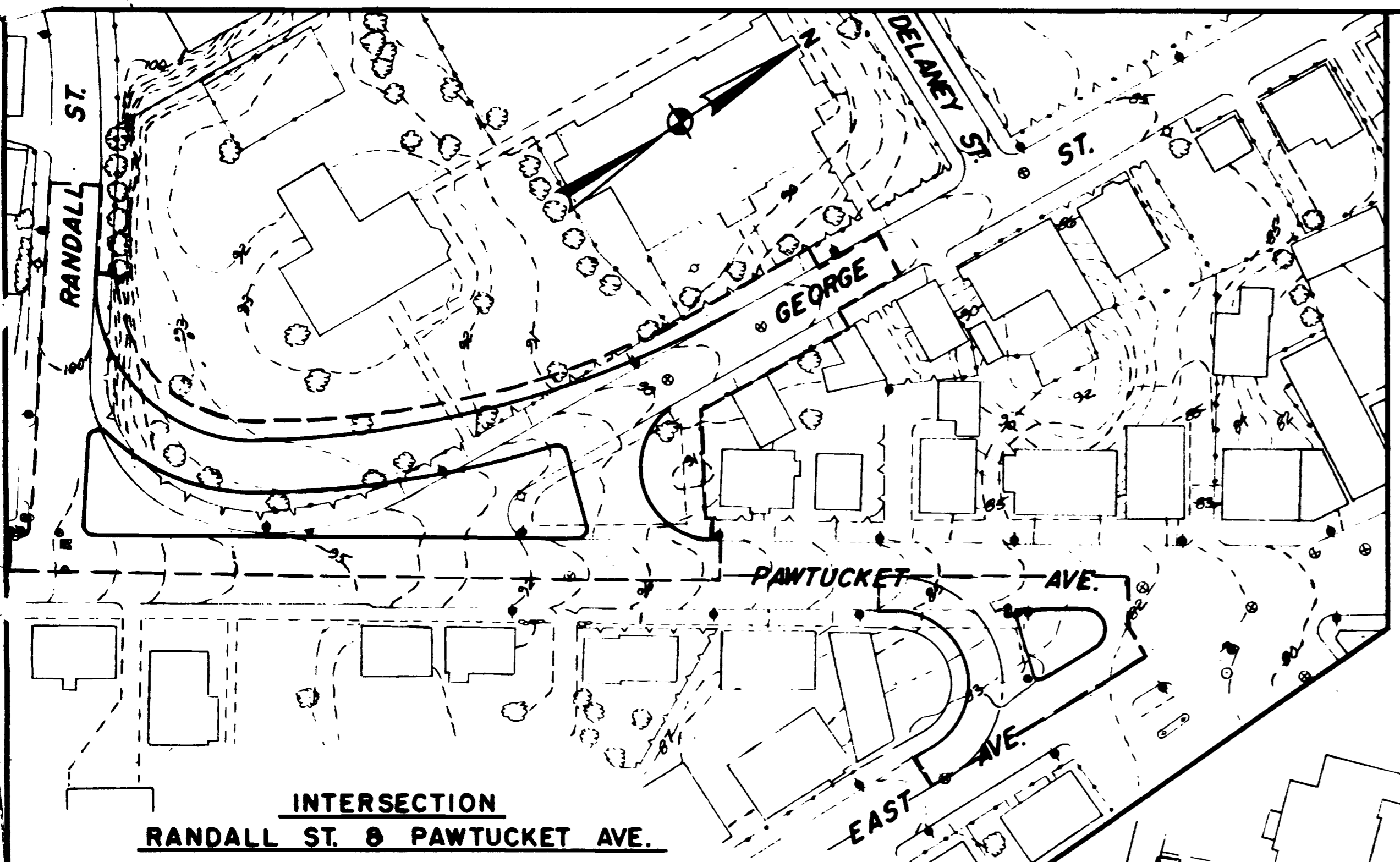
CHARLES A. MAGUIRE & ASSOCIATES
 ENGINEERS
 PROVIDENCE, R. I. BOSTON, MASS.
 DATE FILE NO. 711
 SCALE 1" = 200' SHEET 3 OF 223

APPROVED _____ SET NO. _____
 ENGINEER PRINTED
 APPROVED _____
 PRINCIPAL HIGHWAY ENGINEER ISSUED
 FINAL DATE _____

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	R.I.	I-01-(II)	57	4	223

LEGEND AND NOTES

-  Building to be demolished
 -  Bore Hole Location
 -  Limit of Work under this contract
- For Bore Hole Details See Sheet Nos. 8 Thru 13



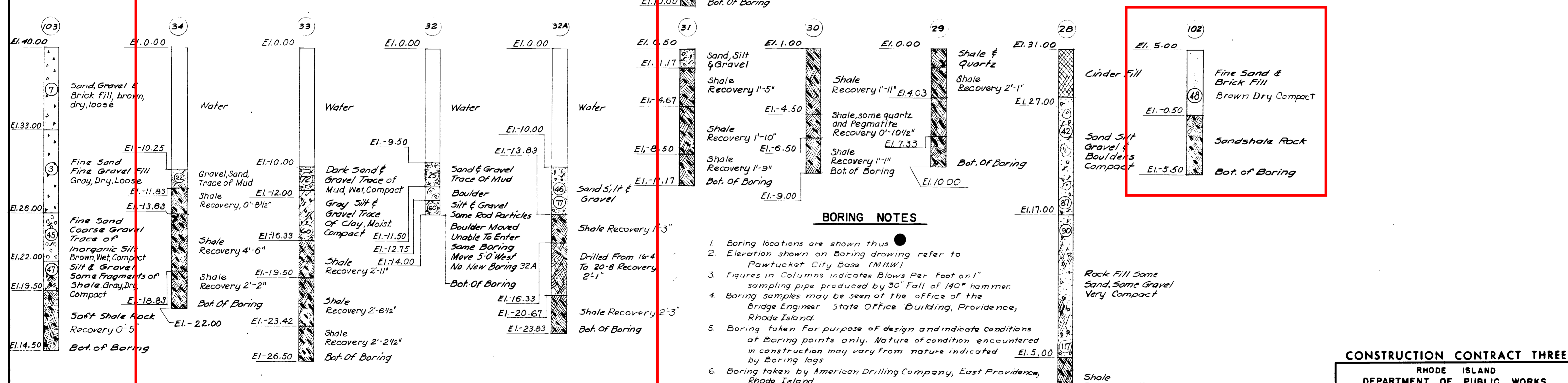
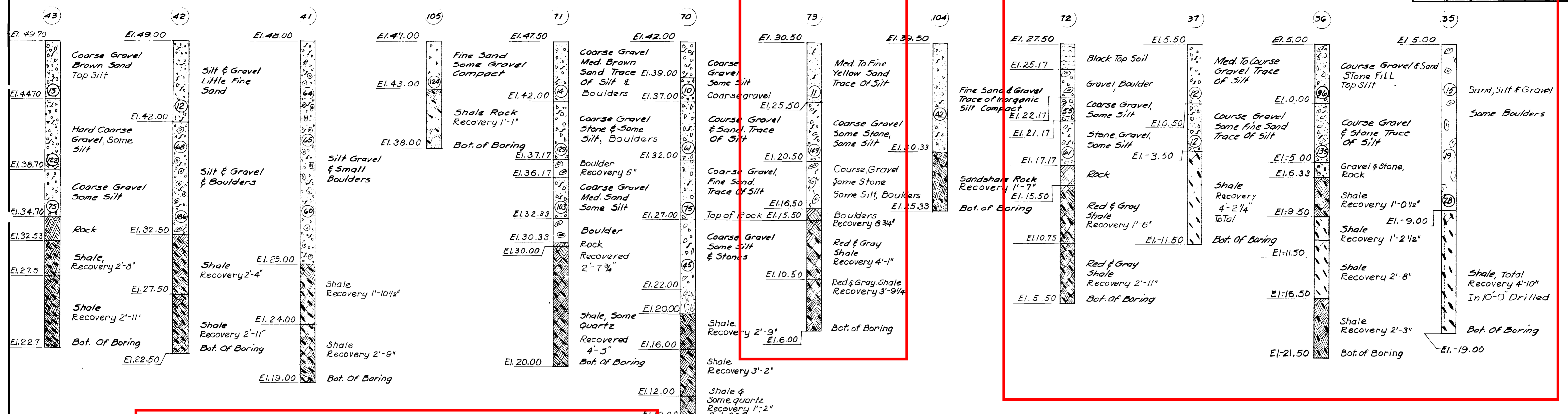
INTERSECTION
RANDALL ST. & PAWTUCKET AVE.



CONSTRUCTION CONTRACT THREE
 RHODE ISLAND
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF ROADS AND BRIDGES
DIVISION STREET PROJECT
 R.I. PROJECT NO. II-01-(II)
 PAWTUCKET, RHODE ISLAND
SITE & BORING PLAN No. 1

CHARLES A. MAGUIRE & ASSOCIATES
 ENGINEERS
 PROVIDENCE, R.I. BOSTON, MASS.
 DATE FILE NO. 711
 SCALE 1"=50' SHEET 4 OF 223

APPROVED _____	ENGINEER	PRINTED _____
APPROVED _____	PRINCIPAL HIGHWAY ENGINEER	ISSUED TO _____
FINAL DATE _____		



BORING NOTES

- Boring locations are shown thus ●
- Elevation shown on Boring drawing refer to Pawtucket City Base (M.H.W.)
- Figures in Columns indicates Blows Per Foot on 1" sampling pipe produced by 30" Fall of 140" hammer.
- Boring samples may be seen at the office of the Bridge Engineer State Office Building, Providence, Rhode Island.
- Boring taken for purpose of design and indicate conditions at Boring points only. Nature of condition encountered in construction may vary from nature indicated by Boring logs.
- Boring taken by American Drilling Company, East Providence, Rhode Island.
- Description of strata shown is combined with description of individual samples recovered.
- Where ground water level is shown, it indicates the Elev. of ground water at the time boring was taken and does not necessarily indicate the elev. of ground water at present.
- For boring legend see sheet no. 9.

CONSTRUCTION CONTRACT THREE

RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS
DIVISION OF ROADS AND BRIDGES

DIVISION STREET PROJECT

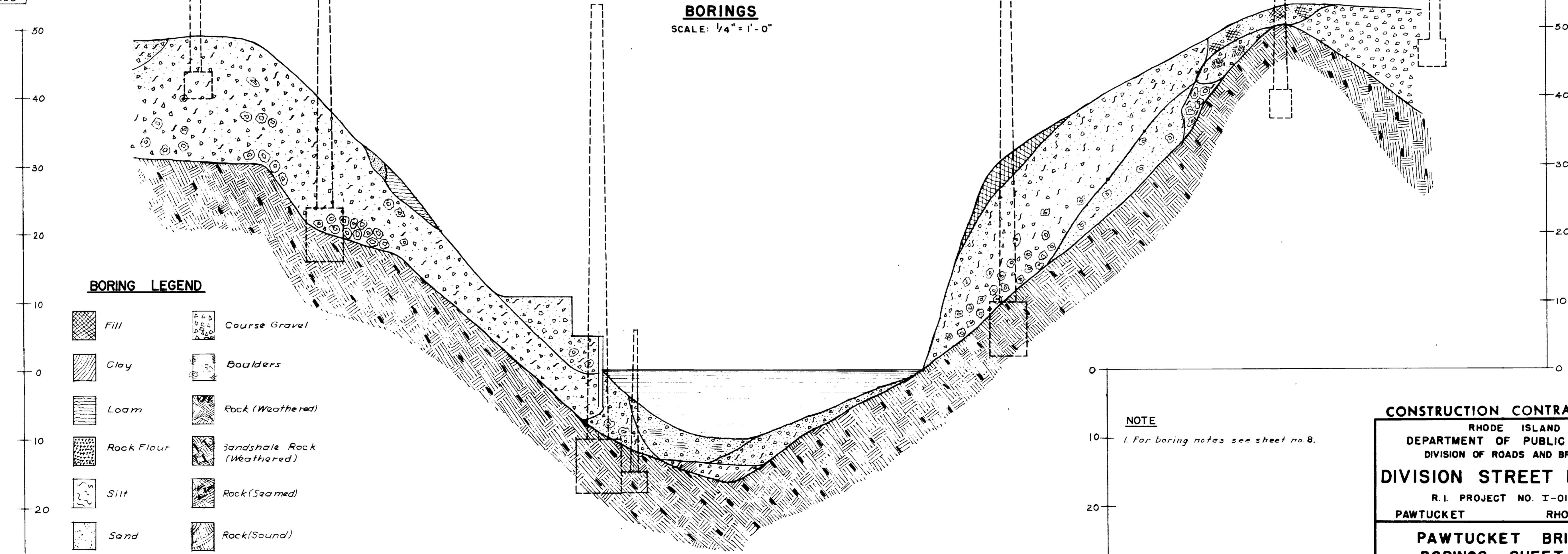
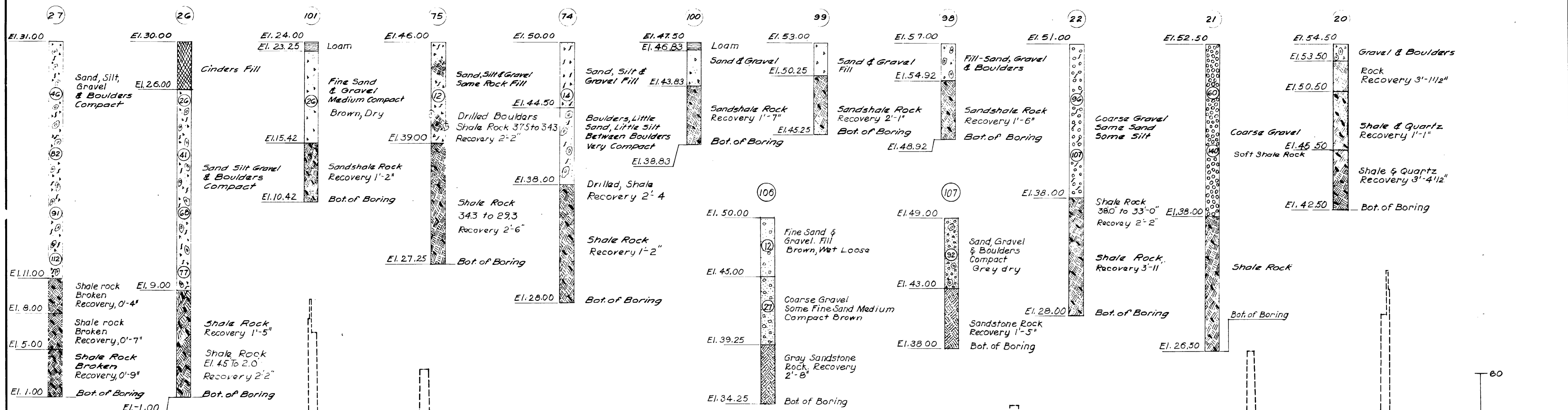
R.I. PROJECT NO. I-01-(11)

PAWTUCKET RHODE ISLAND

PAWTUCKET BRIDGE BORINGS — SHEET I

CHARLES A. MAGUIRE & ASSOCIATES
ENGINEERS
PROVIDENCE, R.I. BOSTON, MASS.
DATE: 1/4-1-0" FILE NO. 711
SCALE: 1/4" = 1'-0" SHEET 8 OF 223

APPROVED _____	SET NO. _____
APPROVED _____	ENGINEER PRINTED _____
APPROVED _____	ISSUED TO _____
APPROVED _____	PRINCIPAL HIGHWAY ENGINEER



BORING LEGEND

	Fill		Course Gravel
	Clay		Boulders
	Loam		Rock (Weathered)
	Rock Flour		Sandshale Rock (Weathered)
	Silt		Rock (Seamed)
	Sand		Rock (Sound)
	Fine Gravel		Hard Pan

NOTE
1. For boring notes see sheet no. 8.

CHARLES A. MAGUIRE & ASSOCIATES
ENGINEERS
PROVIDENCE, R.I. BOSTON, MASS.
DATE FILE NO. 711
SCALE: AS NOTED SHEET 9 OF 223

CONSTRUCTION CONTRACT THREE
RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS
DIVISION OF ROADS AND BRIDGES
DIVISION STREET PROJECT
R.I. PROJECT NO. I-01-(11)
PAWTUCKET RHODE ISLAND
**PAWTUCKET BRIDGE
BORINGS - SHEET 2**

APPROVED: _____ SET NO. _____
ENGINEER PRINTED
APPROVED: _____
PRINCIPAL HIGHWAY ENGINEER ISSUED TO _____
FINAL DATE

Taft St. – Pleasant St. Branch Interceptor

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
BLACKSTONE VALLEY SEWER DISTRICT COMMISSION
PROVIDENCE, RHODE ISLAND

TAFT ST.-PLEASANT ST. BRANCH INTERCEPTER
SECTION B

INLET CHAMBER
DETAILS FOUND IN
THIS CONTRACT... "18"

CONTRACT DRAWINGS

CONTRACT 18

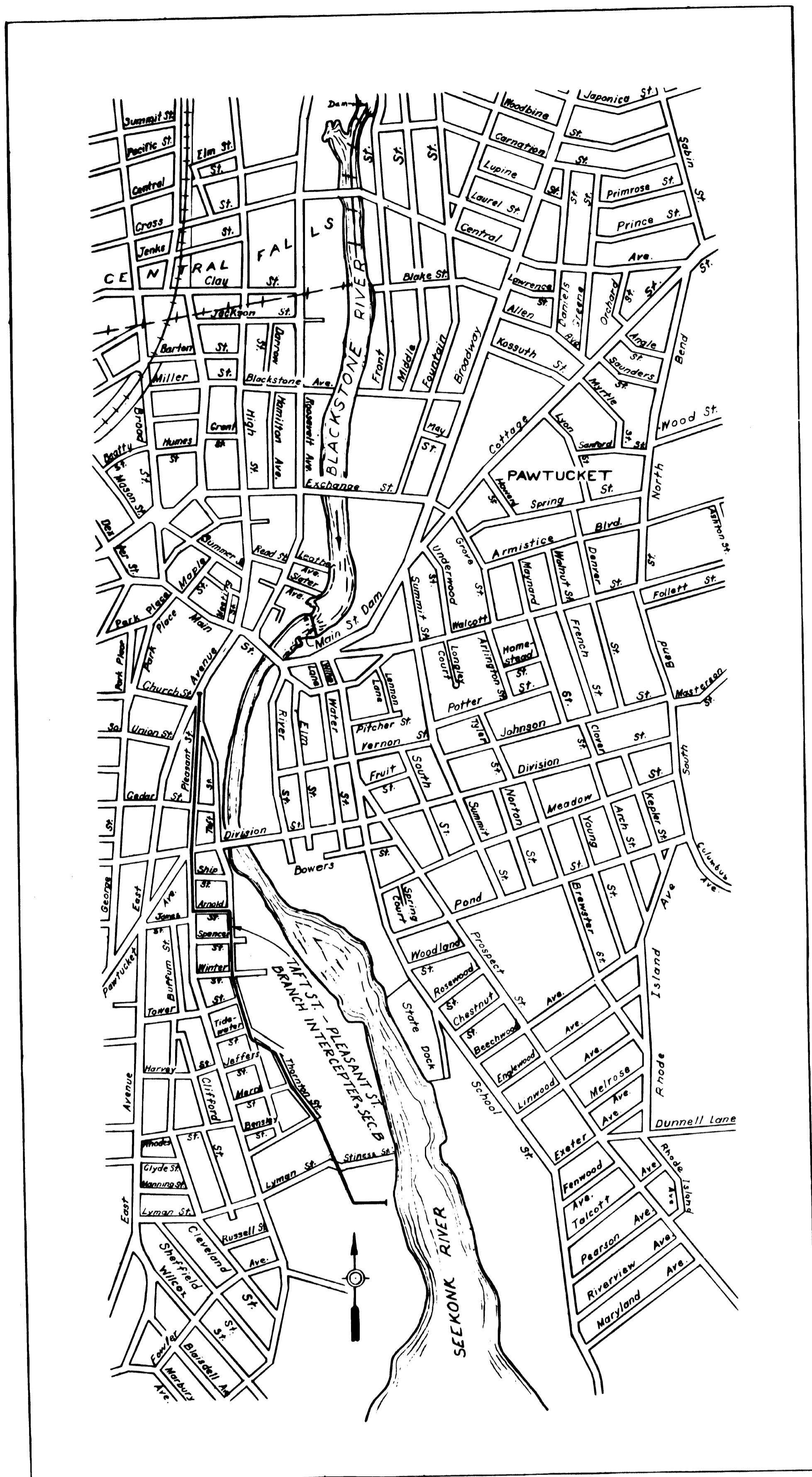
1950

HONORABLE JOHN O. PASTORE, GOVERNOR

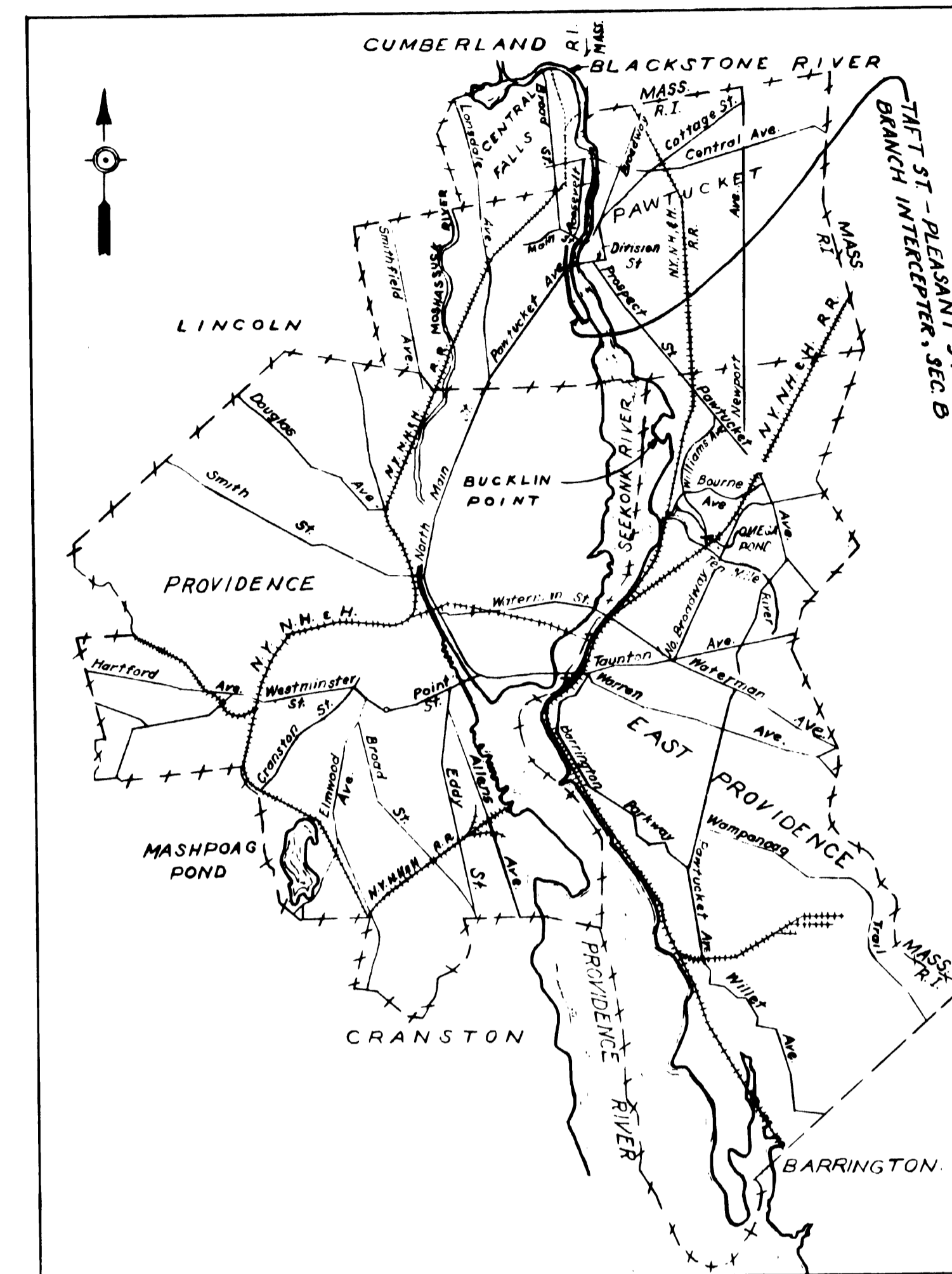
WILLIAM J. HALLORAN	CHAIRMAN
LUGI SCALA	FIRST VICE CHAIRMAN
HAROLD J. CREEDON	SECOND VICE CHAIRMAN
PHILIP S. MANCINI	EX - OFFICIO
EDWARD A. McLAUGHLIN, M.D.	EX - OFFICIO
ANGELO A. BONVICIN	EXECUTIVE SECRETARY
CHARLES G. HAMMANN	CHIEF ENGINEER

METCALF & EDDY
ENGINEERS
BOSTON, MASS.

2111
H
21627



VICINITY PLAN
SCALE: 1" = 600'

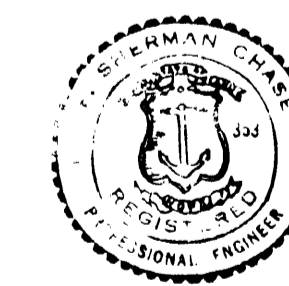


LOCATION MAP
SCALE: 1" = 6000'

LIST OF DRAWINGS

SHEET NO.	TITLE	SHEET NO.	TITLE
1	VICINITY PLAN AND LOCATION MAP - LIST OF DRAWINGS	20	TIDEWATER ST. SEWER CONNECTION - PART I OF II
2	PLAN AND PROFILE - STA. 7+00± TO STA. 12+00	21	" " " " PART II OF II
3	" " " " STA. 12+00 TO STA. 24+00	22	PLEASANT ST. SEWER CONNECTION - PART I OF II
4	" " " " STA. 24+00 TO STA. 36+00	23	" " " " PART II OF II
5	" " " " STA. 36+00 TO STA. 48+00	24	EAST AVENUE SEWER CONNECTION - PART I OF II
6	" " " " STA. 48+00 TO STA. 54+37.74	25	" " " " PART II OF II
7	BYPASS CONDUIT	26	JUNCTION CHAMBER AT PLEASANT ST.
8	SEWER AND TRENCH SECTIONS - UNDERDRAIN DETAILS		
9	MANHOLE DETAILS		
10	MISCELLANEOUS DETAILS		
11	SIPHON INLET STRUCTURE - PART I OF V		
12	" " " " PART II OF V		
13	" " " " PART III OF V		
14	" " " " PART IV OF V		
15	" " " " PART V OF V		
16	JUNCTION CHAMBER AT LYMAN ST. - PART I OF II		
17	" " " " PART II OF II		
18	MERRY ST. SEWER CONNECTION - PART I OF II		
19	" " " " PART II OF II		

DRAWN BY G.K.W.
TRACED BY W.S. D.W.S.
CHECKED BY D.M.R.



APPROVED
FOR METCALF & EDDY, ENGINEERS
R. I. REG. PROF. ENGR. NO. 353 DATE

RECORD PLAN

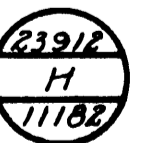
BLACKSTONE VALLEY SEWER DISTRICT COMMISSION
PROVIDENCE, RHODE ISLAND

TAFT ST. - PLEASANT ST.
BRANCH INTERCEPTER
SECTION B

VICINITY PLAN AND LOCATION MAP
LIST OF DRAWINGS

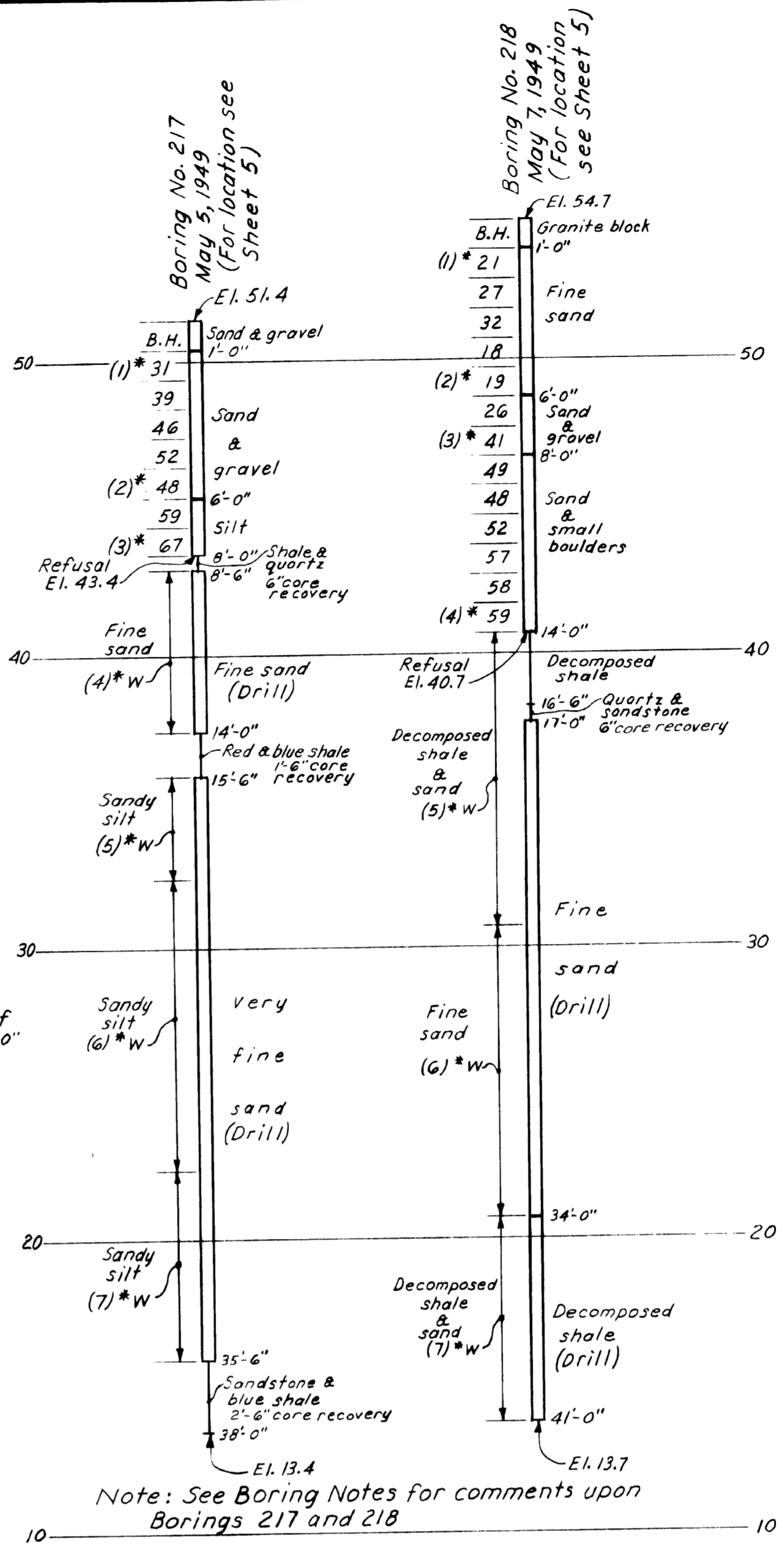
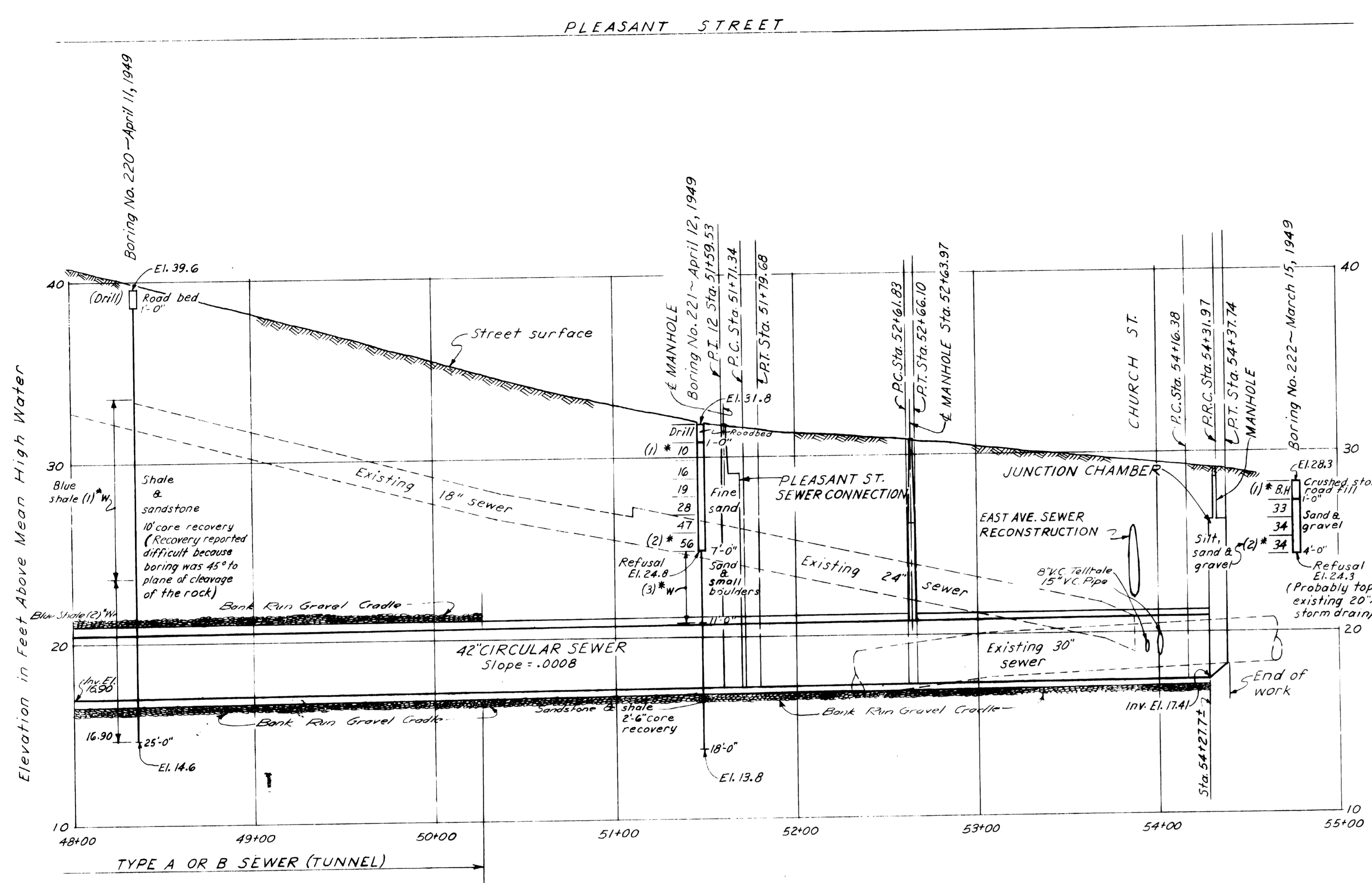
SCALE: AS SHOWN OCTOBER 1950

METCALF & EDDY
ENGINEERS
BOSTON, MASS.



CONTRACT 18 SHEET 1 OF 28

2397
H
1787



BORING AND BAR SOUNDING NOTES

An asterisk (*) indicates a point at which a sample of material was taken from the boring. The figure adjacent to the asterisk, in parentheses, is the sample number. "B.H." indicates that the sample was taken "by hand," without use of a spoon. "Drill" means that the boring was within the indicated limits was made by diamond drill rather than by the wash-boring method. "W" means that the sample was obtained by catching the wash-water in a bucket or jar as it left the casing during drilling operations, the sample being composed of materials carried by the wash-water.

The other figures alongside the boring, at 1'-0" intervals, indicate the penetration, this being the number of blows required to drive an open-end 2" diameter spoon into the material a distance of 1'-0" at the point where the penetration was measured, using a 140-lb. weight falling through a distance of approximately 2'-6", ahead of the washing.

"Refusal" of the borings when 50 or more blows of the weight on the spoon produced zero penetration. Bar soundings were made by driving into the ground a 1 1/2" round iron bar, made up of sections threaded together, driven by dropping a 300-lb. weight on it. The bar had a wedge-shaped chopping bit. "Refusal" at the bar soundings was reported when additional penetration of the iron bar into the ground could not be obtained.

Bar sounding T-7 made at Sta. 11+88± is not shown because sounding T-7A, located about 3'-0" away, penetrated several feet deeper. Sounding T-7 was made by manually driving into the ground a pointed 1" round iron bar by use of an 8-lb. sledge hammer. "Refusal" was reported at elevation 20.4 at this sounding.

Borings 217 and 218 were considered to be erroneous or misleading because the material reported to be "fine sand" was removed by diamond drill rather than by wash-boring method. Borings 217A and 218A were there-upon made nearby, using wash-boring methods where possible, with the result that Borings 217 and 218 were shown to be possibly incorrect in indicating "fine sand" at certain elevations. Therefore Borings 217A and 218A are shown on the profile, Sheet 5, rather than Borings 217 and 218.

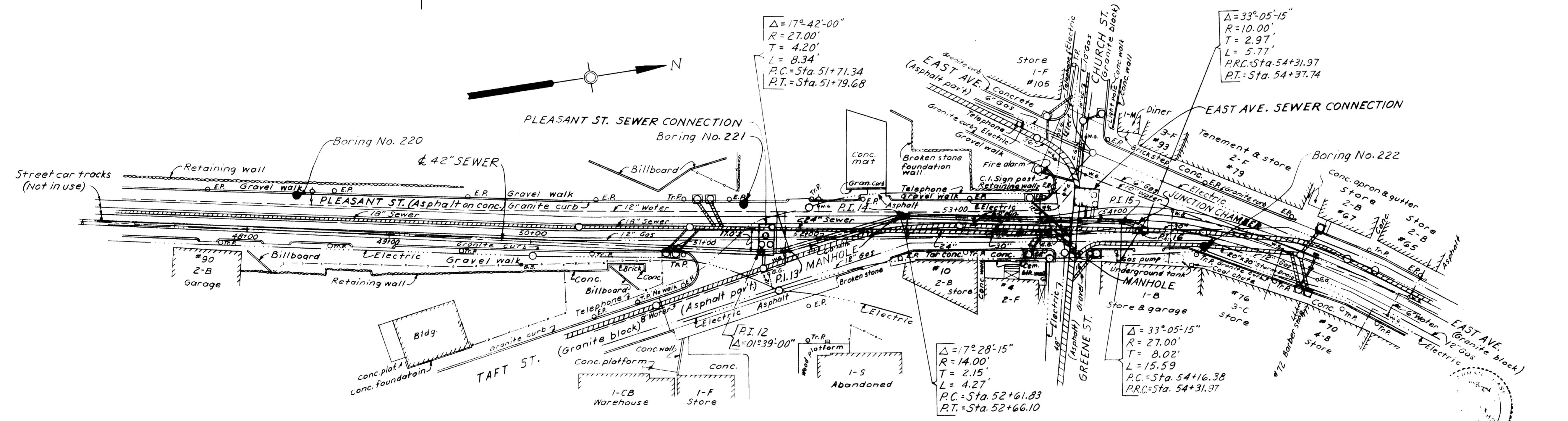
No guarantee is given as to the character of the material encountered in any boring, nor is any guarantee given that borings or bar soundings represent the true character of the material which will be excavated or which will underlie the proposed structures or that groundwater conditions will be as stated.

For additional information upon borings and bar soundings, including information upon groundwater, see the "Information for Bidders."

Note: See Boring Notes for comments upon Borings 217 and 218

TABLE SHOWING DIAMOND-DRILL BORINGS MADE

Boring No.	Diamond-drill boring, depth from ground surface	
	From	To
206 A	15'-0"	16'-0"
	26'-0"	48'-0"
216	14'-0"	24'-8"
	35'-7"	36'-0"
217	8'-0"	38'-0"
217 A	12'-0"	13'-0"
	16'-0"	17'-0"
	19'-0"	41'-0"
218	4'-0"	41'-0"
218 A	6'-0"	7'-0"
	11'-0"	12'-0"
	14'-0"	15'-0"
	20'-0"	44'-0"
219	9'-0"	33'-0"
220	0'-0"	25'-0"
221	0'-0"	1'-0"
	7'-0"	18'-0"



DRAWN BY F.T.O.
TRACED BY F.T.O.
CHECKED BY F.C.T., C.F.V.

APPROVED
FOR METCALF & EDDY, ENGINEERS
R. J. REG. PROF. ENGR. NO. 353 DATE

BLACKSTONE VALLEY SEWER DISTRICT COMMISSION
PROVIDENCE, RHODE ISLAND

**TAFT ST. - PLEASANT ST.
BRANCH INTERCEPTER
SECTION B**

PLAN AND PROFILE
STA. 48+00 TO STA. 54+37.74

SCALE: HOR. 1" = 40'
VERT. 1" = 4'

OCTOBER 1950

RECORD DRAWING
MARCH, 1953. E.K.

METCALF & EDDY
ENGINEERS
BOSTON, MASS.

CONTRACT 16 SHEET 6 OF 20

Phase IIIA-5 Historic Data

Pawtucket Tunnel RFP GDR



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BORING NUMBER B17-41

PAGE 1 OF 1

TEST BORING REPORT

PROJECT NAME Narragansett Bay Commission Phase III CSO Program
CLIENT NBC/Stantec
CONTRACTOR New England Boring Contractors, Inc.

PROJECT NO. 13:308.00D/14106.02
START 5/3/2018
FINISH 5/4/2018
DRILLER NEBC
LOGGED BY HMS
CHECKED BY SJM
ELEVATION 12.8
DATUM NGVD 1929
NORTHING 287414.433
EASTING 359504.663
LOCATION Taft Street near Division Street Bridge

	CASING	SAMPLER	BARREL	DRILLING EQUIPMENT & PROCEDURES
Type	Steel	Split Spoon	HQ3	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	4	1 3/8	2 3/8	Bit Type: 3 7/8" Tricone
Hammer Weight (lb.)	140	140	N/A	Drill Fluid: Water
Hammer Fall (in.)	30	30	N/A	Casing: 4" Hoist/Hammer: Automatic Hammer

TEST BORING REPORT - GINT STD US LAB.GDT - 8/6/19 11:11 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS\14106.02 BORING LOGS.GPJ

DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION (Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	DRILLING NOTES
0	12.8								Approximately 9" Pavement.	9" PAVEMENT
		X								
		10	9-10-12-72 (22)	S-1	15 / 24	0.75 - 2.75	SW-SM		A: Wet, medium dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt. B: Wet, very dense, purple/brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt.	1A: PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs. 1B: PID = 0.0 ppm
		18							No Recovery.	
		97	146	S-2	0 / 6	2.75 - 3.25				
5	7.8	X	28-9-7-3 (16)	S-3	8 / 24	4 - 6	GW		Wet, medium dense, purple/brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
		X								
		X	3-3-4-7 (7)	S-4	5 / 24	6 - 8	GW		Wet, loose, brown, coarse GRAVEL, some fine gravel, little fine to coarse sand, trace silt.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
		X								
		X	3-2-7-17 (9)	S-5	5 / 24	8 - 10	SW-SM		Wet, loose, brown, fine to coarse SAND and fine coarse GRAVEL, little silt.	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
10	2.8	X								
		X	6-3-8-19 (11)	S-6	3 / 24	10 - 12	GW		Wet, medium dense, brown, coarse GRAVEL, little fine to coarse sand, trace silt, trace fine gravel.	PID = 0.0 ppm
		X								
		X	14-10-16-18 (26)	S-7	13 / 24	12 - 14	GW-GM		Wet, medium dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt.	PID = 0.0 ppm
		X								
		X	22-23-33-39 (56)	S-8	11 / 24	14 - 16	GW		Wet, very dense, tan/gray, fine to coarse GRAVEL, little fine to coarse sand, trace silt, trace clay. (Possible weathered Sandstone)	PID = 0.0 ppm
15	-2.2	X								
		X	27-56-87-51 (143)	S-9	19 / 24	16 - 18	SW		A: Wet, very dense, gray, fine to coarse SAND, some fine gravel, trace silt, trace coarse gravel. B: Wet, very dense, gray, fine to coarse GRAVEL and fine to coarse SAND, little silt. (Possible weathered Sandstone)	PID = 0.0 ppm
			103/4"	S-10	2 / 4	18 - 18.3			Wet, very dense, gray, weathered SANDSTONE recovered as fine to coarse gravel, trace fine to coarse sand, trace silt.	PID = 0.0 ppm
Bottom of borehole at 18.30 feet.										

WATER LEVEL DATA				SAMPLE IDENTIFICATION		REMARKS:
DATE/TIME	DEPTH (ft.) TO:			O Open End Rod	T Thin Wall Tube	
	BOTTOM OF CASING	BOTTOM OF HOLE	WATER			
				U Undisturbed Sample	S Split Spoon	1. No casing blows for the first foot. NEBC set and reset casing to make sure casing was plum. 2. Used 140 lb. hammer for casing blows from 2'-4'. 3. Starting at 4', NEBC used the kelly and weight of the drilling to advance casing. 4. NEBC determined weathered bedrock began at approximately 18.3'. NEBC advanced roller bit to competent rock at approximately 21.1'. 5. "X" within casing blows indicates blows were not counted at that interval.
				G Geoprobe		



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BORING NUMBER B17-41

PAGE 1 OF 1

CORE BORING REPORT

PROJECT NO. 13:308.00D/14106.02

CORE BORING REPORT - CORE BORING REPORT.GDT - 8/6/19 11:27 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIP-PHASE III FIELD WORKBORING LOGS\14106.02 CORE BORING LOGS.GPJ

DEPTH (ft)	DRILL RATE (min/ft)	RUN NO.	DEPTH (ft)	ELEV. (ft)	REC (in/%)	RQD (in/%)	DISCON (#/ft)	GRAPHIC LOG	STRAT. DEPTH	VISUAL DESCRIPTION AND REMARKS	DISCONTINUITIES									
											Depth (ft)	Type	Apt (mm)	Dip Angle	Rgh	Wea	Infill			
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
18.5										Weathered Rock - No Sample Taken										
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5	2.5	C-1	21.1 - 25	-8.3 - -12.2	47 100%	37 79%	1		21.1	Strong, gray, conglomeratic SANDSTONE, massive, fresh. - Quartz vein at 21.5', 5 mm±. - Quartz vein at 22.1', 3 mm±. - Quartz vein at 22.2', 2 mm±.	21.3	J	1	45	SR	F	None			
22.0	4.75																			
22.5	2.5						3				22.0 22.5 22.7	J J J	1 1 1	45 45 45	R SM SM	SW F F	Fe None None			
23.0																				
23.5	2.75						1		23.0	Strong, gray/blue, fine to coarse SANDSTONE interlaminated with Siltstone, fresh. - Bedding planes at 40°-50°.	23.3	B	1	45	SM	F	None			
24.0																				
24.5	1.5						ECF (4±)				24.0 24.2 24.7 24.8-24.9	B B B ECF	1 1 1 -	45 40 45 -	SR SM SM SR	F SW SW SW	None Fe SI Fe			
25.0							7													
25.5										Bottom of borehole at 25.0 feet.										
26.0																				
26.5																				
27.0																				
27.5																				
28.0																				
28.5																				
29.0																				
29.5																				
30.0																				

REMARKS:
 1. Dip angles are measured from horizontal (i.e., perpendicular to the core axis).
 2. Wash color white.
 3. Flush return blocked at approximately 22.8'. Driller moved casing up and down to unblock.
 4. Boring was backfilled with cement bentonite grout from 25.0 feet to the ground surface. No groundwater monitoring well was installed.

WATER LEVEL DATA			
DATE/TIME	BOT. OF SOIL CASING (ft)	BOT. OF HOLE (ft)	WATER

GROUND SURFACE EL. 12.8 Note: Refer to the key sheets within the Geotechnical Design Report for the description of rock classification system codes.



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BORING NUMBER B17-42

PAGE 1 OF 2

TEST BORING REPORT

PROJECT NAME Narragansett Bay Commission Phase III CSO Program
CLIENT NBC/Stantec
CONTRACTOR New England Boring Contractors, Inc.

PROJECT NO. 13:308.00D/14106.02
START 5/4/2018
FINISH 5/7/2018
DRILLER NEBC
LOGGED BY HMS
CHECKED BY SJM
ELEVATION 42.9
DATUM NGVD 1929
NORTHING 285819.753
EASTING 359764.101
LOCATION Taft Street at Merry Street

	CASING	SAMPLER	BARREL	DRILLING EQUIPMENT & PROCEDURES
Type	Steel	Split Spoon	HQ3	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	4	1 3/8	2 3/8	Bit Type: 3 7/8" Tricone
Hammer Weight (lb.)	140	140	N/A	Drill Fluid: Water
Hammer Fall (in.)	30	30	N/A	Casing: 4" Hoist/Hammer: Automatic Hammer

TEST BORING REPORT - GINT STD US LAB.GDT - 8/15/19 10:16 - Y:JOBS14 JOBS14106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS14106.02 BORING LOGS.GPJ

DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION (Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	DRILLING NOTES
0	42.9								Approximately 8" Pavement	8" PAVEMENT
		X					N/A			
		X	18-18-21-30 (39)	S-1	19 / 24	0.67 - 2.67	SP-SM		Moist, dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt. (FILL)	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (3) VOAs.
		X	25-20-23	S-2	15 / 18	2.67 - 4	SW		Moist, dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt. (FILL)	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
5	37.9	X	21-28-29-27 (57)	S-3	16 / 24	4 - 6	SW		Moist, very dense, brown, fine to coarse SAND, some fine gravel, little coarse gravel, trace silt. (FILL)	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs.
		X	34-27-25-30 (52)	S-4	34 / 24	6 - 8	SW		Moist/wet, very dense, brown, fine to coarse SAND, some fine to coarse gravel, trace silt. (FILL)	PID = 0.0 ppm Environmental sample taken. (1) 8 oz. Amber, (2) VOAs. Water at approximately 7.5'.
		X	32-41-25-104/2"	S-5	14 / 20	8 - 10	GW-GM GW-GM		A: Wet, very dense, brown, fine to coarse SAND and fine GRAVEL, trace silt. (FILL) B: Wet, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt.	PID = 0.0 ppm 2" of fill then strata change. 1' boulder at approximately 10'.
15	27.9	X	49-71-103/1"	S-6	8 / 13	14 - 15.1	GW		Wet, very dense, brown, fine to coarse GRAVEL, little fine to coarse sand, trace silt.	PID = 0.0 ppm Boulder at approximately 15'1", weathered rock in tip.
		X								Wash color brown advanced roller bit through boulder to approximately 17'.
		X	20-12-18-16 (30)	S-7	11 / 24	17 - 19	GP		Wet, medium dense/dense, tan, coarse GRAVEL, some fine gravel, little fine to coarse sand, trace silt.	PID = 0.0 ppm
20	22.9	X	23-21-14-25 (35)	S-8	15 / 24	19 - 21	GW		Wet, dense, tan, fine to coarse GRAVEL and some fine to coarse SAND, trace silt.	PID = 0.0 ppm
		X	19-25-104/1"	S-9	7 / 13	21 - 22.1	GM		Wet, very dense, tan, fine to coarse GRAVEL and fine to coarse SAND, little silt.	PID = 0.0 ppm Obstruction at ~22'.
		X								
		X								
25	17.9		82/2"	S-10	1 / 2	24 - 24.2	SW		Wet, very dense, tan, fine to coarse SAND and fine GRAVEL, trace coarse gravel, trace silt.	PID = 0.0 ppm

WATER LEVEL DATA

DATE/TIME	DEPTH (ft.) TO:		
	BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

REMARKS:

1. NEBC attempted a sample at 26'; however, the spoon was bouncing and did not advance.
2. "X" within casing blows indicates that blows were not counted at that interval.

(Continued Next Page)



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BORING NUMBER B17-42
 PAGE 2 OF 2

TEST BORING REPORT

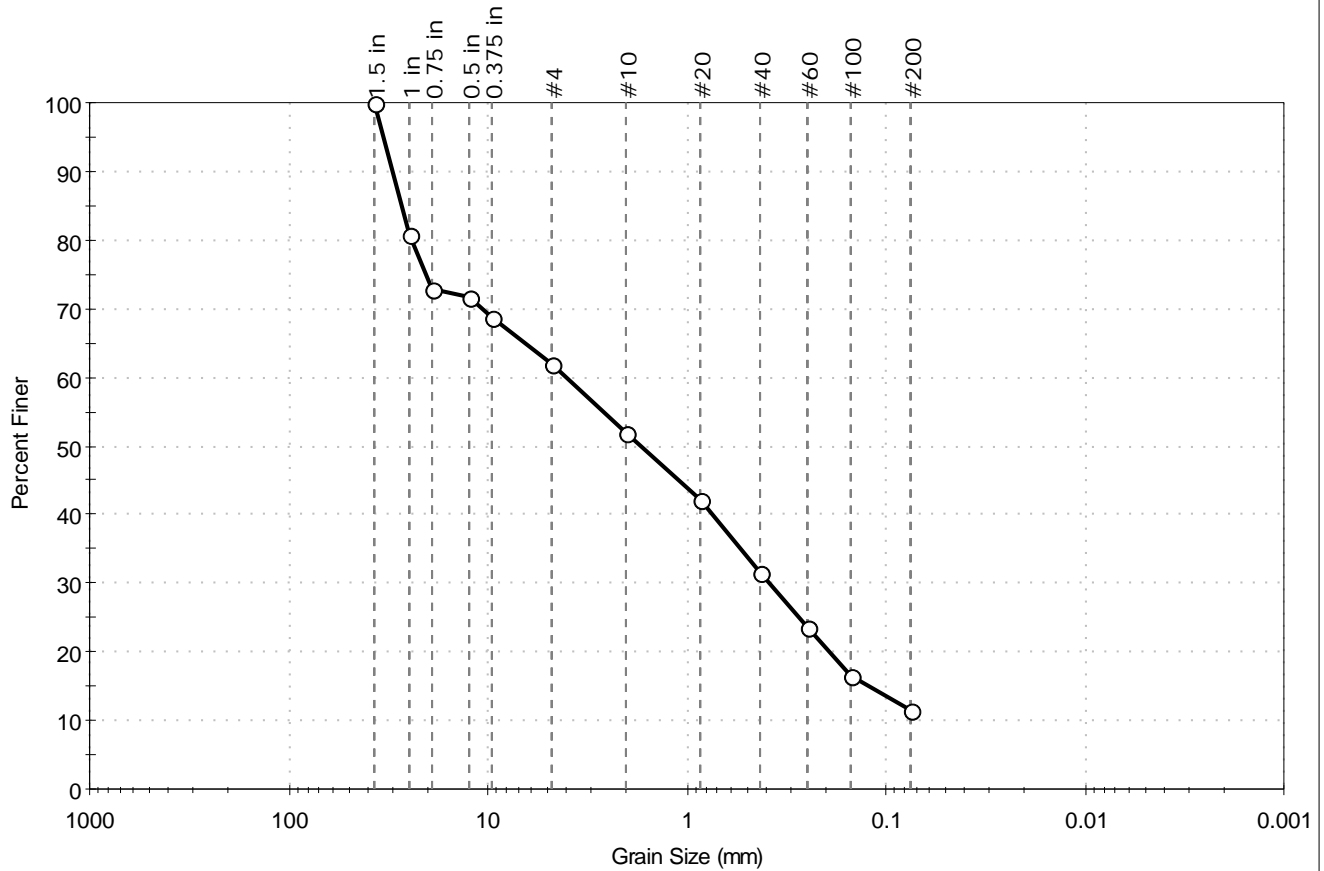
DEPTH (ft)	ELEVATION (ft)	CASING BLOWS	SPT	SAMPLE NO.	REC (in) / PEN (in)	SAMPLE DEPTH (ft)	USCS SYMBOL	GRAPHIC LOG	VISUAL-MANUAL IDENTIFICATION & DESCRIPTION <small>(Density/consistency, color, max. particle size, structure, odor, moisture, optional descriptions, geologic interpretation)</small>	DRILLING NOTES
25	17.9									
			50/0"	S-11	0 / 0	26 - 26			Bottom of borehole at 26.00 feet.	

TEST BORING REPORT - GINT STD US LAB.GDT - 8/15/19 10:16 - Y:\JOBS\14 JOBS\14106.02 NBC PHASE III CSO CER-RIPPHASE III FIELD WORKBORING LOGS\14106.02 BORING LOGS.GPJ



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-41	Sample Type:	jar
Sample ID:	S-1A	Test Date:	05/29/18
Depth :	0.75-2.75	Checked By:	emm
Test Comment:	---		
Visual Description:	Moist, dark grayish brown sand with silt and gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	38.2	50.2	11.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	81		
0.75 in	19.00	73		
0.5 in	12.50	72		
0.375 in	9.50	69		
#4	4.75	62		
#10	2.00	52		
#20	0.85	42		
#40	0.42	32		
#60	0.25	24		
#100	0.15	17		
#200	0.075	12		

<u>Coefficients</u>	
D ₈₅ = 27.3599 mm	D ₃₀ = 0.3803 mm
D ₆₀ = 4.0503 mm	D ₁₅ = 0.1202 mm
D ₅₀ = 1.6817 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

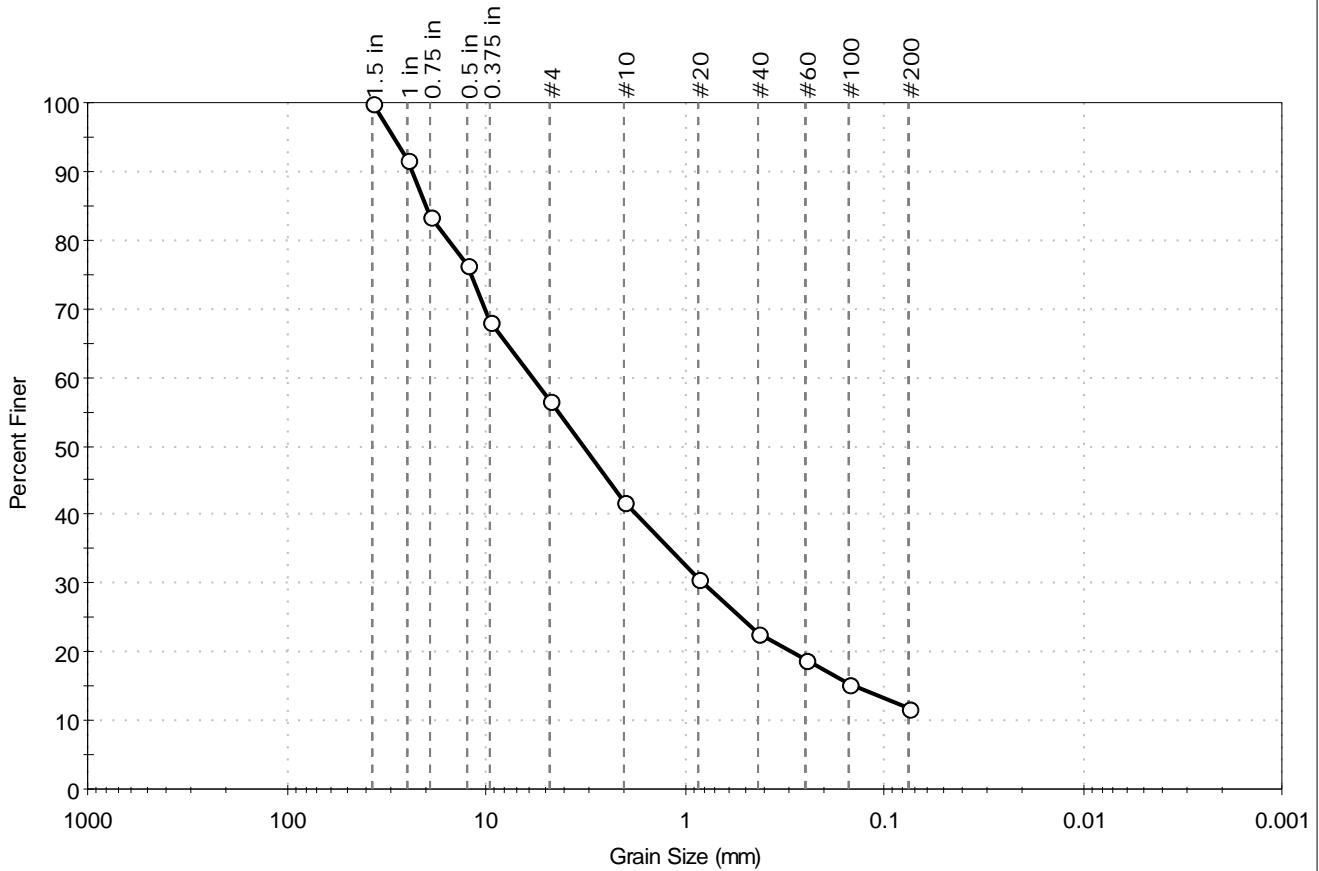
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-41	Sample Type:	jar
Sample ID:	S-5	Test Date:	05/29/18
Depth :	8-10	Checked By:	emm
		Test Id:	456244
Test Comment:	---		
Visual Description:	Moist, dark brown sand with silt and gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	43.2	45.0	11.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	92		
0.75 in	19.00	84		
0.5 in	12.50	77		
0.375 in	9.50	68		
#4	4.75	57		
#10	2.00	42		
#20	0.85	31		
#40	0.42	23		
#60	0.25	19		
#100	0.15	15		
#200	0.075	12		

<u>Coefficients</u>	
D ₈₅ = 19.9511 mm	D ₃₀ = 0.8089 mm
D ₆₀ = 5.8038 mm	D ₁₅ = 0.1408 mm
D ₅₀ = 3.2100 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

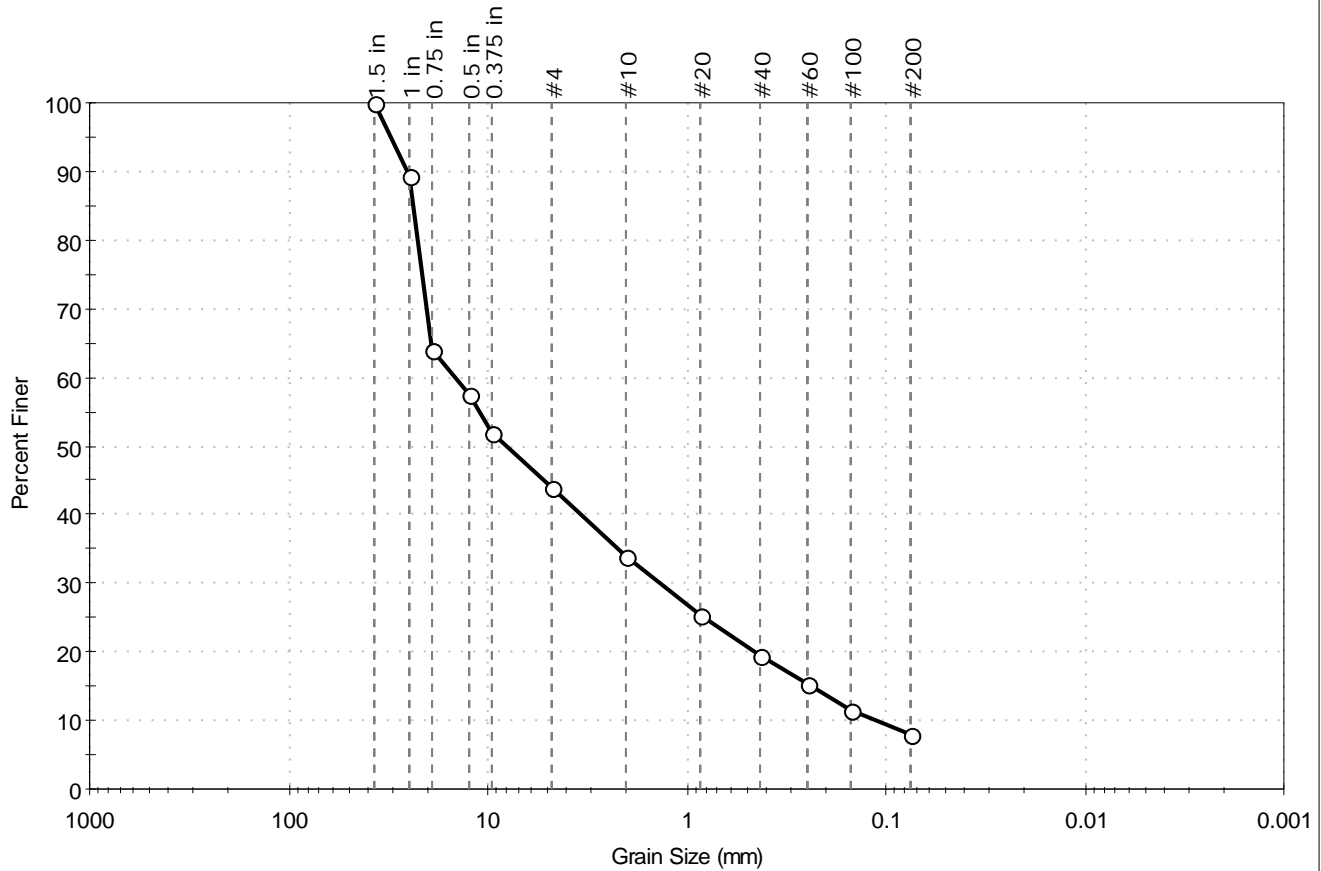
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-41	Sample Type:	jar
Sample ID:	S-7	Test Date:	06/14/18
Depth :	12-14	Checked By:	emm
		Test Id:	457944
Test Comment:	---		
Visual Description:	Moist, redish dark gray gravel with silt and sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	56.2	35.8	8.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	89		
0.75 in	19.00	64		
0.5 in	12.50	58		
0.375 in	9.50	52		
#4	4.75	44		
#10	2.00	34		
#20	0.85	25		
#40	0.42	19		
#60	0.25	15		
#100	0.15	12		
#200	0.075	8.0		

<u>Coefficients</u>	
D ₈₅ = 23.8175 mm	D ₃₀ = 1.3494 mm
D ₆₀ = 14.6163 mm	D ₁₅ = 0.2358 mm
D ₅₀ = 8.0521 mm	D ₁₀ = 0.1103 mm
C _u = 132.514	C _c = 1.129

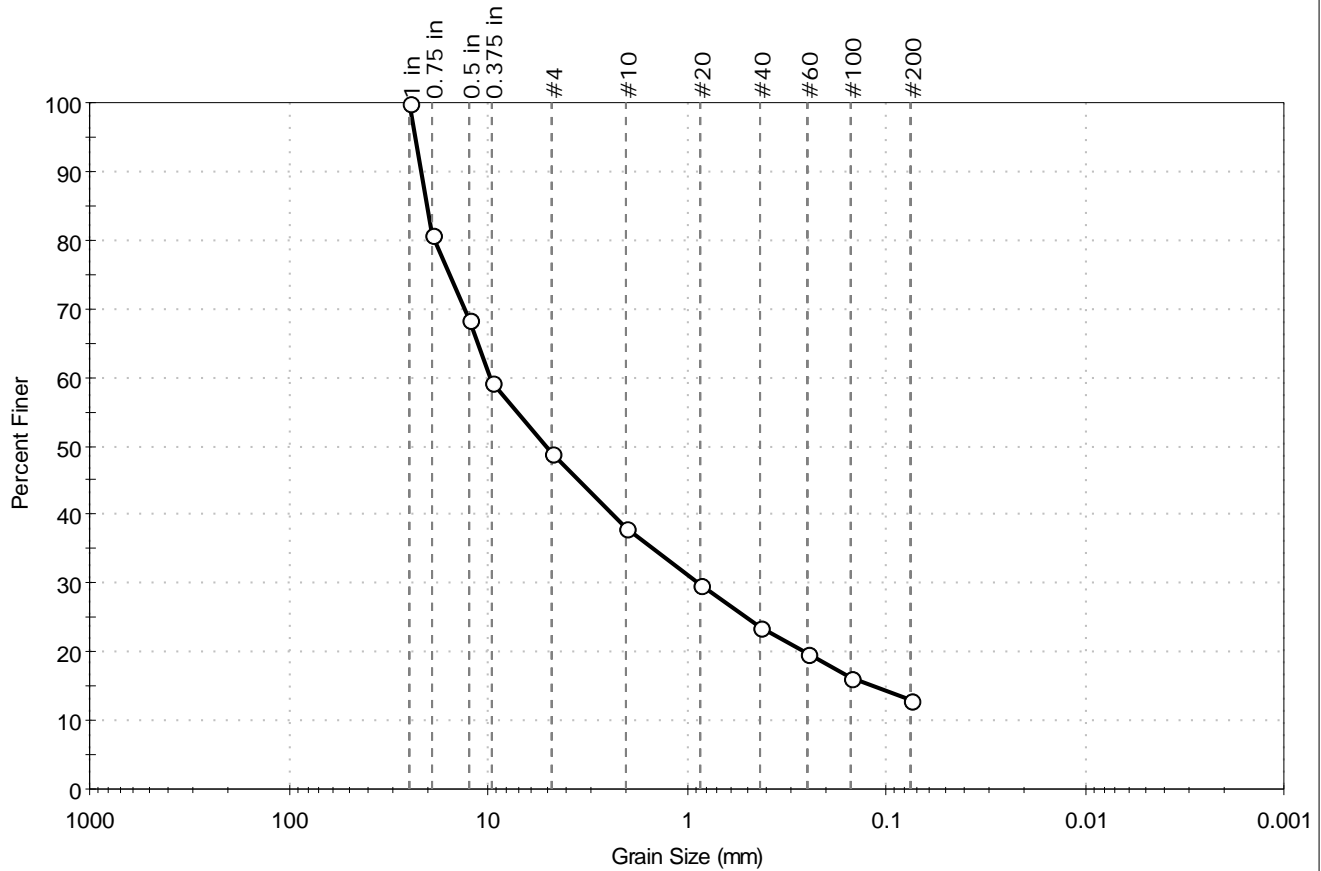
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI	Sample Type: jar	Tested By: jbr
Boring ID: B17-41	Test Date: 05/29/18	Checked By: emm
Sample ID: S-9B	Test Id: 456245	
Depth : 16-18		
Test Comment: ---		
Visual Description: Moist, light olive gray silty gravel with sand		
Sample Comment: ---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	51.1	36.0	12.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	81		
0.5 in	12.50	68		
0.375 in	9.50	59		
#4	4.75	49		
#10	2.00	38		
#20	0.85	30		
#40	0.42	24		
#60	0.25	20		
#100	0.15	16		
#200	0.075	13		

<u>Coefficients</u>	
D ₈₅ = 20.1677 mm	D ₃₀ = 0.8700 mm
D ₆₀ = 9.6751 mm	D ₁₅ = 0.1153 mm
D ₅₀ = 5.1114 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

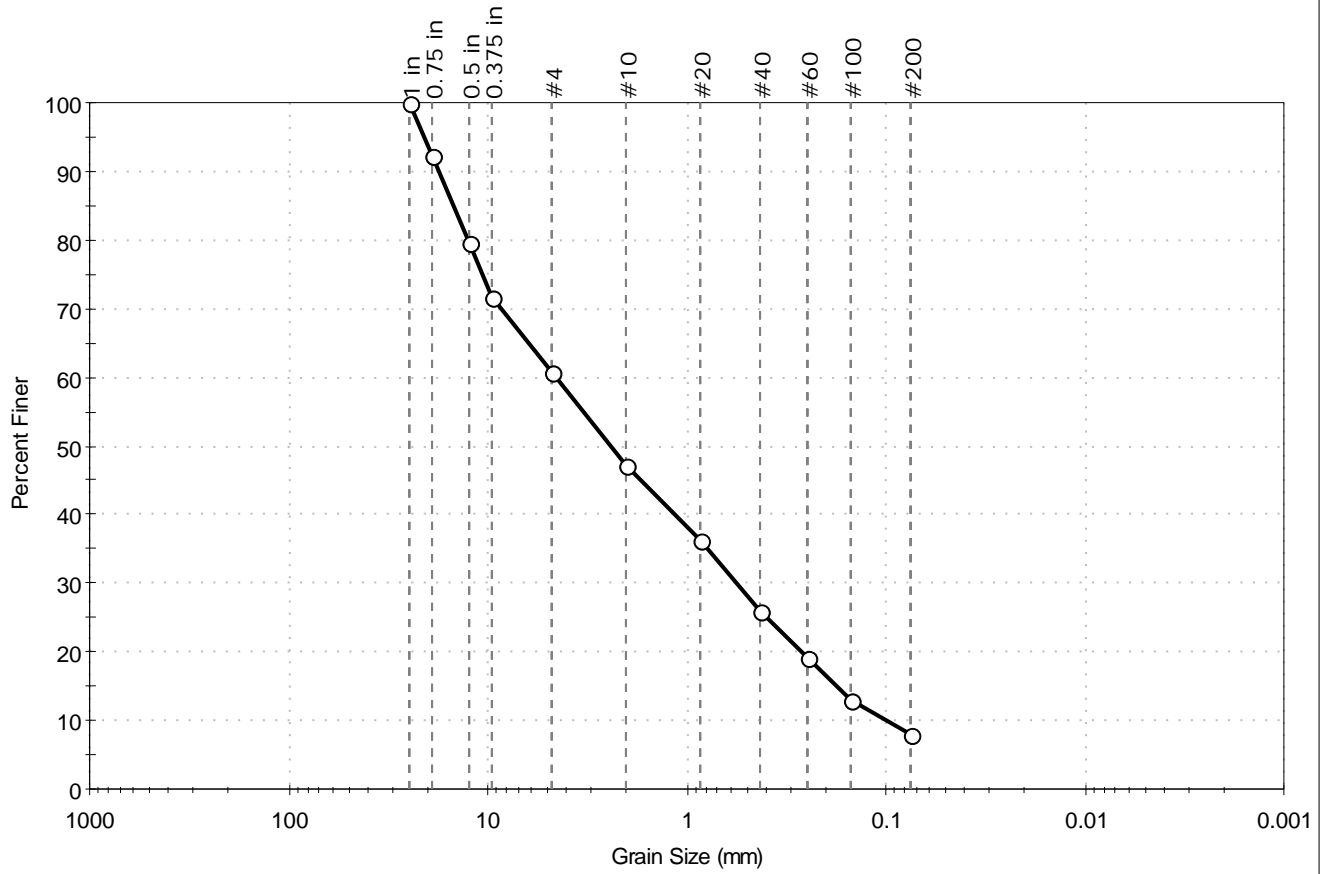
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI	Sample Type: jar	Tested By: jbr
Boring ID: B17-42	Test Date: 05/29/18	Checked By: emm
Sample ID: S-1	Test Id: 456246	
Depth : 0.67-2.67		
Test Comment: ---		
Visual Description: Moist, light gray sand with silt and gravel		
Sample Comment: ---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	39.2	52.7	8.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	92		
0.5 in	12.50	80		
0.375 in	9.50	72		
#4	4.75	61		
#10	2.00	47		
#20	0.85	36		
#40	0.42	26		
#60	0.25	19		
#100	0.15	13		
#200	0.075	8.1		

<u>Coefficients</u>	
D ₈₅ = 14.9320 mm	D ₃₀ = 0.5566 mm
D ₆₀ = 4.5062 mm	D ₁₅ = 0.1770 mm
D ₅₀ = 2.3731 mm	D ₁₀ = 0.0980 mm
C _u = 45.982	C _c = 0.702

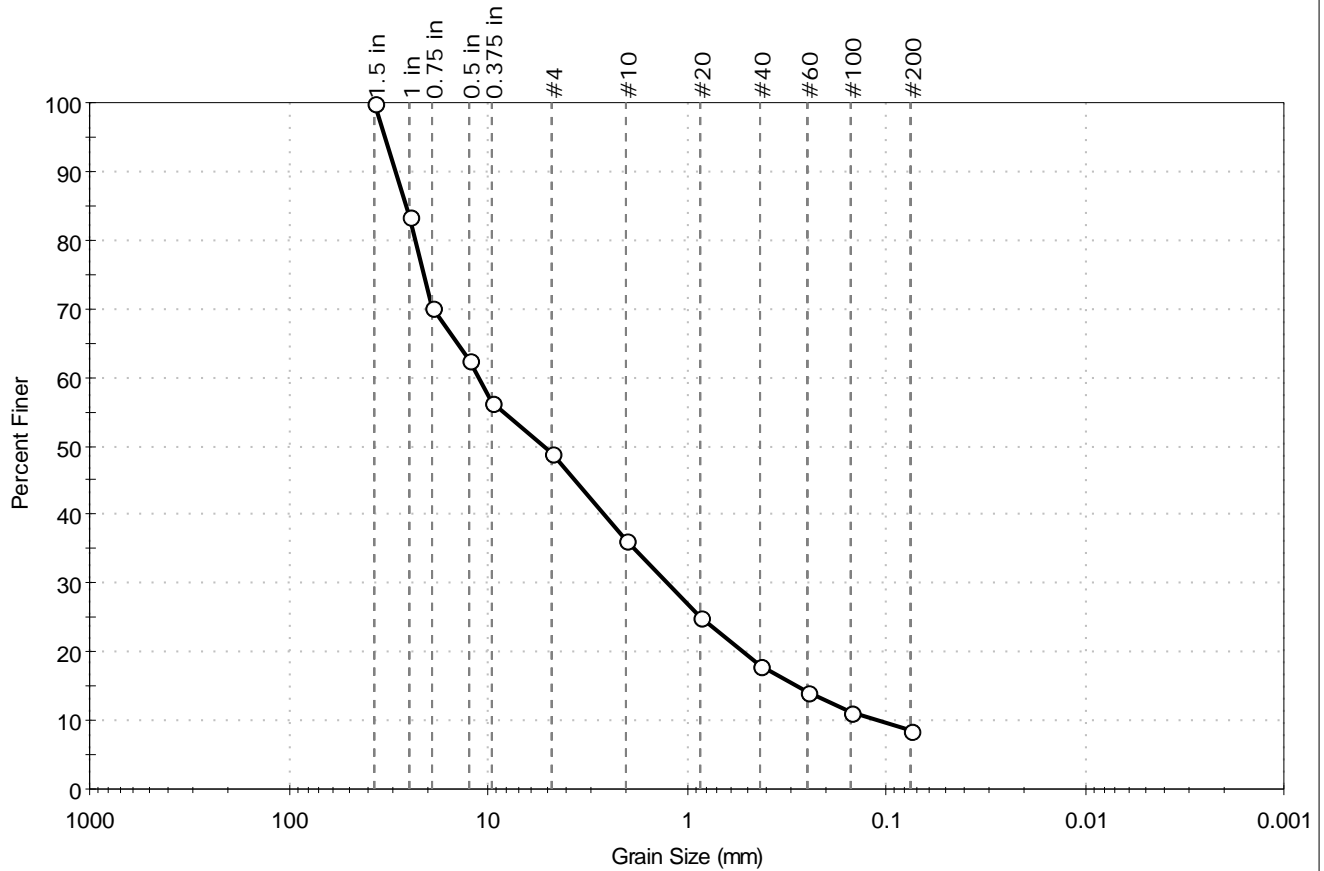
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-42	Sample Type:	jar
Sample ID:	S-5B	Test Date:	05/29/18
Depth :	8-10	Test Id:	456247
Test Comment:	---		
Visual Description:	Moist, gray gravel with silt and sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	51.0	40.5	8.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	83		
0.75 in	19.00	70		
0.5 in	12.50	63		
0.375 in	9.50	56		
#4	4.75	49		
#10	2.00	36		
#20	0.85	25		
#40	0.42	18		
#60	0.25	14		
#100	0.15	11		
#200	0.075	8.5		

<u>Coefficients</u>	
D ₈₅ = 25.9391 mm	D ₃₀ = 1.2400 mm
D ₆₀ = 11.1117 mm	D ₁₅ = 0.2785 mm
D ₅₀ = 5.1885 mm	D ₁₀ = 0.1093 mm
C _u = 101.662	C _c = 1.266

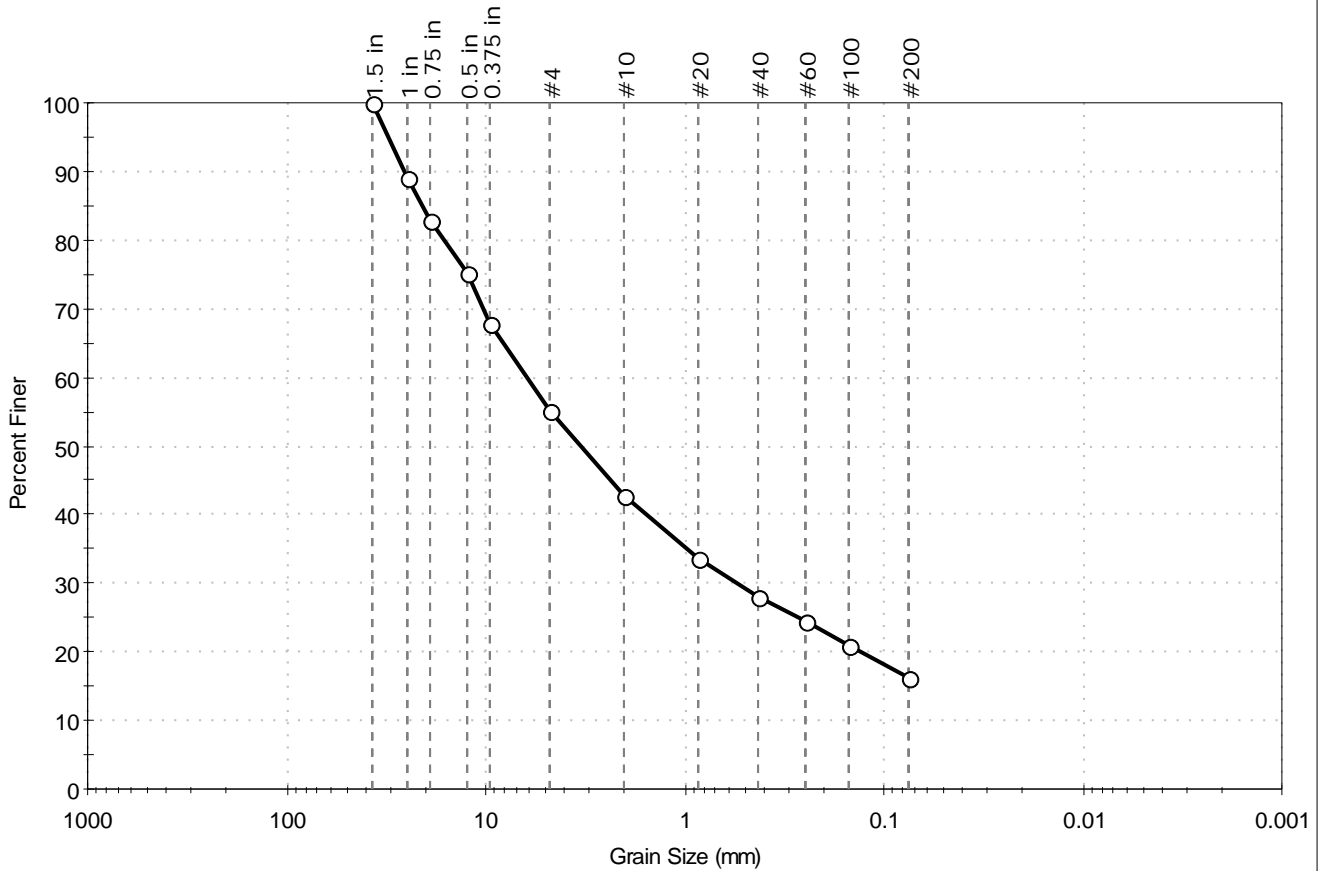
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: Pare Corporation	Project No: GTX-307508	
Project: NBC Phase III -Sewer Overflow		
Location: Pawtucket, RI	Sample Type: jar	Tested By: jbr
Boring ID: B17-42	Test Date: 06/14/18	Checked By: emm
Sample ID: S-8	Test Id: 457945	
Depth : 12-14		
Test Comment: ---		
Visual Description: Moist, pinkish gray silty gravel with sand		
Sample Comment: ---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	44.8	39.0	16.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	89		
0.75 in	19.00	83		
0.5 in	12.50	75		
0.375 in	9.50	68		
#4	4.75	55		
#10	2.00	43		
#20	0.85	34		
#40	0.42	28		
#60	0.25	25		
#100	0.15	21		
#200	0.075	16		

<u>Coefficients</u>	
D ₈₅ = 20.7323 mm	D ₃₀ = 0.5392 mm
D ₆₀ = 6.1742 mm	D ₁₅ = N/A
D ₅₀ = 3.3205 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

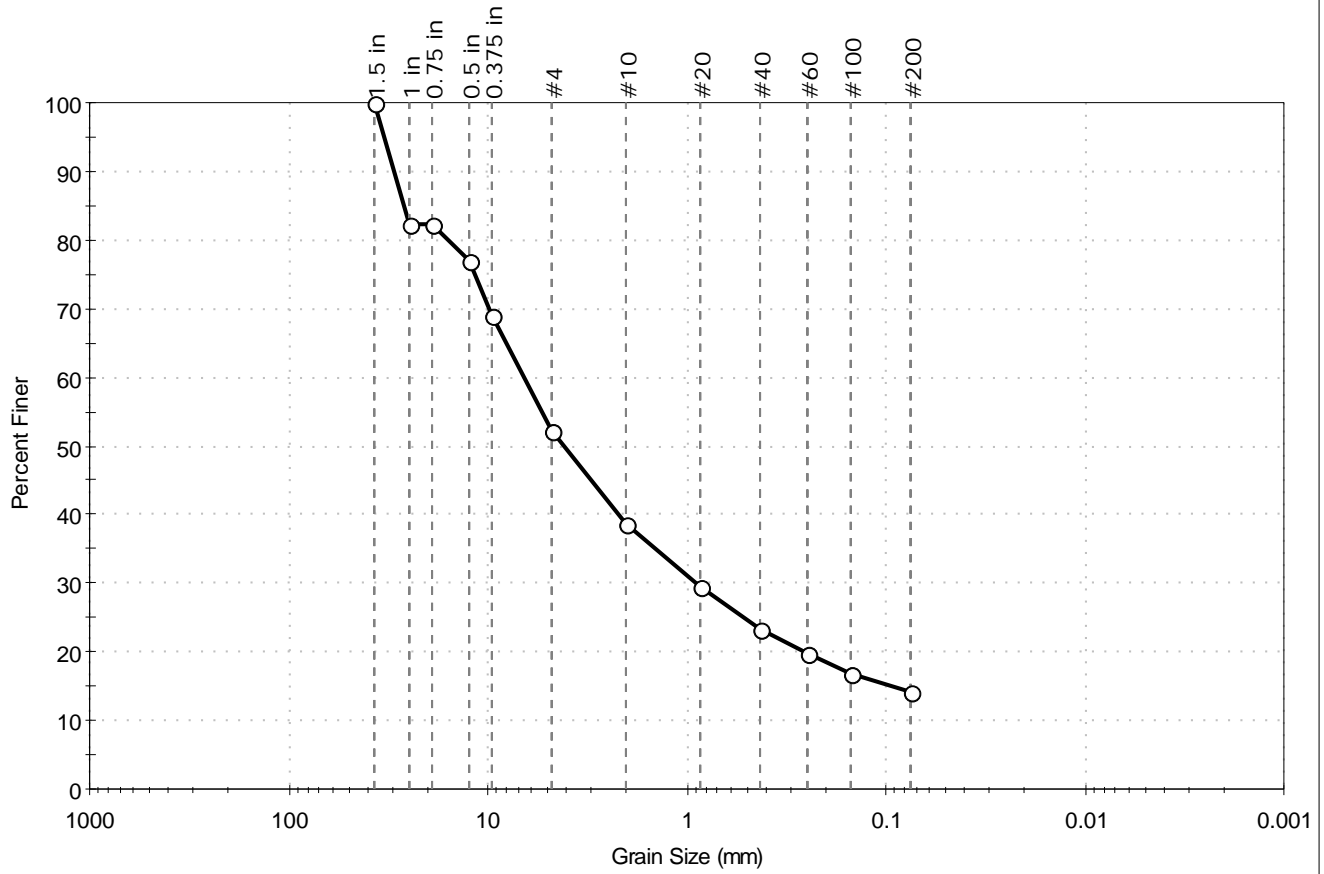
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	Pare Corporation		
Project:	NBC Phase III -Sewer Overflow		
Location:	Pawtucket, RI	Project No:	GTX-307508
Boring ID:	B17-42	Sample Type:	jar
Sample ID:	S-9	Test Date:	05/29/18
Depth :	21-22.1	Checked By:	emm
Test Comment:	---		
Visual Description:	Moist, brownish gray silty gravel with sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	47.7	38.2	14.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	82		
0.75 in	19.00	82		
0.5 in	12.50	77		
0.375 in	9.50	69		
#4	4.75	52		
#10	2.00	39		
#20	0.85	29		
#40	0.42	23		
#60	0.25	20		
#100	0.15	17		
#200	0.075	14		

<u>Coefficients</u>	
D ₈₅ = 26.6542 mm	D ₃₀ = 0.8957 mm
D ₆₀ = 6.5487 mm	D ₁₅ = 0.0931 mm
D ₅₀ = 4.1062 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-a (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD

**SEISMIC REFRACTION SURVEY
NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW PROJECT
PAWTUCKET MAIN TUNNEL SECTION
PAWTUCKET, RHODE ISLAND**

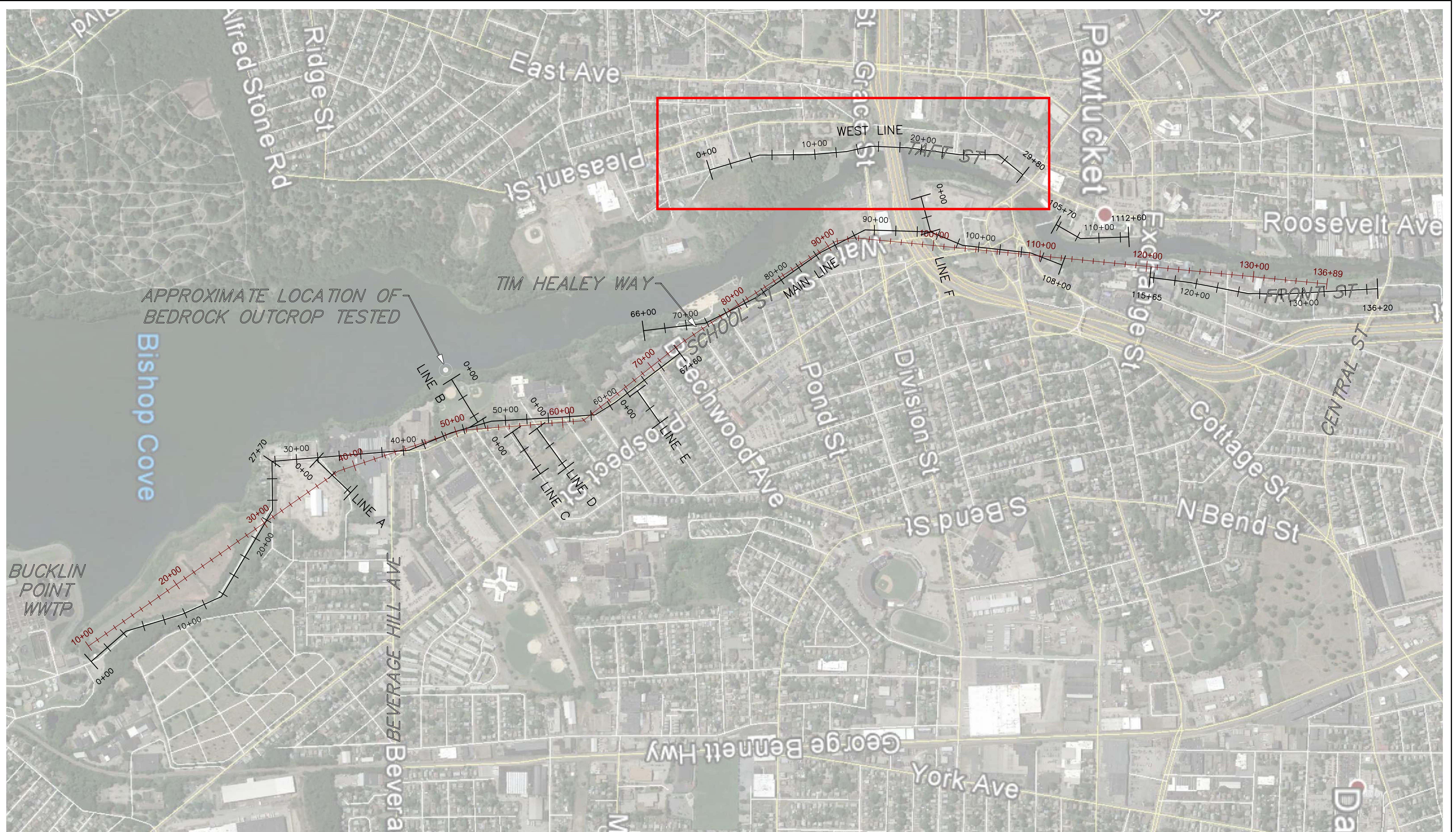
Prepared for:

Stantec
260 West Exchange Street, Suite 001
Providence, Rhode Island 02903

Prepared by:

Hager-Richter Geoscience, Inc.
8 Industrial Way - D10
Salem, New Hampshire 03079

File 17J33
November, 2017



NOTE:
Modified from Google Earth Pro aerial photograph.

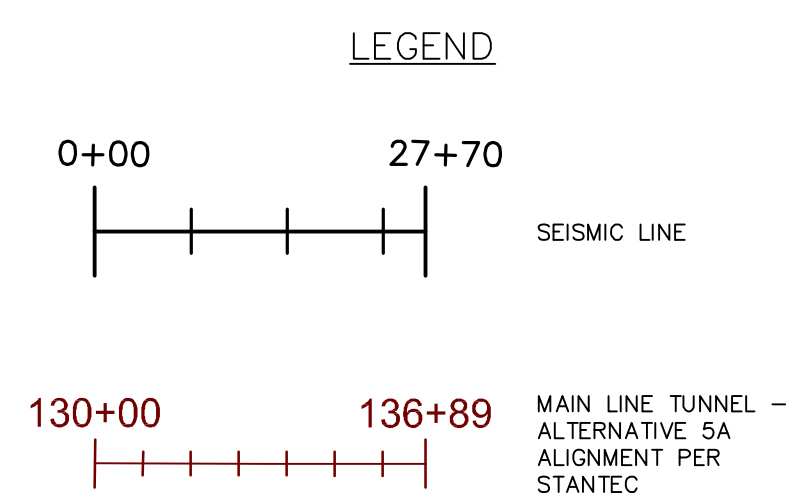
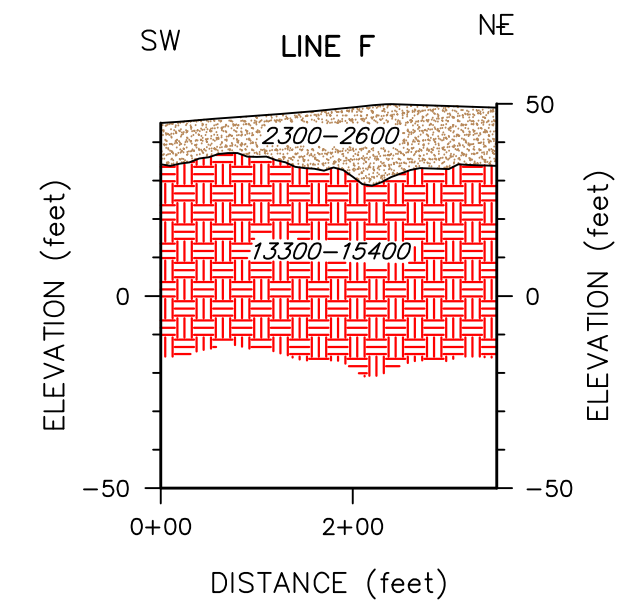
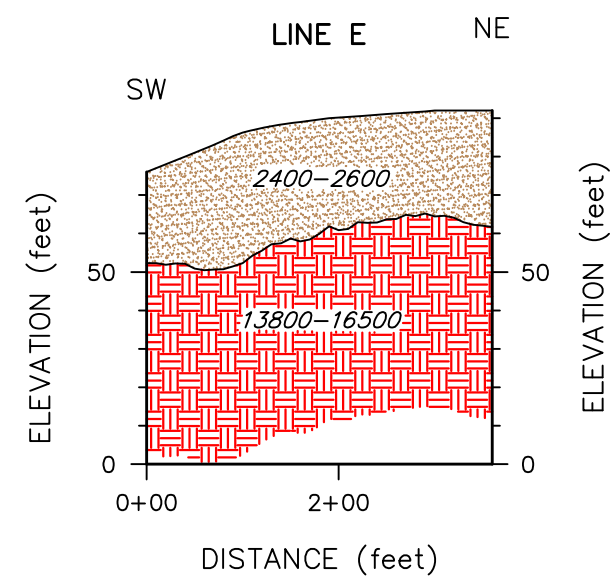
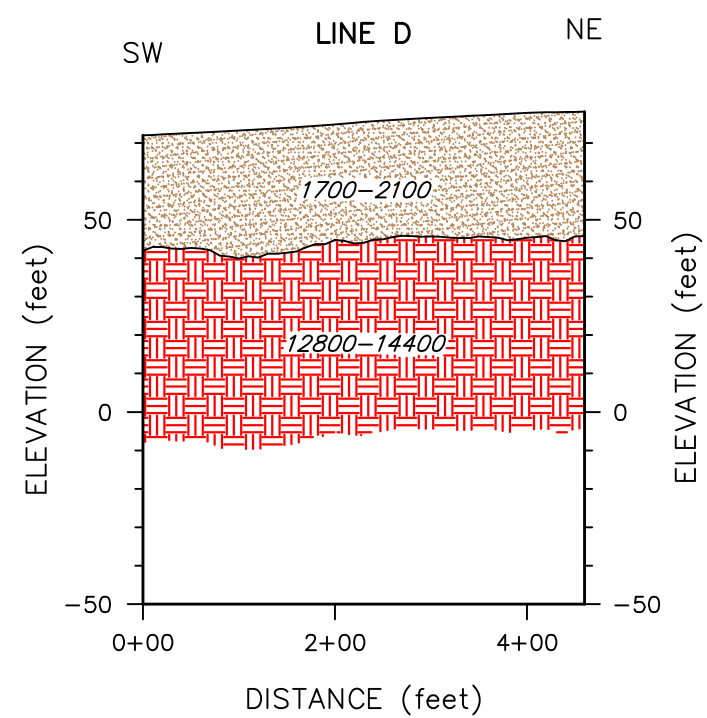
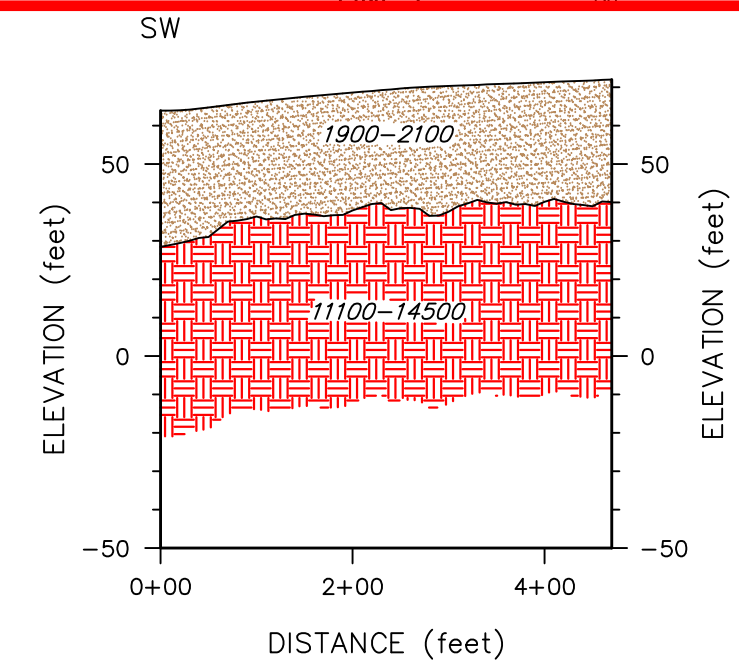
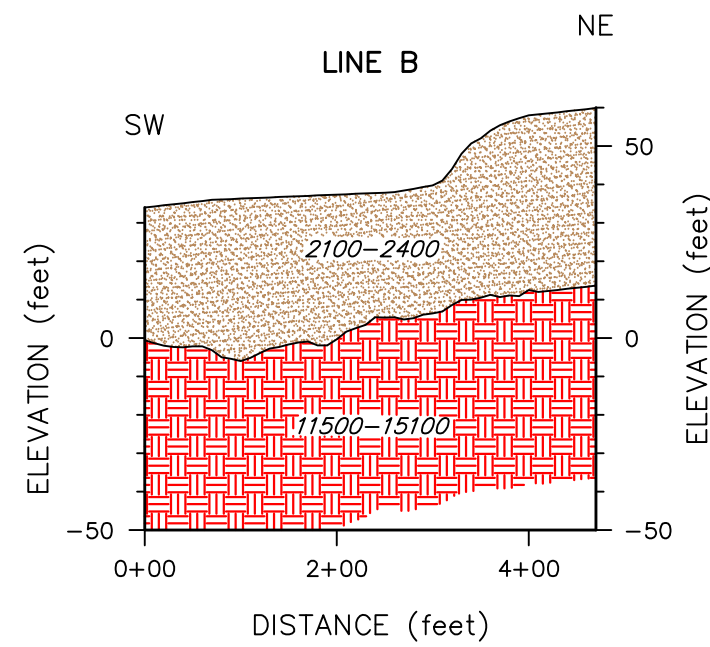
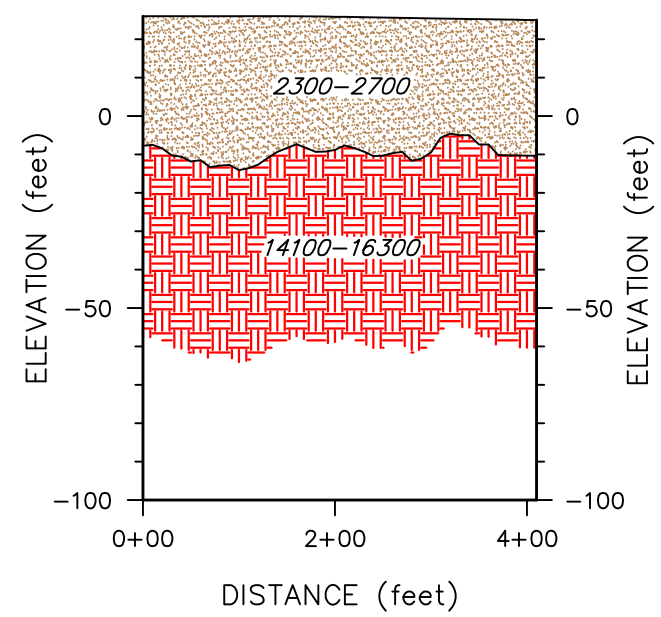
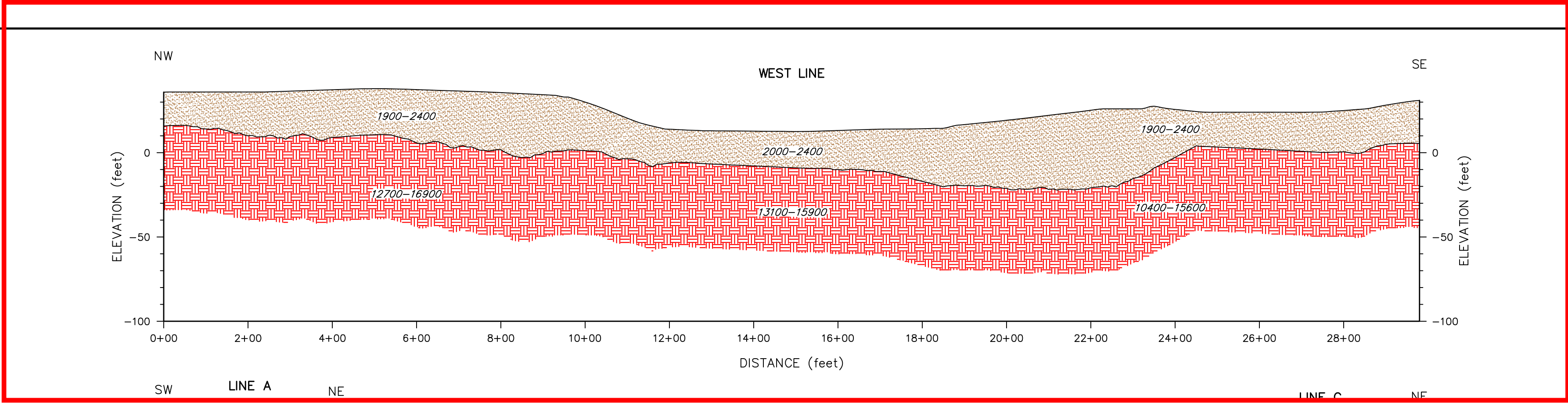


PLATE 1
SEISMIC LINE LOCATIONS
NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW PROJECT
PAWTUCKET MAIN TUNNEL SECTION
PAWTUCKET, RHODE ISLAND

FILE 17J33	NOVEMBER, 2017
HAGER-RICHTER SALEM, NH | FORDS, NJ	



NOTES:

1. Estimated accuracy (standard deviation) of depth of bedrock is $\pm 10\%$ or 2 feet, whichever is greater.
2. The depths determined for bedrock are depths of competent rock; weathered and/or fractured bedrock might occur at shallower depths.
3. Surface elevations determined from plans provided by Stantec. Vertical datum is NGVD 1929.
4. Data were analyzed using the Generalized Reciprocal Method.

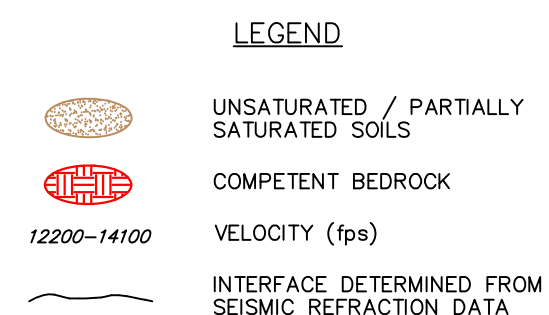
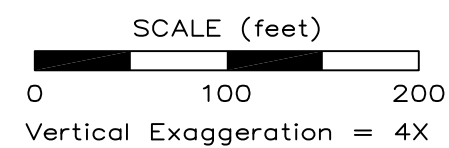


PLATE 3
SEISMIC PROFILES – WEST LINE &
CROSS LINES
NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW PROJECT
PAWTUCKET MAIN TUNNEL SECTION
PAWTUCKET, RHODE ISLAND

FILE 17J33

NOVEMBER, 2017

HAGER-RICHTER
SALEM, NH | FORDS, NJ

Tidewater Site



**Site Investigation Data Report
Former Tidewater MGP and Power Plant Site
Pawtucket, Rhode Island
RIDEM Case No. 95-022**

PREPARED FOR:
RIDEM, OWM
PROVIDENCE,
RHODE ISLAND

ON BEHALF OF:

nationalgrid

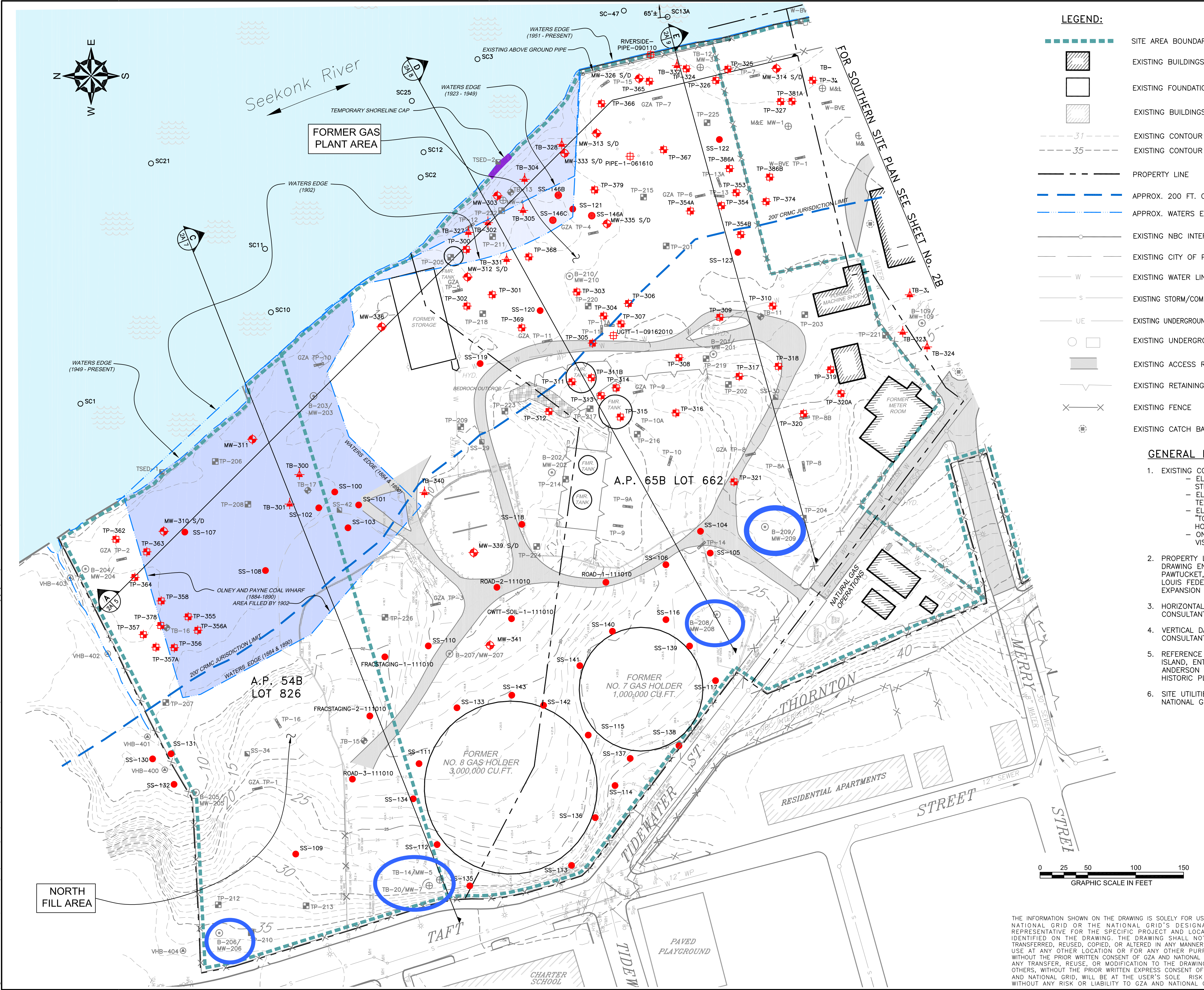
WALTHAM, MASSACHUSETTS

DATE:
JANUARY 2011



PREPARED BY:
GZA GEOENVIRONMENTAL,
INC.
530 Broadway
Providence, Rhode Island
02909

GZA FILE NO.
05.0043654.00



LEGEND:

- SITE AREA BOUNDARIES
- EXISTING BUILDINGS ON-SITE
- EXISTING FOUNDATION/PAD ON-SITE
- EXISTING BUILDINGS/STRUCTURES OFF-SITE
- EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- PROPERTY LINE
- APPROX. 200 FT. CRMC JURISDICTION LIMIT
- APPROX. WATERS EDGE
- EXISTING NBC INTERCEPTOR SANITARY SEWER
- EXISTING CITY OF PAWTUCKET STORM DRAIN
- EXISTING WATER LINE
- EXISTING STORM/COMBINED SAN. SEWER OVERFLOW
- EXISTING UNDERGROUND ELECTRIC CABLE IN CONDUIT
- EXISTING UNDERGROUND ELECTRIC MH/STRUCTURE
- EXISTING ACCESS ROAD
- EXISTING RETAINING WALLS
- EXISTING FENCE
- EXISTING CATCH BASIN LOCATIONS

SAMPLE LEGEND

- SS-9 ATLANTIC SURFACE SOIL SAMPLE LOCATION
- TSED-6 ATLANTIC SEDIMENT SAMPLE LOCATION
- W-BVE SS-3 WESTON/BLACKSTONE VALLEY ELECTRIC SEDIMENT SAMPLE LOCATION
- RIDEM SS-3 RIDEM SURFACE SOIL SAMPLE LOCATION
- B-109/MW-109 MONITORING WELL/BORING (VHB) SURVEYED
- TP-3A ATLANTIC TEST PIT LOCATION
- W-BVE WESTON/BLACKSTONE VALLEY ELECTRIC TEST PIT LOCATION
- GZA TP-8 GZA/VALLEY GAS TEST PIT LOCATION
- TB-15 ATLANTIC SOIL BORING LOCATION
- MW-3 ATLANTIC MONITORING WELL LOCATION
- M&E MW-1 METCALF & EDDY MONITORING WELL LOCATION
- VHB-400 VHB SURFACE SOIL SAMPLE LOCATION NON-SURVEYED
- TP-204 VHB TEST PIT (2006)
- GZ-01 GZA TEST PIT (2009)
- TB-300 TB-300 TEST BORING LOCATION (2010)
- MW-320 S/D GZA MONITORING WELL LOCATION (2010)
- TP-306 GZA TEST PIT LOCATION (2010)
- SS-100 GZA SURFACE SOIL SAMPLE LOCATION (2010)
- SC31 ARCADIS SEDIMENT SAMPLE LOCATION (2008)
- PIPE-1-061610 GZA RESIDUAL MATERIAL SAMPLE (2010)

GENERAL NOTES:

1. EXISTING CONDITIONS BASE MAP DEVELOPED FROM THE FOLLOWING:
 - ELECTRONIC FILES FROM GEI CONSULTANTS, INC. (FORMERLY AES) ENTITLED "HISTORIC STRUCTURES AND SAMPLE LOCATIONS", ORIGINAL SCALE 1"=80', DATED JULY 1999
 - ELECTRONIC FILES FROM VANASSE HANGEN BRUSTLIN, INC. ENTITLED "SOIL BORING, TEST PIT AND MONITOR WELL LOCATIONS", SCALE: 1"=60', UNDATED
 - ELECTRONIC FILES FROM WELSH ASSOCIATES LAND SURVEYORS, INC. ENTITLED "TOPOGRAPHIC SURVEY (AS-BUILT), FORMER TIDEWATER FACILITY, DEMOLITION OF GAS HOLDERS NOS. 7 & 8", DATED DECEMBER 17, 2010
 - ON-SITE INVESTIGATIONS AND SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS DURING 2009 AND 2010.
2. PROPERTY LINES AND LOT INFORMATION ESTABLISHED FROM INFORMATION PROVIDED ON A DRAWING ENTITLED "PERIMETER SURVEY OF LAND AT THE TIDEWATER FORMER MGP SITE IN PAWTUCKET, RHODE ISLAND FOR ATLANTIC ENVIRONMENTAL SERVICES INC." DEVELOPED BY LOUIS FEDERICI AND ASSOCIATES AND AN AUTO CAD FILE ENTITLED "MAX READ FIELD TRACK EXPANSION 2007" PROVIDED BY THE CITY OF PAWTUCKET.
3. HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY GEI CONSULTANTS, INC.
4. VERTICAL DATUM IS BASED ON NGVD 1929 (MSL) FROM BASE MAPPING PROVIDED BY GEI CONSULTANTS, INC.
5. REFERENCE SEWER DATA FROM SCANNED IMAGE PROVIDED BY THE CITY OF PAWTUCKET, RHODE ISLAND, ENTITLED "STUDY OF SEWERAGE FACILITIES" BY WATERMAN ENGINEERING CO. & ANDERSON NICHOLS CO. DATED NOV. 1975, ORIGINAL SCALE 1"=400' & SCANNED IMAGES OF HISTORIC PLAN & PROFILE DRAWINGS PROVIDED BY THE CITY OF PAWTUCKET, RHODE ISLAND.
6. SITE UTILITIES TAKEN FROM 1984 SANBORN MAP AND HISTORIC FIGURES PROVIDED BY NATIONAL GRID. ALL UTILITY LOCATIONS ARE APPROXIMATE AND SHOWN FOR REFERENCE ONLY.



THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NATIONAL GRID OR THE NATIONAL GRID'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA AND NATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.

NO.	ISSUE/DESCRIPTION	BY	DATE
FORMER TIDEWATER FACILITY			
PAWTUCKET, RHODE ISLAND			
EXPLORATION LOCATION PLAN NORTH FILL AREA AND FORMER GAS PLANT AREA			
PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists 530 BROADWAY PROVIDENCE, RHODE ISLAND 02909 (401) 421-4140		NATIONAL GRID	
PROJ MGR:	MSK	REVIEWED BY:	WF
DESIGNED BY:	WF	DRAWN BY:	CRD
DATE:	JANUARY 2011	CHECKED BY:	MSK
		SCALE:	1"=50"
		REVISION NO.:	0
		PROJECT NO.:	43654.00
		FIGURE	2A
		SHEET NO.	1 OF 24

© 2010 - GZA GeoEnvironmental, Inc. GZA\ENVA\3564.mxd\GZA_DWSS\SUPPLEMENTAL_SITE_INVESTIGATION_REPORT\3564-00_07_2011_4.29pm_ebroadband.dwg
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GROUND SURFACE ELEVATION AND DATUM: 35.6 ft.

PROJECT: Tidewater	DATE STARTED: 10-May-06	DATE FINISHED: 10-May-06
DRILLING CONTRACTOR: Subsurface Drilling & Remediation	TOTAL DEPTH (ft.): 30	SCREEN INTERVAL (ft.): 20 - 30 Feet
DRILLING METHOD: Hollow Stem Auger	DEPTH TO WATER: Approx. 24 feet	CASING: 2 inch Schedule 40 PVC
SAMPLING METHOD: 2-Foot Split Spoon	LOGGED BY: CM	
HAMMER WEIGHT: 140 lbs.	DROP: 30 inches	Project No.: 71522

DEPTH (feet)	Sample No.	Blows per 6 inches	PID Reading	DESCRIPTION: strata thickness, color, texture, moisture, observations	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0				Ground Surface	Stand Pipe
1				Augered through Brick to 1 ft.	Cement Grout
2	7/8/12/9		ND	0.2 ft. Dk Br v/f sand, trace silt over 0.7 ft. Blk/Dk Gr v/f sand, li ash, trace slag over 0.3 ft. Lt. olive Br v/f sand	2 inch diameter Schedule 40 PVC Riser Pipe
3					
4	12/12/9/10			0.5 ft. Lt Olive Br v/f sand over 0.6 ft. Lt Olive Br v/f sand, trace clay	
5					
6	8/9/9/13			1.5 ft. Stratified Lt Olive Br silt and Lt Gray clay over 0.2 ft. Yellowish Br coarse sand	
7					
8	12/12/12/12		ND	0.6 ft. Stratified Lt Olive Br silt and Lt Gray clay over 1.4 ft. of Yell Br coarse sand	
9					
10	6/8/7/6			0.3 ft. Br Yell coarse sand, trace gravel over 0.9 ft. Lt Gr coarse sand, trace gravel	Backfill
11					
12	10/11/11/12		ND	1.8 ft. Lt. Gr Coarse sand, trace gravel	
13					
14	15/13/9/8			1.6 ft. Lt. gr Coarse sand, trace gravel	
15					
16					
17				Augered to 20 feet	Bentonite Chip Seal
18					
19					Silica Sand
20					
21	15/11/13/12			1.2 ft. Lt Olive Br Coarse sand, li gravel	2 inch diameter 0.010 inch slot, Sch.40PVC screen
22					
23				Augered to 25 feet	
24					
25					
26	6/11/10/9			1.1 ft. Olive br coarse sand and f/c gravel, wet	
27					
28				Augered to 30 feet	
29					
30					2 inch Schedule 40 PVC end cap
31					
32					

GROUND SURFACE ELEVATION AND DATUM: 26.4 ft.

PROJECT: Tidewater	DATE STARTED: 10-May-06	DATE FINISHED: 10-May-06
DRILLING CONTRACTOR: Subsurface Drilling & Remediation	TOTAL DEPTH (ft.): 20	SCREEN INTERVAL (ft.): 10 - 20 Feet
DRILLING METHOD: Hollow Stem Auger	DEPTH TO WATER: Approx. 14 feet	CASING: 2 inch Schedule 40 PVC
SAMPLING METHOD: 2-Foot Split Spoon	LOGGED BY: CM	
HAMMER WEIGHT: 140 lbs.	DROP: 30 inches	Project No.: 71522

DEPTH (feet)	Sample No.	Blows per 6 inches	PID Reading	DESCRIPTION: strata thickness, color, texture, moisture, observations	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0				Ground Surface	
0-2	B-208	5/30/15/10		0.7 ft. Olive Br/Lt Olive Br vff sand, li Slag over 0.2 ft. rock/cement over 0.4 ft. Lt Olive Br/Blk vf sand and gravel	Stand Pipe 2 inch diameter Schedule 40 PVC Riser Pipe
2-3				No Recovery	Cement
3-4	B-208	10/12/12/17			Backfill
4-6				0.7 ft. Lt Olive Br vff sand, trace rock	
6-7		4/13/9/8			
7-8		4/5/5/5		0.7 ft. SAA	Bentonite Chip Seal
8-9			ND	0.6 Ft. SAA	
9-11		2/4/8/15		0.8 ft. Olive Br vff sand and m/c gravel	Silica Sand
11-13		22/22/25/27	ND	0.6 ft. SAA over 0.7 ft. Yell Br c sand, tr/li f/m gravel	2 inch diameter 0.010 inch slot, Sch.40PVC screen
13-15		22/25/22/60	ND	0.6 ft. Olive Br vf/c sand and gravel (pieces of quartz-like rock), dense, wet, till-like	
15-20				Augered to 20 ft.	2 inch Schedule 40 PVC end cap

GROUND SURFACE ELEVATION AND DATUM: 22.7 ft.

PROJECT: Tidewater	DATE STARTED: 10-May-06	DATE FINISHED: 10-May-06
DRILLING CONTRACTOR: Subsurface Drilling & Remediation	TOTAL DEPTH (ft.): 19	SCREEN INTERVAL (ft.): 9-19 ft.
DRILLING METHOD: Hollow Stem Auger	DEPTH TO WATER: Approx. 14 ft.	CASING: 2 inch Schedule 40 PVC
SAMPLING METHOD: 2-Foot Split Spoon	LOGGED BY: CM	
HAMMER WEIGHT: 140 lbs.	DROP: 30 inches	Project No.: 71522

DEPTH (feet)	Sample No.	Blows per 6 inches	PID Reading	DESCRIPTION: strata thickness,color, texture, moisture, observations	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0				Ground Surface	
0.2	20/35/28/20		ND	0.2 ft. Lt Olive Br m/c sand over 1 ft. Blk/V Dk Gr vf/f sand/coal dust, trace f/m gravel	Cement Grout
0.5				Augered to 5 ft.	Backfill
1.6	7/8/10/12		ND	1.6 ft. Lt Olive Br f/m sand, trace f gravel	Bentonite Chip Seal
2.0				Augered to 10 ft.	Silica Sand
11.4	5/11/10/9		ND	1.4 ft. Olive Br/Lt Olive Br vf/m sand, trace f gravel, moist	2 inch diameter 0.010 inch slot, Sch.40PVC screen
12.0				Augered to 15 ft.	
16.1	35/40/30/48		3	1.1 ft. Dk Gr vf/c sand, trace silt and c gravel, till-like, dense, wet	
19.0				Attempted to auger to 20 ft., encountered refusal at 19 ft.	2 inch Schedule 40 PVC end cap

MW-7/TB-20

Atlantic Environmental Services, Inc.

Ground Elevation: 29.24' X Coordinate: 359651.14

Water Table Elevation: 10.34' Y Coordinate: 286416.37

Project Number: 2061-03-05

Datum: V: NGVD 1929 (MSL) H: NAD 1983

Project Name: Tidewater

Top of PVC Elevation: 32.10'

Location: Pawtucket, RI

Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

Date Started: 08/14/96

Blank Casing:
type: PVC dia: 2.00in fm: -2.1' to: 14.50'

Date Completed: 08/14/96

Drilling Contractor: B.L. Myers Bros., Inc.

Screens:
type: Slotted size: 0.010in dia: 2.00in fm: 14.50' to: 24.50'

Drilling Method: Hollow Stem Auger

Annular Fill:
type: Concrete fm: 0.00' to: 2.00'
type: Cement Bentonite Grout fm: 2.00' to: 11.00'
type: Bentonite fm: 11.00' to: 13.00'
type: Sand Filter fm: 13.00' to: 25.00'

Certified By: P. Georgetti

Remarks:

Sample No.	Blow Count (6")	Recovery %	PID	Elevation (ft)	Material Description	Odor	Visual	Lithology	Depth (ft)	Well Construction
					Augered to 15 feet					
17-19	5 13 27 21	50	0 ppm		Tan/brown, and orange fine to med. Sand, some large cobbles (native), dry	None	None		15	
17-19	17 18 17 15	75	0 ppm		Tan/brown fine to coarse Sand, trace Cobbles	None	None		17	
19-21	90 39 40	75	0 ppm	10	Orange/tan Silt with large cobbles and weathered bedrock/till, saturated, roots	None	None		19	

MW-7/TB-20

Atlantic Environmental Services, Inc.

Ground Elevation: 29.24' X Coordinate: 359851.14

Water Table Elevation: 10.34' Y Coordinate: 285416.37

Project Number: 2061-03-05

V: NGVD 1929 (MSL) H: MAD 1983

Project Name: Tidewater

Top of PVC Elevation: 32.10'

Location: Pawtucket, RI

Conductor Casing:
type: dia: 0.00m fm: 0.00' to: 0.00'

Date Started: 08/14/96

Blank Casing:
type: PVC dia: 2.00m fm: -2.1' to: 14.50'

Date Completed: 08/14/96

Drilling Contractor: Williams Bros., Inc.

Screens:
type: Slotted size: 0.010m dia: 2.00m fm: 14.50' to: 24.50'

Drilling Method: Hollow Stem Auger

Annular Fill:
type: Concrete fm: 0.00' to: 2.00'
type: Cement Bentonite Grout fm: 2.00' to: 11.00'
type: Bentonite fm: 11.00' to: 13.00'
type: Sand Filter fm: 13.00' to: 25.00'

Verified By: P. Georgetti

Remarks:

Sample No.	Blow Count (6')	Recovery %	PD	Elevation (ft)	Material Description	Odor	Visual	Lithology	Depth (ft)	Well Construction
	41									
21-23	32 46 50 52	50	0 ppm		Gray fine Sand, Silt, shale, and Cobbles, moist to saturated, very tight (weathered bedrock/till)	None	None		21- 22-	
23-25	35 30 24 64	75	0 ppm		Gray/tan Silt and gray shale with medium to coarse Sand; very tight (weathered bedrock/till)	None	None		23- 24- 25-	
				0-					26- 27- 28- 29- 30- 31- 32- 33- 34- 35- 36- 37- 38- 39-	
				-10-						

MW-5/TB-14

Atlantic Environmental Services, Inc.

Ground Elevation: 29.37' X Coordinate: 359657.17
 Water Table Elevation: Y Coordinate: 286405.42

Project Number: 2061-03-05

Datum: V: NGVD 1929 (MSL) H: NAD 1983

Project Name: Tidewater

Top of PVC Elevation: 32.00'

Location: Pawlucket, RI

Conductor Casing:
 type: dia: 0.00m fm: 0.00' to: 0.00'

Date Started: 07/09/96

Blank Casing:
 type: PVC dia: 2.00in fm: -2.1' to: 5.50'

Date Completed: 07/09/96

Drilling Contractor: B.L. Myers Bros., Inc.

Screens:
 type: Slotted size: 0.010in dia: 2.00in fm: 5.50' to: 15.50'

Drilling Method: Hollow Stem Auger

Annular Fill:
 type: Concrete fm: 0.00' to: 2.00'
 type: Bentonite fm: 2.00' to: 4.00'
 type: Sand Filter fm: 4.00' to: 15.50'
 type: Cement Bentonite Grout fm: 15.50' to: 25.00'

Verified By: P. Georgetti

Remarks: Boring TB-14 was grouted to the surface, MW-5 was installed to a depth of 15.5 feet as shown, adjacent to TB-14.

Sample No.	Blow Count (6")	Recovery %	PID	Elevation (ft)	Material Description	Odor	Vesud	Lithology	Depth (ft)	Well Construction
-2	6 6 14 14	60	ppm		Topsoil	None	None			
-4	12 11 17 15	70			Gray fine Sand and Silt, some Clay, fine layering varves Same, perched water (Sampled 0-2)	None	None		1 2 3	
-6	12 15 15 17	85			Orange fine Sand, some dark orange/black Silt; 0.2' manganese rich layer at bottom Light brown fine Sand, some Silt, moist	None	None		4 5	
-8	NR NR NR NR	85			Same, wet Dark gray Silt and Clay, wet (Sampled 4-6)	None	None		6 7	
8-10	6 4 4 8	100		20-	Gray v. fine Sand and Silt, some Clay layering, slight red/pink coloring throughout; wet	None	None		8 9	
10-12	4 3 3 7	90			Gray Silt, some Clay, wet	None	None		10 11	
12-14	3 3 3 3	90			Same, some light red/brown Silt layers	None	None		12 13	
14-16	4 6 6 7	95			Gray very fine Sand and Silt, wet	None	None		14 15	
16-18	11 12 14 14	90			Orange very fine Sand and Silt Brown/pink medium Sand, some Gravel, trace Silt, wet	None	None		16 17	
18-20	8 12 15 20	50		10-	Red brown fine to medium Sand, some Gravel, wet	None	None		18 19	

MW-5/TB-14

Atlantic Environmental Services, Inc.

Ground Elevation: 29.37'

X Coordinate: 359657.17

Water Table Elevation:

Y Coordinate: 286405.42

Project Number: 2061-03-05

V: NGVD 1929 (MSL) H: NAD 1983

Project Name: Tidewater

Top of PVC Elevation: 32.00'

Location: Pawtucket, RI

Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

Date Started: 07/09/96

Blank Casing:
type: PVC dia: 2.00in fm: -2.1' to: 5.50'

Date Completed: 07/09/96

Drilling Contractor: B.L. Myers Bros., Inc.

Screens:
type: Slotted size: 0.010in dia: 2.00in fm: 5.50' to: 15.50'

Drilling Method: Hollow Stem Auger

Certified By: P. Georgetti

Annular Fill:
type: Concrete fm: 0.00' to: 2.00'
type: Bentonite fm: 2.00' to: 4.00'
type: Sand Filter fm: 4.00' to: 15.50'
type: Cement Bentonite Grout fm: 15.50' to: 25.00'

Remarks:

Sample No.	Blow Count (cf)	Recovery %	PIB	Elevation (ft)	Material Description	Odor	Visual	Lithology	Depth (ft)	Well Construction
0-22	22 33 30	50			Light brown Sand, Silt and Gravel, (Til), wet	None	None		21- 22- 23- 24- 25- 26- 27- 28- 29- 30- 31- 32- 33- 34- 35- 36- 37- 38- 39-	
				-10-						

Taft St. – Pleasant St. Branch Interceptor

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
BLACKSTONE VALLEY SEWER DISTRICT COMMISSION
PROVIDENCE, RHODE ISLAND

TAFT ST.-PLEASANT ST. BRANCH INTERCEPTER
SECTION B

INLET CHAMBER
DETAILS FOUND IN
THIS CONTRACT... "18"

CONTRACT DRAWINGS

CONTRACT 18

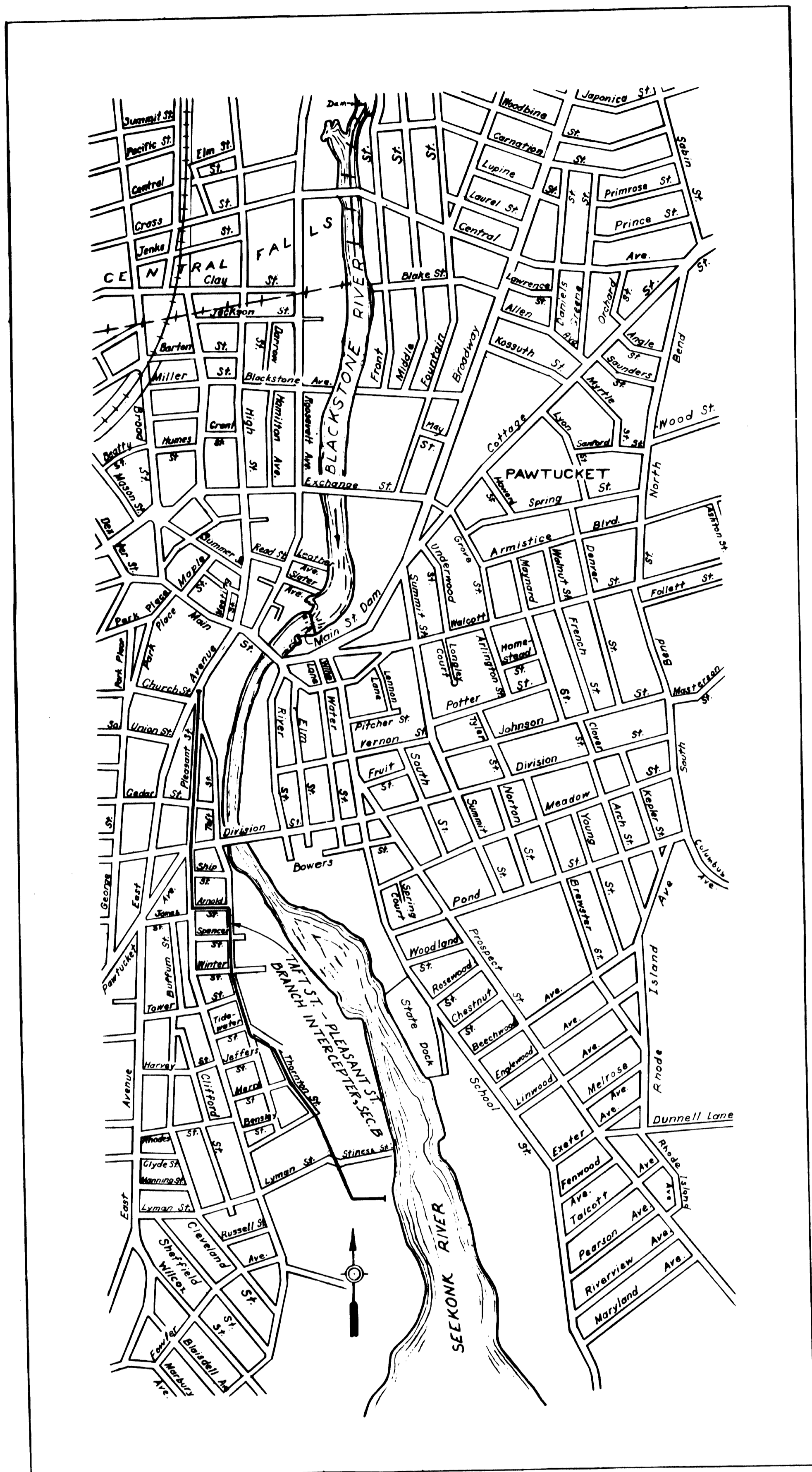
1950

HONORABLE JOHN O. PASTORE, GOVERNOR

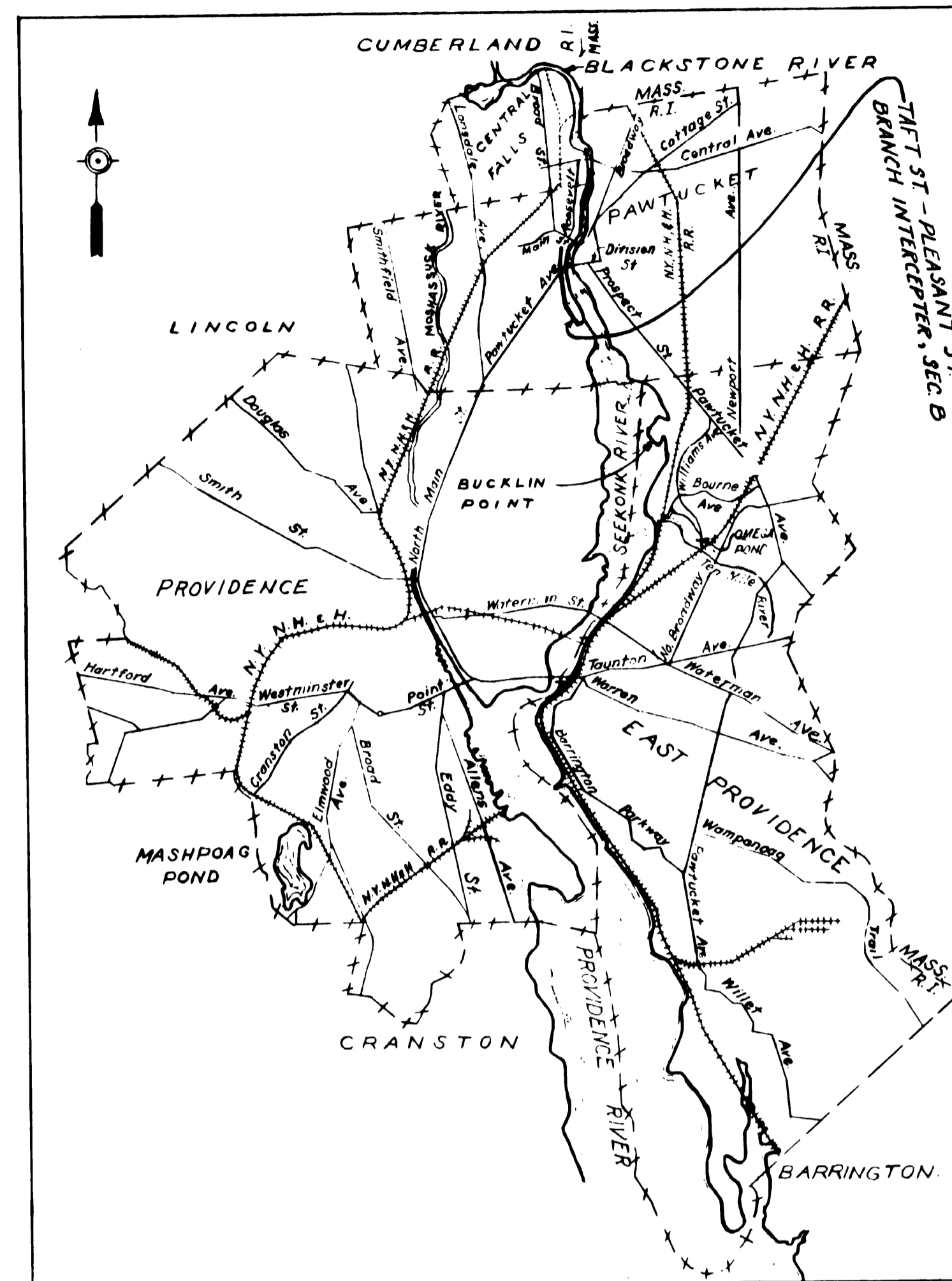
WILLIAM J. HALLORAN	CHAIRMAN
LUIGI SCALA	FIRST VICE CHAIRMAN
HAROLD J. CREEDON	SECOND VICE CHAIRMAN
PHILIP S. MANCINI	EX - OFFICIO
EDWARD A. McLAUGHLIN, M.D.	EX - OFFICIO
ANGELO A. BONVICIN	EXECUTIVE SECRETARY
CHARLES G. HAMMANN	CHIEF ENGINEER

METCALF & EDDY
ENGINEERS
BOSTON, MASS.

2111
H
21627



VICINITY PLAN
SCALE: 1" = 600'

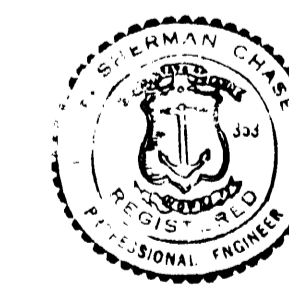


LOCATION MAP
SCALE: 1" = 6000'

LIST OF DRAWINGS

SHEET NO.	TITLE	SHEET NO.	TITLE
1	VICINITY PLAN AND LOCATION MAP - LIST OF DRAWINGS	20	TIDEWATER ST. SEWER CONNECTION - PART I OF II
2	PLAN AND PROFILE - STA. 7+00± TO STA. 12+00	21	" " " " PART II OF II
3	" " " " STA. 12+00 TO STA. 24+00	22	PLEASANT ST. SEWER CONNECTION - PART I OF II
4	" " " " STA. 24+00 TO STA. 36+00	23	" " " " PART II OF II
5	" " " " STA. 36+00 TO STA. 48+00	24	EAST AVENUE SEWER CONNECTION - PART I OF II
6	" " " " STA. 48+00 TO STA. 54+37.74	25	" " " " PART II OF II
7	BYPASS CONDUIT	26	JUNCTION CHAMBER AT PLEASANT ST.
8	SEWER AND TRENCH SECTIONS - UNDERDRAIN DETAILS		
9	MANHOLE DETAILS		
10	MISCELLANEOUS DETAILS		
11	SIPHON INLET STRUCTURE - PART I OF V		
12	" " " " PART II OF V		
13	" " " " PART III OF V		
14	" " " " PART IV OF V		
15	" " " " PART V OF V		
16	JUNCTION CHAMBER AT LYMAN ST. - PART I OF II		
17	" " " " PART II OF II		
18	MERRY ST. SEWER CONNECTION - PART I OF II		
19	" " " " PART II OF II		

DRAWN BY G.K.W.
TRACED BY W.S. D.W.S.
CHECKED BY D.M.R.



APPROVED
FOR METCALF & EDDY, ENGINEERS
R. I. REG. PROF. ENGR. NO. 353 DATE

RECORD PLAN

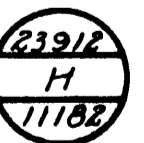
BLACKSTONE VALLEY SEWER DISTRICT COMMISSION
PROVIDENCE, RHODE ISLAND

TAFT ST. - PLEASANT ST.
BRANCH INTERCEPTER
SECTION B

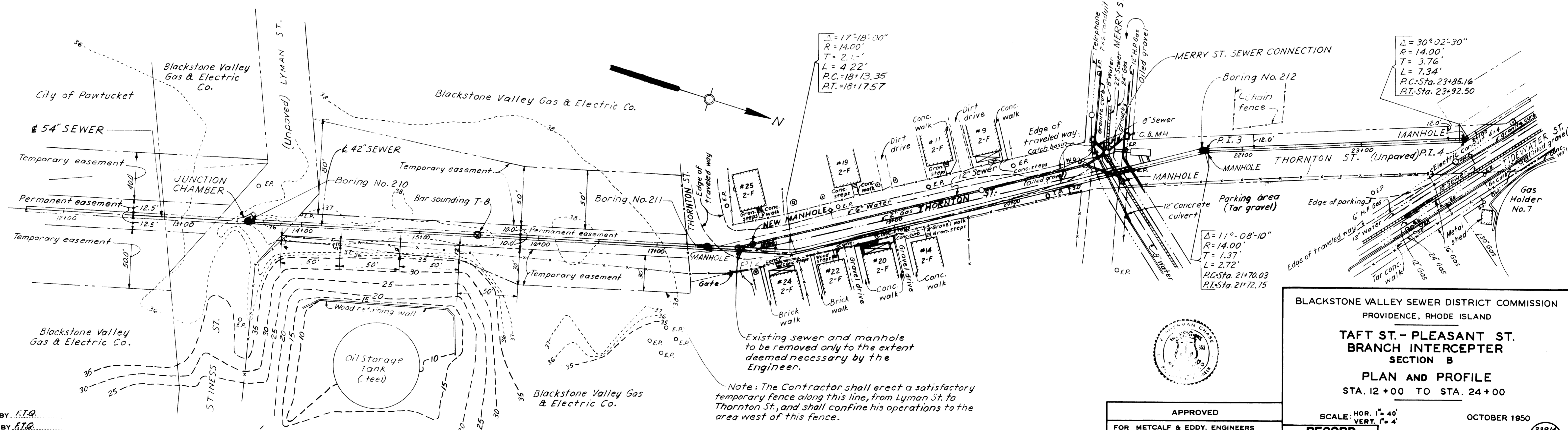
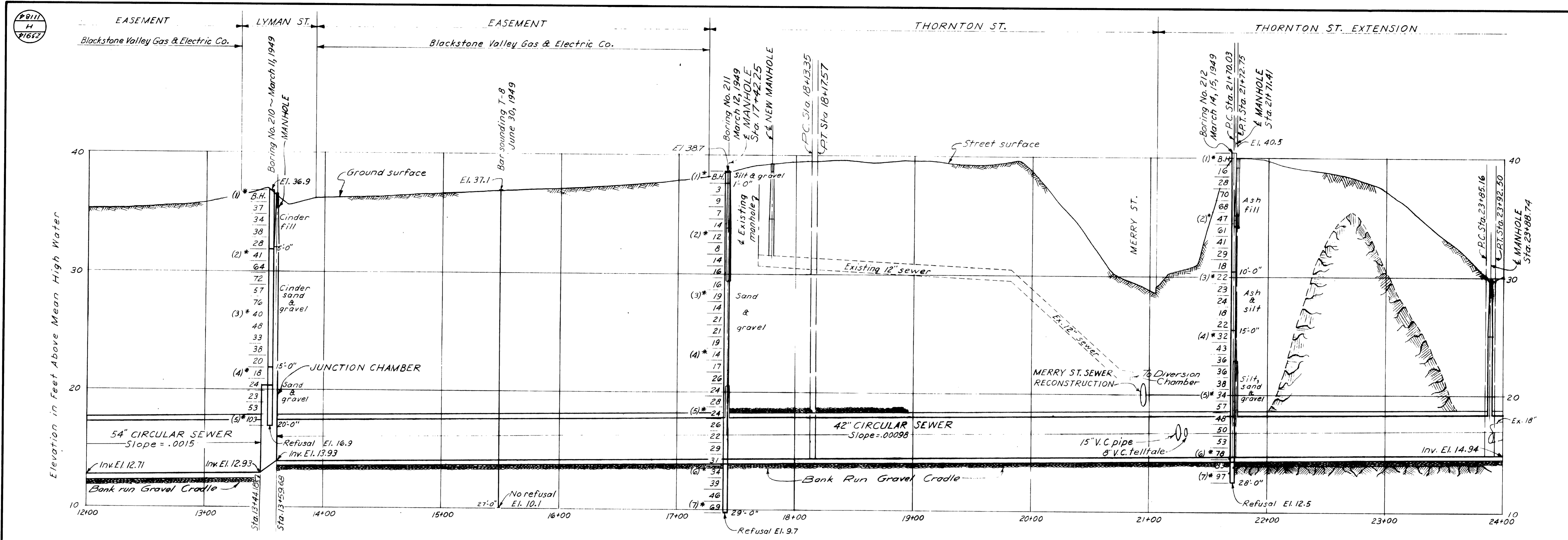
VICINITY PLAN AND LOCATION MAP
LIST OF DRAWINGS

SCALE: AS SHOWN OCTOBER 1950

METCALF & EDDY
ENGINEERS
BOSTON, MASS.



CONTRACT 18 SHEET 1 OF 28



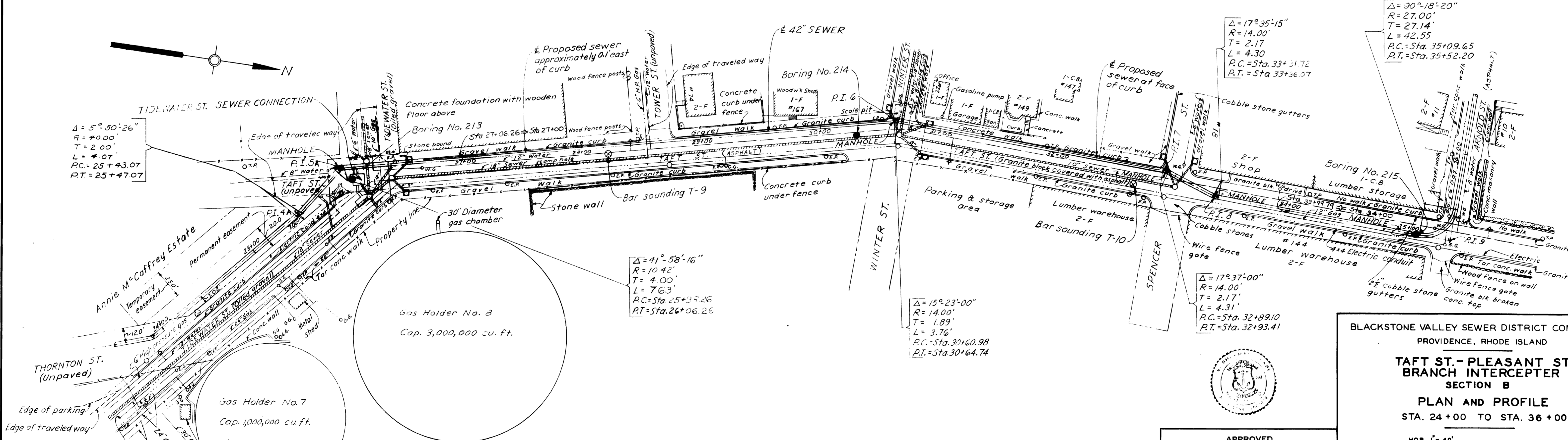
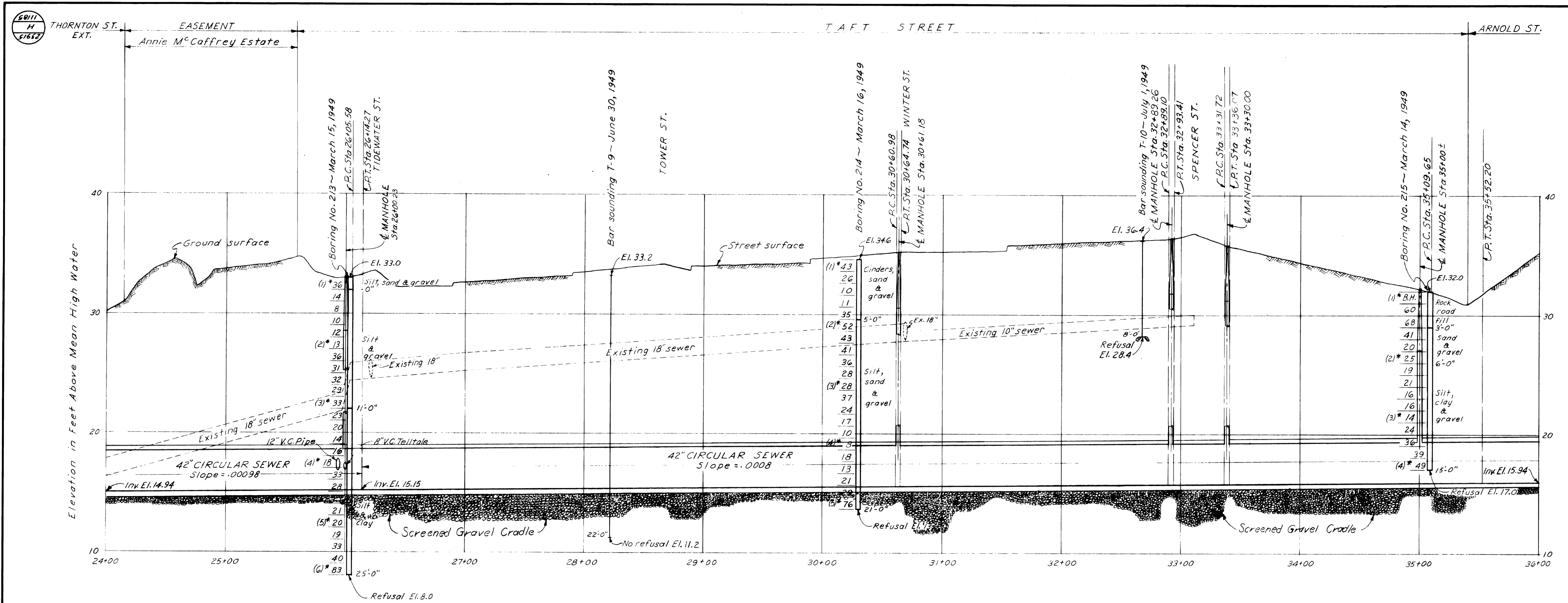
DRAWN BY F.T.R.
 TRACED BY F.T.R.
 CHECKED BY E.C.T., G.H.L.

Note: The Contractor shall erect a satisfactory temporary fence along this line, from Lyman St. to Thornton St., and shall confine his operations to the area west of this fence.

APPROVED
 FOR METCALF & EDDY, ENGINEERS
 R.L. REG. PROF. ENGR. NO. 353 DATE

SCALE: HOR. 1" = 40'
 VERT. 1" = 4'
RECORD DRAWING
 MARCH, 1963. E.K.
 METCALF & EDDY ENGINEERS BOSTON, MASS.

BLACKSTONE VALLEY SEWER DISTRICT COMMISSION
 PROVIDENCE, RHODE ISLAND
TAFT ST. - PLEASANT ST. BRANCH INTERCEPTOR SECTION B
 PLAN AND PROFILE
 STA. 12+00 TO STA. 24+00



DRAWN BY F.T.O.
 TRACED BY F.T.O.
 CHECKED BY R.C.T., C.E.V.

APPROVED
 FOR METCALF & EDDY, ENGINEERS
 R.I. REG. PROF. ENGR. NO. 353 DATE 10-27-50

RECORD DRAWING
 MARCH 1953. WHB

SCALE: HOR. 1" = 40'
 VERT. 1" = 4'
 OCTOBER 1950

METCALF & EDDY
 ENGINEERS
 BOSTON, MASS.

CONTRACT 18 SHEET 4 OF 26

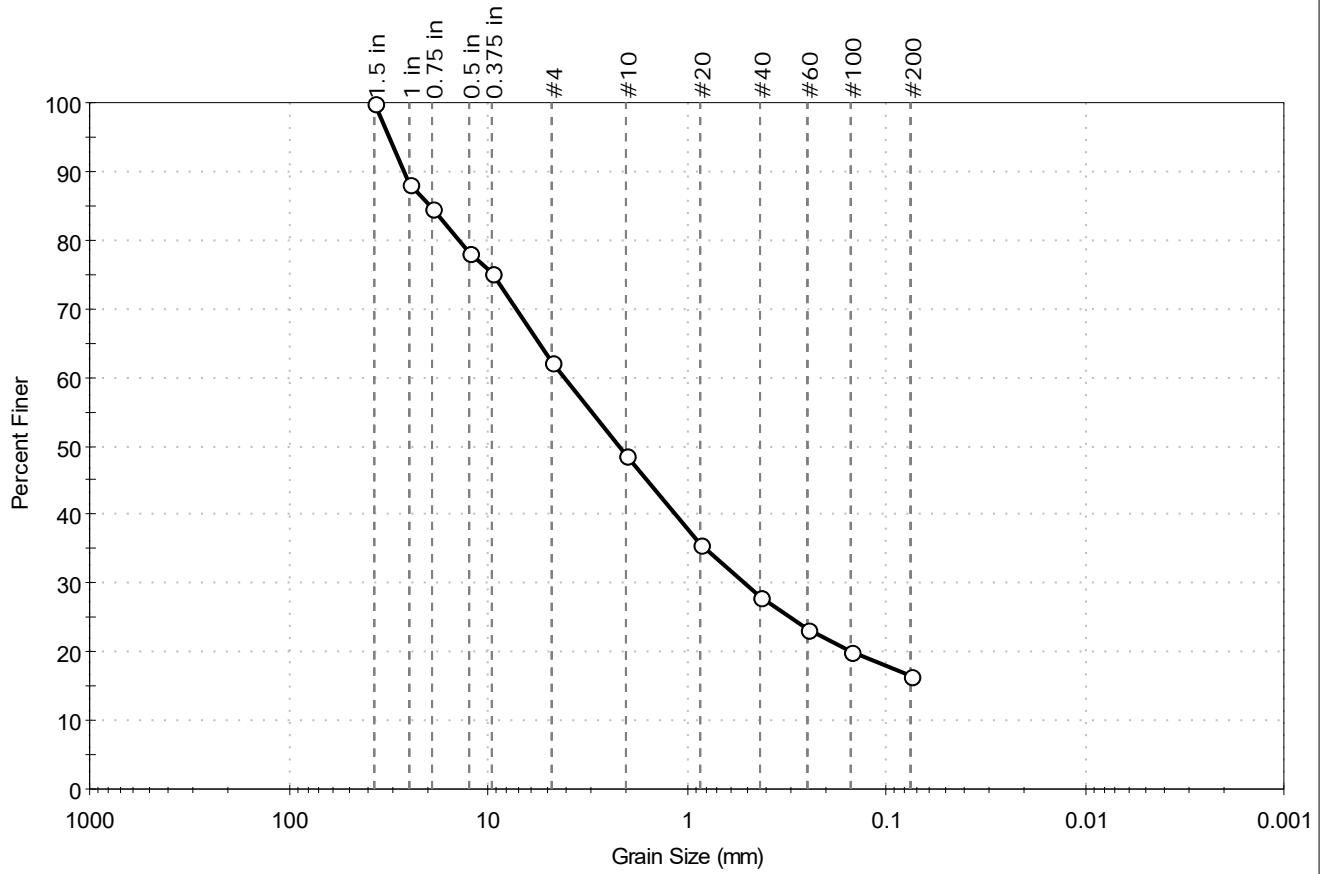
BLACKSTONE VALLEY SEWER DISTRICT COMMISSION
 PROVIDENCE, RHODE ISLAND
**TAFF ST. - PLEASANT ST.
 BRANCH INTERCEPTER
 SECTION B**
PLAN AND PROFILE
 STA. 24+00 TO STA. 36+00

APPENDIX E
Geotechnical Laboratory Testing Results



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-1	Sample Type:	jar
Sample ID:	S-1	Test Date:	10/01/19
Depth :	6-8 ft	Test Id:	525243
Test Comment:	---		
Visual Description:	Moist, brown silty sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	37.6	45.8	16.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	88		
0.75 in	19.00	85		
0.5 in	12.50	78		
0.375 in	9.50	75		
#4	4.75	62		
#10	2.00	49		
#20	0.85	36		
#40	0.42	28		
#60	0.25	23		
#100	0.15	20		
#200	0.075	17		

<u>Coefficients</u>	
D ₈₅ = 19.3520 mm	D ₃₀ = 0.5113 mm
D ₆₀ = 4.1040 mm	D ₁₅ = N/A
D ₅₀ = 2.1878 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

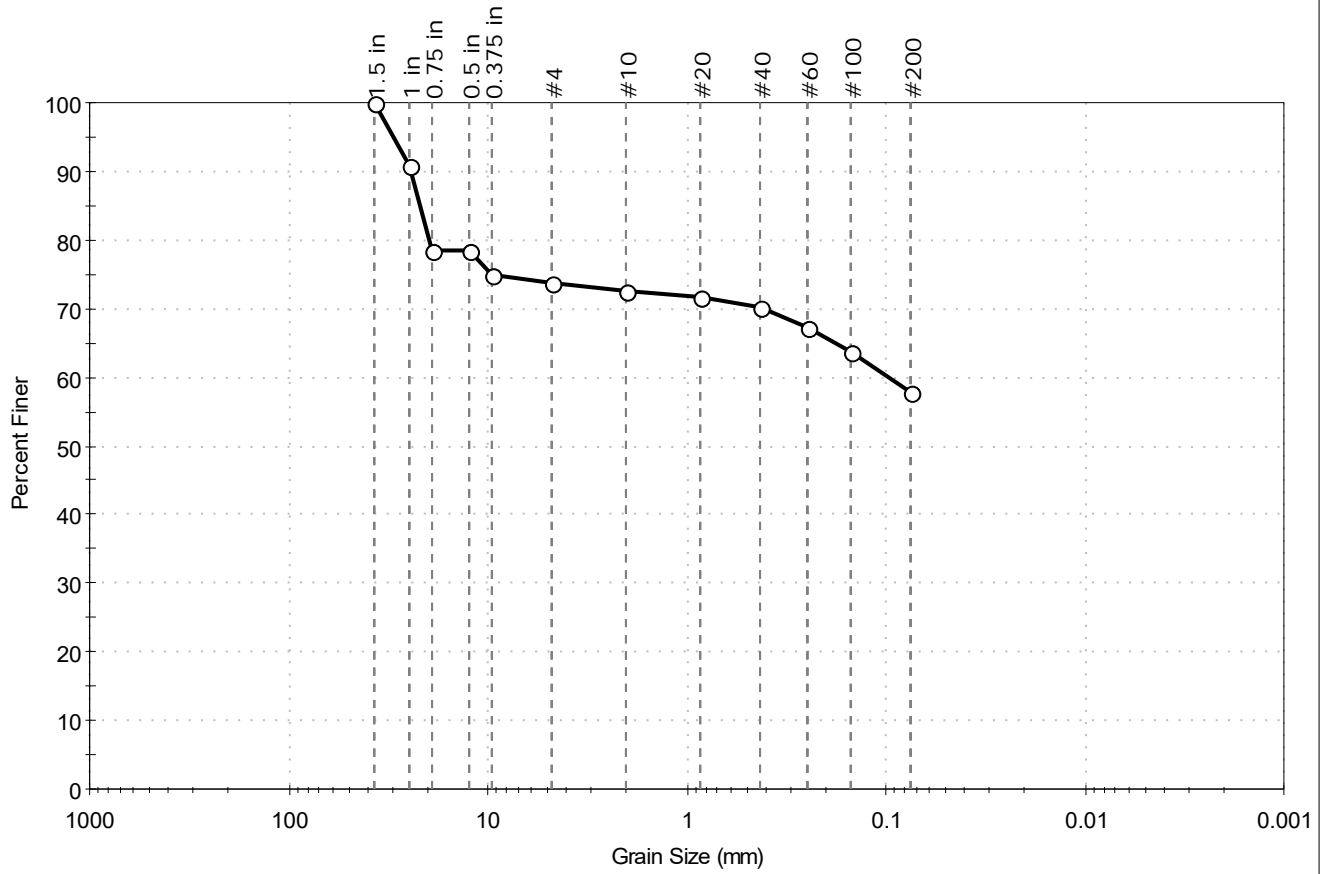
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description
 Sand/Gravel Particle Shape : ANGULAR
 Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-2	Sample Type:	jar
Sample ID:	S-3	Test Date:	10/01/19
Depth:	10-12 ft	Test Id:	525244
Test Comment:	---		
Visual Description:	Moist, brown silt with sand and gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	26.3	15.8	57.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	91		
0.75 in	19.00	78		
0.5 in	12.50	78		
0.375 in	9.50	75		
#4	4.75	74		
#10	2.00	73		
#20	0.85	72		
#40	0.42	70		
#60	0.25	67		
#100	0.15	64		
#200	0.075	58		

<u>Coefficients</u>	
D ₈₅ = 21.9919 mm	D ₃₀ = N/A
D ₆₀ = 0.0969 mm	D ₁₅ = N/A
D ₅₀ = N/A	D ₁₀ = N/A
C _u = N/A	C _c = N/A

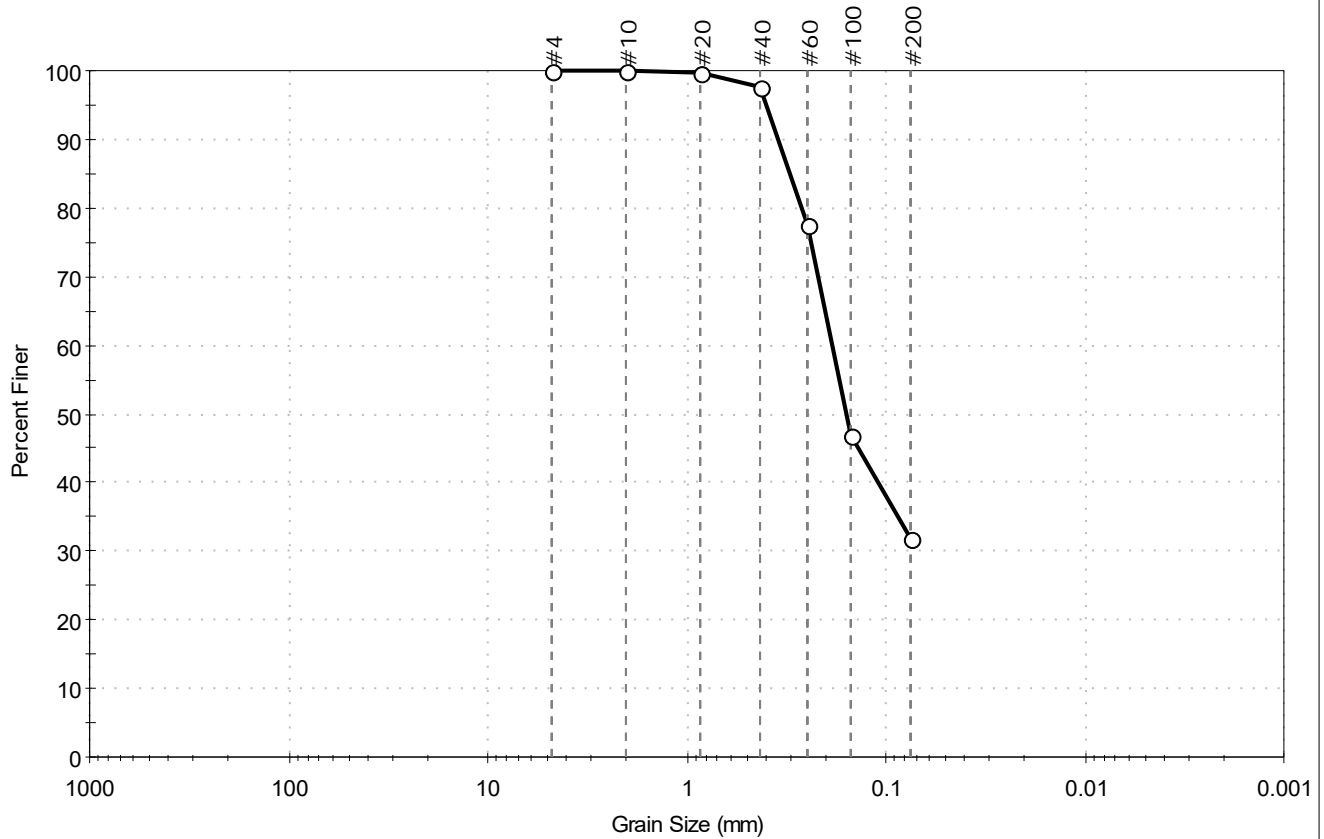
<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Soils (A-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-2	Sample Type:	jar
Sample ID:	S-7	Test Date:	10/01/19
Depth:	18-20 ft	Test Id:	525245
Test Comment:	---		
Visual Description:	Moist, brown silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	68.1	31.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.425	98		
#60	0.25	78		
#100	0.15	47		
#200	0.075	32		

<u>Coefficients</u>	
D ₈₅ = 0.3049 mm	D ₃₀ = N/A
D ₆₀ = 0.1866 mm	D ₁₅ = N/A
D ₅₀ = 0.1579 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

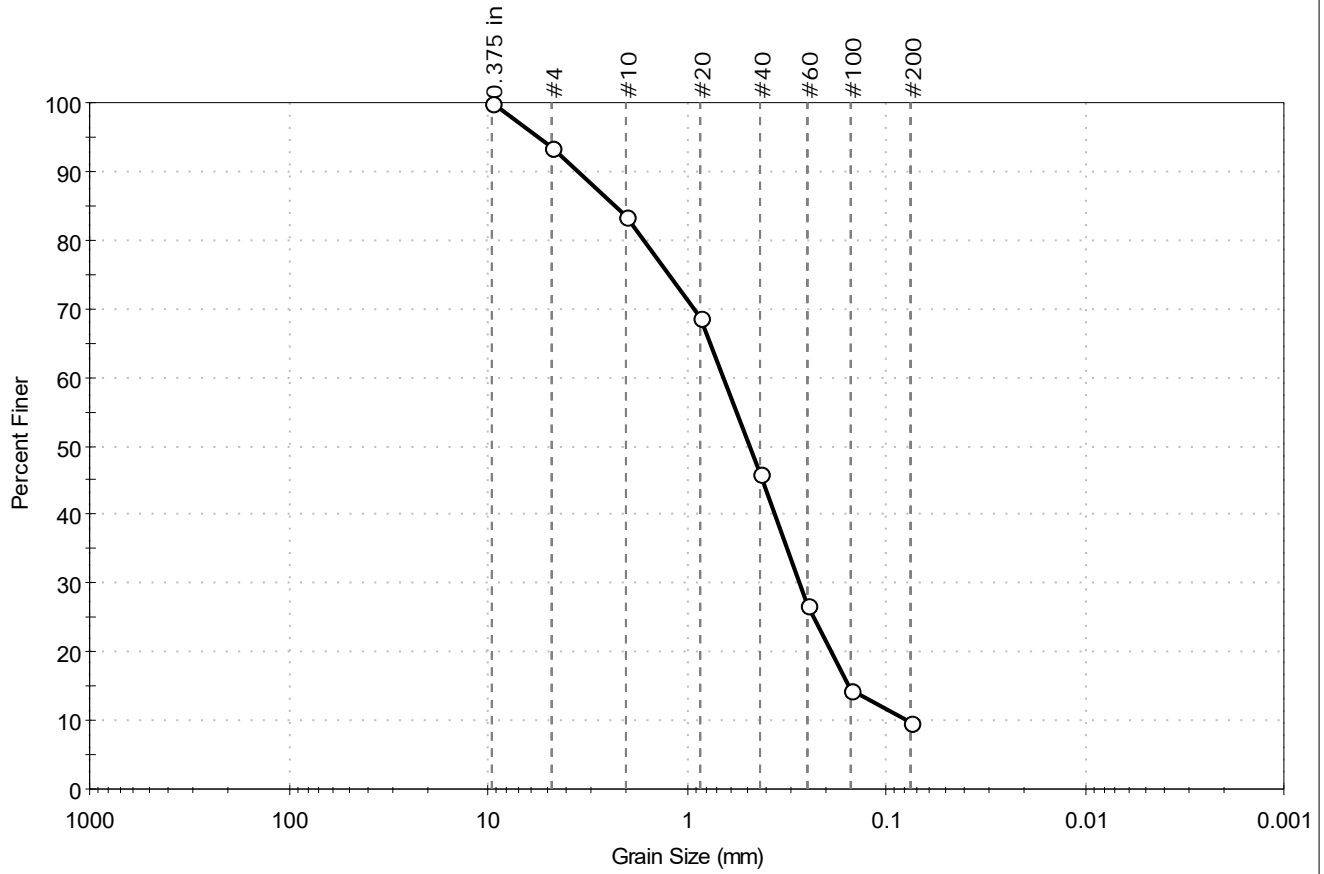
<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Gravel and Sand (A-2-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-3	Sample Type:	jar
Sample ID:	S-2	Test Date:	10/01/19
Depth:	14-16 ft	Test Id:	525246
Test Comment:	---		
Visual Description:	Moist, brown sand with silt		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	6.5	83.8	9.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	93		
#10	2.00	83		
#20	0.85	69		
#40	0.42	46		
#60	0.25	27		
#100	0.15	15		
#200	0.075	9.7		

<u>Coefficients</u>	
D ₈₅ = 2.2983 mm	D ₃₀ = 0.2729 mm
D ₆₀ = 0.6501 mm	D ₁₅ = 0.1526 mm
D ₅₀ = 0.4784 mm	D ₁₀ = 0.0786 mm
C _u = 8.271	C _c = 1.457

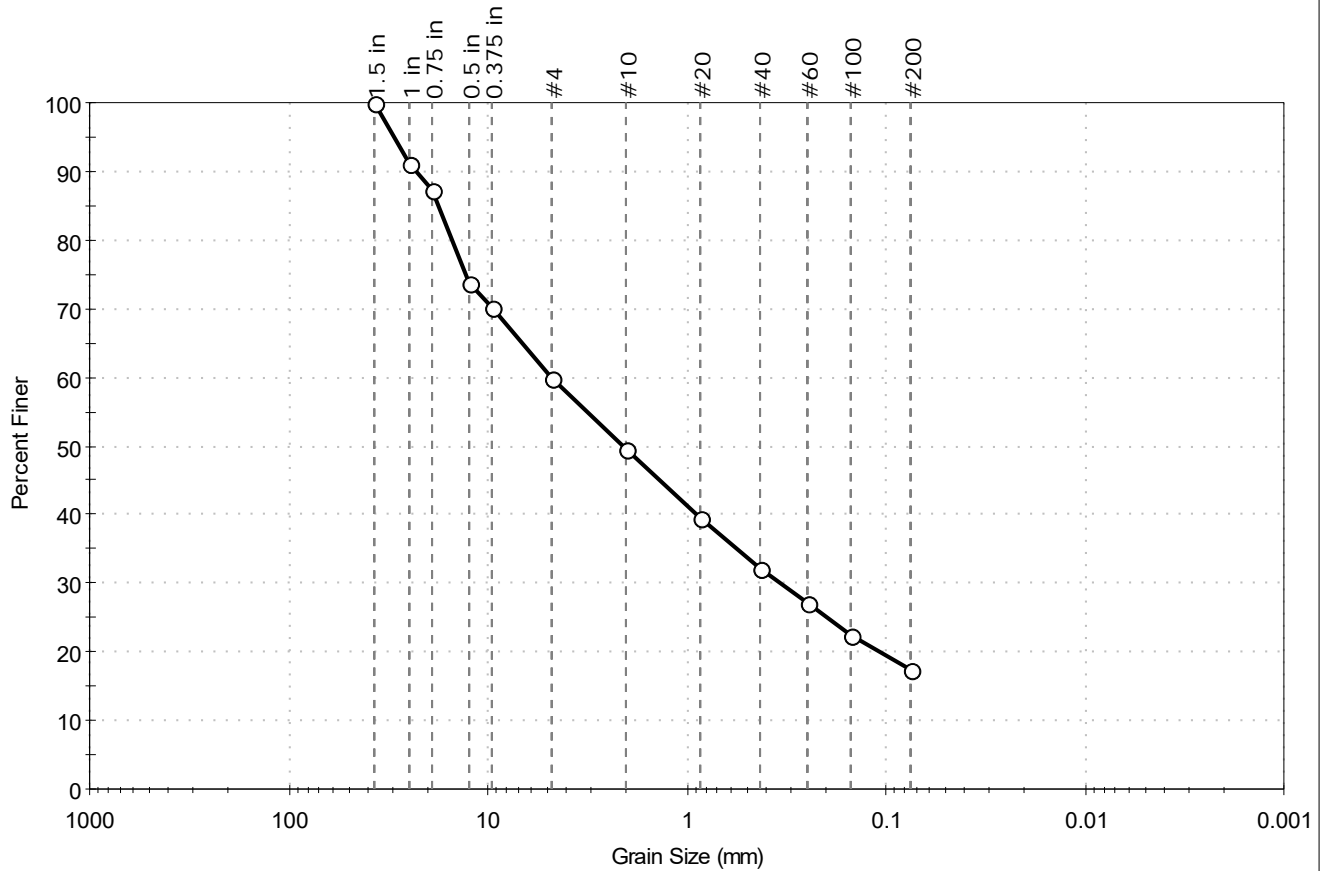
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-b (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-3	Sample Type:	jar
Sample ID:	S-5	Test Date:	10/01/19
Depth :	25-27 ft	Test Id:	525247
Test Comment:	---		
Visual Description:	Moist, brown silty sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	40.1	42.6	17.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	91		
0.75 in	19.00	87		
0.5 in	12.50	74		
0.375 in	9.50	70		
#4	4.75	60		
#10	2.00	50		
#20	0.85	39		
#40	0.42	32		
#60	0.25	27		
#100	0.15	22		
#200	0.075	17		

<u>Coefficients</u>	
D ₈₅ = 17.7034 mm	D ₃₀ = 0.3397 mm
D ₆₀ = 4.7666 mm	D ₁₅ = N/A
D ₅₀ = 2.0608 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

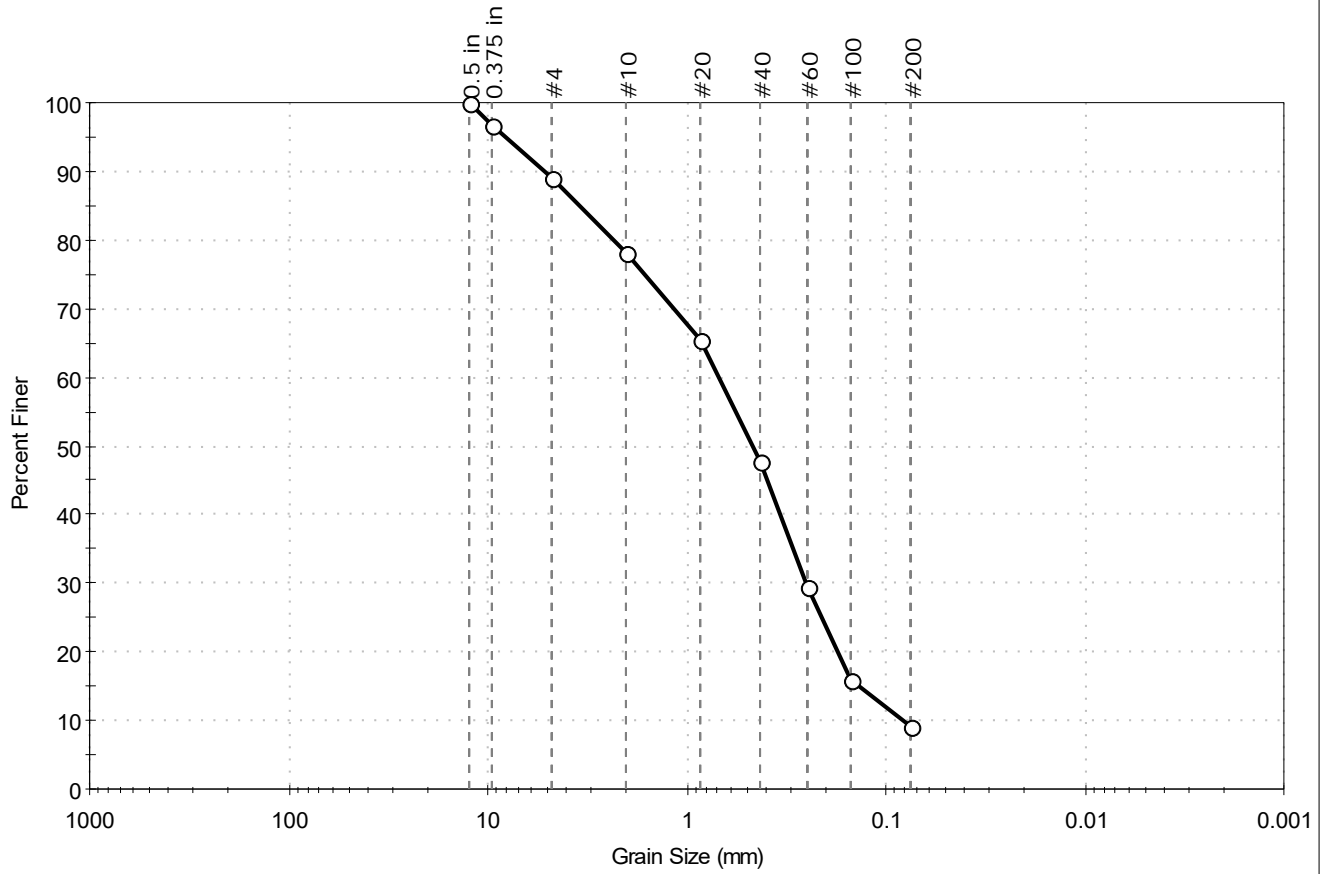
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description
 Sand/Gravel Particle Shape : ANGULAR
 Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-4C	Sample Type:	jar
Sample ID:	S-2	Test Date:	10/01/19
Depth:	14-16 ft	Test Id:	525248
Test Comment:	---		
Visual Description:	Moist, yellowish brown sand with silt		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	11.0	79.8	9.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	97		
#4	4.75	89		
#10	2.00	78		
#20	0.85	66		
#40	0.42	48		
#60	0.25	30		
#100	0.15	16		
#200	0.075	9.2		

<u>Coefficients</u>	
D ₈₅ = 3.4518 mm	D ₃₀ = 0.2535 mm
D ₆₀ = 0.6837 mm	D ₁₅ = 0.1355 mm
D ₅₀ = 0.4631 mm	D ₁₀ = 0.0811 mm
C _u = 8.430	C _c = 1.159

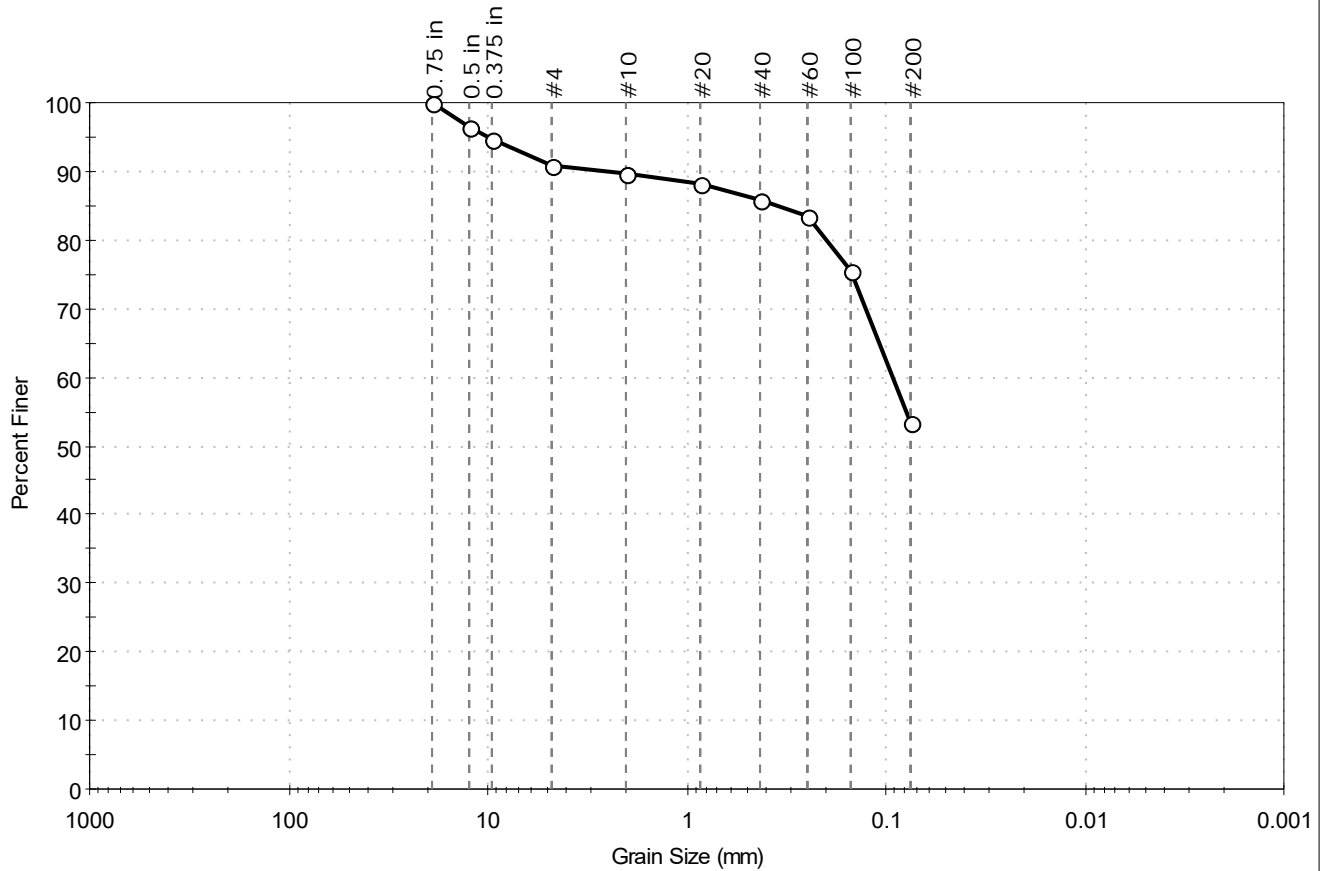
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-4C	Sample Type:	jar
Sample ID:	S-3b	Test Date:	10/01/19
Depth:	19-21 ft	Test Id:	525249
Test Comment:	---		
Visual Description:	Moist, dark yellowish brown sandy silt		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	9.1	37.4	53.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	96		
0.375 in	9.50	95		
#4	4.75	91		
#10	2.00	90		
#20	0.85	88		
#40	0.42	86		
#60	0.25	84		
#100	0.15	75		
#200	0.075	54		

<u>Coefficients</u>	
D ₈₅ = 0.3439 mm	D ₃₀ = N/A
D ₆₀ = 0.0921 mm	D ₁₅ = N/A
D ₅₀ = N/A	D ₁₀ = N/A
C _u = N/A	C _c = N/A

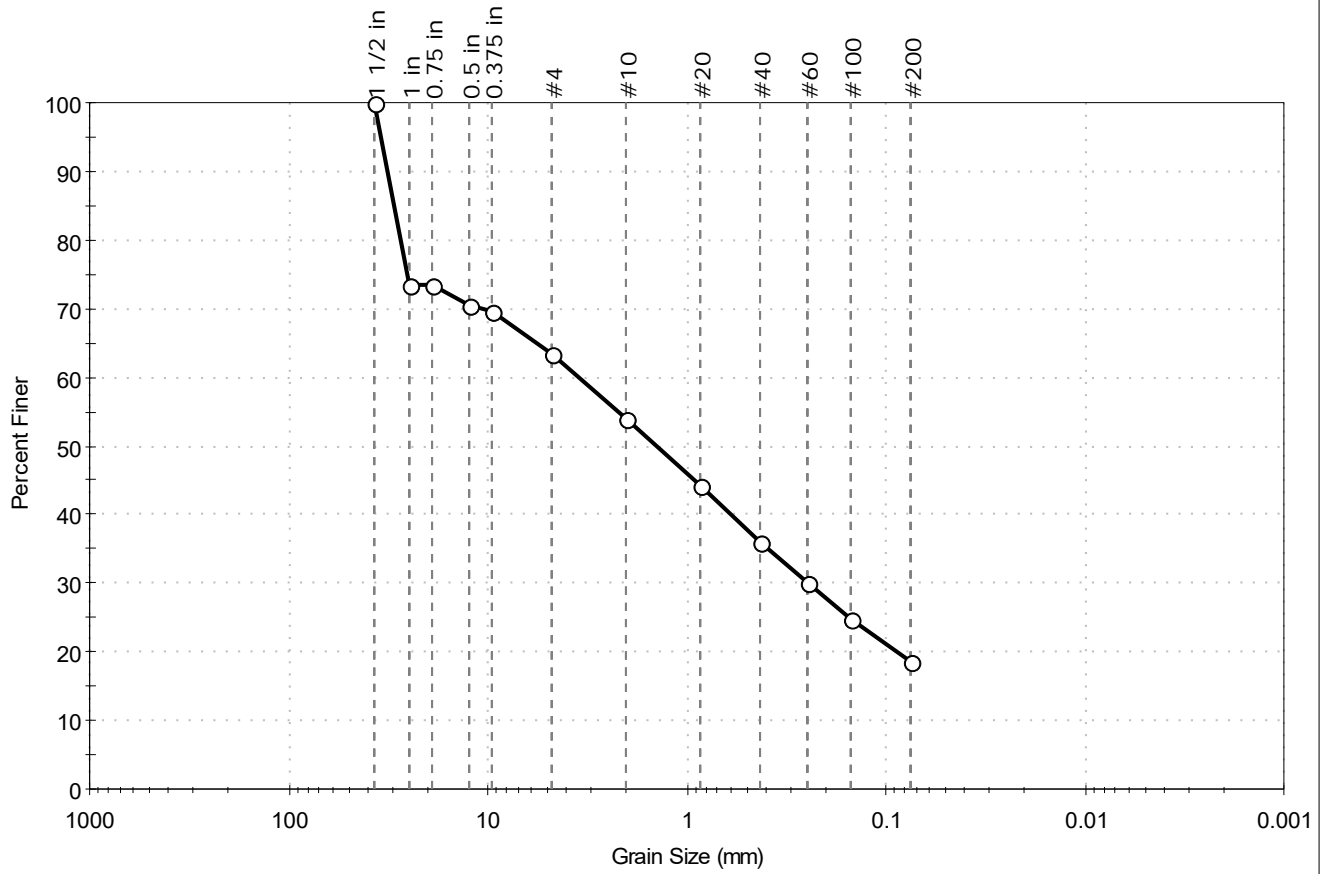
<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Soils (A-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-5	Sample Type:	jar
Sample ID:	S-4	Test Date:	10/01/19
Depth :	6-8 ft	Test Id:	525250
Test Comment:	---		
Visual Description:	Moist, dark gray silty sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	36.5	45.0	18.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 1/2 in	37.50	100		
1 in	25.00	73		
0.75 in	19.00	73		
0.5 in	12.50	70		
0.375 in	9.50	70		
#4	4.75	64		
#10	2.00	54		
#20	0.85	44		
#40	0.42	36		
#60	0.25	30		
#100	0.15	25		
#200	0.075	19		

<u>Coefficients</u>	
D ₈₅ = 29.8577 mm	D ₃₀ = 0.2452 mm
D ₆₀ = 3.4407 mm	D ₁₅ = N/A
D ₅₀ = 1.4144 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

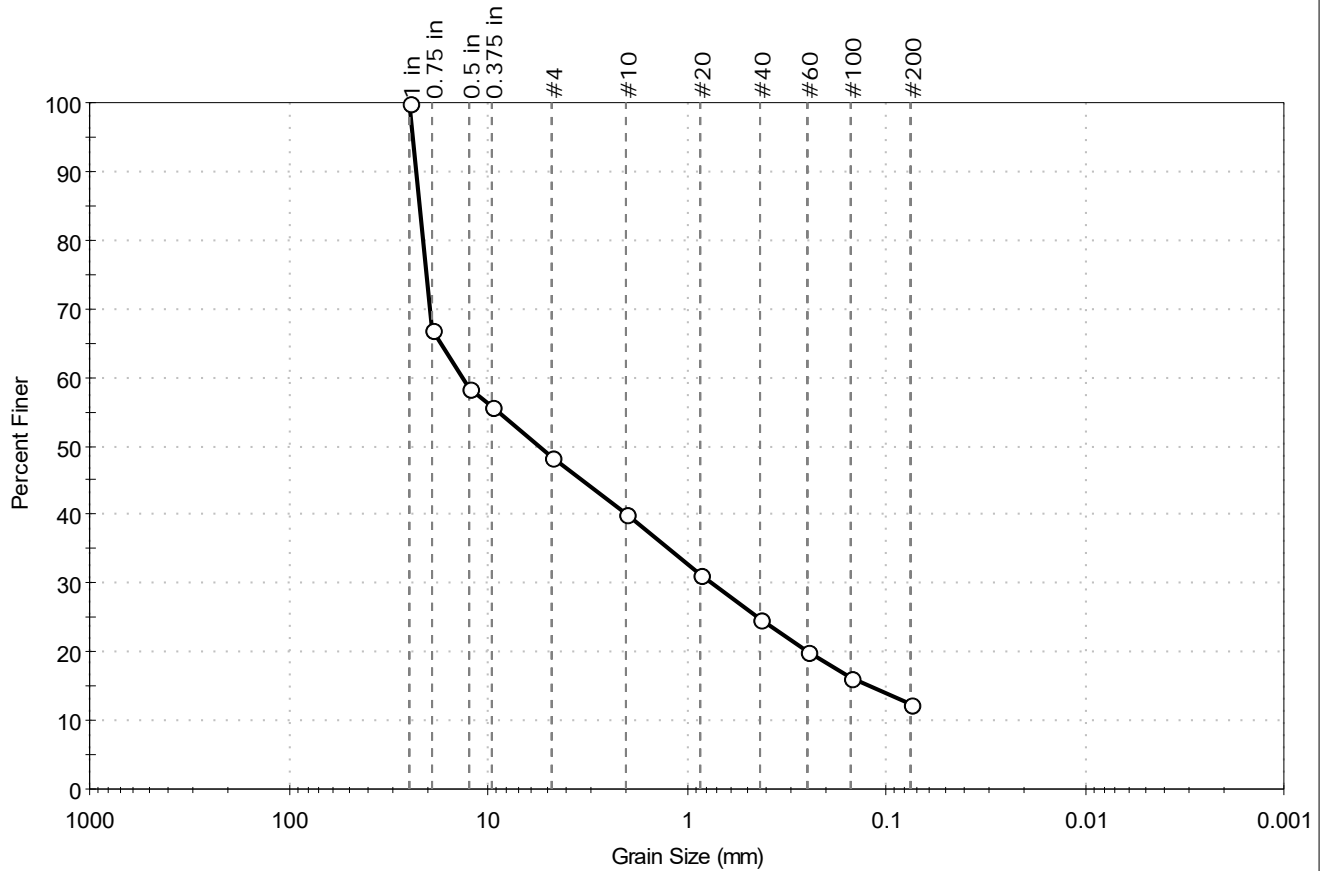
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>	
Sand/Gravel Particle Shape :	ROUNDED
Sand/Gravel Hardness :	HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-5	Sample Type:	jar
Sample ID:	S-8	Test Date:	10/01/19
Depth:	19-21 ft	Test Id:	525251
Test Comment:	---		
Visual Description:	Moist, brownish yellow silty gravel with sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	51.5	36.1	12.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	67		
0.5 in	12.50	58		
0.375 in	9.50	56		
#4	4.75	48		
#10	2.00	40		
#20	0.85	31		
#40	0.42	25		
#60	0.25	20		
#100	0.15	16		
#200	0.075	12		

<u>Coefficients</u>	
D ₈₅ = 22.0771 mm	D ₃₀ = 0.7395 mm
D ₆₀ = 13.5624 mm	D ₁₅ = 0.1220 mm
D ₅₀ = 5.5113 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

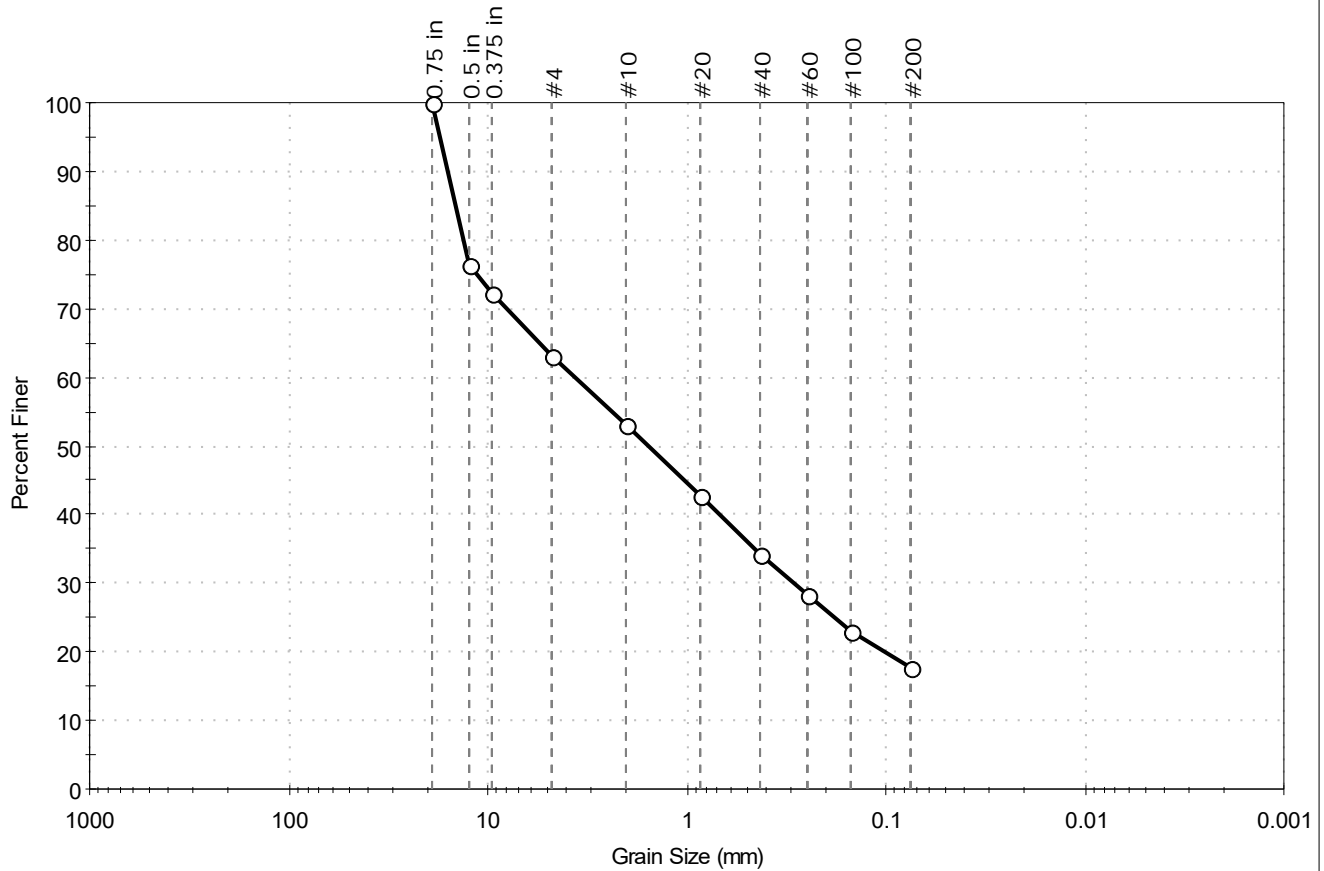
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-a (0))

Sample/Test Description
 Sand/Gravel Particle Shape : ANGULAR
 Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-6A	Sample Type:	jar
Sample ID:	S-5	Test Date:	10/02/19
Depth:	19-21 ft	Test Id:	525252
Test Comment:	---		
Visual Description:	Moist, dark gray silty sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	36.8	45.4	17.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	76		
0.375 in	9.50	72		
#4	4.75	63		
#10	2.00	53		
#20	0.85	43		
#40	0.42	34		
#60	0.25	28		
#100	0.15	23		
#200	0.075	18		

<u>Coefficients</u>	
D ₈₅ = 14.5804 mm	D ₃₀ = 0.2915 mm
D ₆₀ = 3.6233 mm	D ₁₅ = N/A
D ₅₀ = 1.5632 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

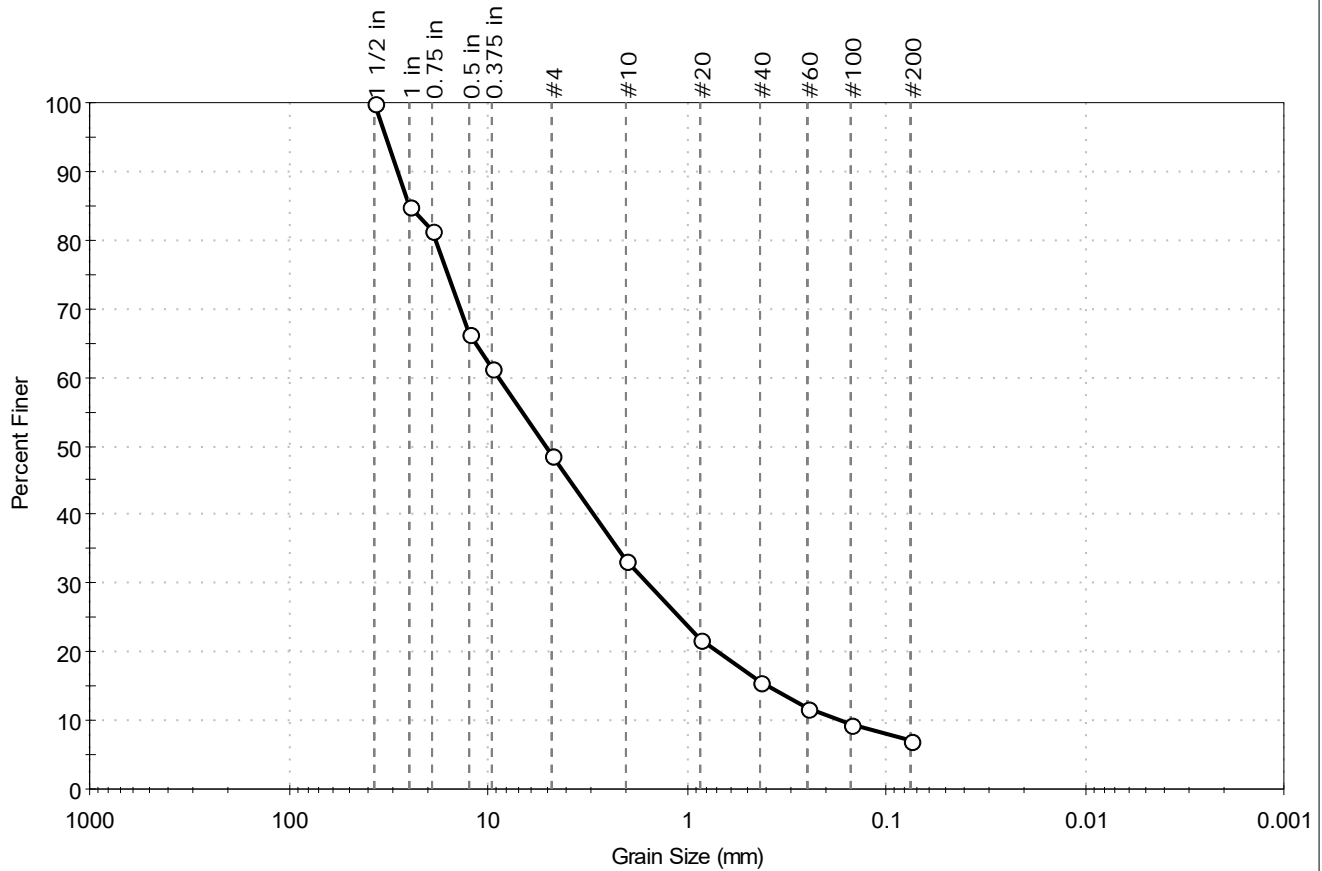
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-b (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-7	Sample Type:	jar
Sample ID:	S-5	Test Date:	10/01/19
Depth:	8-10 ft	Test Id:	525253
Test Comment:	---		
Visual Description:	Moist, brown gravel with silt and sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	51.2	41.6	7.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 1/2 in	37.50	100		
1 in	25.00	85		
0.75 in	19.00	81		
0.5 in	12.50	66		
0.375 in	9.50	61		
#4	4.75	49		
#10	2.00	33		
#20	0.85	22		
#40	0.42	16		
#60	0.25	12		
#100	0.15	9		
#200	0.075	7.2		

<u>Coefficients</u>	
D ₈₅ = 24.9033 mm	D ₃₀ = 1.5670 mm
D ₆₀ = 8.8356 mm	D ₁₅ = 0.3907 mm
D ₅₀ = 5.0743 mm	D ₁₀ = 0.1719 mm
C _u = 51.400	C _c = 1.617

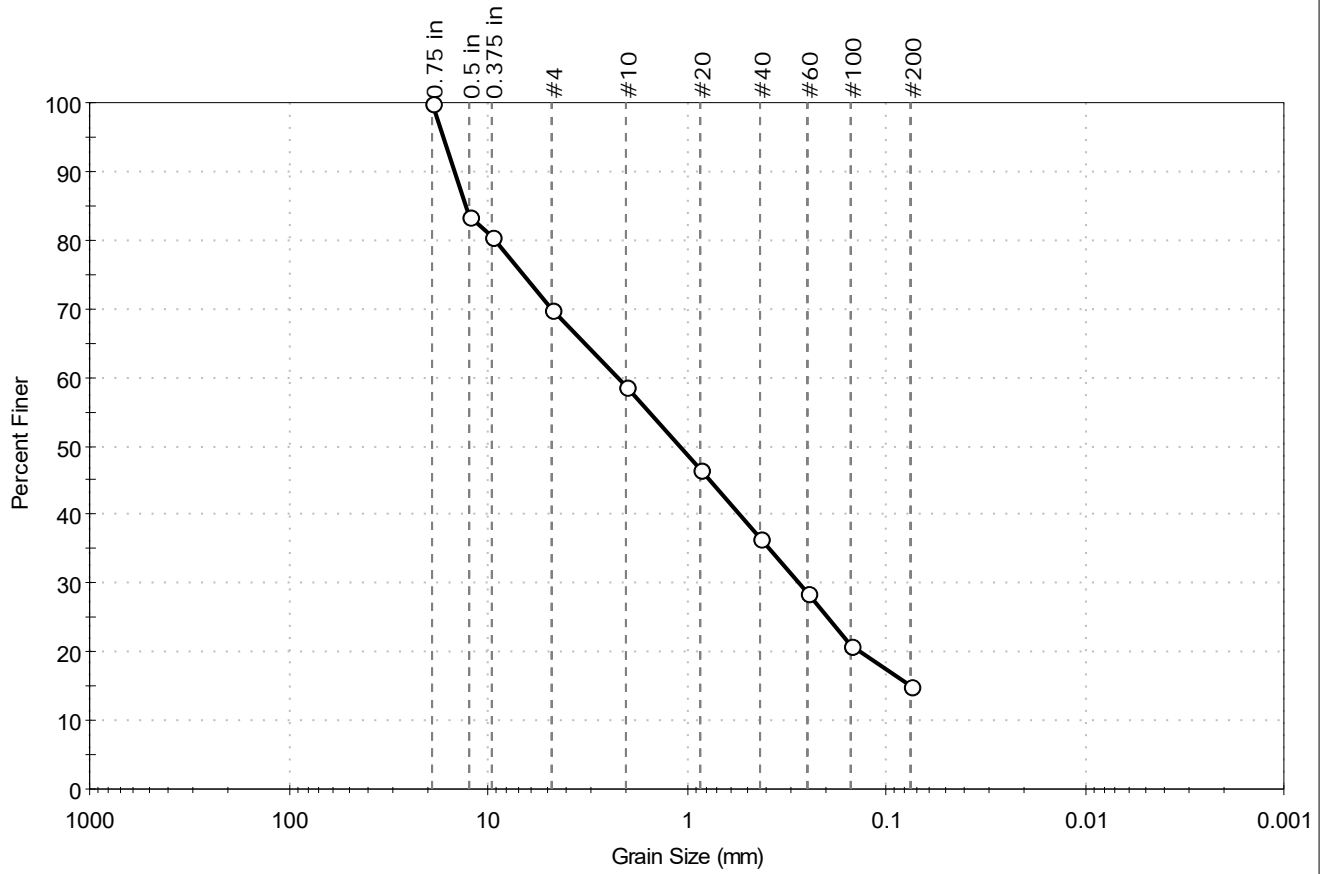
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-7	Sample Type:	jar
Sample ID:	S-7	Test Date:	10/01/19
Depth:	14-16 ft	Test Id:	525254
Test Comment:	---		
Visual Description:	Moist, yellowish brown silty sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	30.2	54.9	14.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	83		
0.375 in	9.50	80		
#4	4.75	70		
#10	2.00	59		
#20	0.85	46		
#40	0.42	37		
#60	0.25	29		
#100	0.15	21		
#200	0.075	15		

<u>Coefficients</u>	
D ₈₅ = 13.0323 mm	D ₃₀ = 0.2730 mm
D ₆₀ = 2.2099 mm	D ₁₅ = 0.0755 mm
D ₅₀ = 1.0873 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

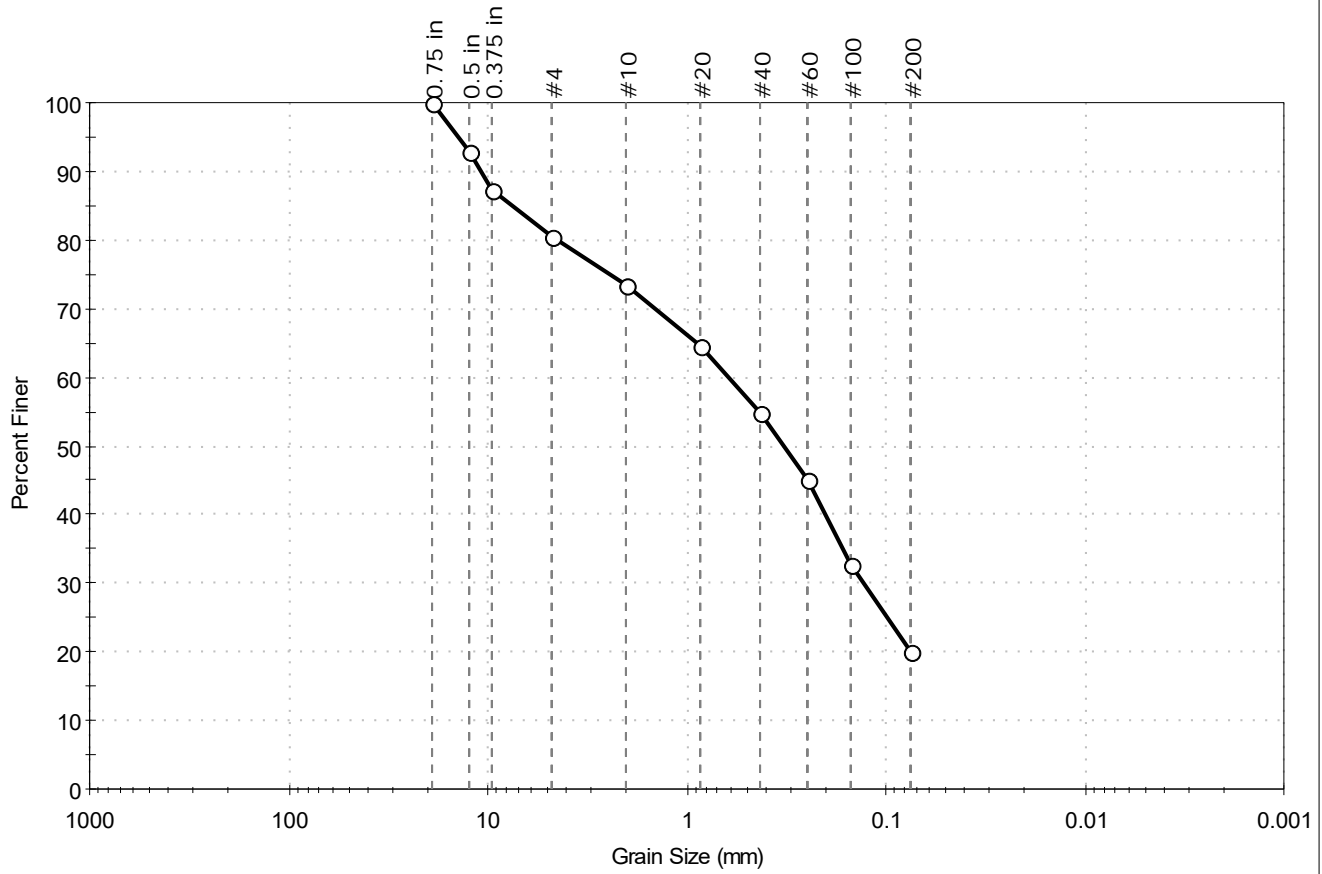
<u>Classification</u>	
<u>ASTM</u>	N/A
<u>AASHTO</u>	Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description
 Sand/Gravel Particle Shape : ANGULAR
 Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation Conduits		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-8	Sample Type:	jar
Sample ID:	S-3	Test Date:	10/01/19
Depth:	10-12 ft	Test Id:	525255
Test Comment:	---		
Visual Description:	Moist, dark yellowish brown silty sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	19.4	60.5	20.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	93		
0.375 in	9.50	87		
#4	4.75	81		
#10	2.00	74		
#20	0.85	65		
#40	0.42	55		
#60	0.25	45		
#100	0.15	33		
#200	0.075	20		

<u>Coefficients</u>	
D ₈₅ = 7.5492 mm	D ₃₀ = 0.1285 mm
D ₆₀ = 0.6145 mm	D ₁₅ = N/A
D ₅₀ = 0.3250 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

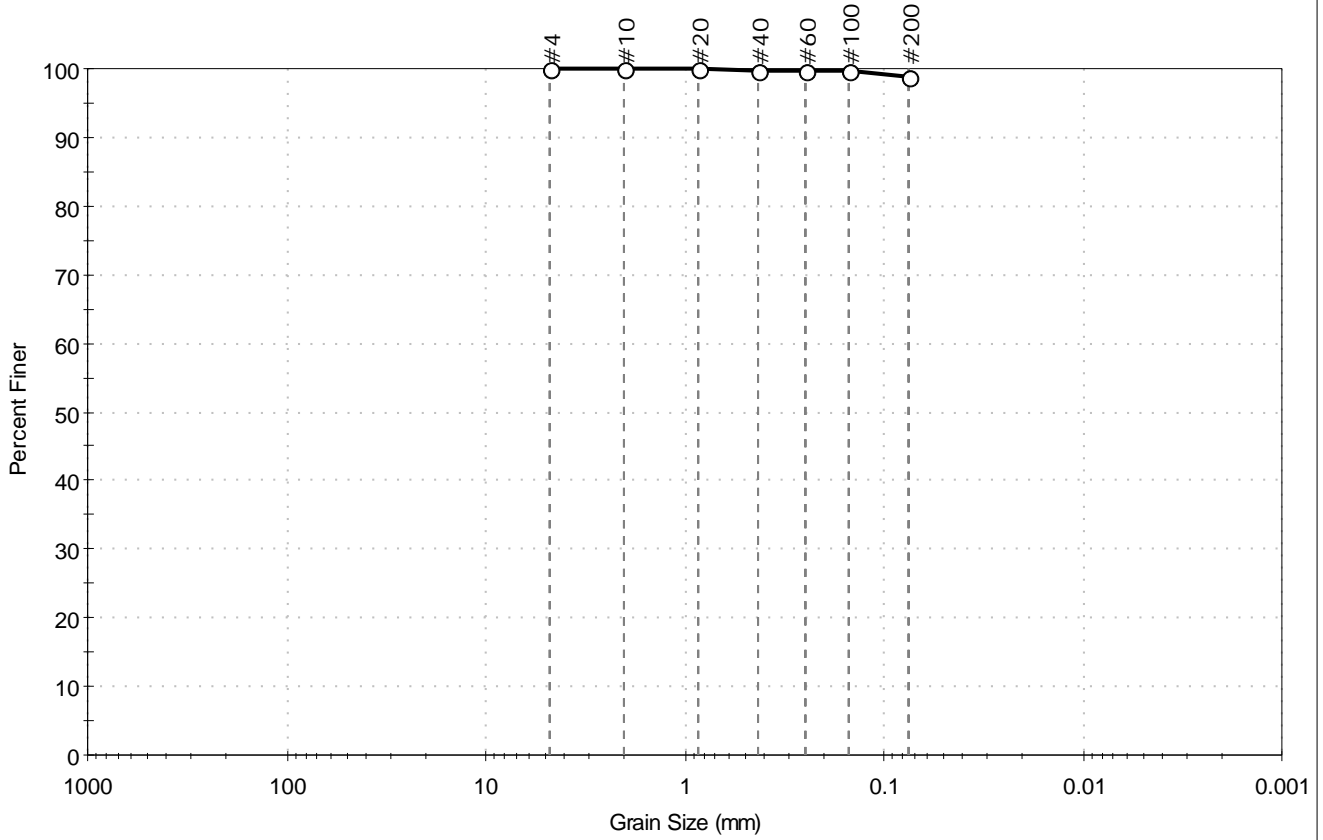
<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Gravel and Sand (A-2-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client: McMillen Jacobs Associates	Project No: GTX-310677
Project: NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C	
Location: Providence, RI	
Boring ID: B-9	Sample Type: jar
Sample ID: S-4	Test Date: 03/06/20
Depth: 17-19	Test Id: 548429
Test Comment: ---	Tested By: ckg
Visual Description: Moist, dark gray silt	Checked By: jsc
Sample Comment: ---	

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	1.3	98.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	100		
#200	0.075	99		

<u>Coefficients</u>	
D ₈₅ = N/A	D ₃₀ = N/A
D ₆₀ = N/A	D ₁₅ = N/A
D ₅₀ = N/A	D ₁₀ = N/A
C _u = N/A	C _c = N/A

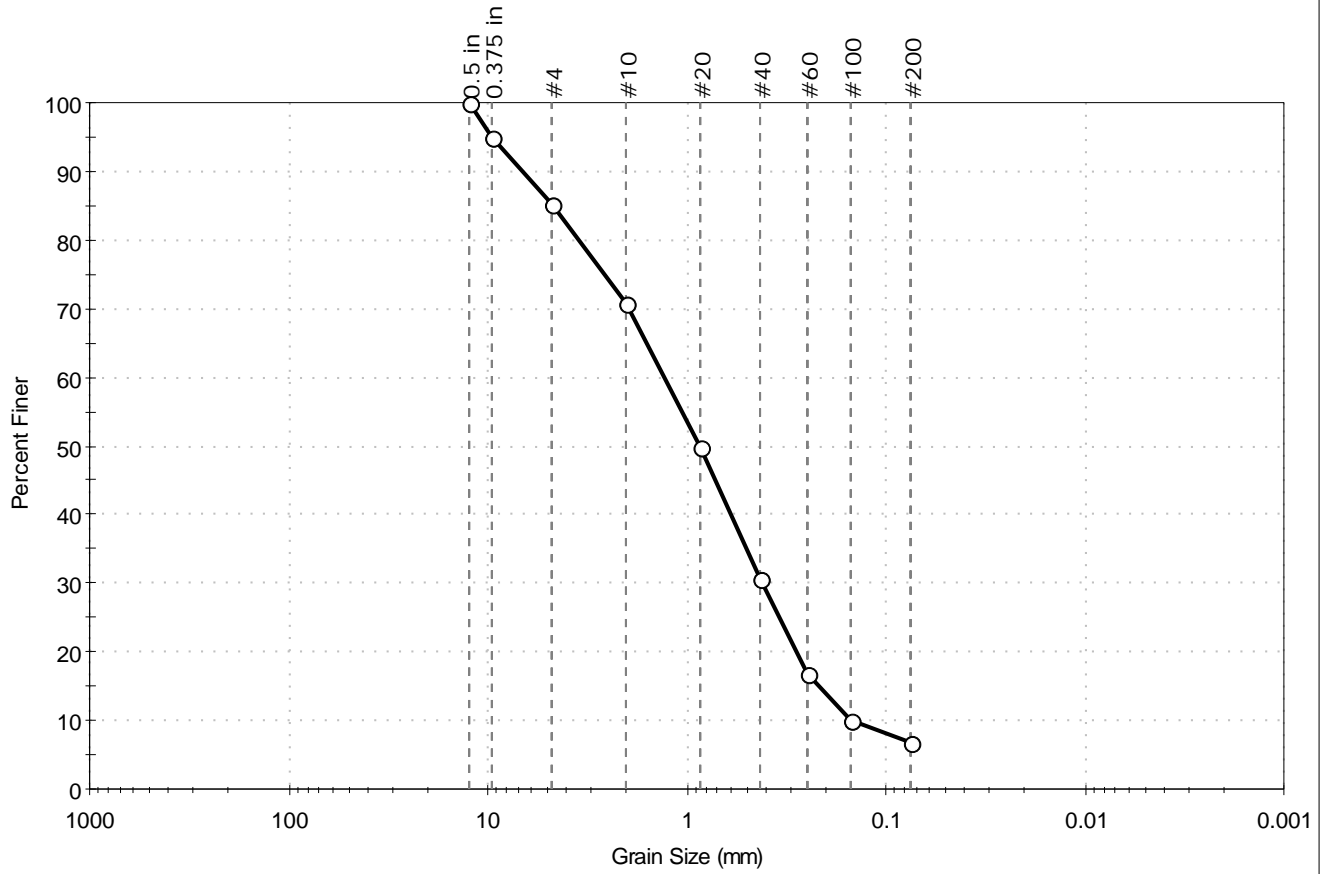
<u>Classification</u>	
ASTM	N/A
AASHTO	Silty Soils (A-4 (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-9	Sample Type:	jar
Sample ID:	S-6	Test Date:	03/06/20
Depth:	21-23	Test Id:	548430
Test Comment:	---		
Visual Description:	Moist, brown sand with silt		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	14.7	78.5	6.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	95		
#4	4.75	85		
#10	2.00	71		
#20	0.85	50		
#40	0.42	31		
#60	0.25	17		
#100	0.15	10		
#200	0.075	6.8		

<u>Coefficients</u>	
D ₈₅ = 4.6702 mm	D ₃₀ = 0.4162 mm
D ₆₀ = 1.2858 mm	D ₁₅ = 0.2161 mm
D ₅₀ = 0.8514 mm	D ₁₀ = 0.1468 mm
C _u = 8.759	C _c = 0.918

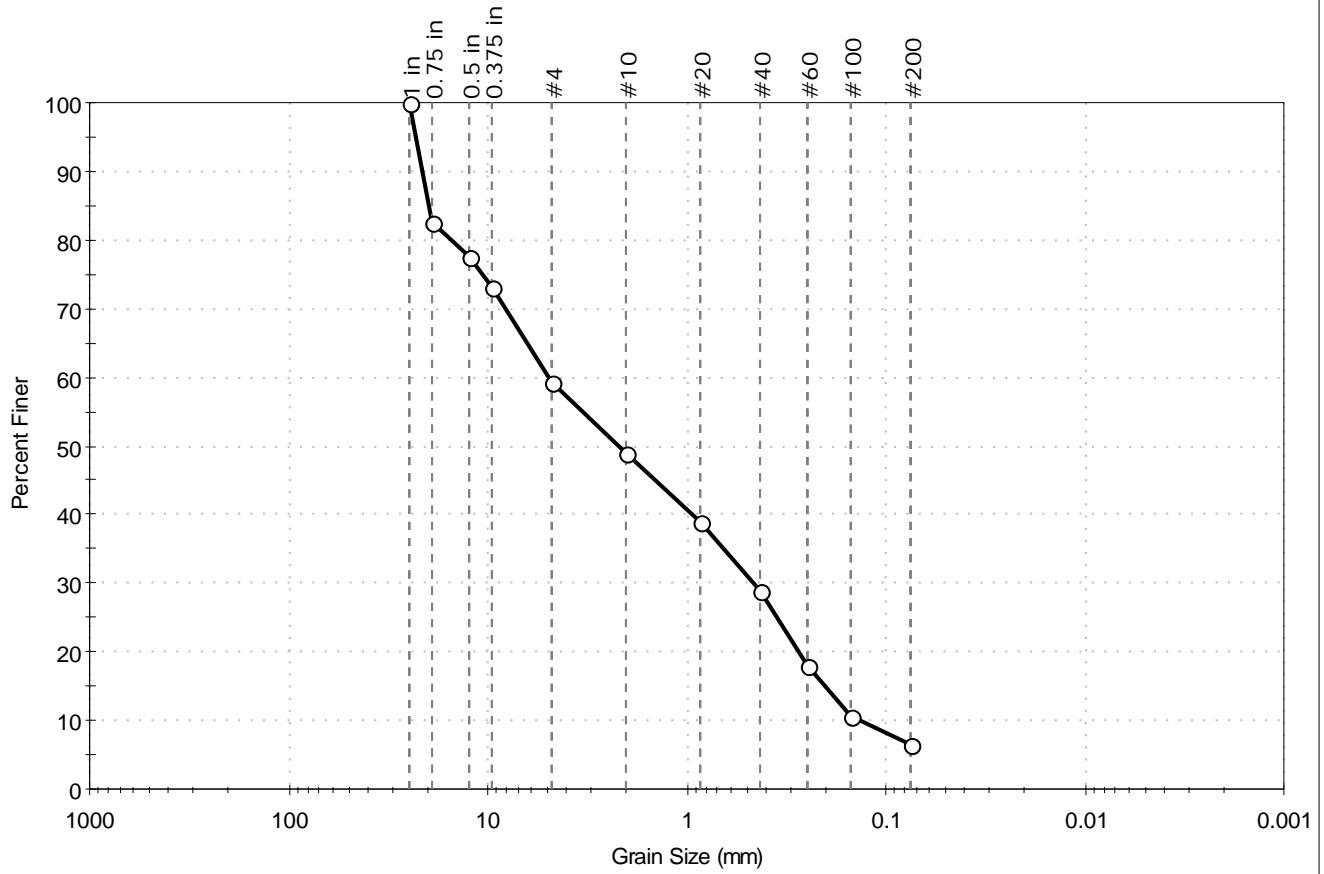
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-10	Sample Type:	jar
Sample ID:	S-6	Test Date:	03/06/20
Depth:	16-18	Test Id:	548431
Test Comment:	---		
Visual Description:	Moist, dark grayish brown sand with silt and gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	40.6	52.9	6.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	83		
0.5 in	12.50	78		
0.375 in	9.50	73		
#4	4.75	59		
#10	2.00	49		
#20	0.85	39		
#40	0.42	29		
#60	0.25	18		
#100	0.15	11		
#200	0.075	6.5		

<u>Coefficients</u>	
D ₈₅ = 19.7135 mm	D ₃₀ = 0.4573 mm
D ₆₀ = 4.8886 mm	D ₁₅ = 0.2036 mm
D ₅₀ = 2.1741 mm	D ₁₀ = 0.1327 mm
C _u = 36.839	C _c = 0.322

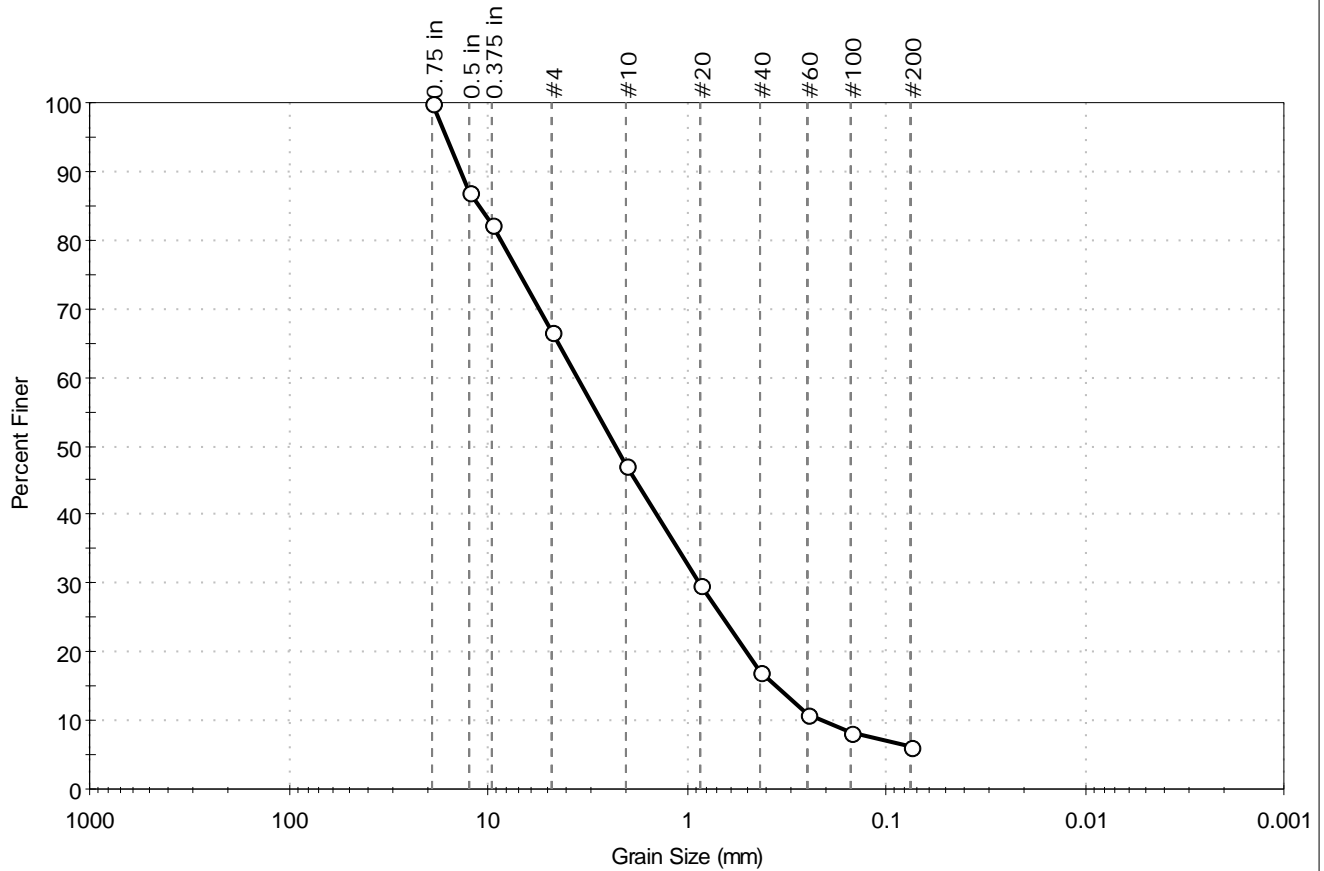
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-11	Sample Type:	jar
Sample ID:	S-7	Test Date:	03/06/20
Depth:	19-21	Test Id:	548432
Test Comment:	---		
Visual Description:	Moist, brown sand with silt and gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	33.2	60.5	6.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	87		
0.375 in	9.50	82		
#4	4.75	67		
#10	2.00	47		
#20	0.85	30		
#40	0.42	17		
#60	0.25	11		
#100	0.15	8		
#200	0.075	6.3		

<u>Coefficients</u>	
D ₈₅ = 11.1640 mm	D ₃₀ = 0.8586 mm
D ₆₀ = 3.5163 mm	D ₁₅ = 0.3506 mm
D ₅₀ = 2.2608 mm	D ₁₀ = 0.2069 mm
C _u = 16.995	C _c = 1.013

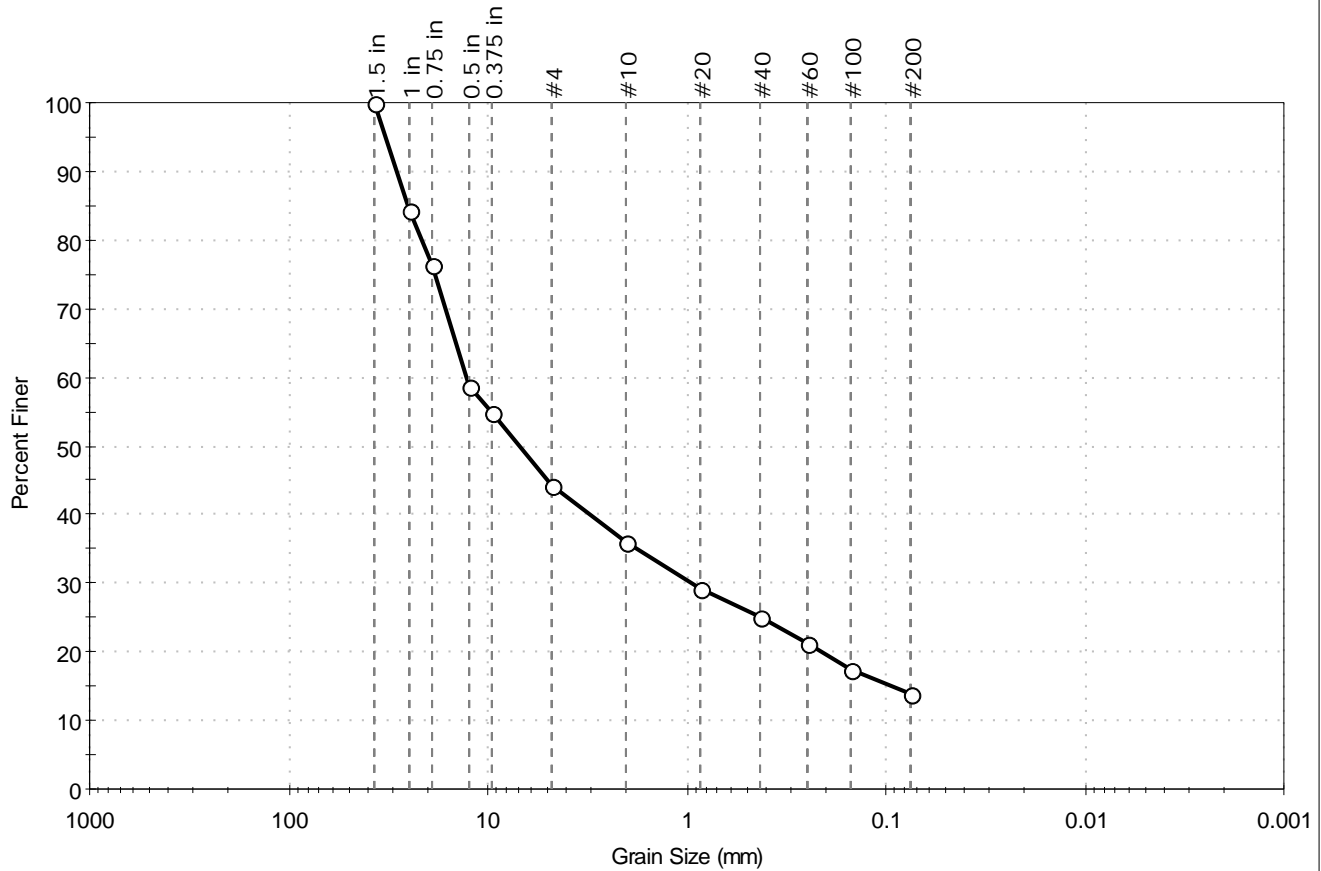
<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-a (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-12	Sample Type:	jar
Sample ID:	S-7	Test Date:	03/06/20
Depth:	27-29	Test Id:	548433
Test Comment:	---		
Visual Description:	Moist, dark olive gray silty gravel with sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	55.8	30.5	13.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	84		
0.75 in	19.00	76		
0.5 in	12.50	59		
0.375 in	9.50	55		
#4	4.75	44		
#10	2.00	36		
#20	0.85	29		
#40	0.42	25		
#60	0.25	21		
#100	0.15	17		
#200	0.075	14		

<u>Coefficients</u>	
D ₈₅ = 25.3728 mm	D ₃₀ = 0.9231 mm
D ₆₀ = 12.8882 mm	D ₁₅ = 0.0960 mm
D ₅₀ = 6.9001 mm	D ₁₀ = N/A
C _u = N/A	C _c = N/A

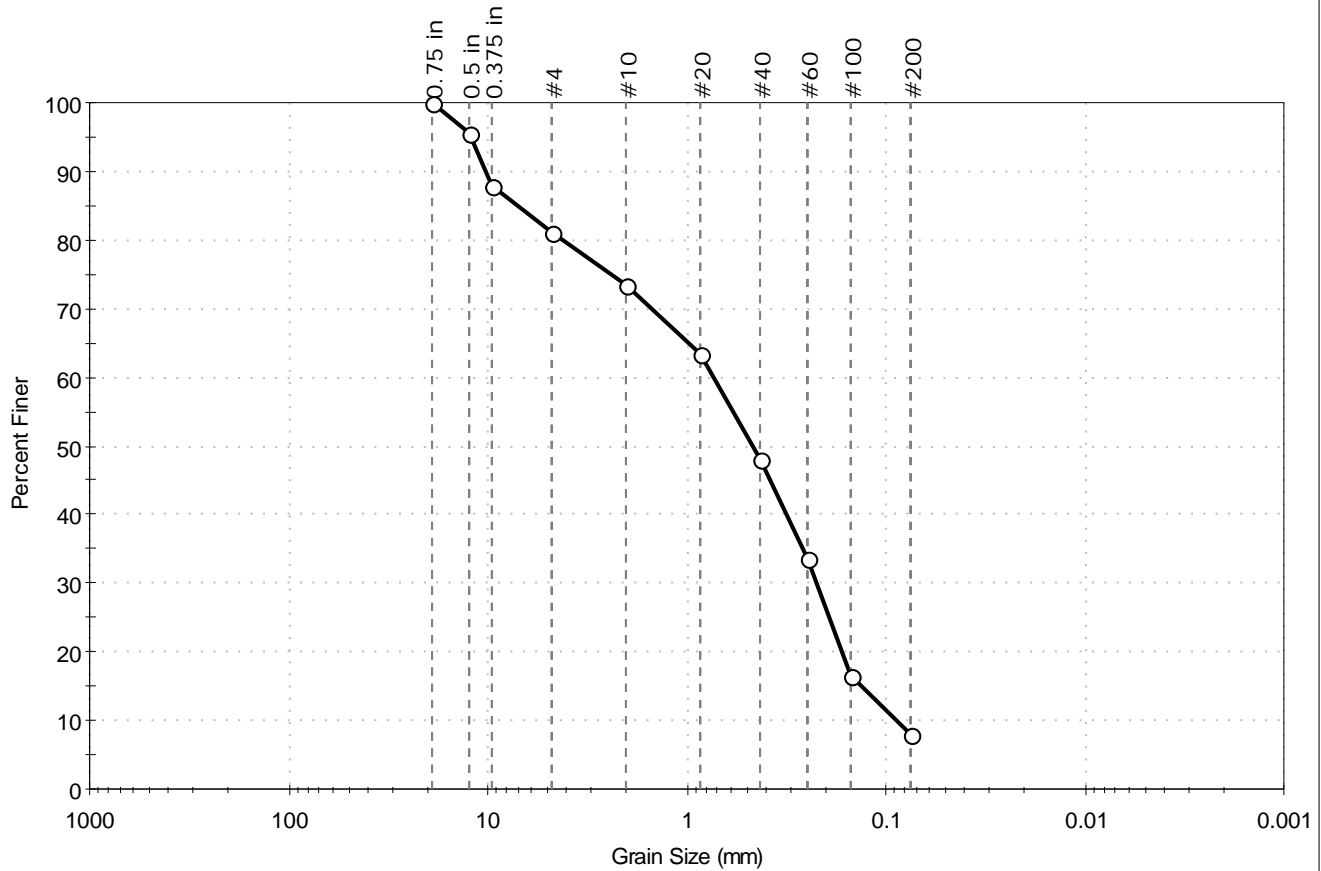
<u>Classification</u>	
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AASHTO	Stone Fragments, Gravel and Sand (A-1-a (0))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	B-13	Sample Type:	jar
Sample ID:	S-2a	Test Date:	03/06/20
Depth:	8-10	Test Id:	548434
Test Comment:	---		
Visual Description:	Moist, very dark grayish brown sand with silt and gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	18.9	73.1	8.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	95		
0.375 in	9.50	88		
#4	4.75	81		
#10	2.00	74		
#20	0.85	63		
#40	0.42	48		
#60	0.25	34		
#100	0.15	17		
#200	0.075	8.0		

<u>Coefficients</u>	
D ₈₅ = 7.0320 mm	D ₃₀ = 0.2241 mm
D ₆₀ = 0.7302 mm	D ₁₅ = 0.1321 mm
D ₅₀ = 0.4624 mm	D ₁₀ = 0.0883 mm
C _u = 8.270	C _c = 0.779

<u>Classification</u>	
ASTM	N/A
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (1))

<u>Sample/Test Description</u>
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C		
Location:	Providence, RI	Project No:	GTX-310677
Boring ID:	---	Sample Type:	---
Sample ID:	---	Test Date:	03/03/20
Depth :	---	Tested By:	tlm
		Checked By:	smd
		Test Id:	547063

**Bulk Density and Compressive Strength
of Rock Core Specimens by ASTM D7012 Method C**

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
B-9	C-1	29.89 - 30.27 ft	170	14240	3	Yes	---
B-10	C-1	22.29 - 22.67 ft	173	7325	2	Yes	---

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.
 All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.
 The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
 (See attached photographs)

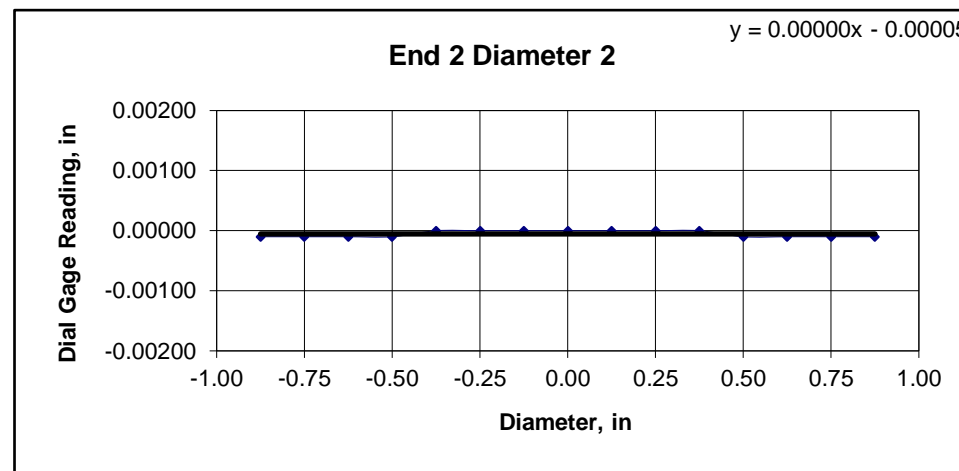
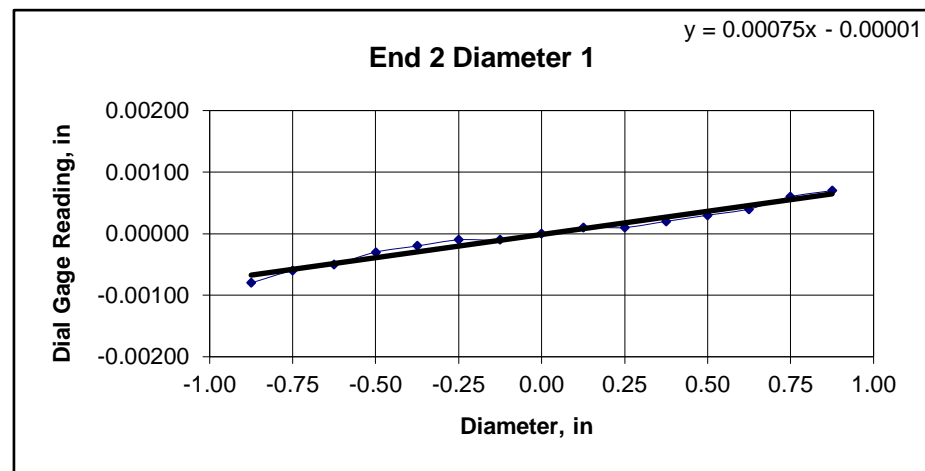
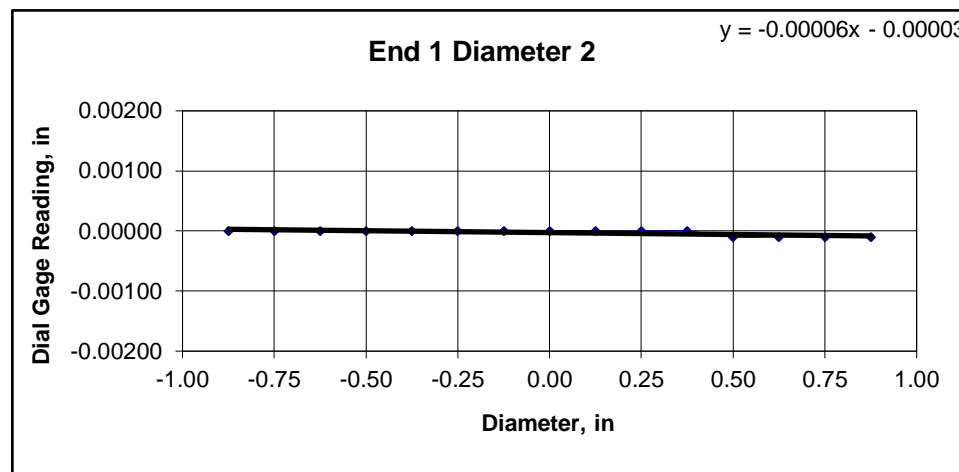
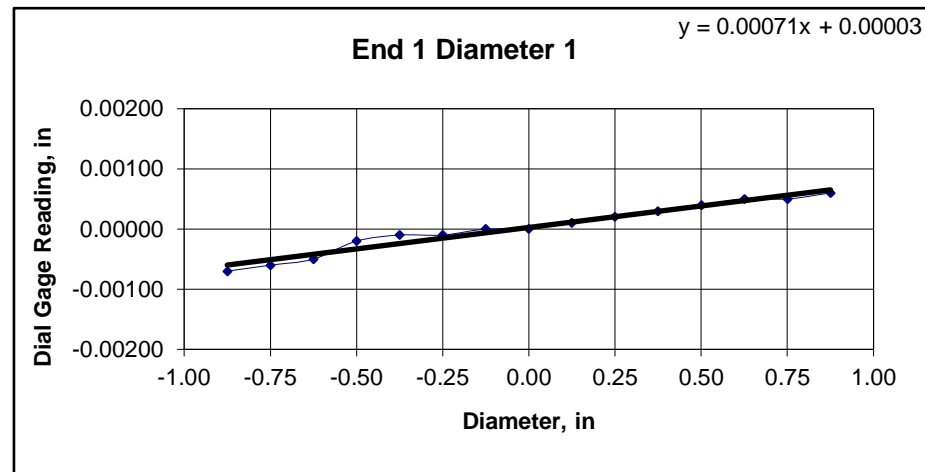


Client:	McMillen Jacobs Associates	Test Date:	3/2/2020
Project Name:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C	Tested By:	cmh
Project Location:	Providence, RI	Checked By:	smd
GTX #:	310677		
Boring ID:	B-9		
Sample ID:	C-1		
Depth:	29.89-30.27 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY	1	2	Average	DEVIATION FROM STRAIGHTNESS (Procedure S1)
Specimen Length, in:	4.34	4.34	4.34	Maximum gap between side of core and reference surface plate:
Specimen Diameter, in:	1.98	1.98	1.98	Is the maximum gap \leq 0.02 in.? YES
Specimen Mass, g:	598.48			Maximum difference must be $<$ 0.020 in.
Bulk Density, lb/ft ³ :	170	Minimum Diameter Tolerance Met? YES		Straightness Tolerance Met? YES
Length to Diameter Ratio:	2.2	Length to Diameter Ratio Tolerance Met? YES		

END FLATNESS AND PARALLELISM (Procedure FP1)															
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00070	-0.00060	-0.00050	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00010	0.00020	0.00030	0.00040	0.00050	0.00050	0.00060
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00010	-0.00010
	Difference between max and min readings, in:														
	0° = 0.00130							90° = 0.00010							
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00080	-0.00060	-0.00050	-0.00030	-0.00020	-0.00010	-0.00010	0.00000	0.00010	0.00010	0.00020	0.00030	0.00040	0.00060	0.00070
Diameter 2, in (rotated 90°)	-0.00010	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00010	-0.00010
	Difference between max and min readings, in:														
	0° = 0.0015							90° = 0.0001							
	Maximum difference must be $<$ 0.0020 in. Difference = \pm 0.00075														
	Flatness Tolerance Met? YES														



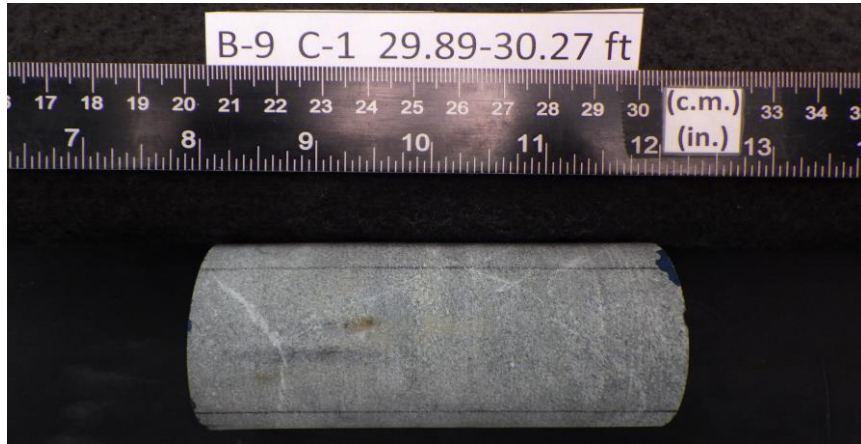
DIAMETER 1	
End 1:	Slope of Best Fit Line: 0.00071 Angle of Best Fit Line: 0.04093
End 2:	Slope of Best Fit Line: 0.00075 Angle of Best Fit Line: 0.04322
Maximum Angular Difference:	0.00229
Parallelism Tolerance Met? Spherically Seated	YES

DIAMETER 2	
End 1:	Slope of Best Fit Line: 0.00006 Angle of Best Fit Line: 0.00360
End 2:	Slope of Best Fit Line: 0.00000 Angle of Best Fit Line: 0.00000
Maximum Angular Difference:	0.00360
Parallelism Tolerance Met? Spherically Seated	YES

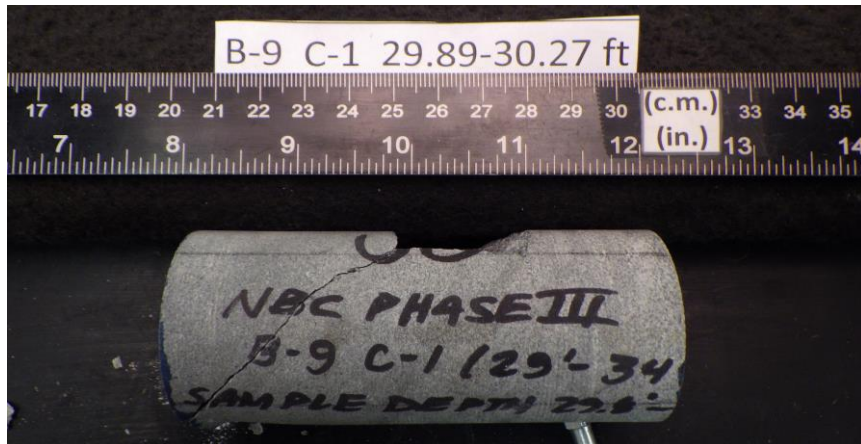
PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						Maximum angle of departure must be \leq 0.25°
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?	
Diameter 1, in	0.00130	1.980	0.00066	0.038	YES	
Diameter 2, in (rotated 90°)	0.00010	1.980	0.00005	0.003	YES	Perpendicularity Tolerance Met? YES
END 2						
Diameter 1, in	0.00150	1.980	0.00076	0.043	YES	
Diameter 2, in (rotated 90°)	0.00010	1.980	0.00005	0.003	YES	



Client:	McMillen Jacobs Associates
Project Name:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C
Project Location:	Providence, RI
GTX #:	310677
Test Date:	3/3/2020
Tested By:	cmh
Checked By:	smd
Boring ID:	B-9
Sample ID:	C-1
Depth, ft:	29.89-30.27 ft



After cutting and grinding



After break

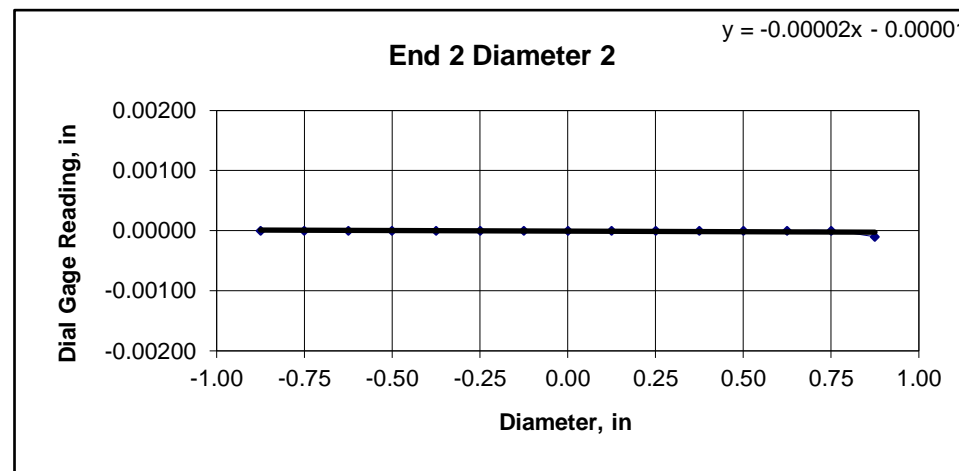
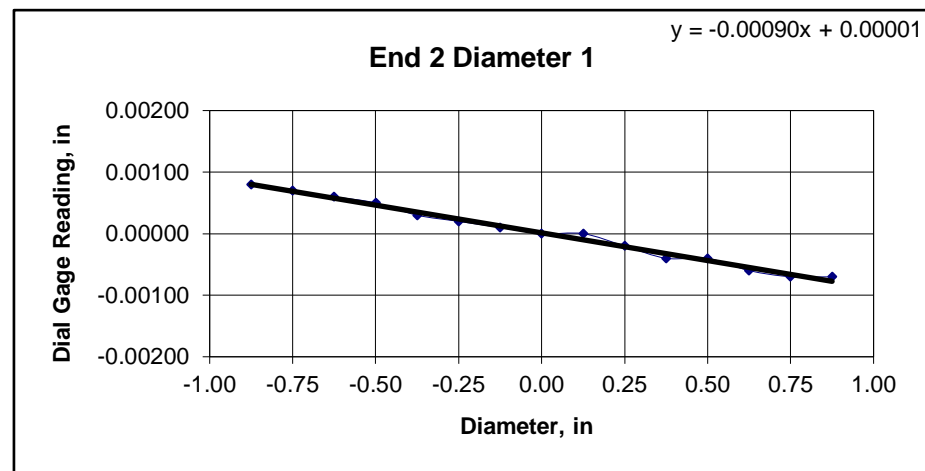
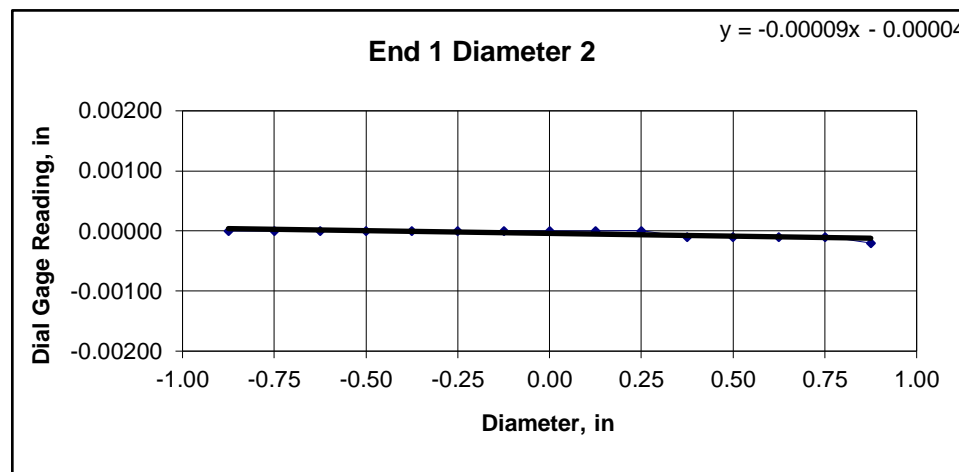
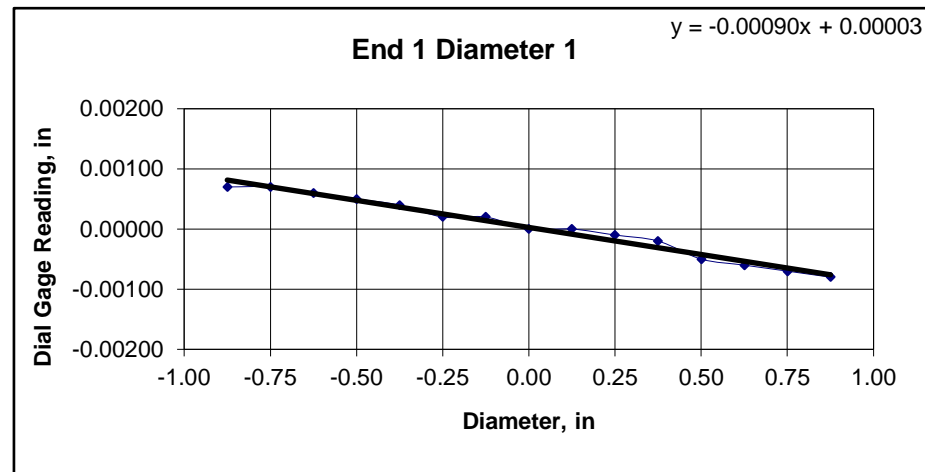


Client:	McMillen Jacobs Associates	Test Date:	3/2/2020
Project Name:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C	Tested By:	cmh
Project Location:	Providence, RI	Checked By:	smd
GTX #:	310677		
Boring ID:	B-10		
Sample ID:	C-1		
Depth:	22.29-22.67 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY				DEVIATION FROM STRAIGHTNESS (Procedure S1)			
	1	2	Average	Maximum gap between side of core and reference surface plate: Is the maximum gap \leq 0.02 in.? YES			
Specimen Length, in:	4.44	4.44	4.44	Maximum difference must be $<$ 0.020 in.			
Specimen Diameter, in:	1.97	1.96	1.97	Straightness Tolerance Met? YES			
Specimen Mass, g:	610.99						
Bulk Density, lb/ft ³ :	173						
Length to Diameter Ratio:	2.3						
		Minimum Diameter Tolerance Met? YES					
		Length to Diameter Ratio Tolerance Met? YES					

END FLATNESS AND PARALLELISM (Procedure FP1)															
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00070	0.00070	0.00060	0.00050	0.00040	0.00020	0.00020	0.00000	0.00000	-0.00010	-0.00020	-0.00050	-0.00060	-0.00070	-0.00080
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00010	-0.00010	-0.00020
	Difference between max and min readings, in: 0° = 0.00150 90° = 0.00020														
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00080	0.00070	0.00060	0.00050	0.00030	0.00020	0.00010	0.00000	0.00000	-0.00020	-0.00040	-0.00040	-0.00060	-0.00070	-0.00070
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010
	Difference between max and min readings, in: 0° = 0.0015 90° = 0.0001 Maximum difference must be $<$ 0.0020 in. Difference = \pm 0.00075														
															Flatness Tolerance Met? YES



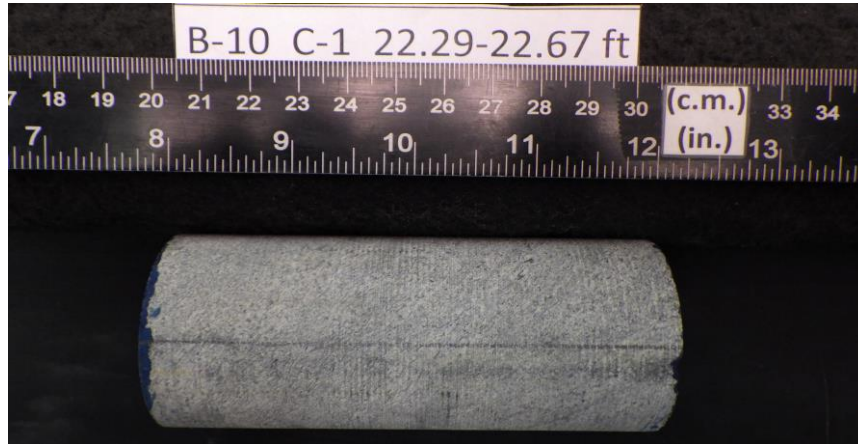
DIAMETER 1	
End 1:	Slope of Best Fit Line: 0.00090 Angle of Best Fit Line: 0.05157
End 2:	Slope of Best Fit Line: 0.00090 Angle of Best Fit Line: 0.05157
Maximum Angular Difference:	0.00000
Parallelism Tolerance Met? Spherically Seated	YES

DIAMETER 2	
End 1:	Slope of Best Fit Line: 0.00009 Angle of Best Fit Line: 0.00524
End 2:	Slope of Best Fit Line: 0.00002 Angle of Best Fit Line: 0.00115
Maximum Angular Difference:	0.00409
Parallelism Tolerance Met? Spherically Seated	YES

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						Maximum angle of departure must be \leq 0.25°	
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?		
Diameter 1, in	0.00150	1.965	0.00076	0.044	YES		
Diameter 2, in (rotated 90°)	0.00020	1.965	0.00010	0.006	YES		
						Perpendicularity Tolerance Met? YES	
END 2							
Diameter 1, in	0.00150	1.965	0.00076	0.044	YES		
Diameter 2, in (rotated 90°)	0.00010	1.965	0.00005	0.003	YES		



Client:	McMillen Jacobs Associates
Project Name:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C
Project Location:	Providence, RI
GTX #:	310677
Test Date:	3/3/2020
Tested By:	cmh
Checked By:	smd
Boring ID:	B-10
Sample ID:	C-1
Depth, ft:	22.29-22.67



After cutting and grinding



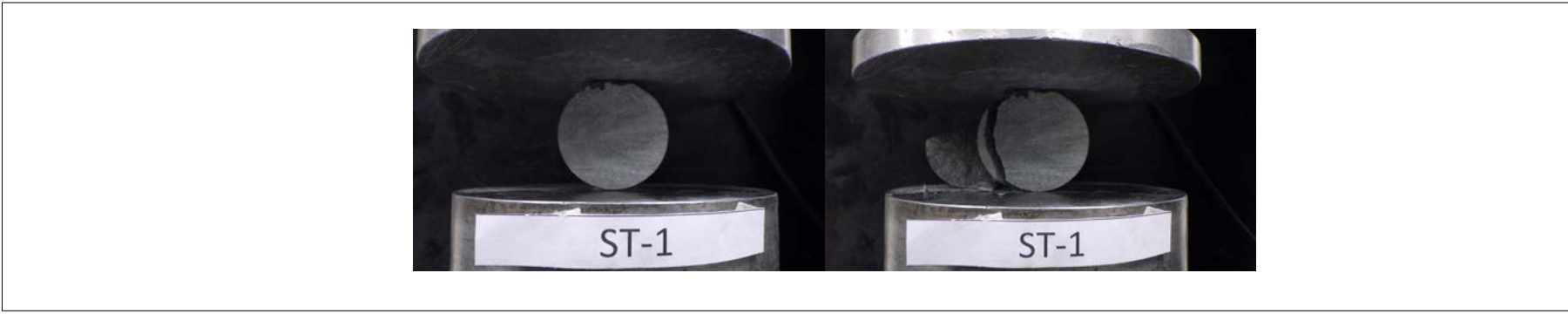
After break



Client:	McMillen Jacobs Associates		Project No:	GTX-310677			
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C						
Location:	Providence, RI	Boring ID:	B-9	Sample Type:	jar	Tested By:	tjm
		Sample ID:	C-1	Test Date:	03/02/20	Checked By:	smd
		Depth :	29.8-30.4 ft	Test Id:	547064		
Test Comment:	---						
Visual Description:	---						
Sample Comment:	---						

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
29.80-29.88 ft	ST-1	1.21	1.99	0.61	4,872	1,290	1



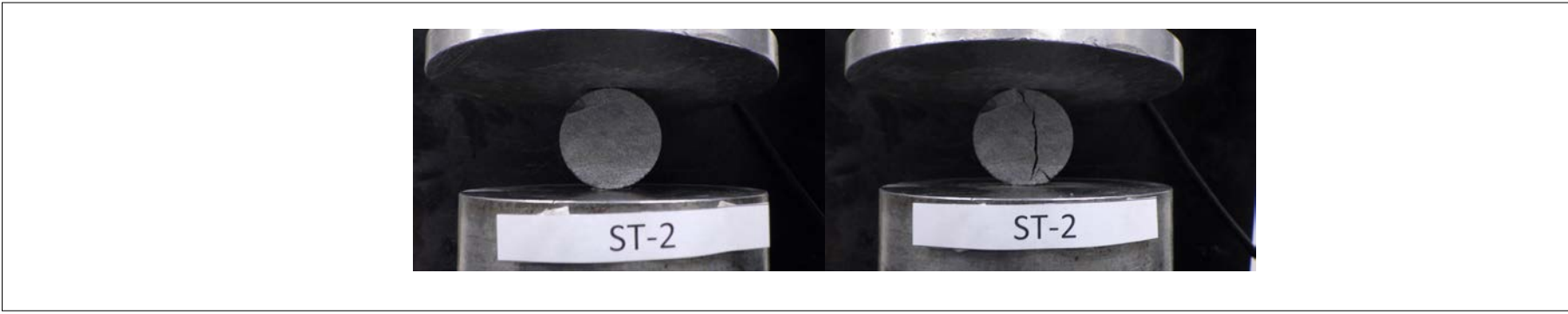
Notes: Strain rate: 2.5%/min.
 ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.
 The reported thickness (L) is the average of three measurements.
 The reported diameter(D) is the average of three measurements.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
 (See attached photographs)



Client:	McMillen Jacobs Associates		Project No:	GTX-310677	
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C				
Location:	Providence, RI	Sample Type:	jar	Tested By:	tjm
Boring ID:	B-10	Test Date:	03/02/20	Checked By:	smd
Sample ID:	C-1	Test Id:	547065		
Depth :	22.2-22.7 ft				
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
22.20-22.28 ft	ST-2	1.00	1.97	0.51	4,478	1,440	1



Notes: Strain rate: 2.5%/min.
 ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.
 The reported thickness (L) is the average of three measurements.
 The reported diameter(D) is the average of three measurements.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
 (See attached photographs)



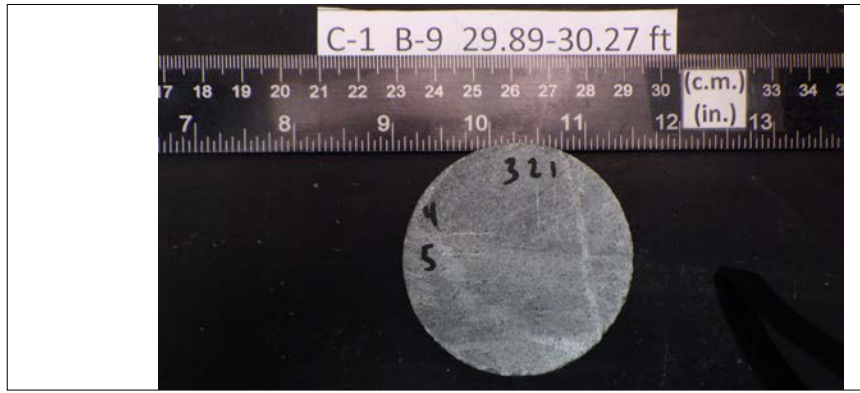
Client:	McMillen Jacobs Associates		Project No:	GTX-310677	
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C				
Location:	Providence, RI	Sample Type:	jar	Tested By:	tjm
Boring ID:	B-9	Test Date:	03/06/20	Checked By:	jsc
Sample ID:	C-1	Test Id:	547281		
Depth :	29.8-30.4 ft				
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Abrasiveness of Rock Using the Cerchar Method by ASTM D7625

Boring ID	Sample ID	Depth	Stylus No	Reading 1	Reading 2	Average	Comments
B-9	C-1	29.89-30.27 ft	1	4.8	4.6	4.70	
			2	3.3	3.2	3.25	
			3	3.2	3.3	3.25	
			4	3.7	4.0	3.85	
			5	1.9	2.2	2.05	
			Average CAIs			3.42	
			Average CAI *			3.87	
CERCHAR Abrasiveness Index Classification						High abrasiveness	

Notes

Test Surface: Saw Cut
 Moisture Condition: As Received
 Apparatus Type: Original CERCHAR
 Stylus Hardness: Rockwell Hardness 54/56 HRC
 Stylus Displacement Relative to Rock Fabric:
 Styli 1-3: Normal; Styli 4-5: Parallel
 * CAI = (0.99 * CAIs) + 0.48
 CAIs = CERCHAR index for smooth (saw cut) surface
 CAI = CERCHAR index for natural surface
 Comments:





Client:	McMillen Jacobs Associates		Project No:	GTX-310677	
Project:	NBC CSO Phase III: IIIA-4 & IIIA-5 Consolidation C				
Location:	Providence, RI	Sample Type:	jar	Tested By:	tjm
Boring ID:	B-10	Test Date:	03/06/20	Checked By:	jsc
Sample ID:	C-1	Test Id:	547282		
Depth :	22.2-22.7 ft				
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Abrasiveness of Rock Using the Cerchar Method by ASTM D7625

Boring ID	Sample ID	Depth	Stylus No	Reading 1	Reading 2	Average	Comments
B-10	C-1	22.29-22.67 ft	1	4.2	3.9	4.05	
			2	3.0	2.8	2.90	
			3	4.3	4.0	4.15	
			4	3.9	3.0	3.45	
			5	2.0	2.0	2.00	
			Average CAIs			3.31	
			Average CAI *			3.76	
CERCHAR Abrasiveness Index Classification						High abrasiveness	

Notes

Test Surface: Saw Cut
 Moisture Condition: As Received
 Apparatus Type: Original CERCHAR
 Stylus Hardness: Rockwell Hardness 54/56 HRC
 Stylus Displacement Relative to Rock Fabric:
 Styli 1-3: Normal; Styli 4-5: Parallel
 * CAI = (0.99 * CAIs) + 0.48
 CAIs = CERCHAR index for smooth (saw cut) surface
 CAI = CERCHAR index for natural surface
 Comments:



APPENDIX B
Environmental Technical Memo

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Narragansett Bay Commission
Drop Shaft 213 Consolidation Conduit &
OF-217 Consolidation Conduit
Phase III CSO Program: Contract IIIA-4 & IIIA-5
April 2021

ENVIRONMENTAL TECHNICAL
MEMORANDUM



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Drop Shaft 213 Consolidation Conduit &
OF-217 Consolidation Conduit
Narragansett Bay Commission
Phase III CSO Program: Contract IIIA-4 & IIIA-5

ENVIRONMENTAL TECHNICAL MEMORANDUM

Prepared by: BETA GROUP, INC.
Prepared for: Stantec

April 2021

Revisions

Revision History

DATE	VERSION	DESCRIPTION	AUTHOR(S)	REVIEWER(S)	Date of Review(s)
4/3/20	1	Draft	McLoughlin	Ellis	4/7/20
5/13/20	2	Final	McLoughlin		
6/5/20	2	Final	McLoughlin		
4/13/21	3	Final	McLoughlin	Cronin	3/23/21

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1.0 INTRODUCTION AND PURPOSE

BETA Group, Inc. (BETA) has prepared this Environmental Technical Memorandum (TM) to summarize the findings of the subsurface investigation program conducted in support of the Narragansett Bay Commission (NBC) Phase III Combined Sewer Overflow (CSO) Consolidation Conduit Projects, Contract IIIA-4 and IIIA-5.

The Consolidation Conduit projects are one component of the NBC Phase III CSO Program, which began in 2016 and is focused primarily on the Bucklin Point Service Area (BPSA) in the communities of Pawtucket and Central Falls. The overall NBC CSO Program is aimed at lowering annual CSO volumes and reducing annual shellfish bed closures in accordance with a 1992 Consent Agreement with the Rhode Island Department of Environmental Management (RIDEM). Phases I and II of this program, which focused on the Fields Point Service Area (FPSA) in Providence, were completed in 2008 and 2015, respectively. Stantec, along with Pare Corporation as subconsultant, is under contract with NBC to serve in the role as the Program Manager/Construction Manager (PM/CM) for the Phase III CSO Program. The Consolidation Conduit IIIA-4 and IIIA-5 projects include the design and construction of consolidation conduits, flow diversions, a gate and screening structure, flow meters, instrumentation panels, sluice gates, and other ancillary facilities necessary to convey flow from outfalls OF-210, OF-213, OF-214, and OF-217 to a drop shaft to be constructed under separate contract.

This TM summarizes the results of an environmental assessment of the subsurface soil and groundwater conducted in conjunction with a geotechnical subsurface exploration program in support of the project. Soil and groundwater samples were obtained during test boring explorations and were analyzed for contaminants that may affect the disposal of soil and groundwater. The results will be reviewed and will support recommendations for management of soil and groundwater encountered during proposed construction activities associated with the project. These recommendations will be included in the Basis of Design report and will be considered in development of the technical specifications and contract documents.

2.0 BACKGROUND

BETA requested a database search from Environmental Data Resources, Inc. (EDR) for the project area. The EDR report gives a listing of sites identified on select federal and state standard source environmental databases within the approximate search radii specified by ASTM Standard Practice for Environmental Site Assessments E1527-13. BETA reviewed each environmental database on a record-by-record basis to determine if certain sites identified in the EDR report could impact the proposed work in the project area. A copy of the executive summary of the EDR regulatory database report is included in Appendix A. Based on the review, BETA identified eight listed sites with the potential to impact the project area. BETA is currently working on two of the sites: Tidewater and Town Landing. The following summarizes relevant information from these two sites:

Tidewater (Contract IIIA-5, Station 7+00 to 18+00)

National Grid owns Parcels 54-826, 65-645, and 65-662 and the consolidation conduit will impact these properties. The subject parcels, often referred to as the Tidewater Property, are located east of Taft Street and north of Tidewater Street and is the site of a former manufactured gas plant (MGP). The properties are known to have soil and groundwater contamination associated with its former use and are listed as a "state Site" under RIDEM's Remediation Regulations (RIDEM Case No. 95-022). The former MGP operated from the 1880s until 1954 and coal was used as the principal fuel to produce coal gas. In the later years of operation (1954 until the late 1960s), the MGP produced gas using oil and propane.

The Site is generally vacant except for an active natural gas regulating station located on the southeast end of Tidewater Street on its south side, the former Power Plant used as an active switching station, and electric substation on the central portion of the Site. The Site is secured with a locked perimeter chain-link fence.

National Grid is currently progressing forward with a plan to construct a cap over the site as part of their Sitewide Remedy Design project. The design was submitted to RIDEM for review in August 2019. The project is expected to be an 18-month project scheduled to commence in Spring 2020 and be completed by October 2021. A second project includes substation construction and that project is estimated to start in July 2020. Demolition of the existing building is scheduled for July 2022. The National Grid Sitewide Remedy Design project is expected to be completed in part, coincident with the NBC OF-217 Consolidation Conduit construction project.

At the request of National Grid, no environmental sampling was conducted on the site as part of this project. Numerous investigations previously completed by National Grid are available for review. It is anticipated that National Grid will dictate requirements associated with soil management and dewatering treatment and disposal. Additional coordination with National Grid is required to define the requirements.

BETA reviewed a January 2011 "Site Investigation Data Report" prepared by GZA GeoEnvironmental, Inc. (GZA) for the Tidewater property and results from groundwater sampling GZA conducted in 2019. This report included laboratory data from numerous soil borings, test pits, and monitoring wells near the proposed layout on the Tidewater property. Appendix B contains a plan that highlights these sample locations and the proposed layout. The data indicated concentrations of arsenic, lead, polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), cyanide, total petroleum hydrocarbons (TPH), and polychlorinated biphenyls (PCBs) in soil. Appendix B contains tables that summarize the data from the sampling locations that are relevant to this project. These tables indicate the following contaminants in soil above RIDEM's standards with the maximum concentration listed:

- Lead: 19,000 milligrams per kilogram (mg/kg);
- Arsenic: 40.7 mg/kg
- Total Petroleum Hydrocarbons: 5,200 mg/kg
- Polychlorinated biphenyls: 1.6 mg/kg
- Total Cyanide: 2,800 mg/kg
- Fluoranthene: 22.4 mg/kg
- Pyrene: 20.9 mg/kg
- Benzo [a] Anthracene: 10.1 mg/kg
- Chrysene: 9.3 mg/kg
- Benzo [b] Fluoranthene: 12.7 mg/kg
- Benzo [k] Fluoranthene: 7.44 mg/kg
- Benzo [a] Pyrene: 8.55 mg/kg
- Indeno [1,2,3-cd] Pyrene: 3.97 mg/kg
- Dibenzo [a,h] Anthracene: 1.63 mg/kg
- Benzo [g,h,i] Perylene: 3.4 mg/kg

These tables also indicate the following contaminants in groundwater above RIDEM's standards with the maximum concentration listed:

- Benzene: 5,200 micrograms per kilogram ($\mu\text{g/L}$);
- Naphthalene: 8,200 $\mu\text{g/L}$
- Ethylbenzene: 3,900 $\mu\text{g/L}$

The combined concentrations of these VOCs exceed the NBC's Total Toxic Organics discharge limit for discharge to the Bucklin Point treatment plant. Although not above RIDEM standards, GZA's groundwater sampling also identified elevated concentrations of TPH, arsenic, cyanide, and other VOCs.

Based on this data, it is likely that contaminated soil and groundwater will be encountered during excavation work on this property. Furthermore, the possibility exists of soil to be classified as hazardous waste within this area. Furthermore, it is likely that dewatering effluent from the Tidewater area will require treatment prior to discharge to the NBC's system.

Town Landing (Contract IIIA-5, Stations 0+00 to 6+00)

BETA reviewed a "Site Investigation Report/Targeted Brownfields Assessment" prepared by Fuss & O'Neill for this property. Appendix B includes a copy of this report which included laboratory data from four soil borings and two monitoring wells near the proposed layout on the Town Landing property. Fuss & O'Neill's report includes figures and data tables for these borings and monitoring wells. The laboratory data identified exceedances of RIDEM's Residential and Industrial/Commercial Exposure Criteria (RDEC and I/C DEC) for lead and PAHs in soil. The following summarizes the maximum detected concentration in soil:

- Lead: 460 milligrams per kilogram (mg/kg);
- Pyrene: 18 mg/kg
- Benzo [a] Anthracene: 9.5 mg/kg
- Chrysene: 8.9 mg/kg
- Benzo [b] Fluoranthene: 7 mg/kg
- Benzo [k] Fluoranthene: 8.6 mg/kg
- Benzo [a] Pyrene: 9.1 mg/kg
- Indeno [1,2,3-cd] Pyrene: 4.8 mg/kg
- Benzo [g,h,i] Perylene: 3.8 mg/kg

The data did not identify any contaminants in groundwater above RIDEM's GA criteria or NBC's Bucklin Point discharge limits.

On June 6, 2019, BETA reviewed files at the Rhode Island Department of Environmental Management (RIDEM) for the other six listed sites within or proximate to the project area. The following summarizes information reviewed in RIDEM's files:

Lawn Terrace Apartments, 180-226 Pleasant Street (Contract IIIA-5, Stations 0+00 to 6+00)

The RIDEM file contained a 2005 "Closure Report" prepared by VHB for a release of mercury at this property. Based on the reviewed information, the mercury release does not appear to pose a threat to the project. However, this report discusses previous issues at this property related to arsenic and polynuclear aromatic hydrocarbons (PAHs) associated with coal and wood ash in soil at the property. Levine Fricke Recon (LFR) completed a Remedial Action Work Plan that consisted of a cap and the implementation of an Environmental Land Use Restriction (ELUR).

Additionally, each of the buildings at this property had a previous petroleum underground storage tank (UST) that was replaced with a new UST in 1999. RIDEM's records do not indicate a release has occurred from the USTs at this property. Based on the information reviewed, it appears that the environmental issues at this property (arsenic and PAHs in soil) may extend into Taft Street and, thus, have the potential to impact the project.

Adams Furniture, 65 East Avenue (Contract IIIA-4, Station 6+00)

Impacted soil was encountered during the removal of a UST from this property. Soil was excavated and soil and groundwater samples did not exceed applicable RIDEM standards. Based on these results and the distance of this property from the project area, this release does not likely pose a threat to the project.

Pet Food Experts, 175 Main Street (Contract IIIA-4, Station 10+00)

Environmental assessments at this property have identified PAHs and total petroleum hydrocarbons (TPH) in soil above RIDEM Residential Direct Exposure Criteria (RDEC). A soil boring closest to the project area contained PAHs above RIDEM's RDEC. Redevelopment of this property in 2015 included construction of a cap and the implementation of an ELUR. The proximity of this site to the northern limit of the project area and the known contaminant concentrations indicate the possibility of similar "urban fill" soil to exist in this portion of the project area.

Roosevelt Avenue Disposal, Roosevelt Avenue Extension (Contract IIIA-4, Station Unknown)

This release consisted of the identification of illegally dumped asbestos-containing building materials in a dumpster on Roosevelt Avenue Extension. RIDEM required removal and proper disposal of the materials. Based on this information, this release does not represent a concern to the project.

Pawtucket Bridge #550, Route 95 (Contract IIIA-4, Station 4+00[S] to 5+00[S])

RIDEM's file contained a letter from RIDEM approving a Remedial Action Work plan for Pawtucket Bridge #550. BETA reviewed reports relating to the project including an August 2009 "Site Investigation Report" for the Rhode Island Department of Transportation's Pawtucket Bridge #550 Replacement and Improvements project prepared by Wright-Pierce, Inc. This report included results from two soil borings (WP-7 and WP-8) that were advanced in Taft Street under the Route 95 bridge and just north of Division Street. Laboratory analysis of a soil sample from WP-7 (5 to 7 feet below grade) identified arsenic, lead, chrysene, and benzo(a)pyrene above RIDEM's RDEC. Laboratory analysis of a second soil sample from WP-7 (9 to 10 feet below grade) identified chrysene above RIDEM's RDEC. Laboratory analysis of a soil sample from WP-8 (10 to 12 feet below grade) identified arsenic above RIDEM's RDEC. Sampling of groundwater from a well installed in boring WP-7 did not identify contaminants above RIDEM's GB groundwater criteria.

A Remedial Action Work Plan prepared by Wright Pierce, Inc. indicated that an ELUR would likely be filed for the Taft Street bridge abutment area; however, a copy of the ELUR was not in RIDEM's file. Mr. Jeff Crawford of RIDEM indicated that the ELUR had not yet been filed for this area. BETA was provided with a draft of the ELUR and Post Remediation Soil Management Plan (SMP). Appendix H contains a copy of the draft documents.

Based on the information reviewed, it is likely that contaminated soil will be encountered during excavation work in this area. Furthermore, even though the ELUR has not been filed, work in this area should adhere to the provisions of the ELUR and SMP which include:

- Notification to RIDEM prior to initiating work;
- Appropriate work health and safety provisions;
- Reuse of soil is allowed;
- Dust suppression during excavation;
- Excess soil to be placed on and covered with 10 mil poly sheeting;
- Equipment decontamination; and
- Restoration of areas to their original conditions.

Sovereign Bank, 210 Main Street (Contract IIIA-4, Station 10+00)

RIDEM's file contained a November 12, 2001 "Limited Subsurface Investigation" report by Lincoln Environmental, Inc. Soil and groundwater testing at this property identified petroleum above RIDEM's standards in the northwestern portion of this property. The borings and wells closest to the project area did not contain any exceedances of the RIDEM standards. Based on these results and this property's distance from the project area, it is unlikely that impacted soil from this release will be encountered during construction.

Historical Research

BETA requested copies of historical United States Geologic Survey (USGS) topographic maps for the Site from EDR. EDR provided 1894, 1915, 1921, 1935, 1938, 1939, 1941, 1942, 1943, 1944, 1947, 1949, 1957, 1970, 1971, 1975, 1979, 1987, 1996, 1998 and 2012 USGS Topographic Maps. A copy of the topographic map report can be provided upon request. Due to the scale of these maps, specific site information could not be ascertained. These maps do indicate that the roadways in the northern portion of the Site have been reconfigured over time.

BETA requested copies of historical aerial photographs for the Site from EDR. EDR provided copies of 1939, 1951, 1955, 1962, 1969, 1970, 1975, 1981, 1985, 1995, 2005, 2008, 2012, and 2016 aerial photographs. A copy of the EDR aerial photograph report can be provided upon request. Other than the presence of large tanks and industrial activity at the Tidewater site and significant development at the Town Landing site, due to the scale of these maps, detailed site information could not be ascertained. These photographs indicate that the current layout of roadways in the northern portion of the Site first appeared in the 1969 photograph.

Historical City directories and Cross Reference directories are often useful for obtaining historical tenants for a property. City directories provide tenant listings, by address, for every year covered by the directory service. EDR provided copies of 1938, 1943, 1948, 1953, 1958, 1964, 1974, 1979, 1984, 1989, 1992, 1995, 2000, 2005, 2010, and 2014. A copy of the EDR City Directory Abstract can be provided upon request. These directories list industrial and commercial enterprises (electric companies, auto repair, junk dealer, lumber yard, machine shops, a box company, a tire supply company, and a municipal garage) within the project area. Due to reconfiguration of the roadways and the renumbering of properties, these listings could not be located geographically with any accuracy. These listings confirm the known, long history of urban use within the project area.

Sanborn maps identify prior Site uses of real property for many cities and towns in the United States. The maps were originally created to assist insurance underwriters in understanding the potential fire risk of structures requiring insurance; however, they are also useful for determining the previous uses of a property. Sanborn maps often contain information relating to uses of individual structures, location of certain fuel storage tanks, chemical storage tanks, or both, and storage of other potentially toxic substances. BETA requested copies of Sanborn maps for the Site from EDR which provided copies of 1884, 1890, 1902, 1923, 1949, and 1984 Sanborn maps. Copies of the Sanborn maps can be provided upon request. The following provides a summary of relevant information, as it relates to the project site, from these maps.

- The 1902, 1923, 1949, and 1984 Sanborn maps depict an electric generating station on the east side of Roosevelt Avenue Extension in the northern portion of the project area. In 1902, this property was occupied by the "Pawtucket Electric Company" and in 1923, 1949, and 1984 by the "Blackstone Valley Electric Company." This generating station still exists at this location and is currently owned by National Grid.
- The 1890 Sanborn map depicts the "Jas. Davis Belting Co." tannery in the current location of Roosevelt Avenue Extension near its intersection with Jenks Way.
- The 1923 Sanborn map depicts an area labeled "coal pockets" on the Town Landing property on east side of Taft Street. Coal and coal ash can be sources of polynuclear aromatic hydrocarbons and metals.
- The 1949 Sanborn map depicts a "filling station" west of Taft Street and north of Division Street.
- The 1949 and 1984 Sanborn maps depict a "Tin Shop," "Auto Spring M'fg," and "Auto Body Rep" shops north of the current location of the Route 95 bridge.

Program Borings

In May 2018, Pare and Stantec advanced borings in the project area and in areas on the eastern side of the Seekonk and Blackstone Rivers. Of these borings, seven were within or proximate to the project area. The following describes the boring locations which are depicted on the "Boring Location Plan" in Appendix C.

- B17-8 and B-17-8A: In the sidewalk south of Jenks Way;
- B17-39: In the sidewalk north of Jenks Way;
- B17-40: In Main Street, north of the project limits;
- B17-41: In Taft Street, south of Division Street;
- B17-45: In Jenks Way, west of the intersection of Jenks Way and Taft Street;
- B17-46: In Jenks Way, west of the project limits; and
- B17-46A: In Jenks Way, near B17-46.

We have included the laboratory data for soil and groundwater samples from these borings in Appendix C. The following summarizes the relevant data by location:

B17-8 and B17-8A

Groundwater sampling from a well in this location (on the former Masonic Temple property) identified tetrachloroethene (2,060 micrograms per liter [$\mu\text{g/L}$]) above RIDEM's GA and GB groundwater objectives. Trichloroethene (238 $\mu\text{g/L}$) was identified above RIDEM's GA groundwater objective. The combined concentrations of these VOCs exceed the NBC's Total Toxic Organics discharge limit for discharge to the Bucklin Point treatment plant. Soil samples were not collected from these borings. Additional groundwater monitoring wells are being installed on the former Masonic Temple by the Program Manager to determine the extent of contamination in this area.

B17-39

Five soil samples were submitted for analysis of VOCs, SVOCs, TPH, metals, and PCBs. The laboratory identified benzo(a)pyrene (0.934 mg/Kg) and lead (2,340 mg/Kg) above both the RIDEM RDEC and I/CDEC in the 0-2 foot sample. The laboratory also identified lead (234 mg/Kg) above the RIDEM RDEC in the 8-10 foot sample, benzo(a)pyrene (0.474 and 0.439 mg/Kg) above the RDEC in the 4-6 and 6-8 foot samples, benzo(b)fluoranthene (0.924 mg/Kg) above the RDEC in the 0-2 foot sample, and dibenzo(a,h)anthracene (1.05, 0.459, and 0.510 mg/Kg) above the RDEC in the 0-2, 4-6, and 6-8 foot samples.

B17-40

Five soil samples were submitted for analysis of VOCs, SVOCs, TPH, metals, and PCBs. The laboratory identified benzo(a)pyrene (0.439 mg/kg) and chrysene (0.432 mg/Kg) above the RIDEM RDEC in the 0-2 foot sample.

B17-41

Four soil samples were submitted for analysis of VOCs, SVOCs, TPH, metals, and PCBs. The laboratory identified benzo(a)pyrene (0.499 mg/kg) above the RIDEM RDEC in the 0.75-2.75 foot sample.

B17-45

Five soil samples were submitted for analysis of VOCs, SVOCs, TPH, metals, and PCBs. The laboratory identified the following exceedances of RIDEM standards:

- Lead: 678 mg/kg in the 8-12 foot sample and 898 mg/kg in the 12-14 foot sample;
- Pyrene: 18.1 mg/kg in the 4-8 foot sample;
- Benzo [a] Anthracene: 9.48 mg/kg in the 4-8 foot sample, 1.21 mg/kg in the 8-12 foot sample, and 0.958 in the 12-14 foot sample;
- Chrysene: 7.56 mg/kg in the 4-8 foot sample, 1.01 mg/kg in the 8-12 foot sample, and 0.733 in the 12-14 foot sample;
- Benzo [b] Fluoranthene: 8.51 mg/kg in the 4-8 foot sample and 0.941 mg/kg in the 8-12 foot sample;
- Benzo [k] Fluoranthene: 3.99 mg/kg in the 4-8 foot sample
- Benzo [a] Pyrene: 7.98 mg/kg in the 4-8 foot sample, 1.18 mg/kg in the 8-12 foot sample, and 0.944 in the 12-14 foot sample;
- Fluoranthene: 21.4 mg/kg in the 4-8 foot sample;
- Dibenzo(a,h)anthracene: 2.70 mg/kg in the 4-8 foot sample;
- Indeno [1,2,3-cd] Pyrene: 4.75 mg/kg in the 4-8 foot sample; and
- Benzo [g,h,i] Perylene: 5.13 mg/kg in the 4-8 foot sample.

B17-46

Five soil samples were submitted for analysis of VOCs, SVOCs, TPH, metals, and PCBs. The laboratory identified the following exceedances of RIDEM standards:

- Pyrene: 21.6 mg/kg in the 6-8 foot sample;
- Benzo [a] Anthracene: 9.38 mg/kg in the 6-8 foot sample, 1.05 mg/kg in the 8-10 foot sample, and 2.0 mg/kg in the 10-11.5 foot sample;
- Chrysene: 0.637 mg/kg in the 4-6 foot sample, 7.83 mg/kg in the 6-8 foot sample, 0.913 mg/kg in the 8-10 foot sample, and 1.70 in the 10-11.5 foot sample;
- Benzo [b] Fluoranthene: 7.30 mg/kg in the 6-8 foot sample and 1.32 in the 10-11.5 foot sample;
- Benzo [k] Fluoranthene: 5.77 mg/kg in the 6-8 foot sample and 1.21 mg/kg in the 10-11.5 foot sample;
- Benzo [a] Pyrene: 0.663 mg/kg in the 4-6 foot sample, 8.58 mg/kg in the 6-8 foot sample, 0.904 mg/kg in the 8-10 foot sample, and 1.64 in the 10-11.5 foot sample;
- Fluoranthene: 24.0 mg/kg in the 6-8 foot sample;
- Dibenzo(a,h)anthracene: 2.29 mg/kg in the 6-8 foot sample;
- Indeno [1,2,3-cd] Pyrene: 4.52 mg/kg in the 6-8 foot sample; and
- Benzo [g,h,i] Perylene: 4.81 mg/kg in the 6-8 foot sample and 0.872 mg/kg in the 10-11.5 foot sample.

B17-46A

Five soil samples were submitted for analysis of VOCs, SVOCs, TPH, metals, and PCBs. The laboratory identified the following exceedances of RIDEM standards:

- Lead: 794 mg/kg in the 13-15 foot sample;
- Benzo [a] Anthracene: 1.13 mg/kg in the 1.5-3 foot sample, 1.46 mg/kg in the 5-7 foot sample;
- Chrysene: 0.992 mg/kg in the 1.5-3 foot sample, 1.12 mg/kg in the 5-7 foot sample;
- Benzo [b] Fluoranthene: 0.978 in the 5-7 foot sample;
- Benzo [k] Fluoranthene: 1.03 mg/kg in the 5-7 foot sample; and
- Benzo [a] Pyrene: 0.969 mg/kg in the 1.5-3 foot sample, 1.24 mg/kg in the 5-7 foot sample, ;

3.0 SOIL BORINGS

In August and September 2019 and February 2020, BETA oversaw the advancement of soil borings at the Site. The following details the advancement of these borings and the sampling of soil at the Site.

3.1 PREPARATION

Prior to initiating investigatory activities at the Site, BETA performed the following activities in preparation of the implementation of the field work for this investigation:

- Marked out the proposed boring locations in the field for utility locations purposes;
- More than 72 hours prior to the start of the drilling activities, notified “Digsafe” and the City of Pawtucket to mark utilities in the vicinity of the proposed boring locations;
- Reviewed Site plans and attempted to locate borings away from on-site utility lines; and,
- Prepared a project-specific Health and Safety Plan (HASP) prior to the commencement of field work (see Appendix D).

3.2 SOIL BORINGS

BETA oversaw the advancement of fourteen (14) soil borings in August and September 2019 and February 2020 (see below for a description of boring locations). Drilling activities were completed by Geologic Earth Exploration (Geologic) of Norfolk, Massachusetts using a track-mounted drill rig. McMillen Jacobs Associates (McMillen) of Burlington, Massachusetts conducted geotechnical soil sampling, rock core sampling, and provided the boring and monitoring well logs (Appendix E). Soil samples were collected during drilling operations using split spoons at each boring location with samples collected continuously from grade for the first ten feet and then at five-foot intervals below ten feet. The boreholes were cleared to six feet below grade via vacuum extraction to avoid any potential risk to subsurface utilities. Soil boring locations are depicted on the Plan Set sheets included in the figures appendix and are described as follows:

- B-1: Contract IIIA-5, Station 16+70, on the eastern edge of the Tidewater property near the chain link fence gate.
- B-2: In the center of the Tidewater property along Tidewater Street. Please note that this boring does not appear on the Plan Set sheets as it was located along the original alignment that bisected the Tidewater property.
- B-3: Contract IIIA-5, Station 6+87, on the western edge of the Tidewater property along Taft Street.
- B-4: Contract IIIA-4, Station 0+93 (S), along Roosevelt Avenue Extension across from the building located at 50 Pleasant Street.
- B-5: Contract IIIA-4, Station 2+31, along Roosevelt Avenue Extension at the intersection with Jenks Way.
- B-6: Contract IIIA-4, Station 2+45, along Roosevelt Avenue Extension across from the building located at 92 East Ave.

- B-6A: Contract IIIA-4, Station 3+45, along Roosevelt Avenue Extension approximately 100 feet south of boring B-6.
- B-7: Contract IIIA-4, Station 6+06, along Roosevelt Avenue Extension near the National Grid generating station.
- B-8: Contract IIIA-4, Station 9+42, along Roosevelt Avenue Extension southwest of the intersection with Main Street.
- B-9: Contract IIIA-5, Station 9+86, on the western edge of the Tidewater property along Taft Street.
- B-10: Contract IIIA-5, Station 14+03, in the center of the Tidewater property along Tidewater Street.
- B-11: Contract IIIA-5, Station 11+87, in the center of the Tidewater property along Tidewater Street.
- B-12: Contract IIIA-5, Station 8+39, on the western edge of the Tidewater property along Taft Street.
- B-13: On the northeastern edge of the Tidewater property near the chain link fence.

BETA field screened soil samples from the upper ten feet from borings B-4 through B-8 for the presence of total volatile organic compounds (TVOCs) using a photoionization detector (PID) calibrated to measure TVOCs in parts per million by volume (ppm_v). McMillan Jacobs field screened soil samples at various depths from each of the borings. BETA's headspace readings for samples from B-4 through B-8 ranged from 0.0 ppm_v to 6.0 ppm_v. McMillan Jacobs identified several soil samples from the borings on the Tidewater property with headspace readings from 20 ppm_v to >100 ppm_v. Table 1 summarizes BETA and McMillan Jacobs PID readings for samples from the soil borings.

BETA collected soil samples from the 0-2 foot, 2-4 foot, 4-6 foot, and 6-10 foot intervals from each split spoon collected during the first ten feet of borings B-4, B-5, B-6A, B-7, and B-8. BETA also collected 0-2 foot and 2-4 foot samples from boring B-6 which hit refusal at 4 feet. These samples were submitted to ESS Laboratory (ESS) of Cranston, Rhode Island for analysis of thirteen priority pollutant metals (PP-13) by EPA Method 6010B, total petroleum hydrocarbons (TPH) by EPA Method 8100M, volatile organic compounds (VOCs) by EPA Method 8260B, semi-volatile organic compounds (SVOCs) by EPA Method 8270D, and polychlorinated biphenyls (PCBs) by EPA Method 8082A. Table 2 summarizes the detected compounds from these analyses and Appendix F contains the laboratory certificates of analysis. Environmental samples were not collected from the borings (B-1, B-2, B-3, B-9, B-10, B-11, B-12, and B-13) advanced on the Tidewater property.

In addition, geotechnical soil samples collected by McMillen were submitted to Geocomp of Acton, Massachusetts for soil classification and assessment of engineering properties. Rock cores were obtained from boreholes in continuous 5-ft lengths when refusal was encountered. The core samples were retained in wooden core boxes and field measured for recovery (inches and percentage) and rock quality designation (inches and percentage) before submission to Geocomp by McMillen. Results from Geocomp's analyses are included in the Geotechnical Data Report

3.3 SOIL ANALYTICAL DATA

Table 2 provides a summary of the analytical data with comparison to RIDEM's RDEC and I/CDEC standards. The following lists exceedances of the RIDEM RDEC which is listed in parentheses after each compound.

- Benzo(a)anthracene (0.9 mg/kg) in the samples from B-5 4-6 feet (2.29 mg/kg) and B-7 6-10 feet (1.83 mg/kg);
- Benzo(a)pyrene (0.4 mg/kg) in the samples from B-4 2-4 feet (0.665 mg/kg), B-5 4-6 feet (1.98 mg/kg), B-7 6-10 feet (1.70 mg/kg), and B-8 6-10 feet (0.559 mg/kg);
- Benzo(b)fluoranthene (0.9 mg/kg) in the samples from B-5 4-6 feet (1.40 mg/kg) and B-7 6-10 feet (1.49 mg/kg);
- Benzo(g,h,i)perylene (0.8 mg/kg) in the samples from B-5 4-6 feet (1.11 mg/kg) and B-7 6-10 feet (0.847 mg/kg);
- Benzo(k)fluoranthene (0.9 mg/kg) in the samples from B-5 4-6 feet (2.07 mg/kg) and B-7 6-10 feet (1.58 mg/kg);
- Chrysene (0.4 mg/kg) in the samples from B-4 2-4 feet (0.815 mg/kg), B-5 4-6 feet (2.04 mg/kg), B-7 2-4 feet (0.413 mg/kg), B-7 4-6 feet (0.485 mg/kg), B-7 6-10 feet (1.95 mg/kg), B-8 4-6 feet (0.453 mg/kg), and B-8 6-10 feet (0.616 mg/kg);
- Dibenzo(a,h)anthracene (0.4 mg/kg) in the sample from B-5 4-6 feet (0.510 mg/kg);
- Indeno(1,2,3-cd)pyrene (0.9 mg/kg) in the sample from B-5 4-6 feet (1.10 mg/kg);
- Total petroleum hydrocarbons (500 mg/kg) in the samples from B-4 0-2 feet (886 mg/kg), B-4 2-4 feet (1,370 mg/kg), B-4 4-6 feet (744 mg/kg), B-4 6-10 feet (543 mg/kg), B-5 4-6 feet (1,850 mg/kg), B-7 0-2 feet (973 mg/kg), B-7 2-4 feet (735 mg/kg), and B-7 4-6 feet (1,220 mg/kg);
- Arsenic (7 mg/kg) in the samples from B-4 6-10 feet (7.69 mg/kg), B-7 2-4 feet (9.20 mg/kg), B-7 4-6 feet (8.15 mg/kg), B-7 6-10 feet (52.5 mg/kg), B-8 0-2 feet (9.84 mg/kg), B-8 4-6 feet (16.8 mg/kg), and B-8 6-10 feet (12.4 mg/kg); and
- Lead (150 mg/kg) in the sample from B-7 6-10 feet (153 mg/kg).

In addition, benzo(a)pyrene was detected above the applicable industrial and commercial direct exposure criteria (ICDEC) (0.8 mg/kg) in the sample from B-7 6-10 feet. Arsenic was detected above the applicable ICDEC (7 mg/kg) in the samples from B-4 6-10 feet, B-7 2-4 feet, B-7 4-6 feet, B-7 6-10 feet, B-8 0-2 feet, B-8 4-6 feet, and B-8 6-10 feet.

4.0 GROUNDWATER

As part of this subsurface investigation, BETA oversaw the installation of six monitoring wells at the Site. The following details the installation of these wells at the Site.

4.1 MONITORING WELLS

During the advancement of the soil borings in August and September 2019 and February 2020, refusal was encountered on presumed bedrock at twelve of the thirteen borings (refusal was not encountered at boring B-7) at depths ranging from 10 to 29.5 feet below grade. BETA oversaw the installation of six monitoring wells: MW-2, MW-3, MW-4, MW-7, MW-9, and MW-10. These wells are depicted on the Plan Set sheets included in the figures appendix. Please note that each well was installed in the correspondingly numbered boring (i.e., B-2 is the location of MW-2).

The depth of the six monitoring wells ranges from 15 to 26.5 feet below the ground surface. Each monitoring well was completed using 2-inch schedule 40 PVC material. At each monitoring well ten feet of 0.010-inch slotted screen, an appropriate length of riser material, sand and bentonite were used to complete the well. The wells were completed with either a flush-mounted roadbox or standpipe and cemented in place. Soil boring logs are included as Appendix D. Monitoring well and soil boring locations are depicted on the Plan Set sheets included in the figures appendix.

4.2 GROUNDWATER MONITORING WELL DEVELOPMENT

Following boring completion and well installation Geologic personnel developed monitoring wells MW-2, MW-3, MW-4, MW-7, MW-9, and MW-10. In accordance with state and federal protocols, the monitoring wells were developed to remove fine silt and sand from the well and to ensure a proper connection between the well and the surrounding aquifer prior to the collection of groundwater samples. Geologic used the overpumping method to develop the wells. Water collected during the development of the monitoring wells located on the Tidewater property (MW-2, MW-3, MW-9, and MW-10) was containerized in 55-gallon drums by Geologic for disposal by National Grid.

4.3 GROUNDWATER CLASSIFICATION

RIDEM classifies groundwater within the project area as GB. Groundwater classified GB is known or presumed to be unsuitable for drinking water use without treatment. In Section 4.4, BETA has compared groundwater results to RIDEM's GB Objectives.

4.4 GROUNDWATER SAMPLING

On March 12, 2020, the depth to groundwater was gauged in monitoring wells MW-4 and MW-7 and samples were collected from each well. The four wells on the Tidewater property were not sampled; however, groundwater on that property is known to be contaminated. EPA's low-flow sampling method was used to collect the groundwater sample from each monitoring well. Appendix G contains sampling logs for the wells.

BETA submitted these groundwater samples to ESS for analysis of the PP-13 metals by EPA Method 6010B, TPH by EPA Method 8100M, VOCs by EPA Method 8260B, SVOCs by EPA Method 8270D, and PCBs by EPA Method 8082A. Table 3 summarizes the detected compounds from these analyses and Appendix H contains the laboratory certificates of analysis.

4.5 GROUNDWATER ANALYTICAL DATA

As can be seen in Table 3, none of the concentrations of the detected compounds exceeded the applicable RIDEM GB Objectives. As dewatering effluent will likely be discharged to the NBC's sewer system, Table 3 also includes NBC's Bucklin Point Effluent Discharge Limitations. As can be seen in Table 3, none of the concentrations of the detected compounds exceeded the discharge limitations.

Please note; however, that groundwater at Tidewater likely contains higher concentrations of contaminants than those detected in the sampled wells. As such, dewatering effluent may require pre-treatment prior to discharge into the NBC's sewer system. The Basis of Design report and the technical specifications and contract documents will address the need for pre-treatment.

4.6 HYDROGEOLOGY

Coincident to the August and September 2019 field work, Bryant Associates, Inc. (Bryant) of Lincoln, Rhode Island conducted an elevation and location survey, consistent with the State Plane Coordinate System and NAVD88 vertical datum. McMillan Jacobs measured water levels in September 2019 and February 2020. BETA measured groundwater elevations in the recently installed monitoring wells during the March 2020 field work. Table 4 and the well logs in Appendix G include groundwater measurements and elevations.

5.0 PROJECT MONITORING

During the work conducted on the Tidewater property and in accordance with National Grid's Health and Safety requirements, BETA coordinated access control to the work areas utilizing the following control boundaries:

- Work Zone: A 20-foot circumference around the drilling location treated as the exclusion zone;
- Work Zone Perimeter: A 50-foot circumference around the drilling location, all equipment was decontaminated in this zone before being transferred to the support zone; and,
- Support Zone: The area located outside the work zone perimeter;

BETA personnel were allowed to enter the work zone perimeter when equipped with a photoionization detector (PID) and DustTrack dust monitor to monitor air quality within the work zone. The PID and dust monitor were run continuously (with data logging enabled) within the work zone with readings collected at the work zone perimeter every two hours. Logged data was provided to National Grid daily.

Due to heavy rains encountered during the February 2020 site work the PID used for air monitoring became routinely saturated with moisture, resulting in skewed readings that were observed to have no relationship to proximity to the work zone or the work being conducted. Attempts were made to mitigate this problem such as the use of 45 mm/0.45 mm external filters, supplemental readings from other PIDs protected from the weather, housing the PID itself under cover when possible, and frequent work stops to "dry out" the PID inside BETA personnel's vehicles. These complications and the steps taken to address them were communicated to National Grid daily.

6.0 CONCLUSIONS

Based on the investigatory activities conducted in support of the Narragansett Bay Commission (NBC) Phase III Combined Sewer Overflow (CSO) Consolidation Conduits IIIA-4 and IIIA-5 project, BETA makes the following conclusions:

- Although soil and groundwater sampling were not allowed on the Tidewater property, review of GZA's report for the site indicate the presence of lead, arsenic, TPH, cyanide, PCBs, and SVOCs in soil and VOCs, TPH, arsenic, and cyanide in groundwater near the proposed work areas above RIDEM's RDECs. The concentrations of lead could result in some soil being classified as hazardous waste. Soil and groundwater management requirements on the Tidewater Property will be dictated by National Grid.
- Within the RIDOT I-95 remedial area on Taft Street, contaminated soil will likely be encountered. Work in this area will need to adhere to the provisions of the draft ELUR and SMP that has been prepared for this area but has not yet been filed with RIDEM.
- Laboratory analysis of soil samples identified concentrations of lead, arsenic, TPH, and SVOCs above the applicable RIDEM RDECs in four of the six boring locations along Taft Street and Roosevelt Avenue Extension (B-4, B-5, B-7, and B-8).
- In addition, benzo(a)pyrene was identified in concentrations in excess of the applicable RIDEM ICDEC (0.8 mg/kg) in samples B-5 4-6 ft (1.98 mg/kg) and B-7 6-10 ft (1.70 mg/kg). Arsenic was identified in concentrations in excess of the applicable RIDEM ICDEC (7 mg/kg) in samples B-4 6-10 ft (7.69 mg/kg), B-7 2-4 ft (9.20 mg/kg), B-7 4-6 ft (8.15 mg/kg), B-7 6-10 ft (52.5 mg/kg), B-8 0-2 ft (9.94 mg/kg), B-8 4-6 ft (16.8 mg/kg), and B-8 6-10 ft (12.4 mg/kg).
- Laboratory analysis of BETA's groundwater samples did not identify exceedances of RIDEM's GB groundwater objectives or NBC's discharge limits for their Bucklin Point facility. Although wells were not sampled on the Tidewater property, groundwater in this area is known to be contaminated.
- Historic groundwater sampling at B17-8 (near the former Masonic Temple property) identified VOCs above RIDEM's GB groundwater objectives and NBC's discharge limits for their Bucklin Point facility. Additional groundwater monitoring wells are being installed on the former Masonic Temple by the Program Manager to determine the extent of contamination in this area.

TABLES

Table 1 - Field Screening Results
NBC Phase III CSO Program Consolidation Conduits - Phase IIA-4 and IIIA-5
Pawtucket, Rhode Island

Sample Designation	B-4	B-5	B-6	B-6A	B-7	B-8
Sample Date	08/28/2019	08/27/2019	08/29/2019	9/18/2019	08/30/2019	09/03/2019
Total Volatile Organic Compounds (ppmv)						
0-2'	0.2	0.0	0.2	0.1	0.0	0.1
2-4'	6.0	0.1	0.0	0.3	0.0	0.0
4-6'	0.1	0.0	*	0.0	0.0	0.0
6-10'	0.0	0.0	*	0.0	0.0	0.0

* - Boring abandoned and relocated after unforeseen concrete obstruction encountered at 4'
 Field screening performed using the headspace method via MiniRAE2000 equipped with a 10.6 eV lamp

Table 2 - Soil Analytical Results
NBC Phase III CSO Program Consolidation Conduits - Phase IIA-4 and IIIA-5
Pawtucket, Rhode Island

Sample Designation	B-4 0-2ft	B-4 2-4ft	B-4 4-6ft	B-4 6-10ft	B-5 0-2ft	B-5 2-4ft	B-5 4-6ft	B-5 6-10ft	B-6 0-2ft	B-6 2-4ft	B-6A 0-2ft	B-6A 2-4ft	B-6A 4-6ft	B-6A 6-10ft	B-7 0-2ft	B-7 2-4ft	B-7 4-6ft	B-7 6-10ft	B-8 0-2ft	B-8 2-4ft	B-8 4-6ft	B-8 6-10ft	RIDEM ResDEC	RIDEM ICDEC
Sample Date	08/28/2019	08/28/2019	08/28/2019	08/28/2019	08/27/2019	08/27/2019	08/27/2019	08/27/2019	08/29/2019	08/29/2019	9/18/2019	9/18/2019	9/18/2019	9/18/2019	08/30/2019	08/30/2019	08/30/2019	08/30/2019	09/03/2019	09/03/2019	9/10/2019	9/10/2019		
Volatile Organic Compounds, mg/kg																								
Acetone	0.0331 U	0.0379 U	0.0449 U	0.028 U	0.0347 U	0.0354 U	0.044 U	0.0393 U	0.0386 U	0.0513	0.0359 U	0.0462 U	0.04 U	0.0384 U	0.0395 U	0.0472	0.0582 U	0.0407 U	0.0409 U	0.0397 U	0.0369 U	0.0346 U	7,800	10,000
1,1-Dichloroethene	0.0033 U	0.0038 U	0.0045 U	0.0028 U	0.0035 U	0.0035 U	0.0044 U	0.0039 U	0.0039 U	0.0041 U	0.0036 U	0.0046 U	0.004 U	0.0038 U	0.004 U	0.0046 U	0.0058 U	0.0041 U	0.0041 U	0.004 U	0.0037 U	0.0035 U	0.2	9.5
1,2-Dibromo-3-Chloropropane	0.0033 U	0.0038 U	0.0045 U	0.0028 U	0.0035 U	0.0035 U	0.0044 U	0.0039 U	0.0039 U	0.0041 U	0.0036 U	0.0046 U	0.004 U	0.0038 U	0.004 U	0.0046 U	0.0058 U	0.0041 U	0.0041 U	0.004 U	0.0037 U	0.0035 U	0.5	4.1
1,2-Dibromoethane	0.0033 U	0.0038 U	0.0045 U	0.0028 U	0.0035 U	0.0035 U	0.0044 U	0.0039 U	0.0039 U	0.0041 U	0.0036 U	0.0046 U	0.004 U	0.0038 U	0.004 U	0.0046 U	0.0058 U	0.0041 U	0.0041 U	0.004 U	0.0037 U	0.0035 U	0.01	0.07
Benzene	0.0033 U	0.0038 U	0.0045 U	0.0028 U	0.0035 U	0.0035 U	0.0044 U	0.0039 U	0.0039 U	0.0041 U	0.0036 U	0.0046 U	0.004 U	0.0038 U	0.004 U	0.0046 U	0.0058 U	0.0041 U	0.0041 U	0.004 U	0.0037 U	0.0035 U	2.5	200
Methylene Chloride	0.0166 U	0.0189 U	0.0225 U	0.014 U	0.0173 U	0.0177 U	0.022 U	0.0197 U	0.0193 U	0.0203 U	0.018 U	0.0231 U	0.02 U	0.0192 U	0.0198 U	0.0733	0.0732	0.0204 U	0.0205 U	0.0199 U	0.0185 U	0.0173 U	45	760
Tetrachloroethene	0.0033 U	0.0038 U	0.0045 U	0.0028 U	0.0035 U	0.0035 U	0.0044 U	0.0039 U	0.0039 U	0.0041 U	0.0036 U	0.0046 U	0.004 U	0.0038 U	0.004 U	0.0046 U	0.0058 U	0.0041 U	0.0041 U	0.004 U	0.0037 U	0.0035 U	12	110
Toluene	0.0033 U	0.0038 U	0.0045 U	0.0028 U	0.0035 U	0.0035 U	0.0044 U	0.0039 U	0.0039 U	0.0041 U	0.0036 U	0.0046 U	0.004 U	0.0038 U	0.004 U	0.0046 U	0.0058 U	0.0041 U	0.0041 U	0.004 U	0.0037 U	0.0035 U	190	10,000
Vinyl Chloride	0.0066 U	0.0076 U	0.009 U	0.0056 U	0.0069 U	0.0071 U	0.0088 U	0.0079 U	0.0077 U	0.0081 U	0.0072 U	0.0092 U	0.008 U	0.0077 U	0.0079 U	0.0092 U	0.0116 U	0.0081 U	0.0082 U	0.0079 U	0.0074 U	0.0069 U	0.02	3
Xylene P,M	0.0066 U	0.0076 U	0.009 U	0.0056 U	0.0069 U	0.0071 U	0.0088 U	0.0079 U	0.0077 U	0.0081 U	0.0072 U	0.0092 U	0.008 U	0.0077 U	0.0079 U	0.0092 U	0.0116 U	0.0081 U	0.0082 U	0.0079 U	0.0074 U	0.0069 U	110	10,000
Total VOCs	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05	ND	ND	ND	0.0384	ND	0.67	0.15	ND	ND	ND	ND	ND	NE	NE
Semi-Volatile Organic Compounds, mg/kg																								
Anthracene	0.75 U	0.717 U	0.754 U	0.718 U	0.344 U	0.372 U	0.879	0.356 U	0.381 U	0.369 U	0.376 U	0.354 U	0.377 U	0.366 U	1.53 U	1.64 U	1.67 U	0.523	0.359 U	0.364 U	0.387 U	0.396 U	35	10,000
Benzo(a)anthracene	0.75 U	0.800	0.754 U	0.718 U	0.344 U	0.372 U	2.29	0.388	0.381 U	0.370	0.376 U	0.354 U	0.377 U	0.366 U	0.766 U	0.823 U	0.836 U	1.83	0.359 U	0.364 U	0.387 U	0.473	0.9	7.8
Benzo(a)pyrene	0.376 U	0.665	0.378 U	0.36 U	0.173 U	0.187 U	1.98	0.300	0.250	0.331	0.189 U	0.178 U	0.189 U	0.261	0.305 U	0.399	0.394	1.70	0.18 U	0.183 U	0.385	0.559	0.4	0.8
Benzo(b)fluoranthene	0.75 U	0.717 U	0.754 U	0.718 U	0.344 U	0.372 U	1.40	0.356 U	0.381 U	0.369 U	0.376 U	0.354 U	0.377 U	0.366 U	0.766 U	0.823 U	0.836 U	1.49	0.359 U	0.364 U	0.481	0.625	0.9	7.8
Benzo(g,h,i)perylene	0.75 U	0.717 U	0.754 U	0.718 U	0.344 U	0.372 U	1.11	0.356 U	0.381 U	0.369 U	0.376 U	0.354 U	0.377 U	0.366 U	0.459 U	0.493 U	0.5 U	0.847	0.359 U	0.364 U	0.387 U	0.396 U	0.8	10,000
Benzo(k)fluoranthene	0.75 U	0.717 U	0.754 U	0.718 U	0.344 U	0.372 U	2.07	0.356 U	0.381 U	0.369 U	0.376 U	0.354 U	0.377 U	0.366 U	0.766 U	0.823 U	0.836 U	1.58	0.359 U	0.364 U	0.387 U	0.523	0.9	78
Chrysene	0.376 U	0.815	0.398	0.36 U	0.173 U	0.187 U	2.04	0.324	0.230	0.337	0.189 U	0.178 U	0.189 U	0.262	0.305 U	0.413	0.485	1.95	0.18 U	0.183 U	0.453	0.616	0.4	780
Dibenzo(a,h)anthracene	0.376 U	0.36 U	0.378 U	0.36 U	0.173 U	0.187 U	0.510	0.178 U	0.191 U	0.185 U	0.189 U	0.178 U	0.189 U	0.184 U	0.305 U	0.328 U	0.333 U	0.305	0.18 U	0.183 U	0.194 U	0.198 U	0.4	0.8
Fluoranthene	0.75 U	1.80	0.754 U	0.718 U	0.344 U	0.372 U	4.35	1.02	0.468	0.665	0.376 U	0.354 U	0.377 U	0.395	1.53 U	1.64 U	1.67 U	4.49	0.359 U	0.364 U	0.834	1.01	20	10,000
Indeno(1,2,3-cd)pyrene	0.75 U	0.717 U	0.754 U	0.718 U	0.344 U	0.372 U	1.10	0.356 U	0.381 U	0.369 U	0.376 U	0.354 U	0.377 U	0.366 U	0.766 U	0.823 U	0.836 U	0.811	0.359 U	0.364 U	0.387 U	0.396 U	0.9	7.8
Naphthalene	0.75 U	0.717 U	0.754 U	0.718 U	0.344 U	0.372 U	0.383 U	0.356 U	0.381 U	0.369 U	0.376 U	0.354 U	0.377 U	0.366 U	0.382 U	0.41 U	0.417 U	0.401	0.359 U	0.364 U	0.387 U	0.396 U	54	10,000
Phenanthrene	0.75 U	1.73	0.754 U	0.718 U	0.344 U	0.372 U	3.52	1.12	0.381 U	0.376	0.376 U	0.354 U	0.377 U	0.366 U	1.53 U	1.64 U	1.67 U	3.47	0.359 U	0.364 U	0.387 U	0.396 U	40	10,000
Pyrene	0.75 U	1.82	0.859	0.718 U	0.344 U	0.372 U	4.02	0.844	0.424	0.593	0.376 U	0.354 U	0.377 U	0.482	1.53 U	1.64 U	1.67 U	3.73	0.359 U	0.364 U	0.825	1.07	13	10,000
Total SVOCs	ND	7.6	1.3	ND	ND	ND	25.3	4.0	1.4	2.7	ND	ND	ND	1.4	ND	0.8	0.9	23.1	ND	ND	3.0	4.9	NE	NE
Total Petroleum Hydrocarbons, mg/kg																								
Total Petroleum Hydrocarbons	886	1,370	744	543	160	1,850	233	136	390	205	41.5 U	310	40.6 U	60.3	973	735	1,220	143	41.8 U	38.8 U	59.6	68.6	500	2,500
Total Metals, mg/kg																								
Antimony	3.93 U	5.19 U	1.79 U	4.06 U	5.24 U	3.98 U	4.49 U	5.37 U	1.97 U	5.2 U	4.33 U	5.2 U	4.56 U	4.16 U	3.29 U	4.75 U	2.39 U	5.24	3.69 U	3.93 U	4.96 U	4.91 U	10	820
Arsenic	1.97 U	5.74	5.60	7.69	2.62 U	3.16	4.79	5.09	4.89	6.57	2.16 U	2.6 U	5.11	3.49	3.82	9.20	8.15	52.5	9.94	6.88	16.8	12.4	7	7
Beryllium	0.33	0.27	0.31	0.28	0.73	0.40	0.32	0.67	0.28	0.32	0.29	0.33	0.25	0.23	0.37	0.30	0.41	0.05 U	0.25	0.21	0.33	0.35	1.5	1.5
Cadmium	0.39 U	0.52 U	0.18 U	0.41 U	0.52 U	0.4 U	0.45 U	0.54 U	0.2 U	0.52 U	0.43 U	0.52 U	0.46 U	0.42 U	0.33 U	0.47 U	0.24 U	2.46 U	0.37 U	0.39 U	0.5 U	0.49 U	39	1,000
Chromium	9.53	12.8	12.1	15.6	12.1	14.0	11.5	20.1	8.99	10.8	4.25	7.43	6.59	7.88	4.95	9.32	9.59	17.2	7.00	7.48	14.3	14.1	1,400	10,000
Copper	10.4	22.2	24.7	17.7	11.4	14.3	23.8	14.4	25.5	25.7	6	8.64	10.6	18.8	7.56	23.1	20.7	327	6.78	5.93	37.5	37.5	3,100	10,000
Lead	14.1	53.2	85.4	60.8	8.02	27.8	90.3	60.6	51.6	51.4	5.87	7.03	20.7	35.7	6.43	28.9	21.8	153	5.41	5.02	68.0	67.8	150	500
Mercury	0.023	0.105	0.250	0.158	0.016 U	0.033	0.215	0.025 U	0.102	0.191	0.029 U	0.033 U	0.04	0.223	0.027 U	0.157	0.092	0.177	0.027 U	0.031 U	0.068	0.074	23	610
Nickel	8.15	11.5	10.7	12.1	9.89	11.5	8.35	14.1	8.26	9.12	5.96	8.49	8.41	9.14	6.77	9.50	9.89	105	9.00	8.62	14.6	16.3	1,000	10,000
Selenium	3.93 U	5.19 U	0.18 U	4.06 U	5.24 U	3.98 U	4.49 U	5.37 U	1.97 U	5.2 U	4.33 U	5.2 U	4.56 U	4.16 U	3.29 U	4.75 U	2.39 U	0.72	3.69 U	3.93 U	0.5 U	0.49 U	390	10,000
Silver	0.39 U	0.52 U	0.36 U	0.41 U	0.52 U	0.4 U	0.45 U	0.54 U	0.2 U	0.52 U	0.43 U	0.52 U	0.46 U	0.42 U	0.33 U	0.47 U	0.24 U	2.46 U	0.37 U	0.39 U	0.5 U	0.49 U	200	10,000
Thallium	0.39 U	0.52 U	0.18 U	0.41 U	0.52 U	0.4 U	4.49 U	0.54 U	0.2 U	0.52 U	0.43 U	5.2 U	4.56 U	4.16 U	0.33 U	4.75 U	0.24 U	0.25 U	0.37 U	0.39 U	0.5 U	0.49 U	5.5	140
Zinc	24.5	43.9	66.8	54.8	30.3	41.8	68.9	45.9	44.4	48.1	33.5	37.2	29.9	31.3	25.2	41.4	37.1	106	24.6	27.1	87.9	79.3	6,000	10,000
Toxicity Characteristic Leaching Procedure Metals, mg/L																								
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.054	NA	NA	NA	NA	NA	5 (EPA)
Polychlorinated Biphenyls, mg/kg																								
Aroclor 1262	0.06 U	0.05 U	0.06 U	0.06 U	0.05 U																			

Table 3 - Groundwater Analytical Results
NBC Phase III CSO Program Consolidation Conduits - Phase IIA-4 and IIIA-5
Pawtucket, Rhode Island

Sample Designation	MW-4		MW-7		RIDEM GB Objective	NBC Discharge Limits	
Sample Date	03/12/2020		03/12/2020				
Volatile Organic Compounds, micrograms per liter (µg/L)							
Chloroform	1	U	2.1		NE	2,130 (Total Toxic Organics)	
Trichloroethene	1	U	1.6		540		
Semi-volatile Organic Compounds, µg/L							
Benzo(b)fluoranthene	0.5		0.5	U	NE		
Polychlorinated Biphenyls (PCBs), µg/L							
PCBs	ND		ND		NE		
Total Petroleum Hydrocarbons (TPH), µg/L							
TPH	190	U	190	U	NE	125,000	
Total Metals, µg/L							
Antimony	1	U	1	U	NE	NE	
Arsenic	3		2.7		NE	200	
Beryllium	0.5	U	0.5	U	NE	NE	
Cadmium	2.5	U	2.5	U	NE	110	
Chromium	10.1		10	U	NE	2,770	
Copper	13.4		14.2		NE	1,200	
Lead	10	U	17.5		NE	690	
Mercury	0.2	U	0.2	U	NE	60	
Nickel	25	U	25	U	NE	1,620	
Selenium	25	U	25	U	NE	400	
Silver	5	U	5	U	NE	400	
Thallium	0.5	U	0.5	U	NE	NE	
Zinc	25	U	27.9		NE	1,670	

Notes

U - Analyte not detected above laboratory minimum detection limits

NE - Standard not established

ND - Not detected

FIGURES

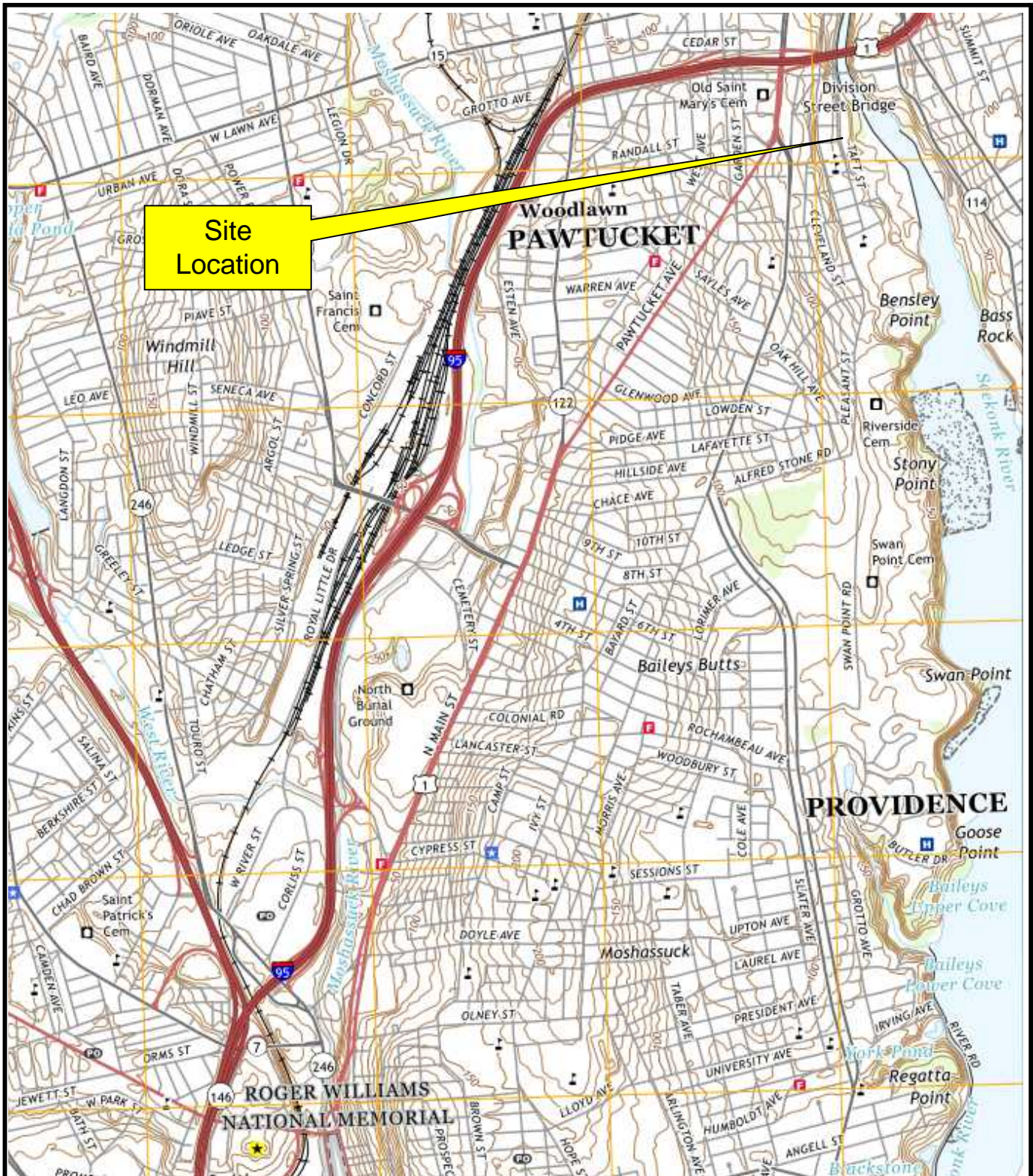
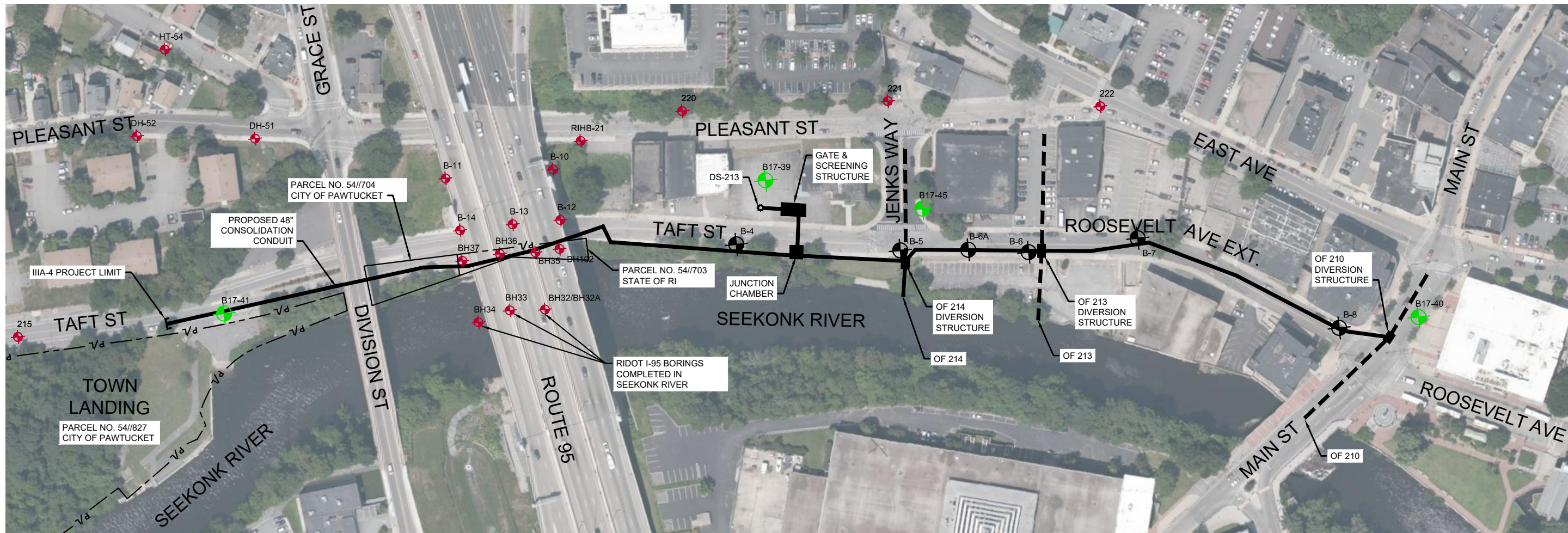


Figure 1: Site Locus

Drop Shaft 213 Consolidation Conduit & OF-217 Consolidation Conduit
 Pawtucket, Rhode Island



www.BETA-Inc.com

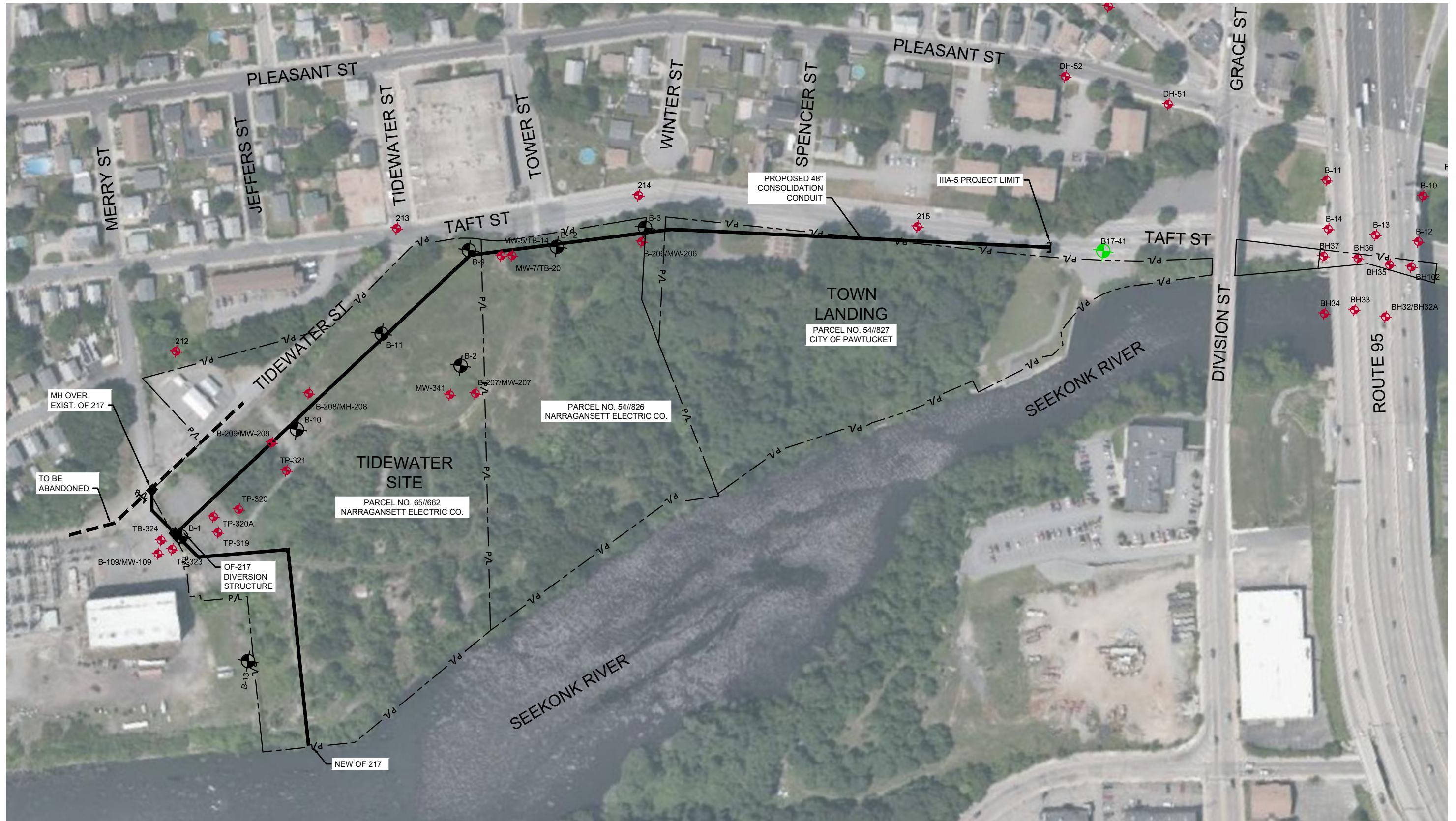


BY: JAMIE PAYNE

DWG FILE: J:\6412 NBC CSO Consolidation Conduits\Drawing Files\Acad - Misc\PAWT_ FIG_ IIIA-4 & IIIA-5_GEO TECH_BORINGS.dwg PLOT DATE: Tuesday, May 1, 2018 11:18:00 AM

LEGEND	
	B-1 BORINGS COMPLETED FOR CONTRACT IIIA-4/IIIA-5
	BH-35 BORINGS PREVIOUSLY COMPLETED FOR OTHER PROJECTS
	B-17-45 BORINGS COMPLETED FOR CONTRACT IIIA-4/IIIA-5 BY PARE CORP.

SCALE 1"=80'	NBC CONTRACT NO 308.XXC	SHEET FIG. 2
	CIVIL	
	III A-4 BASIS OF DESIGN	



LEGEND

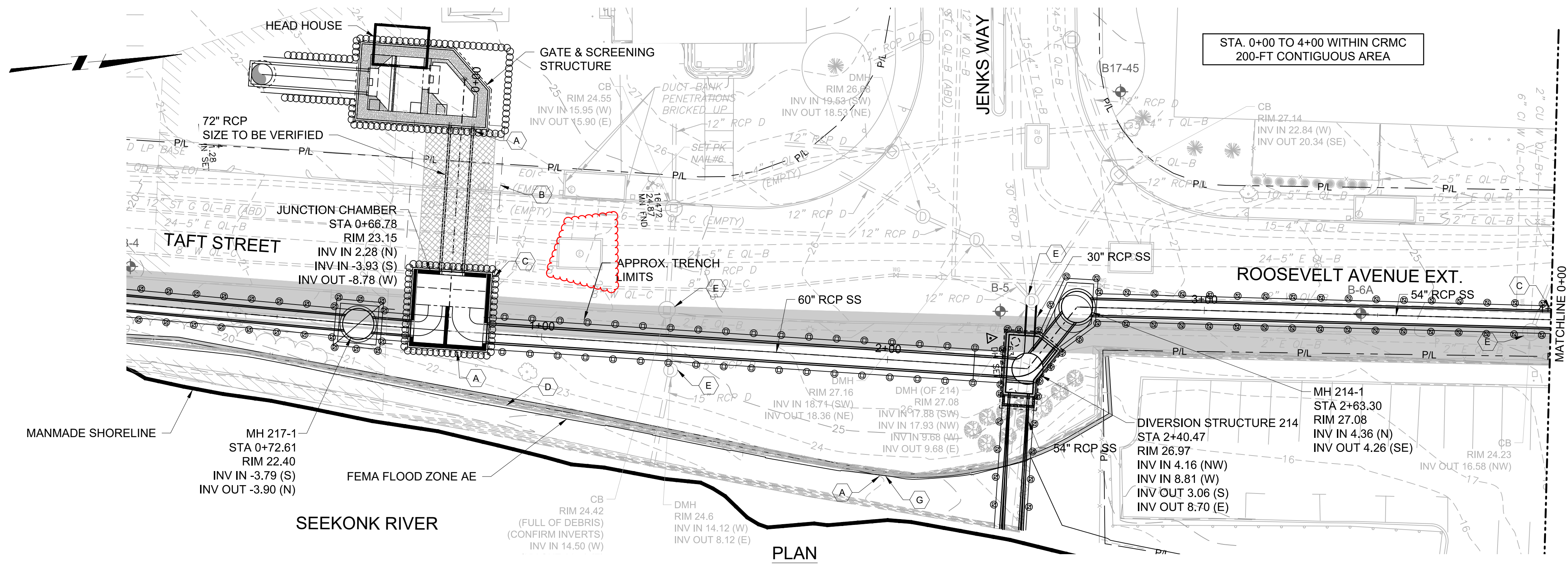
B-1	BORINGS COMPLETED FOR CONTRACT IIIA-4/IIIA-5	B17-45	BORINGS COMPLETED FOR CONTRACT IIIA-4/IIIA-5 BY PARE CORP.
BH-35	BORINGS PREVIOUSLY COMPLETED FOR OTHER PROJECTS		

SCALE 1"=80'	NBC CONTRACT NO 308.XXC	SHEET FIG. 3
	CIVIL	
	IIIA-5 BASIS OF DESIGN	

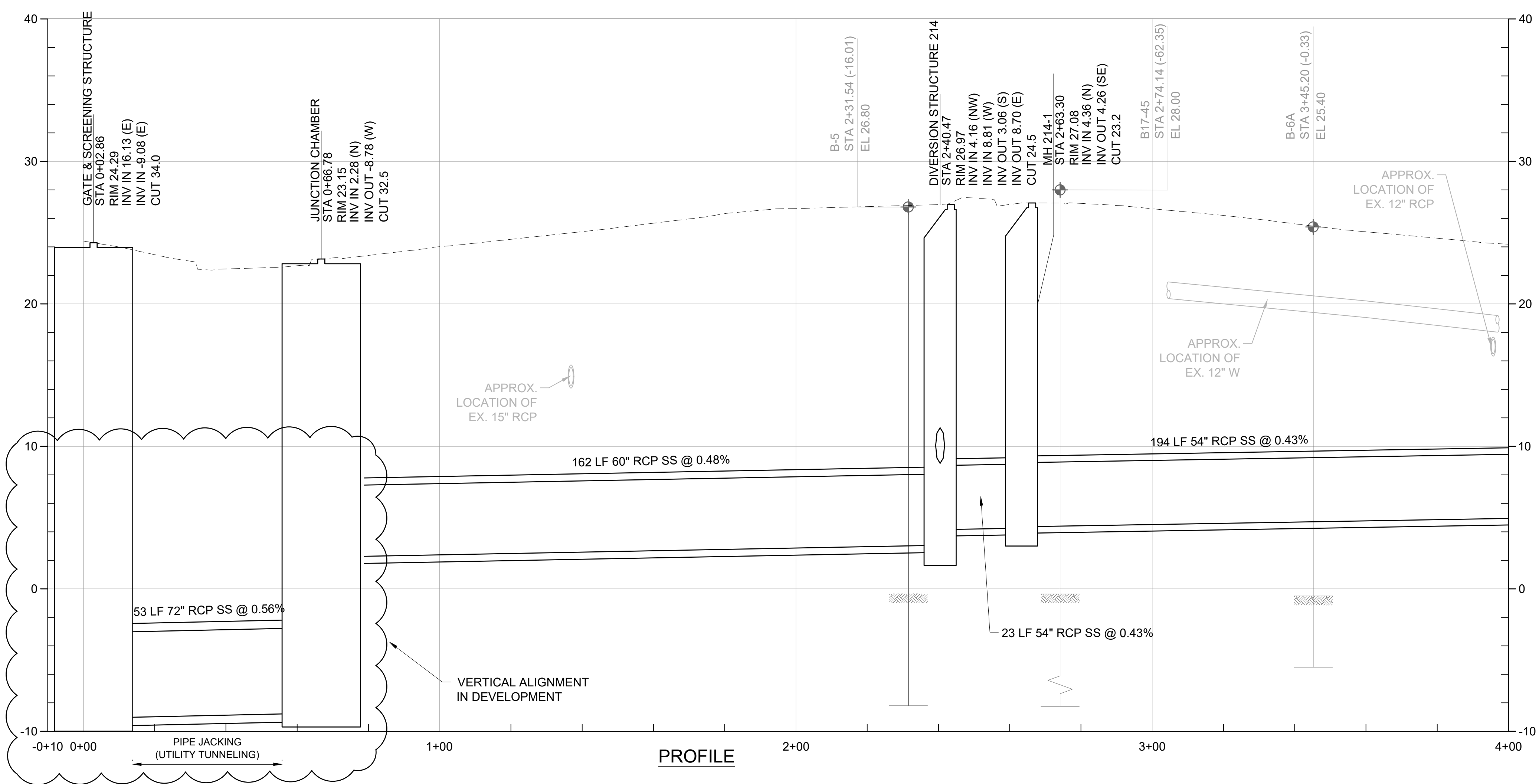
BY: JAMIE PAYNE

PLOT DATE: Friday, March 27, 2020 11:14:08 AM

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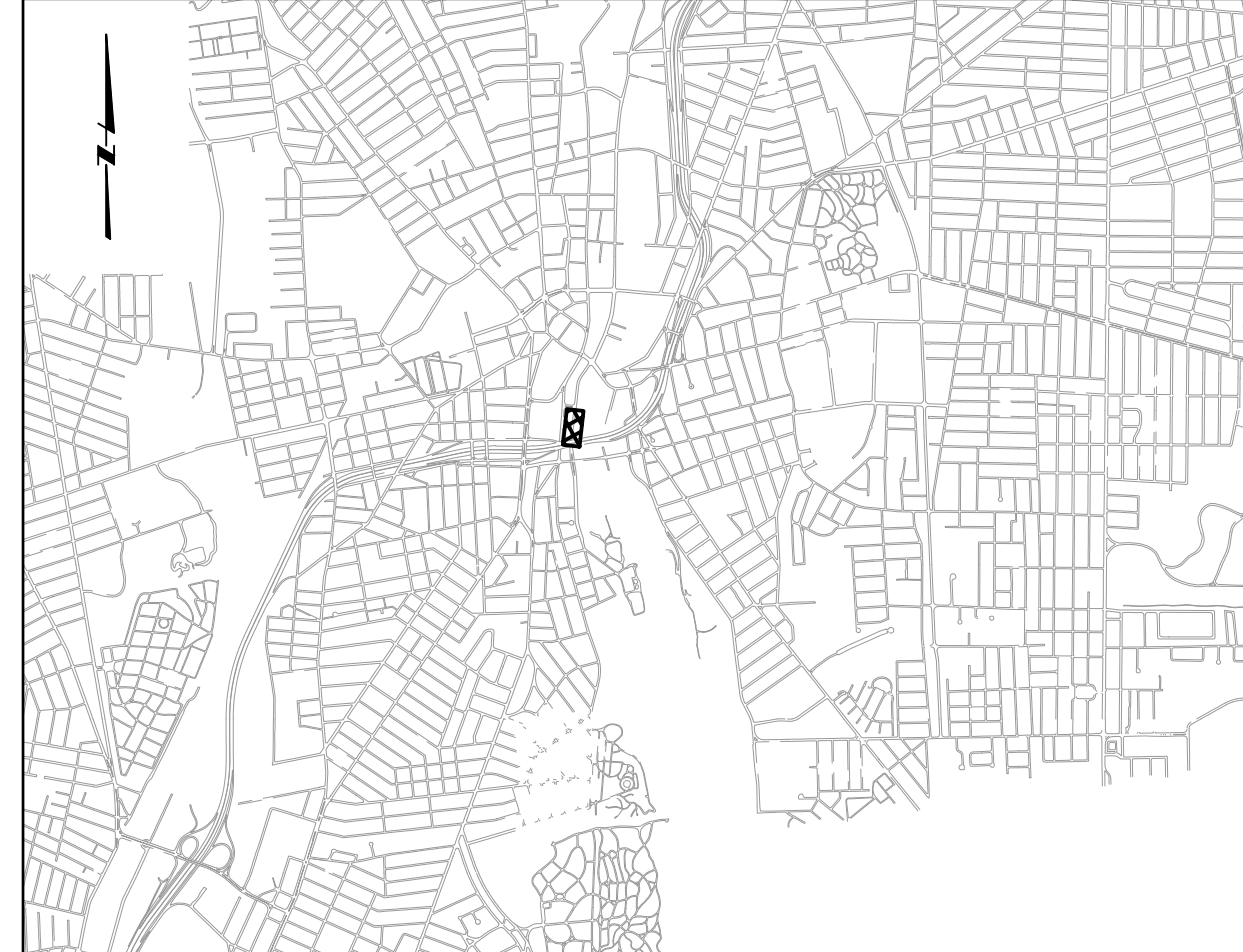


PLAN



PROFILE

KEY PLAN



GENERAL SHEET NOTES

1. SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
2. UTILITY INFORMATION DEPICTED, PROVIDED BY BSI ENGINEERING INC. QL-B.
3. FLOOD PLAIN INFORMATION IS FROM FEMA, PANEL NO. 44007C0194J. FLOOD PLAIN ELEVATIONS CONVERTED FROM VERTICAL DATUM NAVD 1988 TO NGVD 1929 AND ARE APPROXIMATELY:
 - NORTH OF DIVISION STREET BRIDGE: AE ELEVATION 12.8
 - SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
4. CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GRAY SHADING FOR COORDINATION.

SHEET KEYNOTES

- A. PIPE JACKING: STATION 0+00 TO STATION 0+73
- B. AREA TO RECEIVE GROUND IMPROVEMENT - CHEMICAL INJECTION
- C. REMOVE AND REPLACE WATER MAIN: STATION 0+73 TO STATION 4+00
- D. RETAINING WALL STABILIZATION - GROUT INJECTION: STATION 0+66 TO STATION 2+00
- E. REMOVE AND REPLACE DRAIN AND CATCH BASIN FOR INSTALLATION OF CONSOLIDATION CONDUIT: STATION 1+40 AND STATION 3+95
- F. COORDINATE WITH CITY AND NATIONAL GRID TO ISOLATE AND REMOVE ELECTRIC LIGHT POLE: STATION 0+66
- G. REMOVE AND REPLACE RETAINING WALL: STATION 0+66 TO STATION 0+90, STATION 2+00 TO STATION 4+50

REV	DATE	BY	DESCRIPTION

SCALE
H. SCALE 1"=20'
V. SCALE 1"=5'

WARNING
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED C. CRONIN
DRAWN B. MARINI
CHECKED C. CRONIN

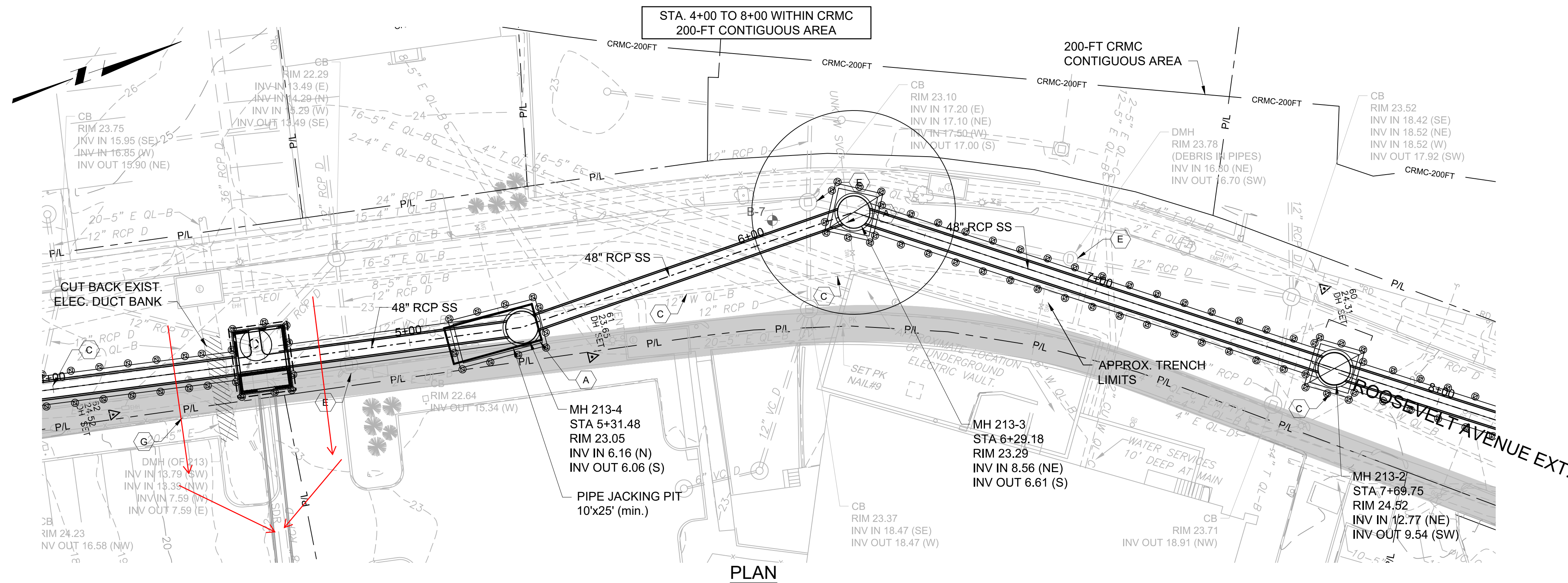
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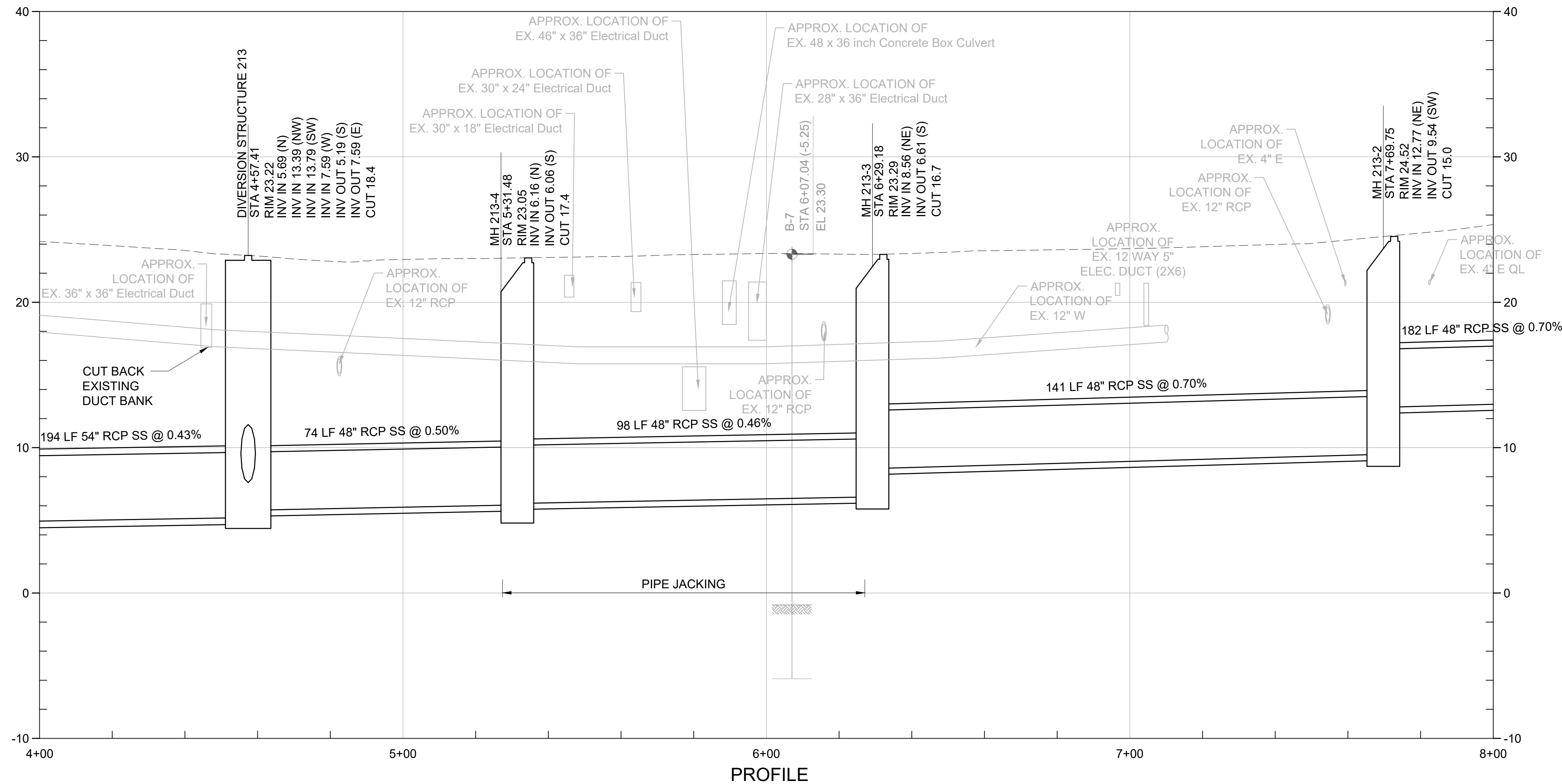
NARRAGANSETT BAY COMMISSION
PHASE III COMBINED SEWER
OVERFLOW PROGRAM
Stantec logo

NBC CONTRACT NO 308.XXC
CIVIL
DROP SHAFT 213 CONSOLIDATION CONDUIT
PLAN AND PROFILE 1: STA 0+00 - 4+00

SHEET
C-5
195130165



PLAN



PROFILE

KEY PLAN



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1. SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
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 - NORTH OF DIVISION STREET BRIDGE: AE ELEVATION 12.8
 - SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
4. CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GRAY SHADING FOR COORDINATION.

SHEET KEYNOTES

- A. PIPE JACKING: STATION 5+31 TO STATION 6+22
- B. AREA TO RECEIVE GROUND IMPROVEMENT - CHEMICAL INJECTION
- C. REMOVE AND RELOCATE WATER MAIN: STATION 4+00 TO STATION 5+75, STATION 6+22 TO STATION 7+66
- D. RETAINING WALL STABILIZATION - GROUT INJECTION: STATION 3+00 TO STATION 4+40
- E. REMOVE AND REPLACE DRAIN AND CATCH BASIN FOR INSTALLATION OF CONSOLIDATION CONDUIT: STATION 4+30, STATION 6+15 TO STATION 6+90
- F. COORDINATE WITH CITY AND NATIONAL GRID TO ISOLATE AND REMOVE ELECTRIC LIGHT POLE:
- G. REMOVE AND REPLACE RETAINING WALL: STATION 4+00 TO STATION 4+35

BY: JAMIE PAYNE

PLOT DATE: Friday, March 27, 2020 11:14:41 AM

DWG FILE: C:\pwworkdir\0520964\PAWT_SITE_PLAN_&_PROFILE_III-A-4.dwg

REV	DATE	BY	DESCRIPTION

SCALE
H. SCALE 1"=20'
V. SCALE 1"=5'

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED C. CRONIN
DRAWN BMARINI
CHECKED C. CRONIN

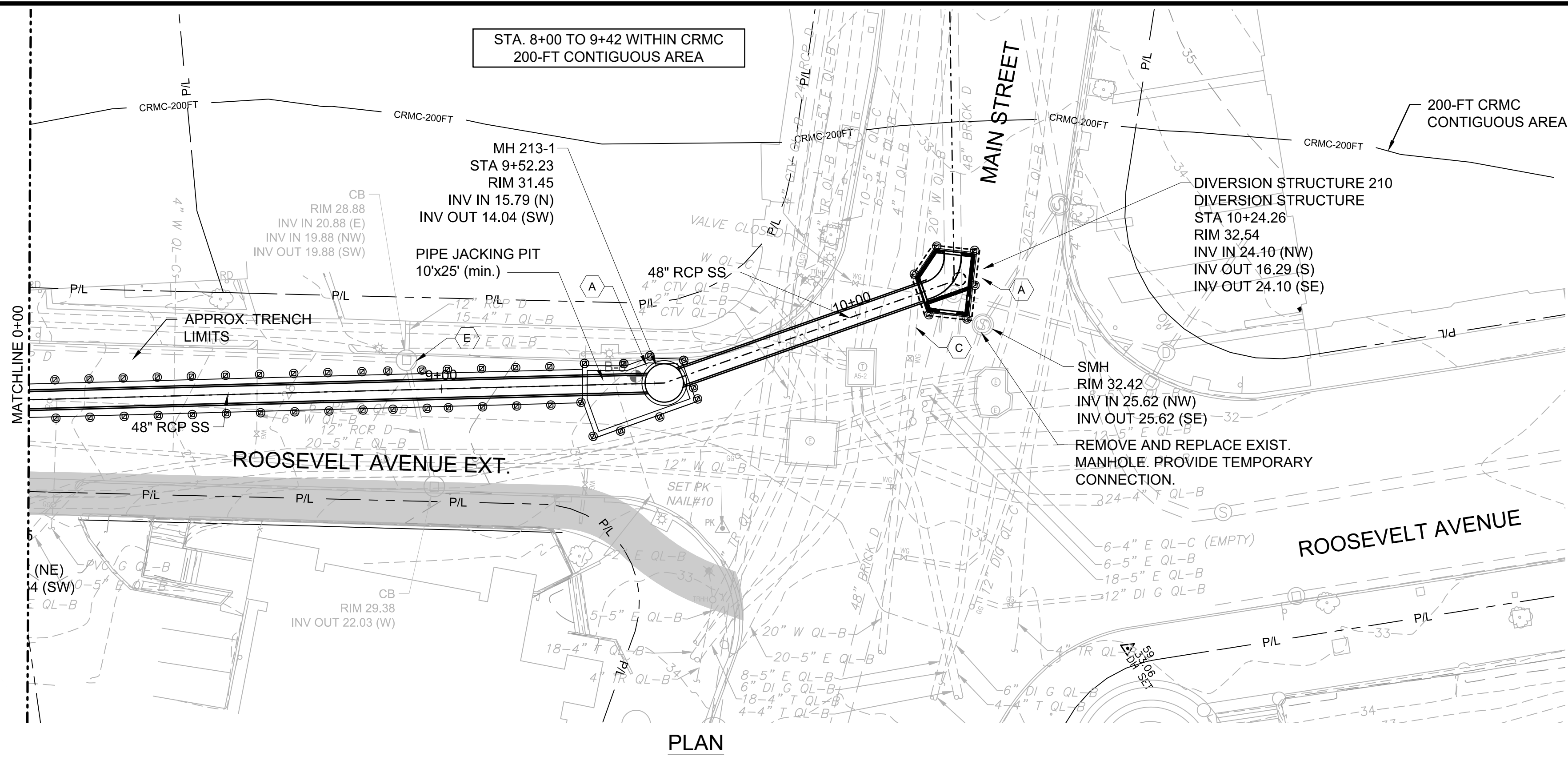
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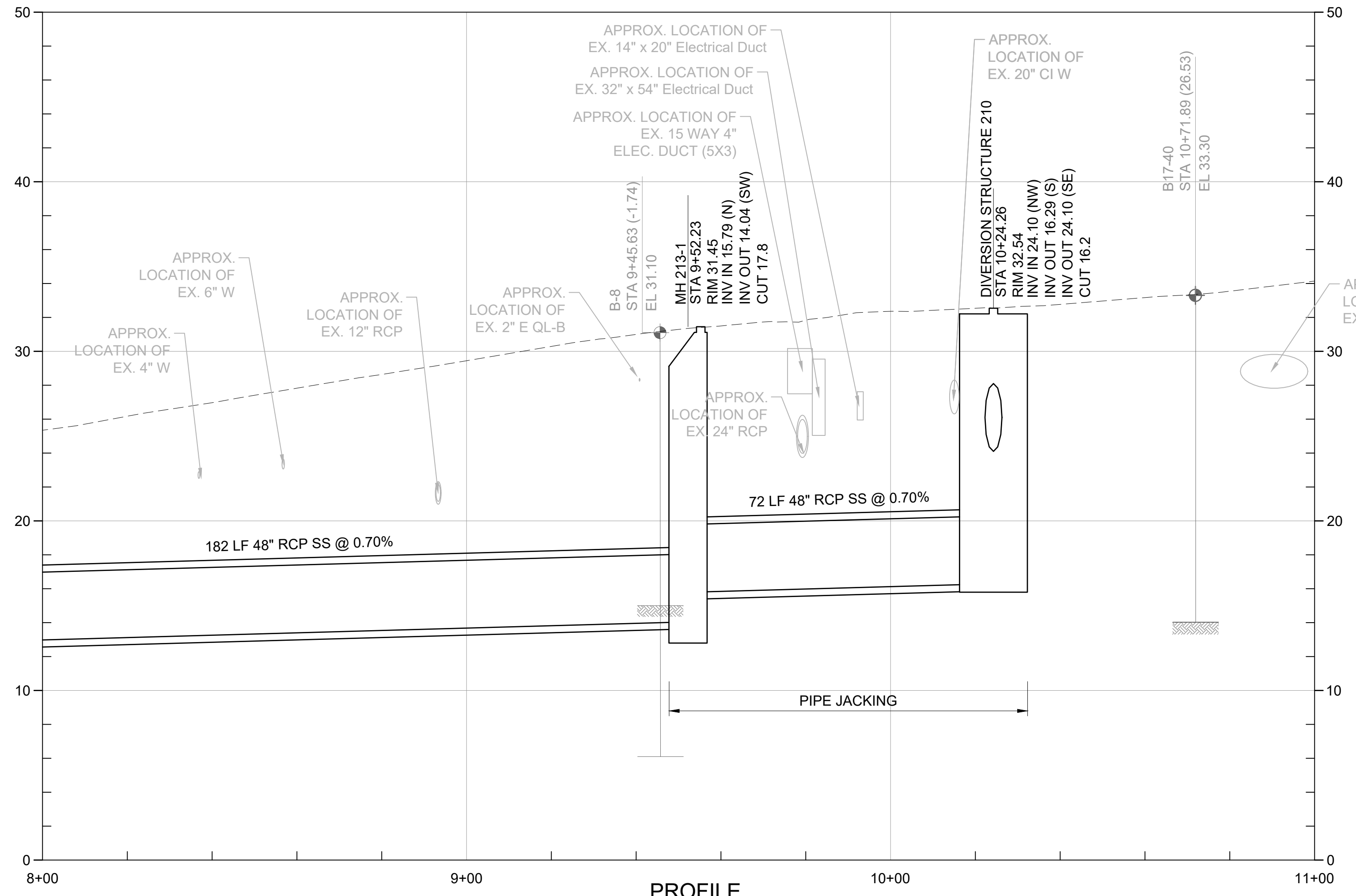
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PHASE III COMBINED SEWER OVERFLOW PROGRAM
Stantec logo

NBC CONTRACT NO 308.XXC
CIVIL
DROP SHAFT 213 CONSOLIDATION CONDUIT
PLAN AND PROFILE 2: STA 4+00 - 8+00

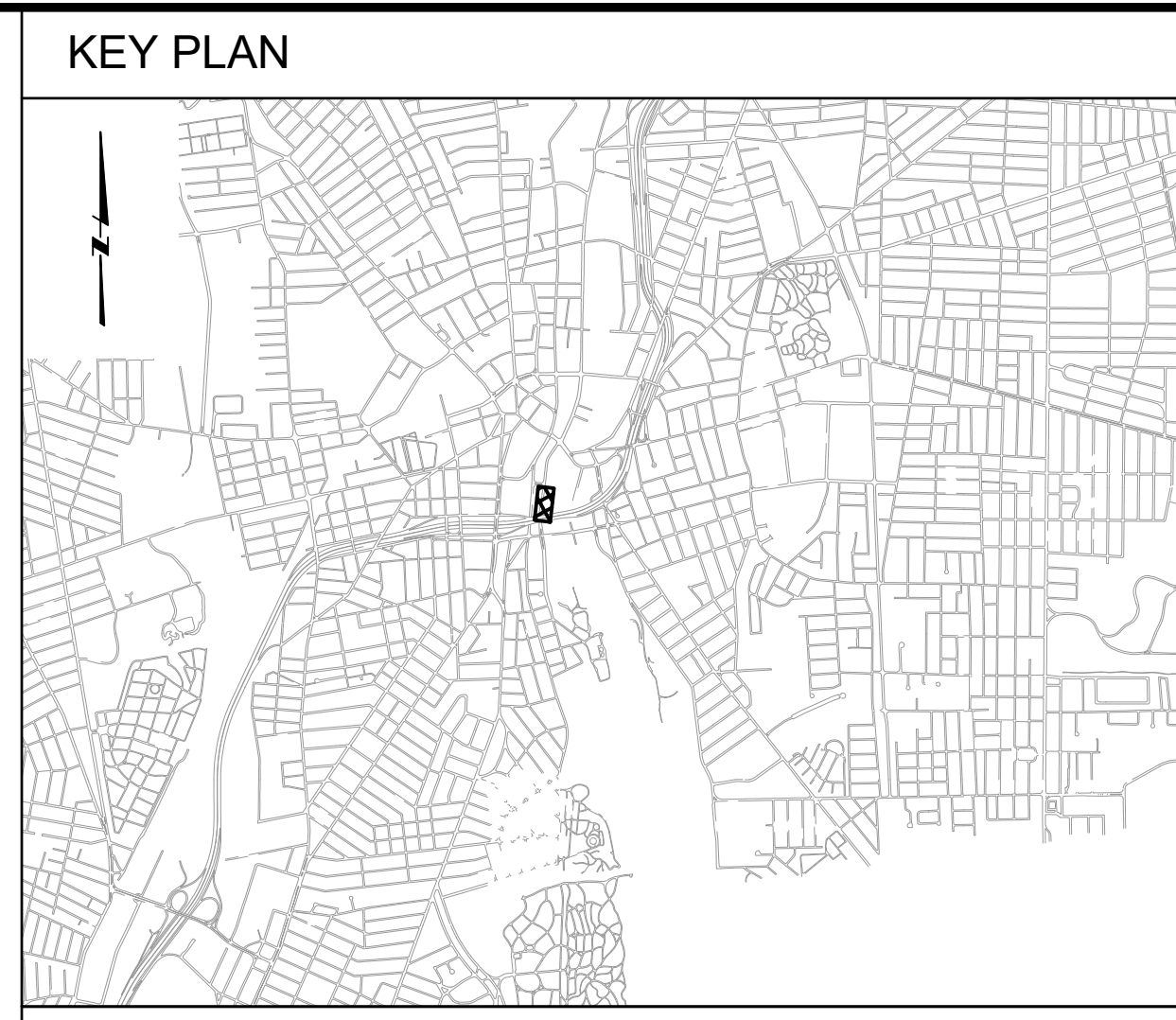
SHEET
C-6
195130165



PLAN



PROFILE



- GENERAL SHEET NOTES**
- SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
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 - SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
 - CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GRAY SHADING FOR COORDINATION.

- SHEET KEYNOTES**
- PIPE JACKING: STATION 9+48 TO STATION 10+21
 - AREA TO RECEIVE GROUND IMPROVEMENTS - CHEMICAL INJECTION
 - RELOCATE WATER MAIN: STATION 10+10 (~25 LF)
 - RETAINING WALL STABILIZATION - GROUT INJECTION
 - REMOVE AND REPLACE DRAIN AND CATCH BASIN FOR INSTALLATION OF CONSOLIDATION CONDUIT: STATION 8+90
 - COORDINATE WITH CITY AND NATIONAL GRID TO ISOLATE AND REMOVE ELECTRIC LIGHT POLE:

BY: JAMIE PAYNE

PLOT DATE: Friday, March 27, 2020 11:15:13 AM

DWG FILE: C:\pwworkdir\0520964\PAWT_SITE_PLAN_&_PROFILE_III-A-4.dwg

REV	DATE	BY	DESCRIPTION

SCALE
H. SCALE 1"=20'
V. SCALE 1"=5'

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DRAWN C. DIAS
CHECKED C. CRONIN

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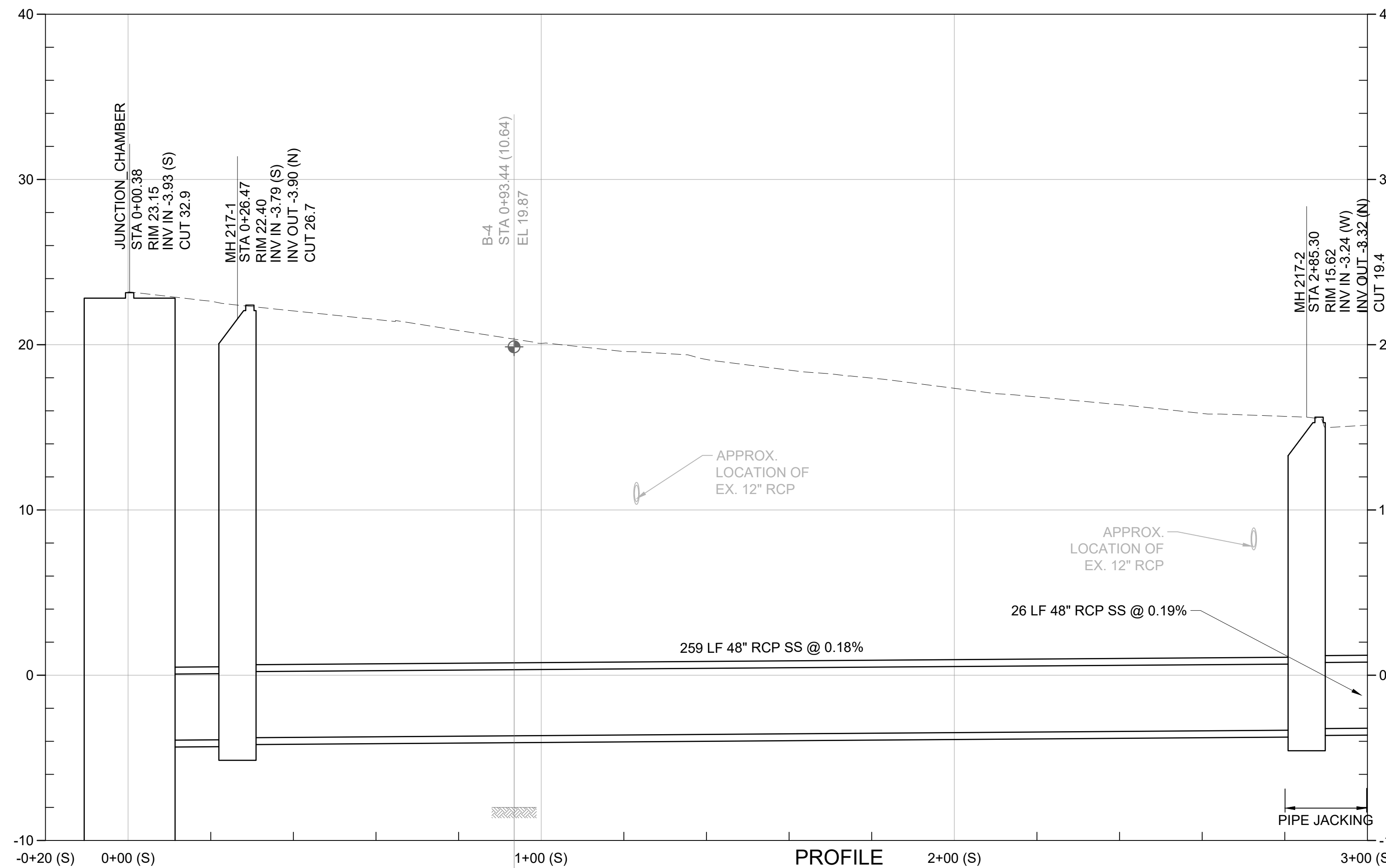
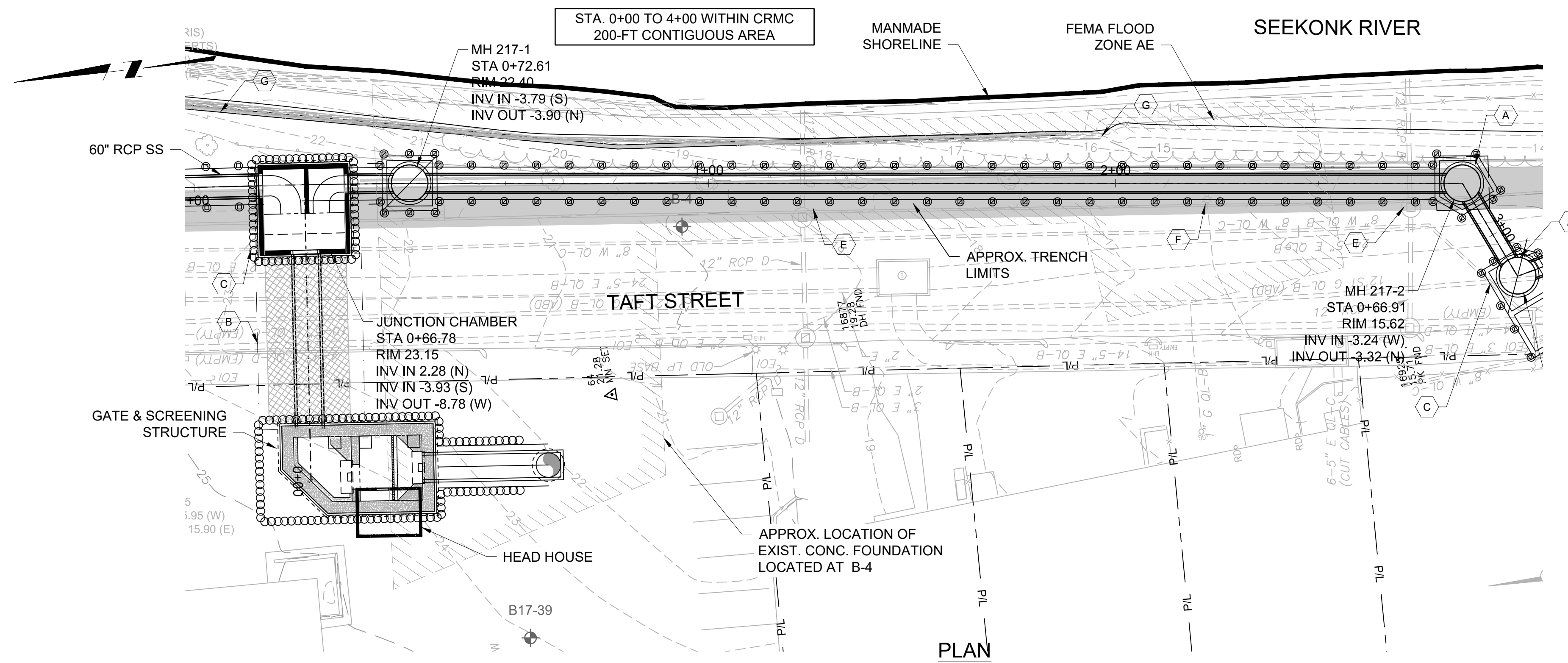
NBC CONTRACT NO 308.XXC
CIVIL
DROP SHAFT 213 CONSOLIDATION CONDUIT
PLAN AND PROFILE 3: STA 8+00 - 11+00

SHEET
C-7
195130165

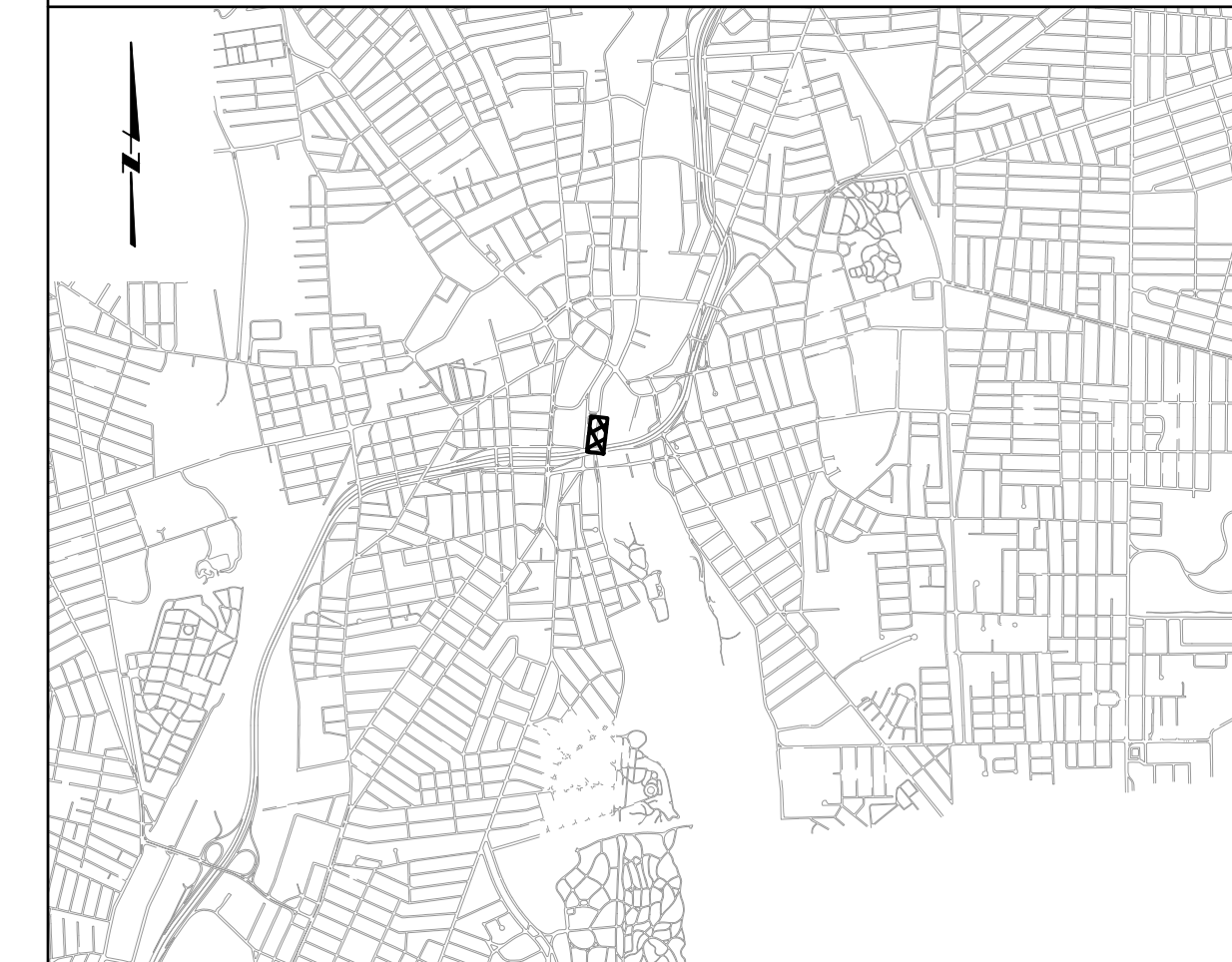
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PLOT DATE: Friday, March 27, 2020 11:15:46 AM

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KEY PLAN



GENERAL SHEET NOTES

1. SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
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 - NORTH OF DIVISION STREET BRIDGE: AE ELEVATION 12.8
 - SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
4. CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GRAY SHADING FOR COORDINATION.

SHEET KEYNOTES

- A. PIPE JACKING: STATION 2+85 TO STATION 3+11
- B. AREA TO RECEIVE GROUND IMPROVEMENT - CHEMICAL INJECTION
- C. REMOVE AND REPLACE WATER MAIN: STATION 0+00 TO STATION 3+00
- D. RETAINING WALL STABILIZATION - GROUT INJECTION
- E. REMOVE AND REPLACE DRAIN AND CATCH BASIN FOR INSTALLATION OF CONSOLIDATION CONDUIT: STATION 1+22, STATION 2+70
- F. COORDINATE WITH CITY AND NATIONAL GRID TO ISOLATE AND REMOVE ELECTRIC LIGHT POLE: STATION 2+22
- G. REMOVE & REPLACE RETAINING WALL FROM STATION -0+20 TO STATION 1+96

REV	DATE	BY	DESCRIPTION

SCALE
H. SCALE 1"=20'
V. SCALE 1"=5'

WARNING
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DESIGNED C. CRONIN
DRAWN B. MARINI
CHECKED C. CRONIN

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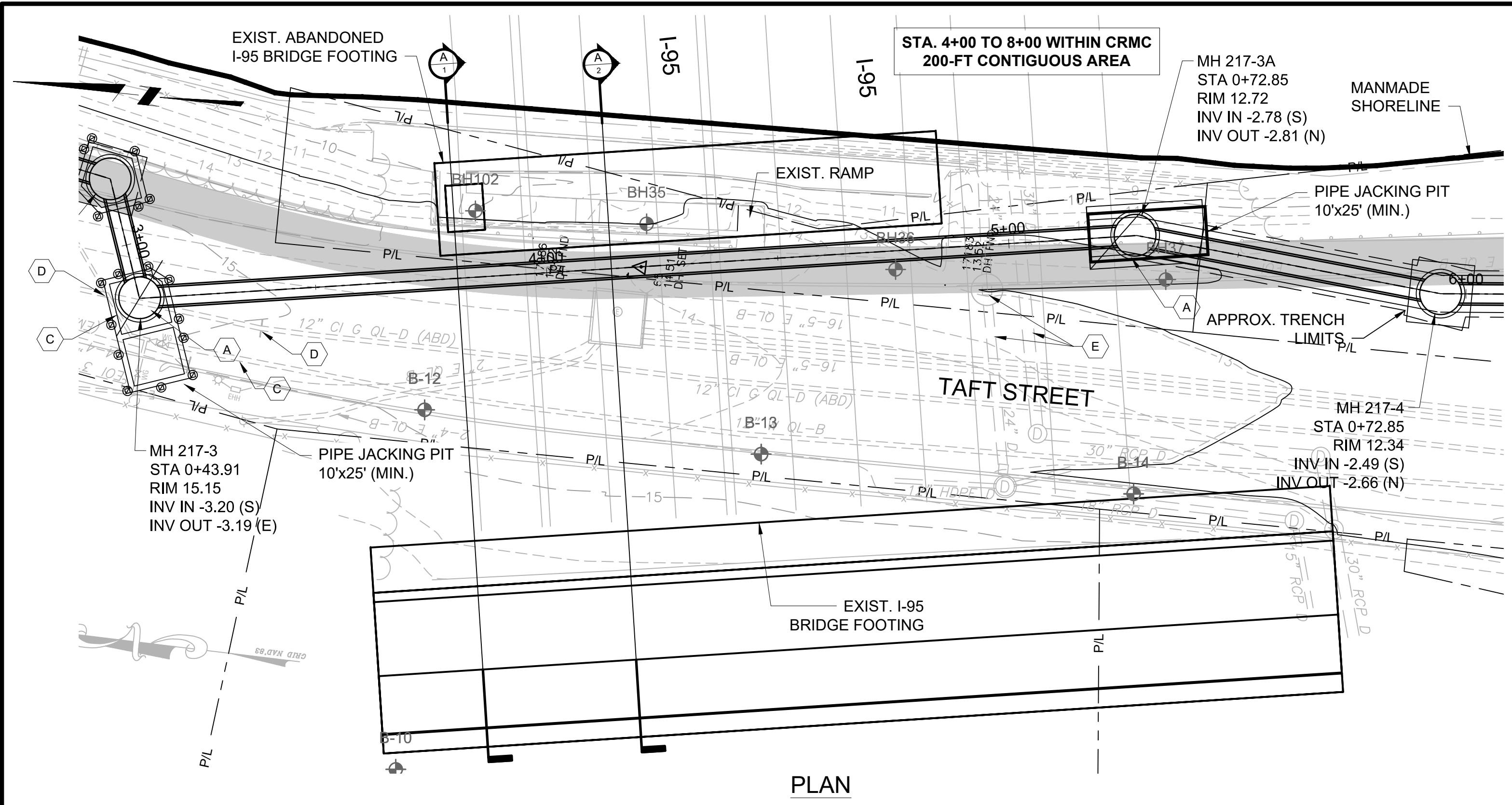
NBC CONTRACT NO 308.XXC
CIVIL
DROP SHAFT 213 CONSOLIDATION CONDUIT
PLAN AND PROFILE 4: STA 0+00 (S) - 4+00 (S)

SHEET
C-8
195130165

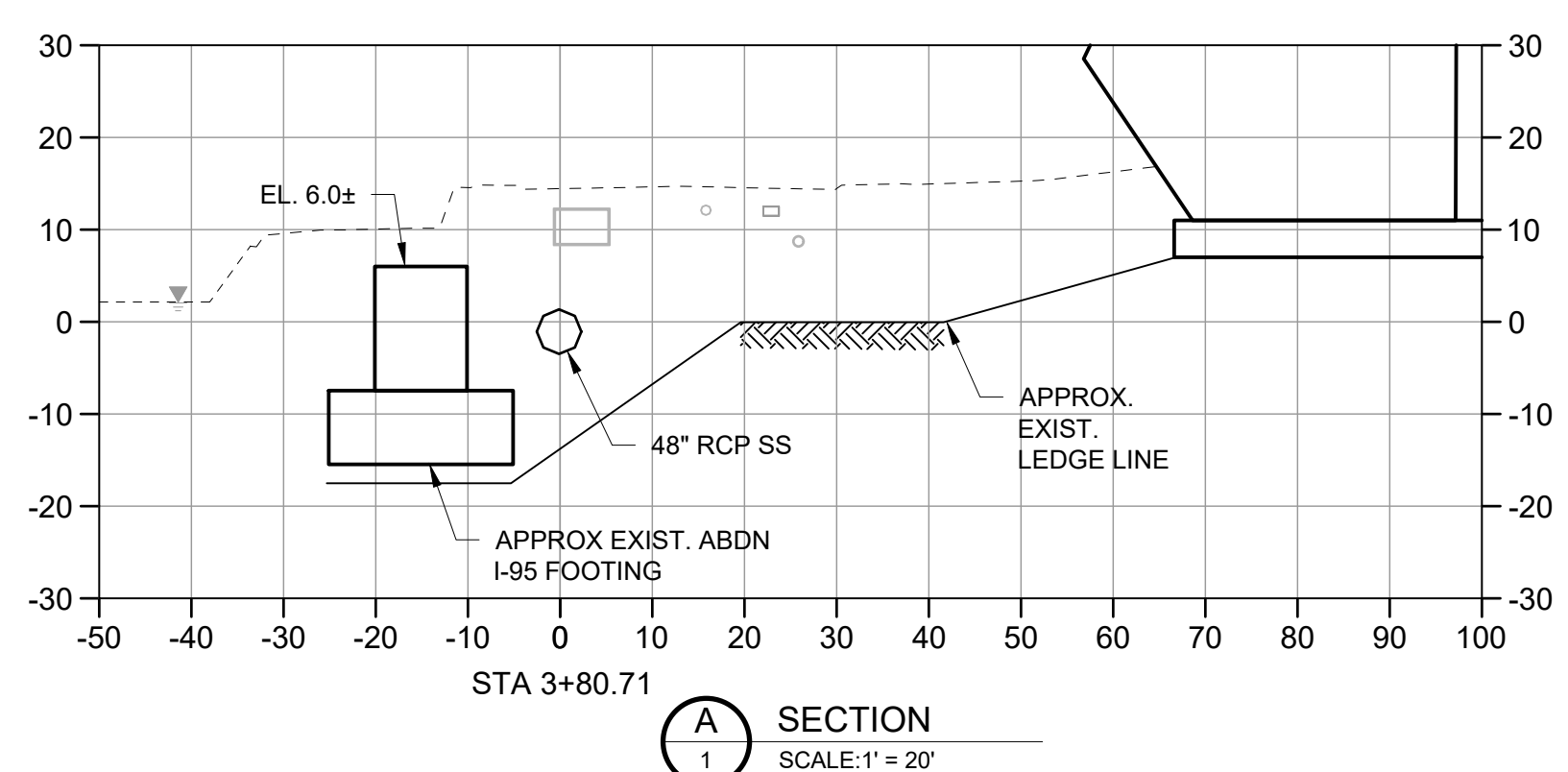
BY: JAMIE PAYNE

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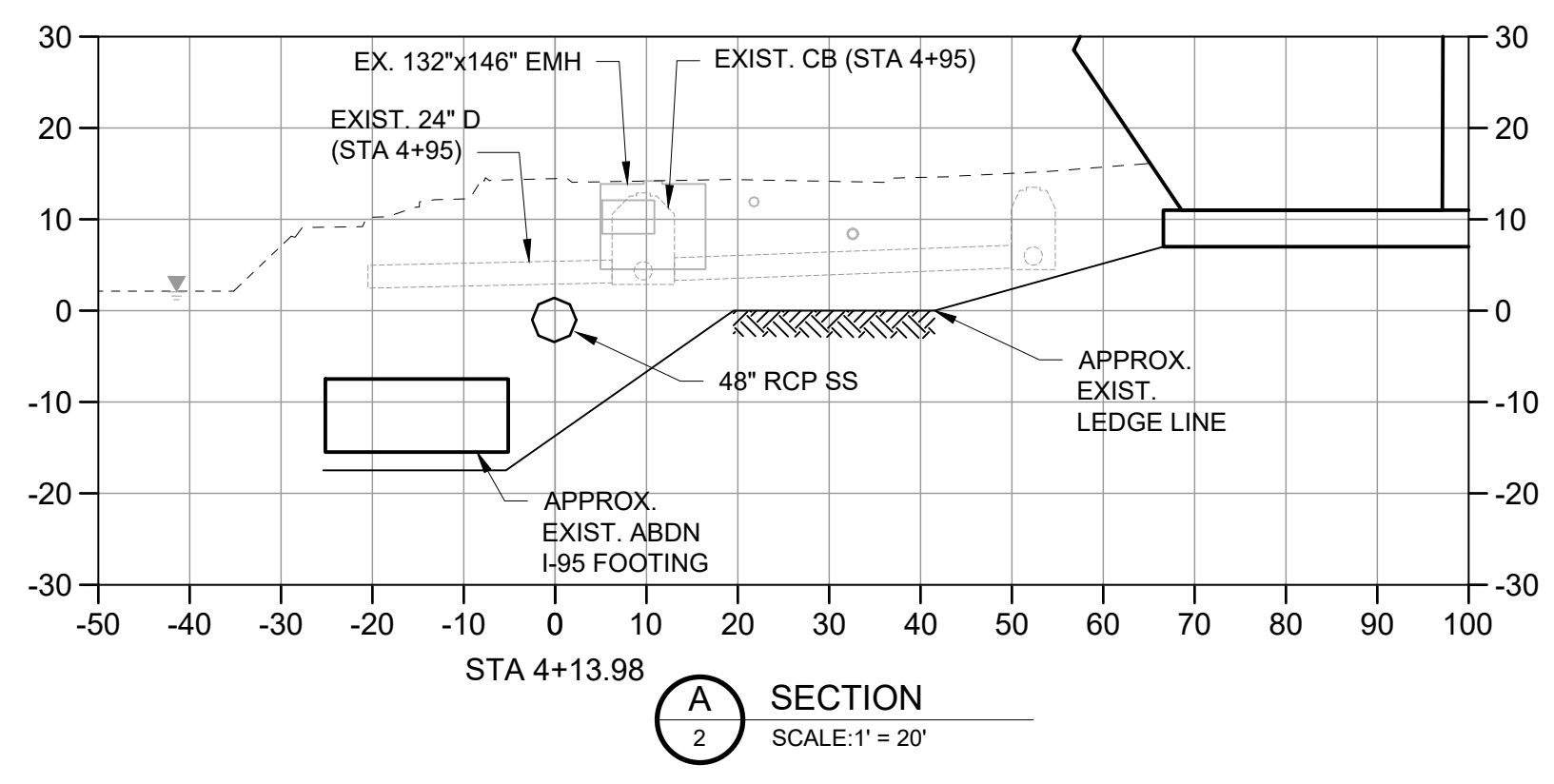
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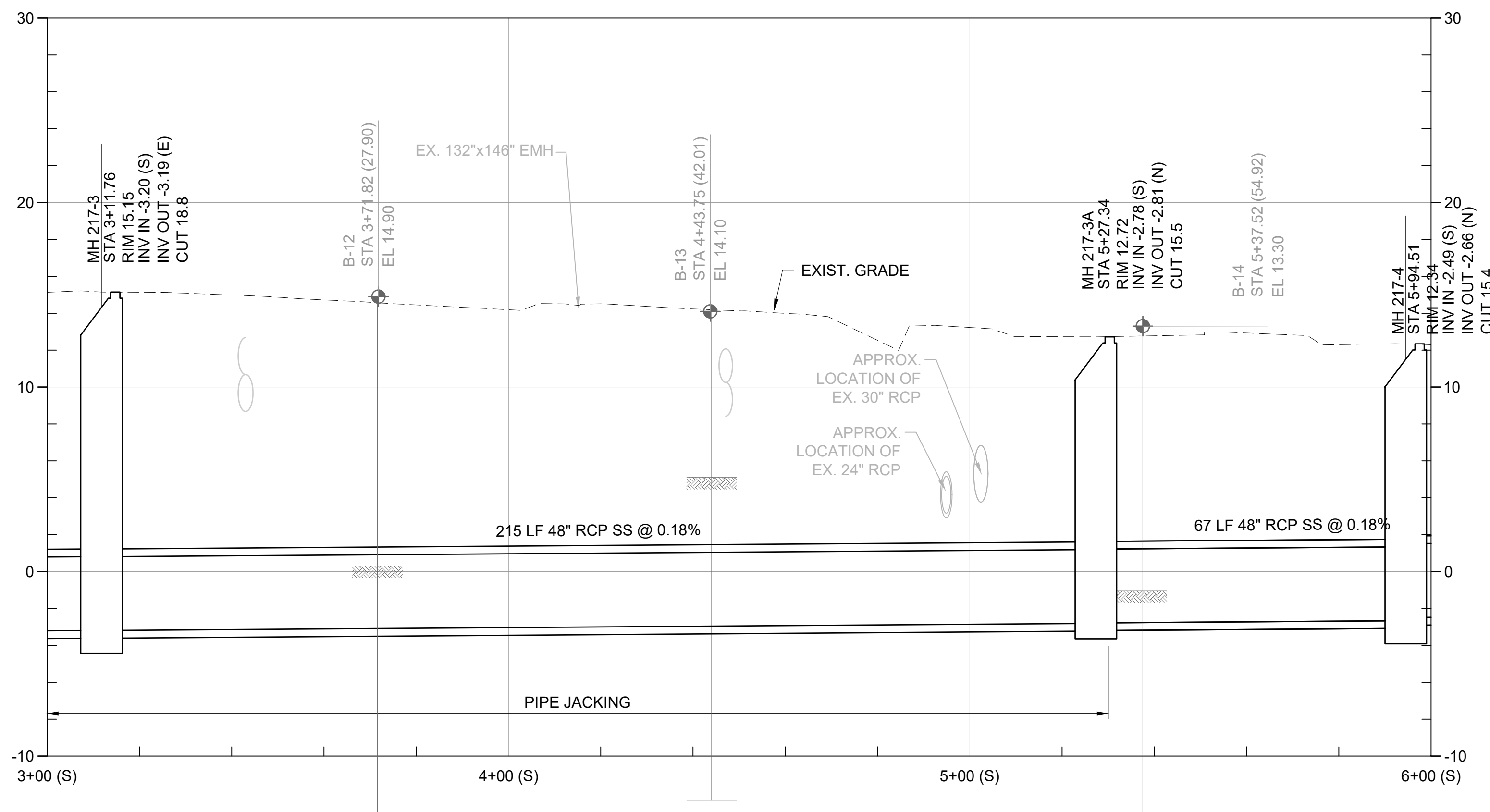
PLAN



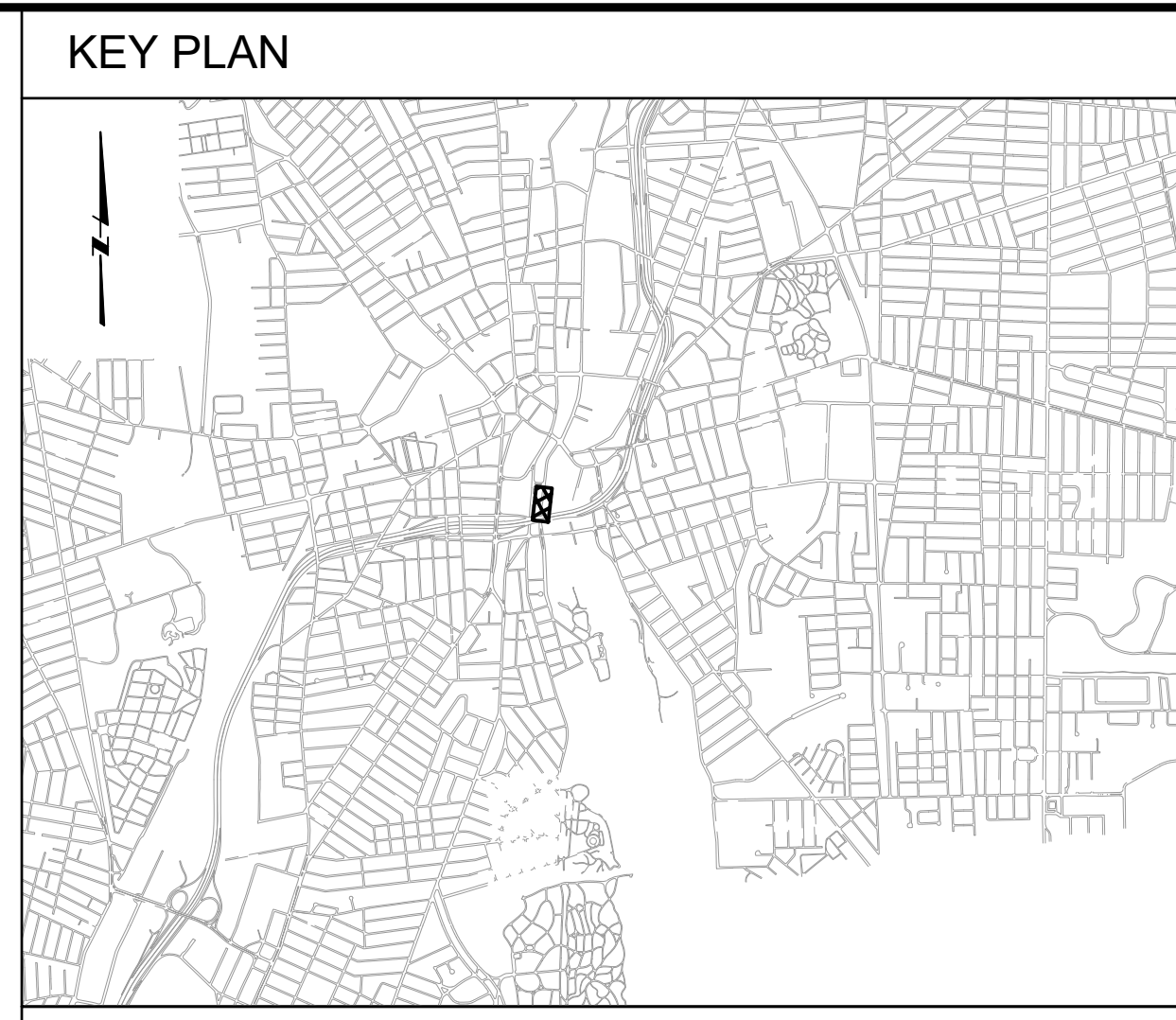
SECTION 1
SCALE: 1" = 20'



SECTION 2
SCALE: 1" = 20'



PROFILE



- GENERAL SHEET NOTES**
- SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
 - UTILITY INFORMATION DEPICTED, PROVIDED BY BSI ENGINEERING INC. QL-B.
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 - SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
 - CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GRAY SHADING FOR COORDINATION.

- SHEET KEYNOTES**
- A. PIPE JACKING: STATION 3+11 TO STATION 5+27
 - B. AREA TO RECEIVE GROUND IMPROVEMENT - CHEMICAL INJECTION
 - C. RELOCATE WATER MAIN: STATION 3+00 TO STATION 3+35
 - D. RETAINING WALL STABILIZATION - GROUT INJECTION
 - E. REMOVE AND REPLACE DRAIN AND CATCH BASIN FOR INSTALLATION OF CONSOLIDATION CONDUIT: STATION 4+97, STATION 5+05
 - F. COORDINATE WITH CITY AND NATIONAL GRID TO ISOLATE AND REMOVE ELECTRIC LIGHT POLE:
 - G. REMOVE AND REPLACE RETAINING WALL:
 - H. REMOVE AND DISPOSE ABANDONED GAS MAIN: STATION 3+00 TO STATION 3+40

REV	DATE	BY	DESCRIPTION

SCALE
H. SCALE 1"=20'
V. SCALE 1"=5'

WARNING
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CIVIL
DROP SHAFT 213 CONSOLIDATION CONDUIT
PLAN AND PROFILE 5: STA 3+00 (S) - 6+00 (S)

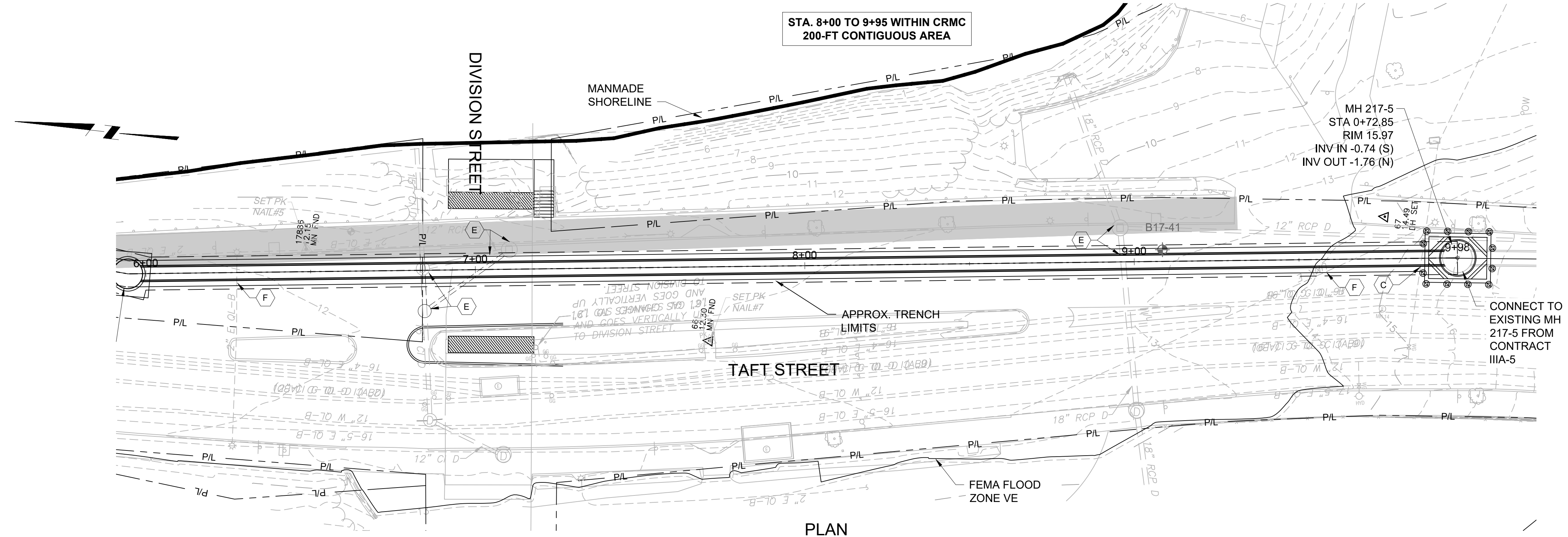
SHEET
C-9
195130165

BY: JAMIE PAYNE

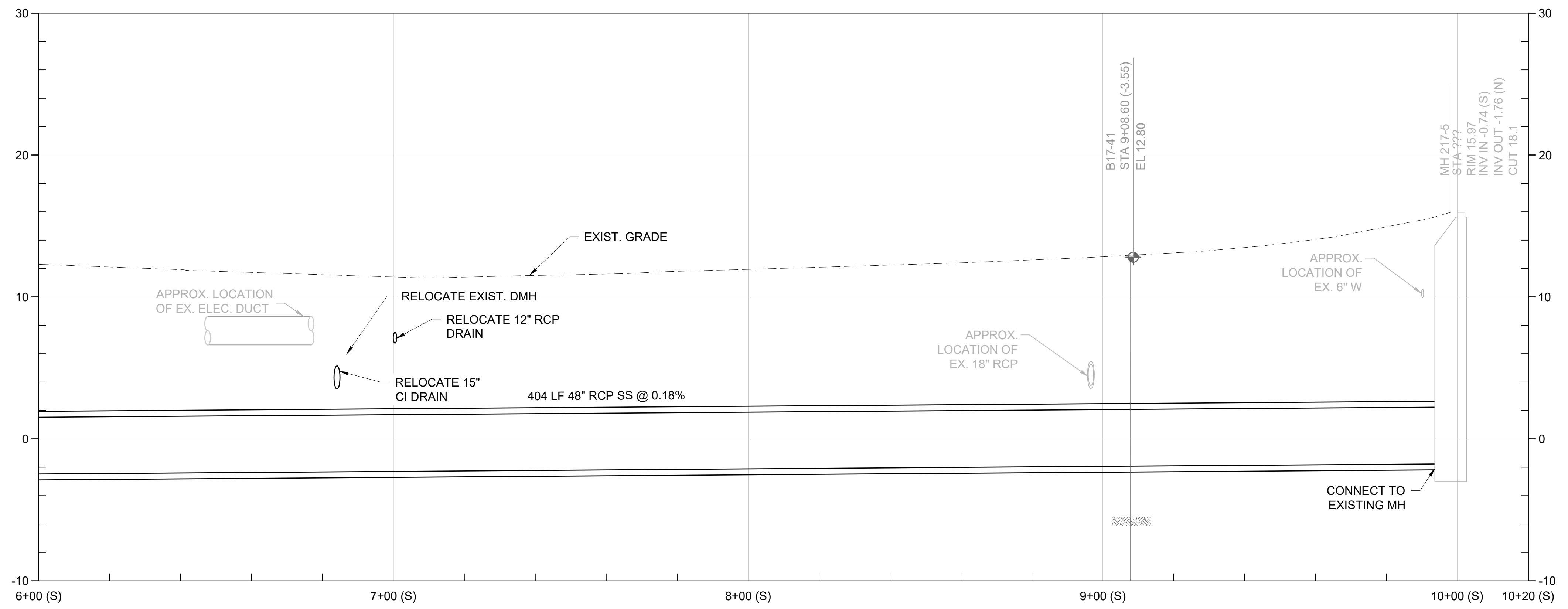
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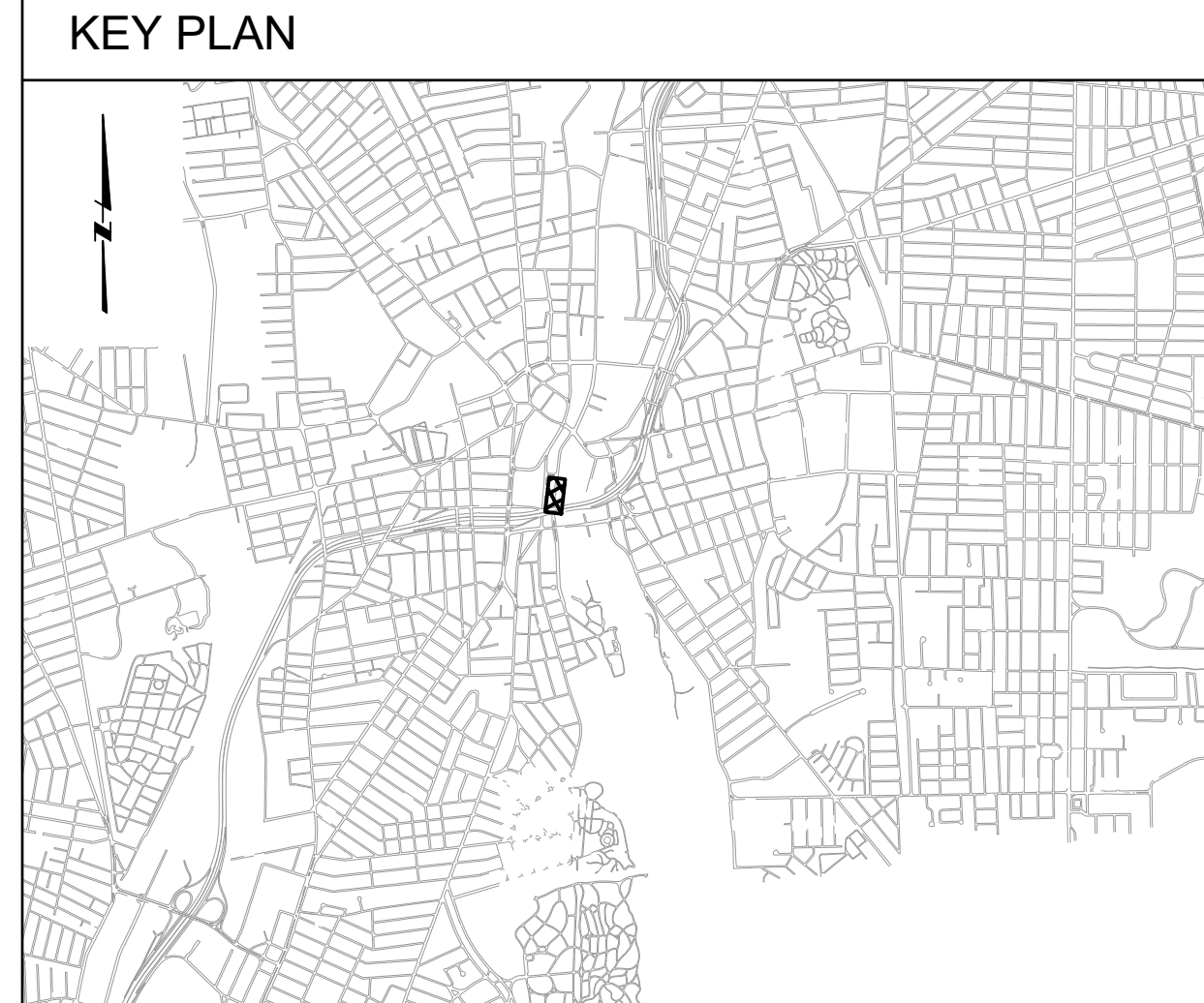
STA. 8+00 TO 9+95 WITHIN CRMC
200-FT CONTIGUOUS AREA



PLAN



PROFILE



GENERAL SHEET NOTES

1. SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
2. UTILITY INFORMATION DEPICTED, PROVIDED BY BSI ENGINEERING INC. QL-B.
3. FLOOD PLAIN INFORMATION IS FROM FEMA, PANEL NO. 44007C0194J. FLOOD PLAIN ELEVATIONS CONVERTED FROM VERTICAL DATUM NAVD 1988 TO NGVD 1929 AND ARE APPROXIMATELY:
 - NORTH OF DIVISION STREET BRIDGE: AE ELEVATION 12.8
 - SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
4. CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GRAY SHADING FOR COORDINATION.

SHEET KEYNOTES

- A. PIPE JACKING:
- B. AREA TO RECEIVE GROUND IMPROVEMENT - CHEMICAL INJECTION
- C. RELOCATE WATER MAIN: STATION 9+85 (HYDRANT SERVICE)
- D. RETAINING WALL STABILIZATION - GROUT INJECTION
- E. REMOVE AND REPLACE DRAIN AND CATCH BASIN FOR INSTALLATION OF CONSOLIDATION CONDUIT: STATION 6+80 TO STATION 7+10, STATION 8+95
- F. COORDINATE WITH CITY AND NATIONAL GRID TO ISOLATE AND REMOVE ELECTRIC LIGHT POLE: STATION 6+25 AND STATION 9+60
- G. REMOVE AND REPLACE RETAINING WALL:

REV	DATE	BY	DESCRIPTION

SCALE
H. SCALE 1"=20'
V. SCALE 1"=5'

WARNING
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED C. CRONIN
DRAWN B. MARINI
CHECKED C. CRONIN

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NBC CONTRACT NO 308.XXC
CIVIL
DROP SHAFT 213 CONSOLIDATION CONDUIT
PLAN AND PROFILE 6: STA 6+00 (S) - 10+00 (S)

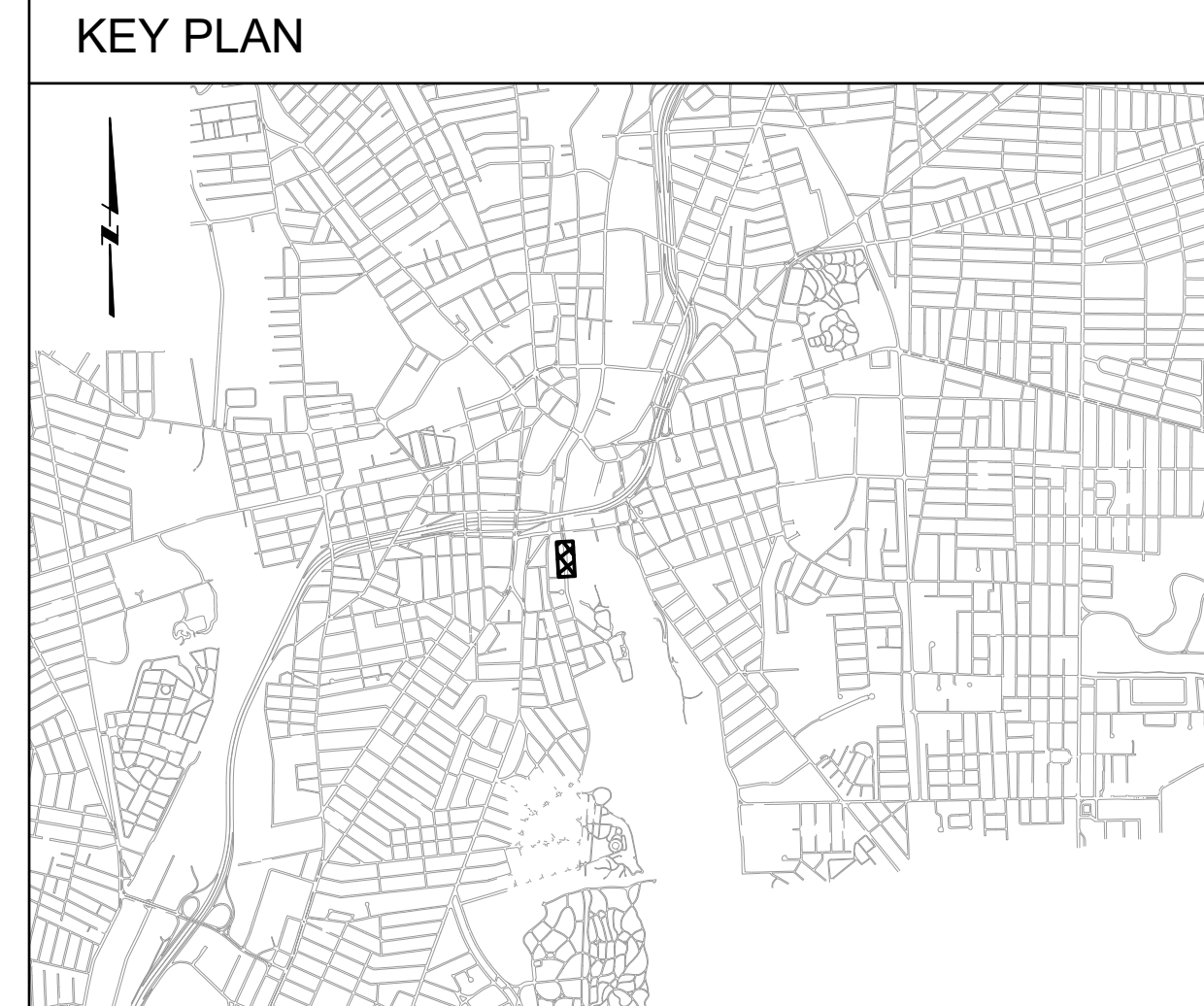
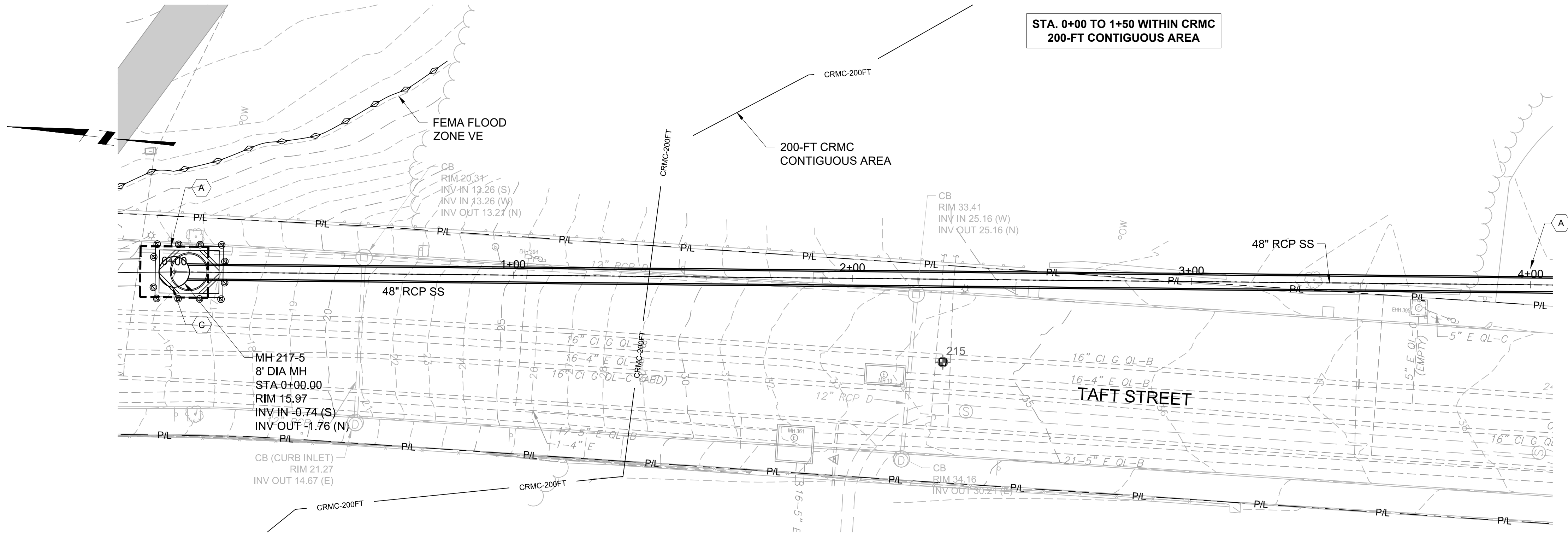
SHEET
C-10
195130165

BY: JAMIE PAYNE

PLOT DATE: Wednesday, March 25, 2020 5:07:35 PM

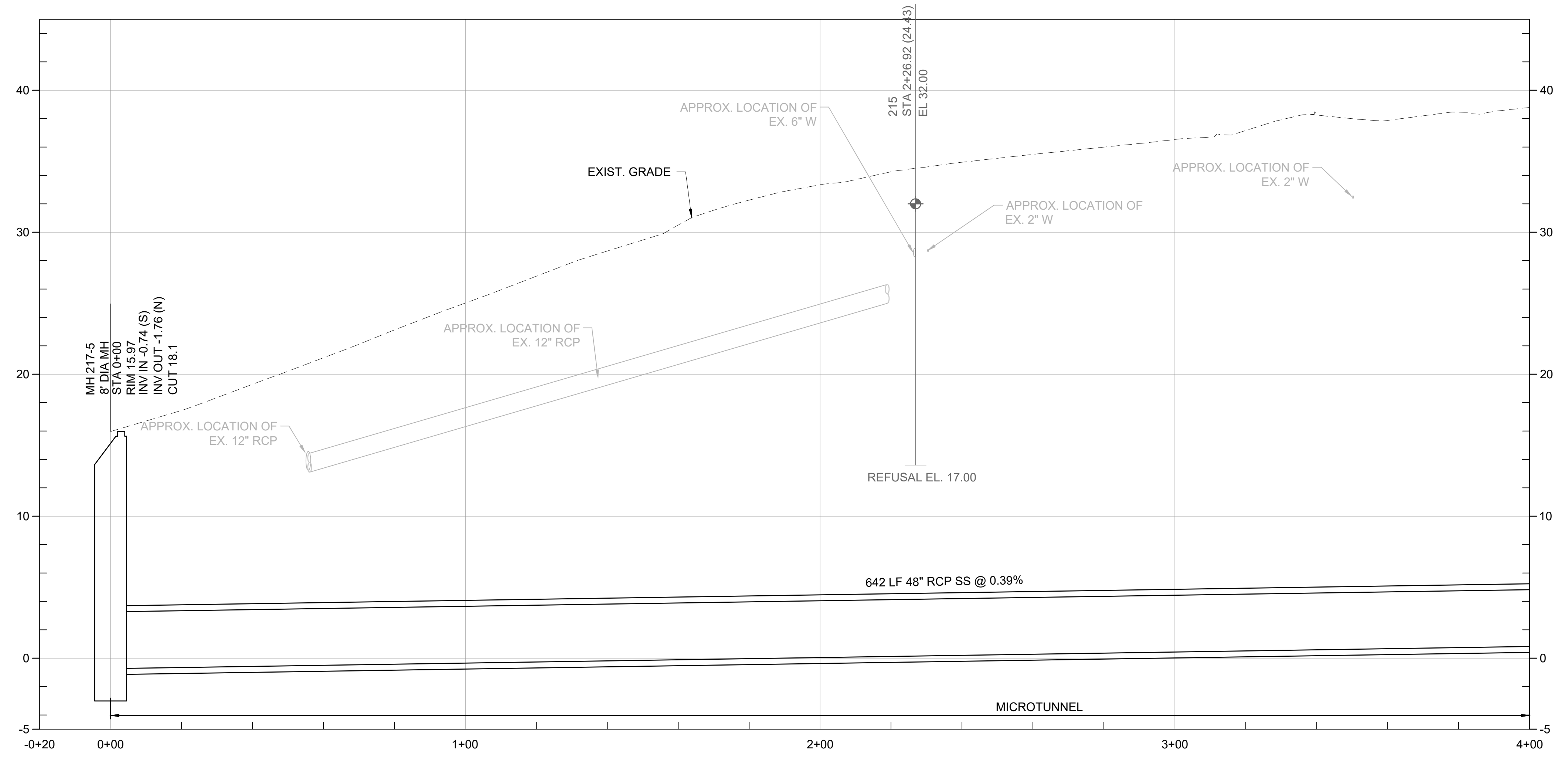
DWG FILE: C:\pwworkdir\6250964\PAWT_SITE_PLAN_&_PROFILE_IIA-5_ALT3.dwg

STA. 0+00 TO 1+50 WITHIN CRMC
200-FT CONTIGUOUS AREA



- GENERAL SHEET NOTES**
1. SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
 2. UTILITY INFORMATION DEPICTED, PROVIDED BY BSI ENGINEERING INC. QL-B.
 3. FLOOD PLAIN INFORMATION IS FROM FEMA, PANEL NO. 44007C0307J. FLOOD PLAIN ELEVATIONS CONVERTED FROM VERTICAL DATUM NAVD 1988 TO NGVD 1929 AND ARE APPROXIMATELY:
 - NORTH OF DIVISION STREET BRIDGE: AE ELEVATION 12.8
 - SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
 4. CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GREY SHADING FOR COORDINATION.

- SHEET KEYNOTES**
- A. MICROTUNNEL: STATION 0+00 TO STATION 4+00
 - B. RELOCATE WATER MAIN:
 - C. EXCAVATION FOR MH 217-5 TO BE CONSTRUCTED AS RECEIVING PIT FOR MICROTUNNEL OPERATION



REV	DATE	BY	DESCRIPTION

SCALE
H. SCALE 1" = 20'
V. SCALE 1" = 5'

WARNING
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED: C. CRONIN
DRAWN: B. MARINI
CHECKED: C. CRONIN

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PHASE III COMBINED SEWER
OVERFLOW PROGRAM

NBC CONTRACT NO 308.XXC
CIVIL

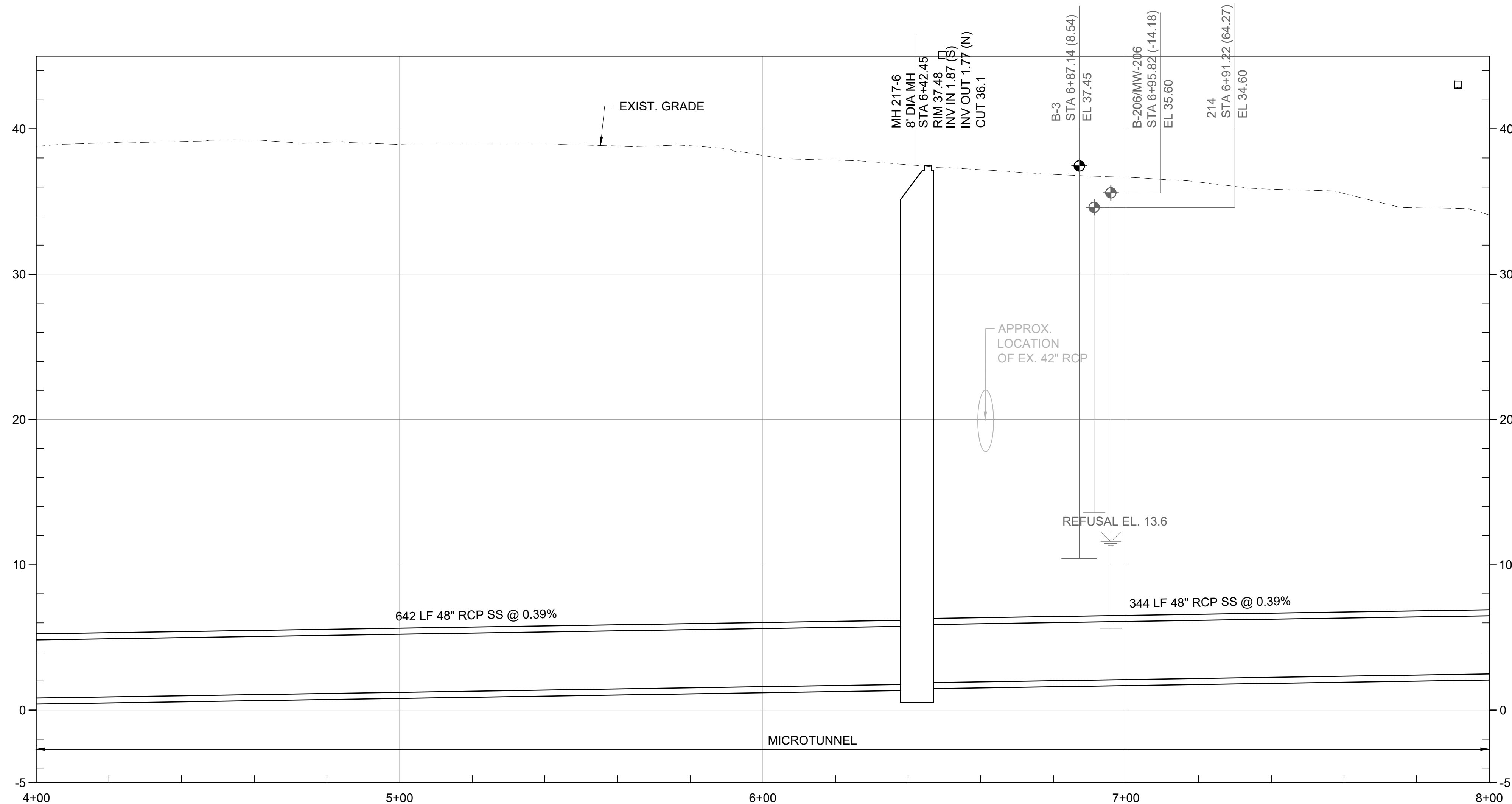
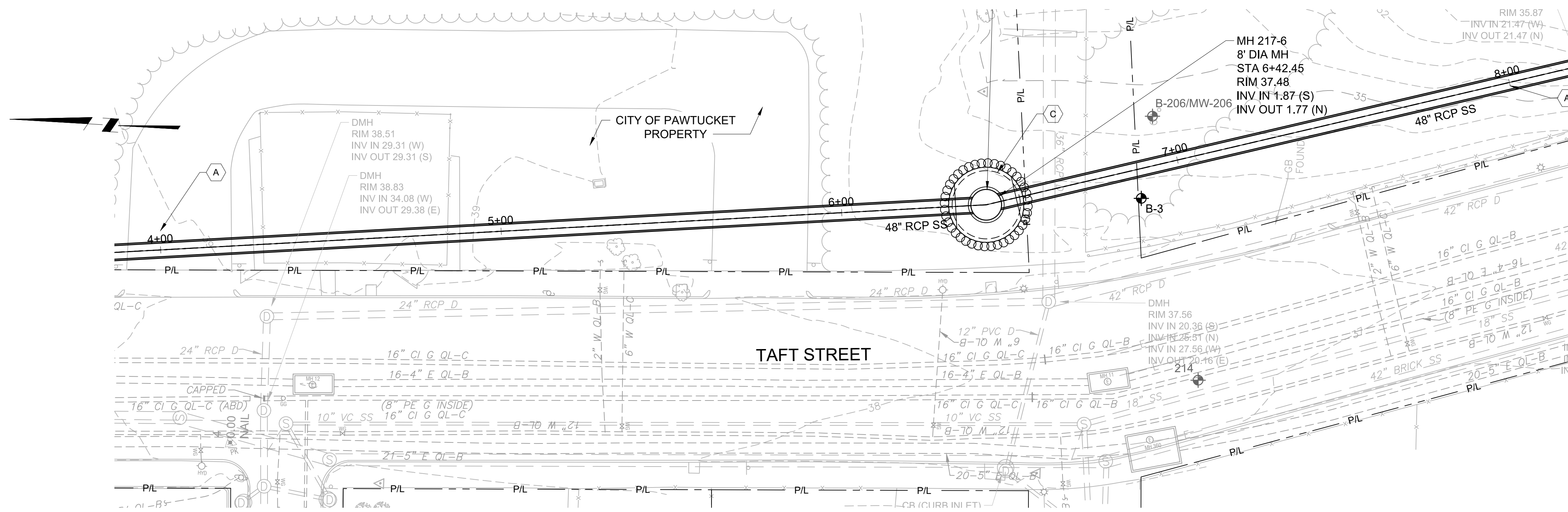
OF-217 CONSOLIDATION CONDUIT
PLAN AND PROFILE 1: STA 0+00 - 4+00

SHEET
C-4
195130165

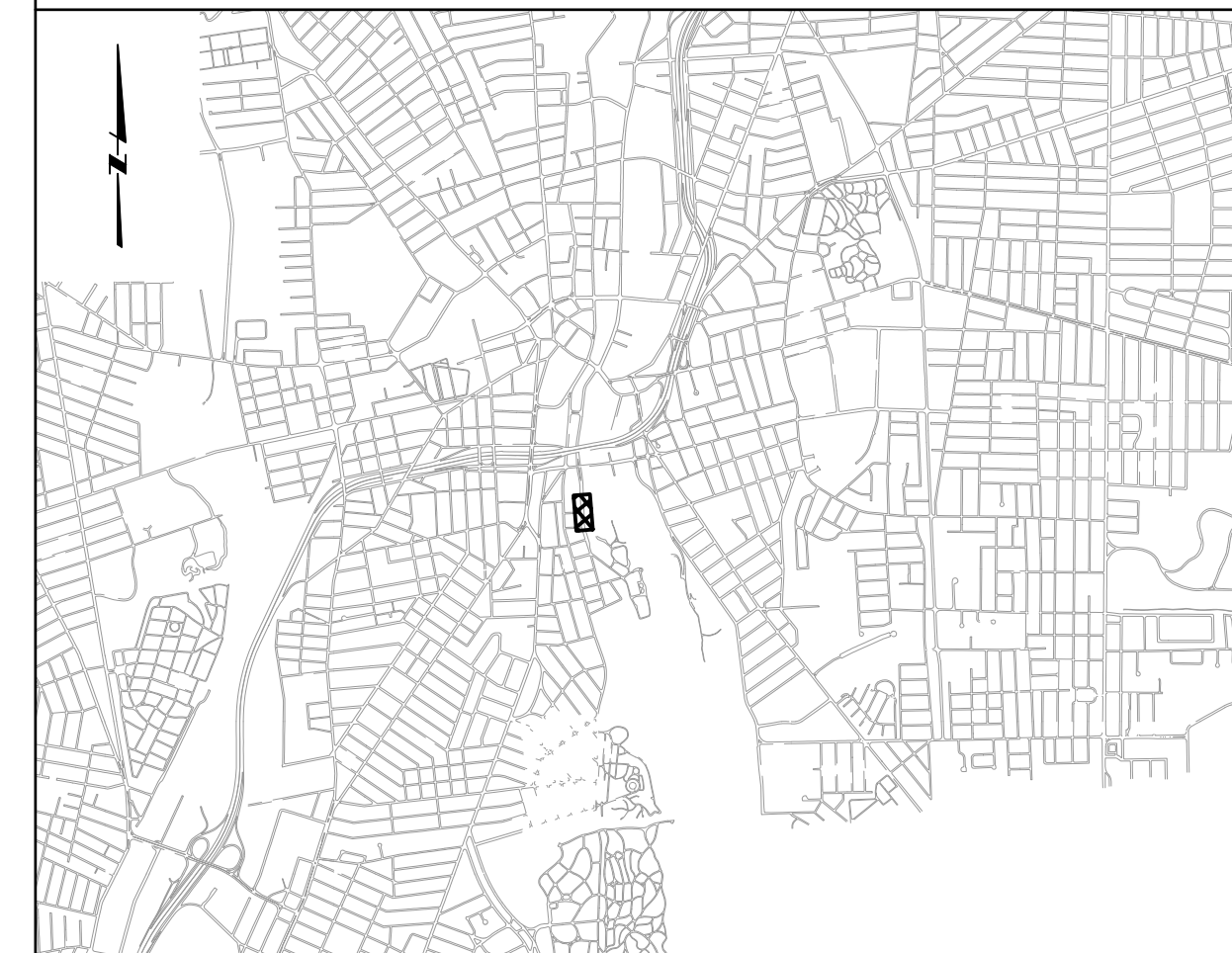
BY: JAMIE PAYNE

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DWG FILE: C:\pwworkdir\6250964\PAWT_SITE_PLAN & PROFILE_IIA-5_ALT3.dwg



KEY PLAN



GENERAL SHEET NOTES

1. SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
2. UTILITY INFORMATION DEPICTED, PROVIDED BY BSI ENGINEERING INC. QL-B.
3. FLOOD PLAIN INFORMATION IS FROM FEMA, PANEL NO. 44007C0307J. FLOOD PLAIN ELEVATIONS CONVERTED FROM VERTICAL DATUM NAVD 1988 TO NGVD 1929 AND ARE APPROXIMATELY:
 - NORTH OF DIVISION STREET BRIDGE: AE ELEVATION 12.8
 - SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
4. CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GREY SHADING FOR COORDINATION.

SHEET KEYNOTES

- A. MICROTUNNEL: STATION 4+00 TO STATION 8+00
- B. RELOCATE WATER MAIN:
- C. EXCAVATION FOR MH 217-6 TO BE CONSTRUCTED AS DRIVING AND RECEIVING PIT IN SUPPORT OF MICROTUNNEL OPERATION

REV	DATE	BY	DESCRIPTION

SCALE	WARNING
H. SCALE 1" = 20'	0 1/2 1
V. SCALE 1" = 5'	IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED	C. CRONIN
DRAWN	B. MARINI
CHECKED	C. CRONIN

30% DESIGN PHASE - APRIL 2020

NOT FOR CONSTRUCTION

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NARRAGANSETT BAY COMMISSION
PHASE III COMBINED SEWER
OVERFLOW PROGRAM

NBC CONTRACT NO 308.XXC
CIVIL

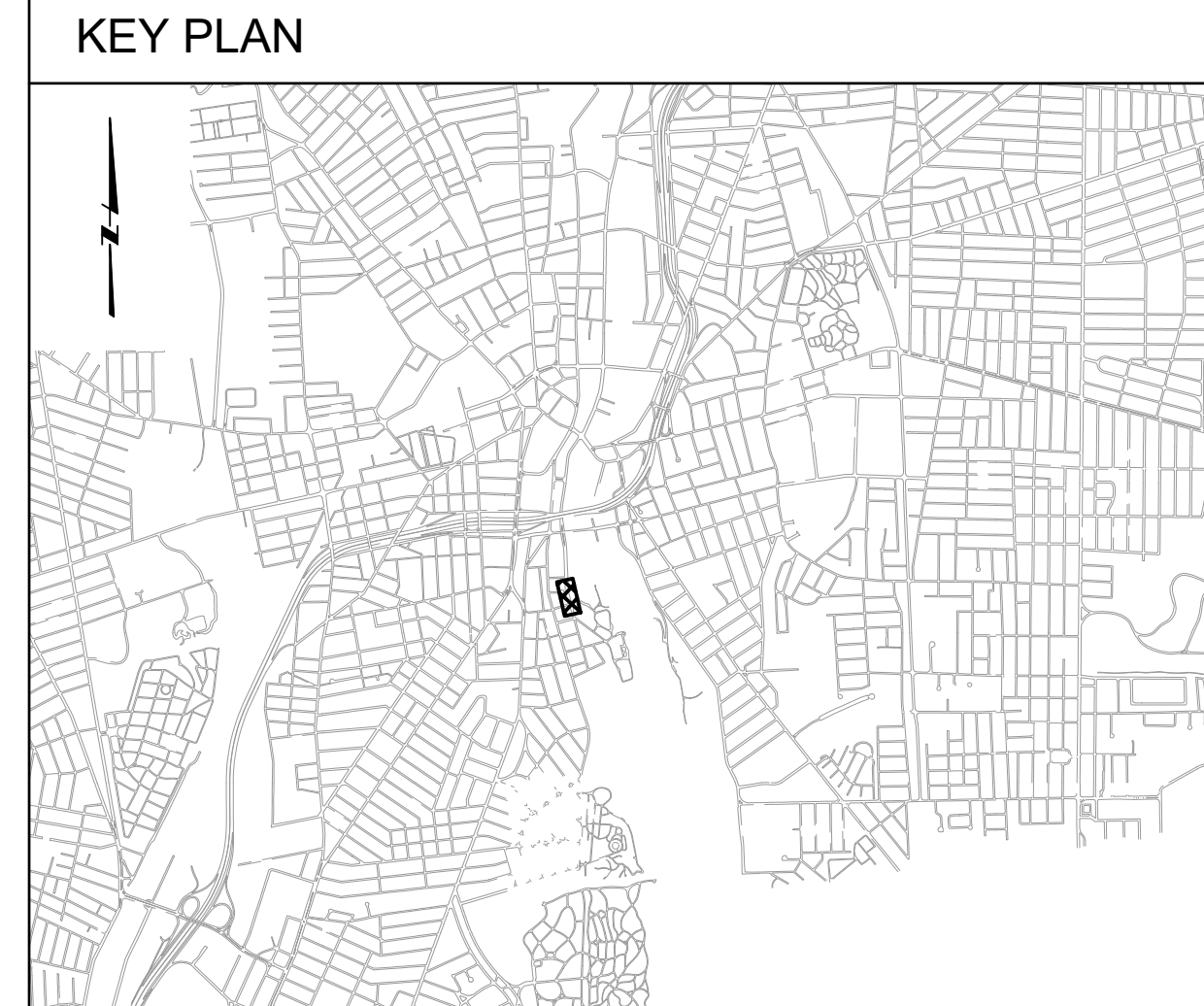
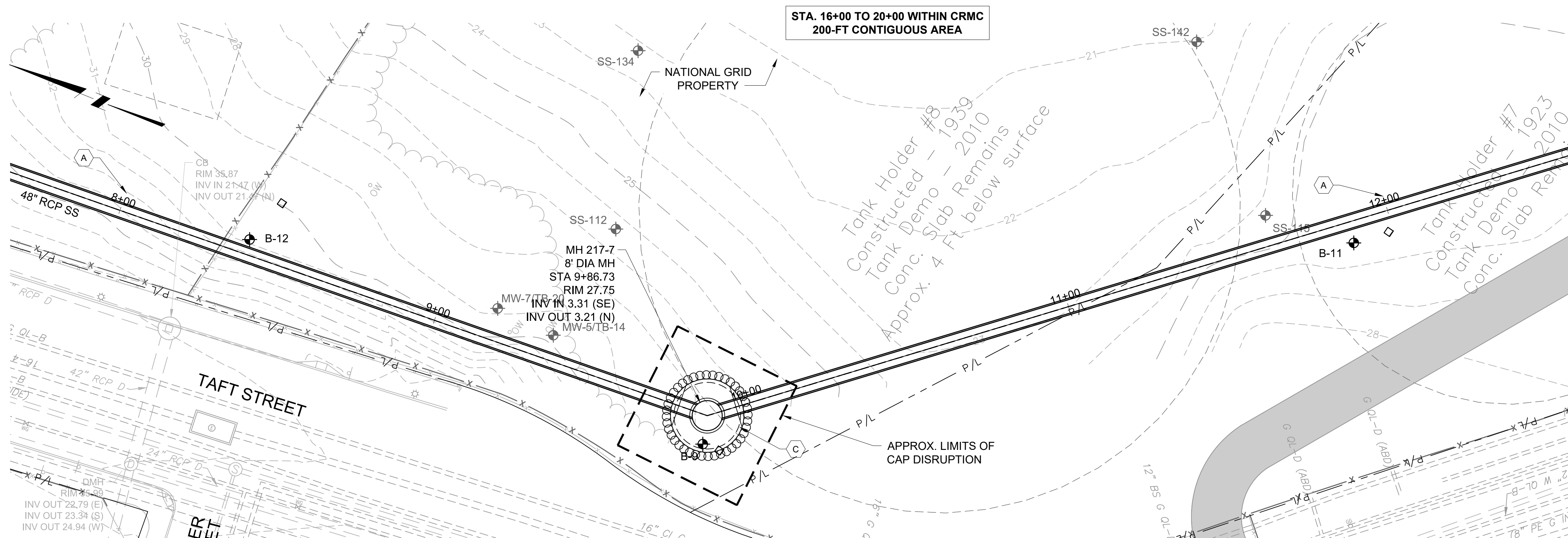
OF-217 CONSOLIDATION CONDUIT
PLAN AND PROFILE 2: STA 4+00 - 8+00

SHEET
C-5
195130165

BY: JAMIE PAYNE

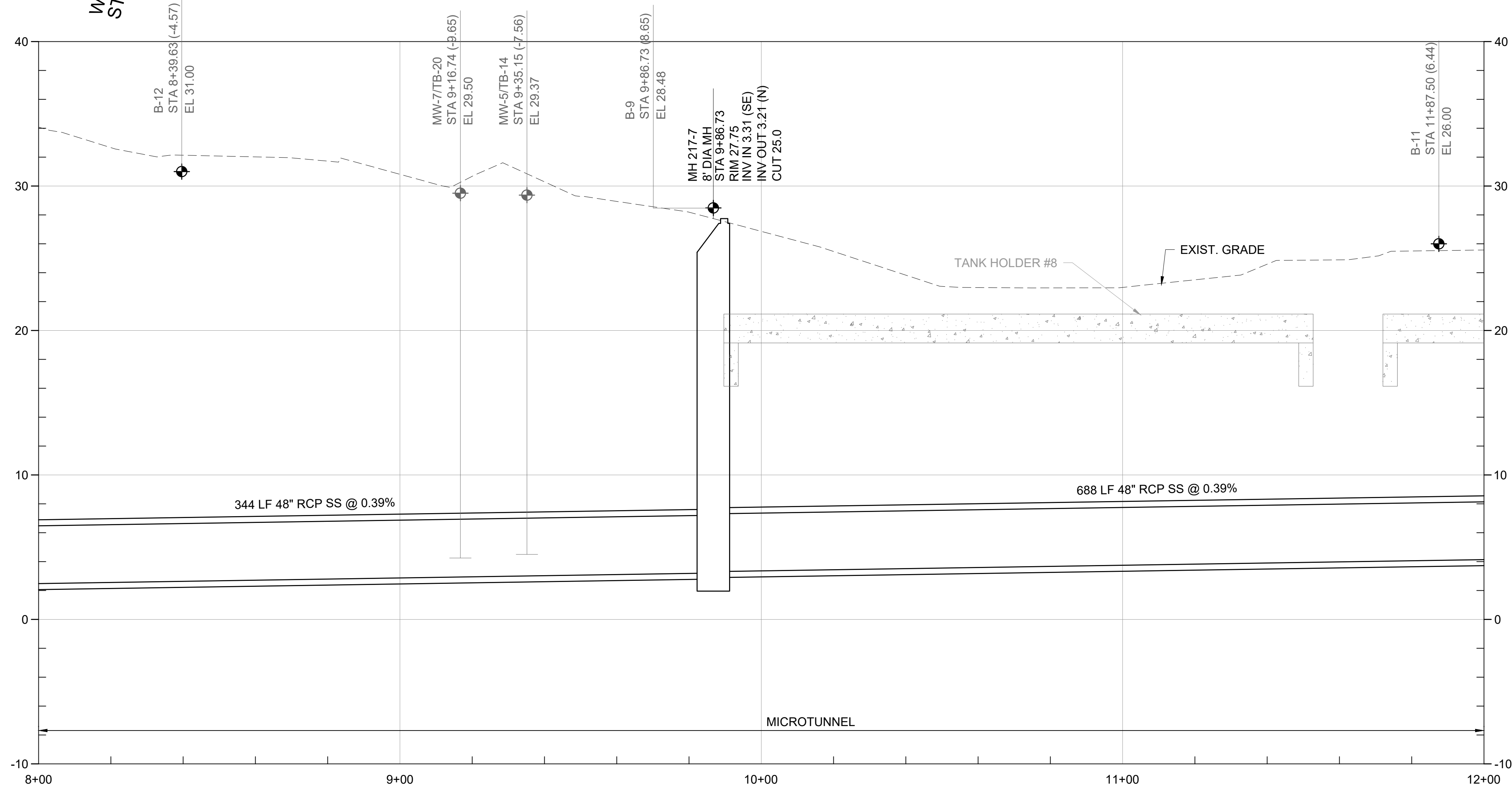
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- GENERAL SHEET NOTES**
1. SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
 2. UTILITY INFORMATION DEPICTED, PROVIDED BY BSI ENGINEERING INC. QL-B.
 3. FLOOD PLAIN INFORMATION IS FROM FEMA, PANEL NO. 44007C0307J. FLOOD PLAIN ELEVATIONS CONVERTED FROM VERTICAL DATUM NAVD 1988 TO NGVD 1929 AND ARE APPROXIMATELY:
 - NORTH OF DIVISION STREET BRIDGE: AE ELEVATION 12.8
 - SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
 4. WORK IS IN PROPERTY OWNED BY NATIONAL GRID
 5. CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GREY SHADING FOR COORDINATION.

- SHEET KEYNOTES**
- A. MICROTUNNEL: STATION 16+00 TO STATION 20+00
 - B. RELOCATE WATER MAIN:
 - C. EXCAVATION FOR MH 217-7 TO BE CONSTRUCTED AS DRIVING AND RECEIVING PITS IN SUPPORT OF MICROTUNNEL OPERATION



REV	DATE	BY	DESCRIPTION

SCALE
 H. SCALE 1" = 20'
 V. SCALE 1" = 5'

WARNING
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED: C. CRONIN
 DRAWN: B. MARINI
 CHECKED: C. CRONIN

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 PHASE III COMBINED SEWER OVERFLOW PROGRAM



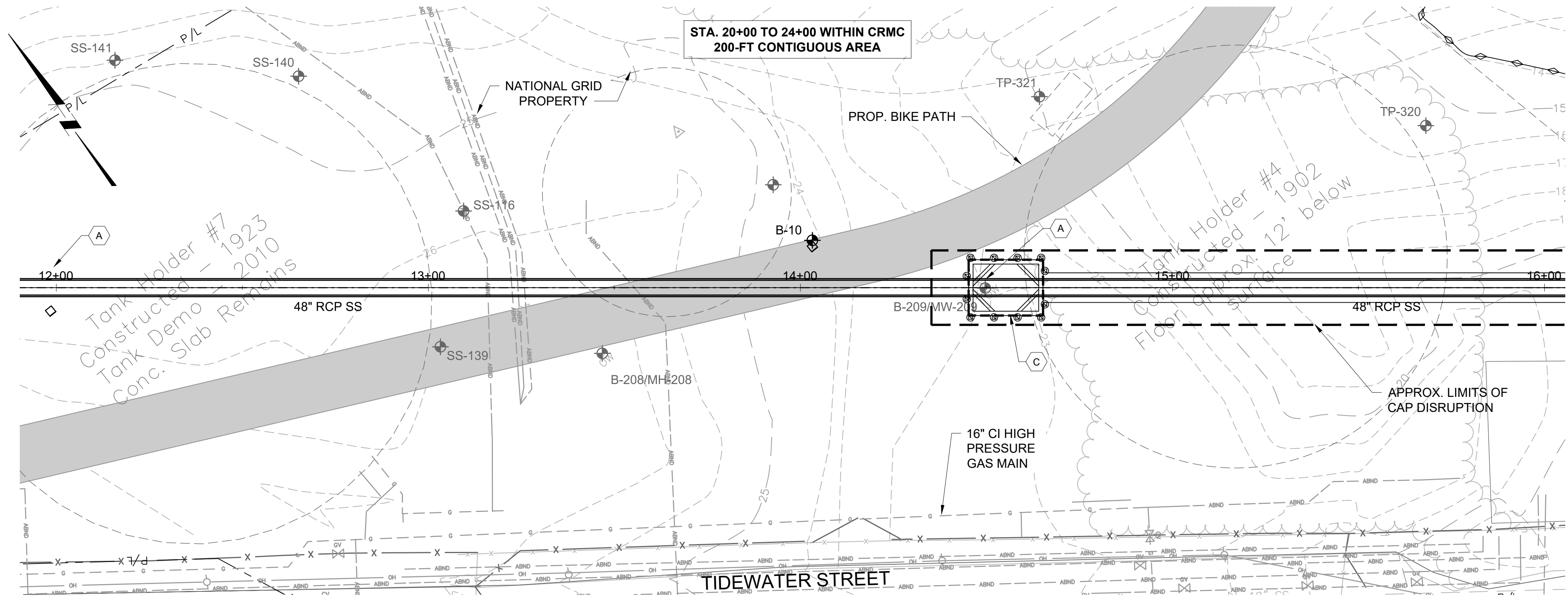
NBC CONTRACT NO 308.XXC
 CIVIL
 OF-217 CONSOLIDATION CONDUIT
 PLAN AND PROFILE 3: STA 8+00 - 12+00

SHEET
 C-6
 195130165

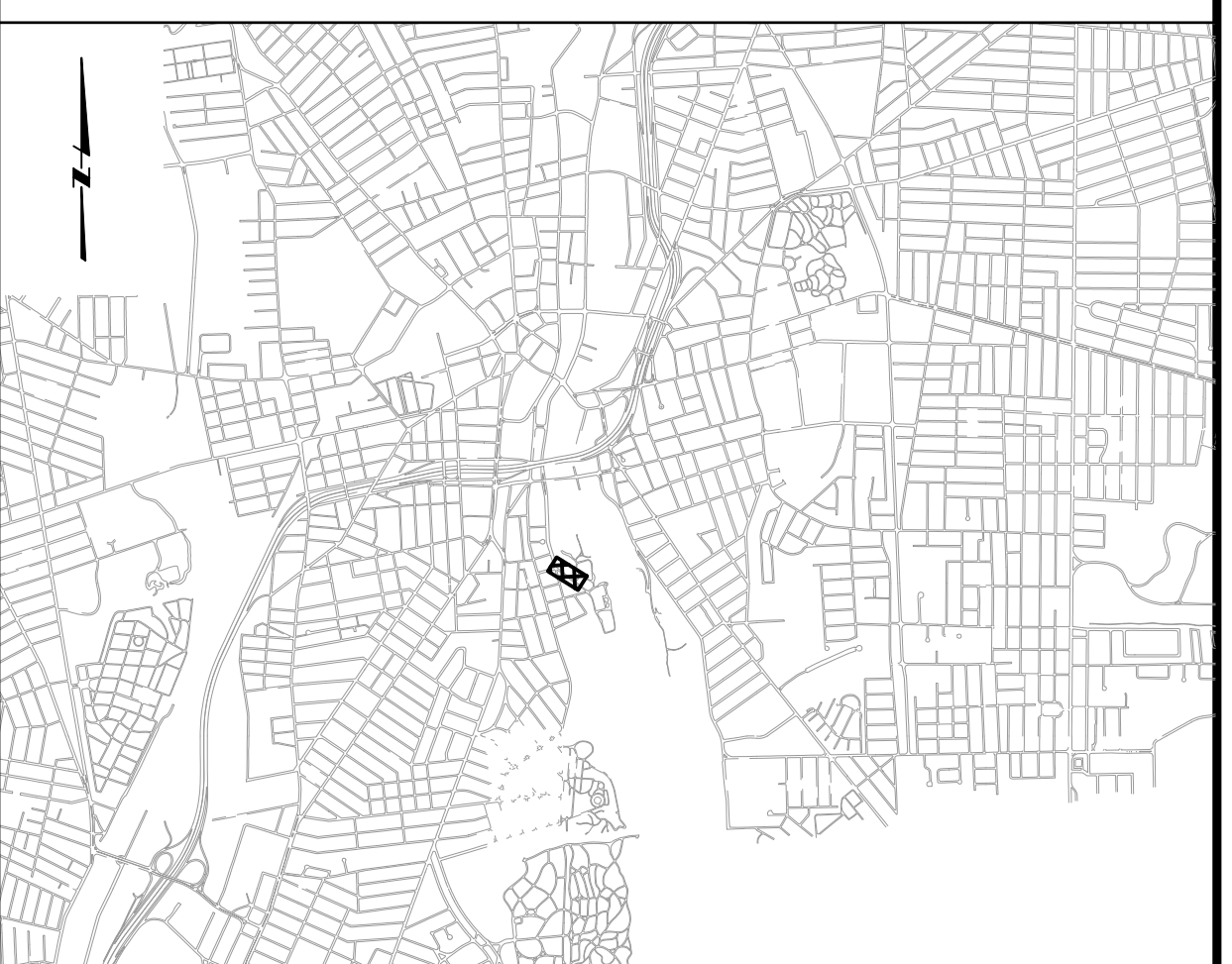
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KEY PLAN

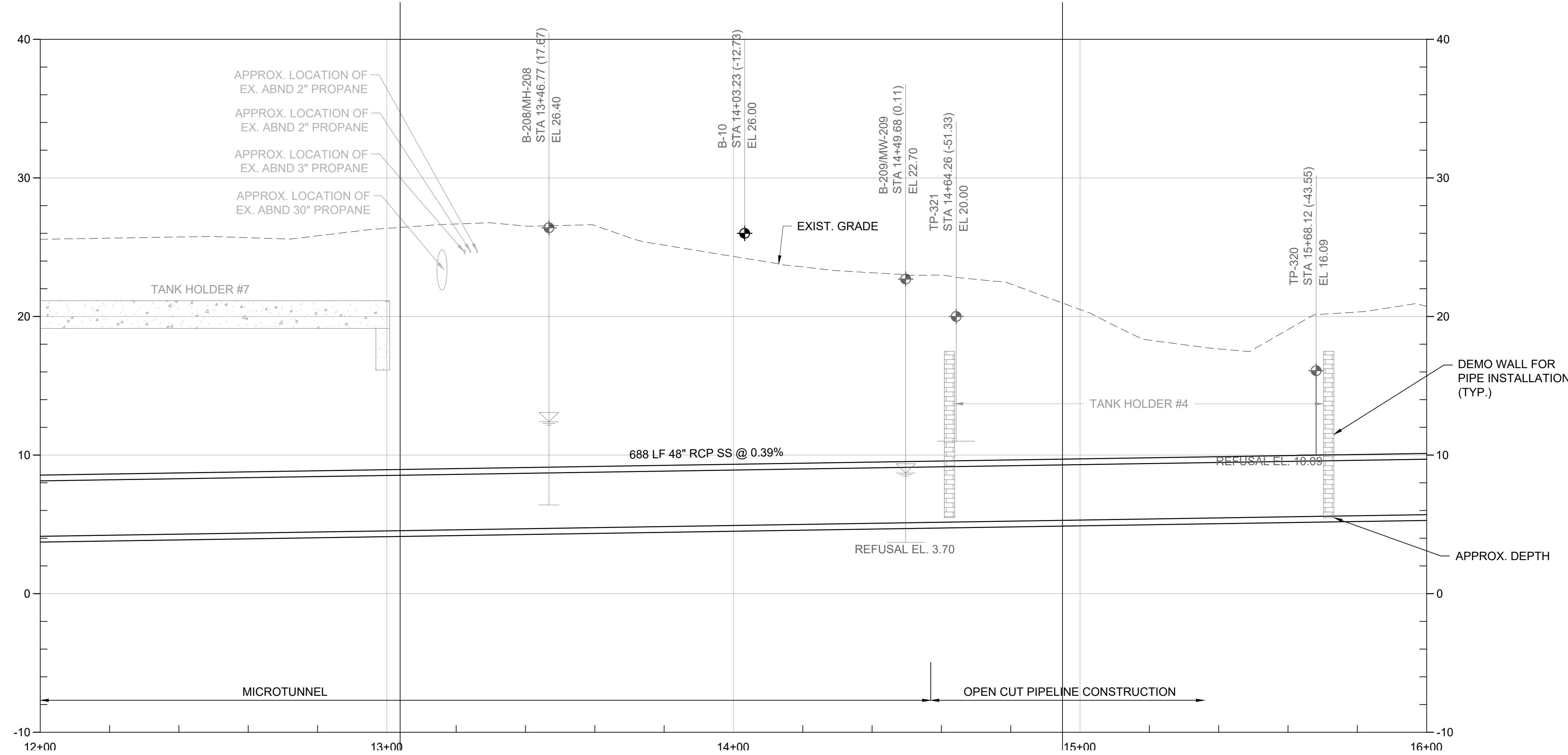


GENERAL SHEET NOTES

1. SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
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 - NORTH OF DIVISION STREET BRIDGE: AE ELEVATION 12.8
 - SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
4. WORK IS IN PROPERTY OWNED BY NATIONAL GRID
5. CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GREY SHADING FOR COORDINATION.

SHEET KEYNOTES

- A. MICROTUNNEL: STATION 12+00 TO STATION 14+50
- B. RELOCATE WATER MAIN:
- C. EXCAVATION AT 14+50 TO BE CONSTRUCTED AS RECEIVING PIT IN SUPPORT OF MICROTUNNEL OPERATION



REV	DATE	BY	DESCRIPTION

SCALE
 H. SCALE 1" = 20'
 V. SCALE 1" = 5'

WARNING
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED C. CRONIN
 DRAWN B. MARINI
 CHECKED C. CRONIN

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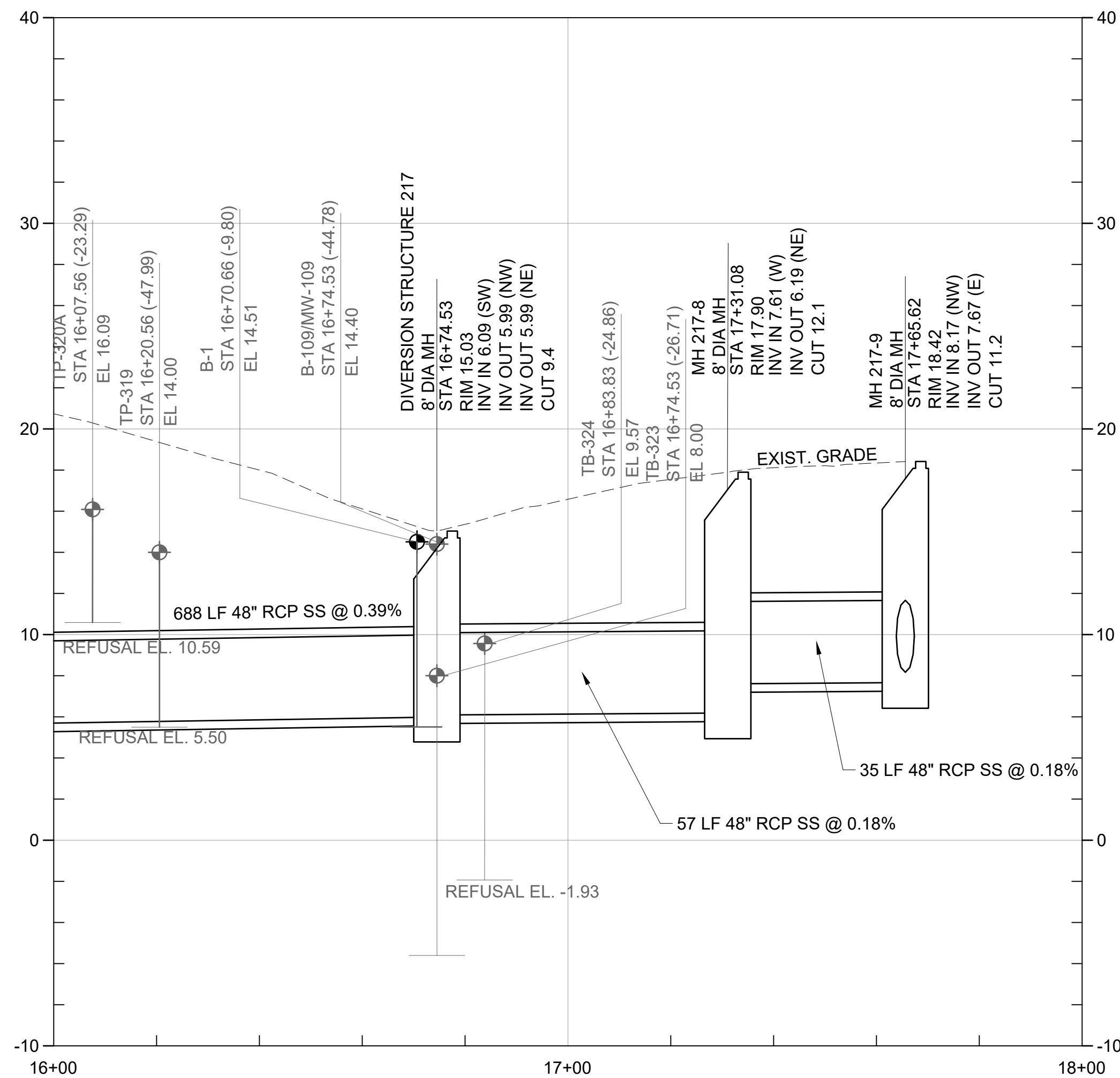
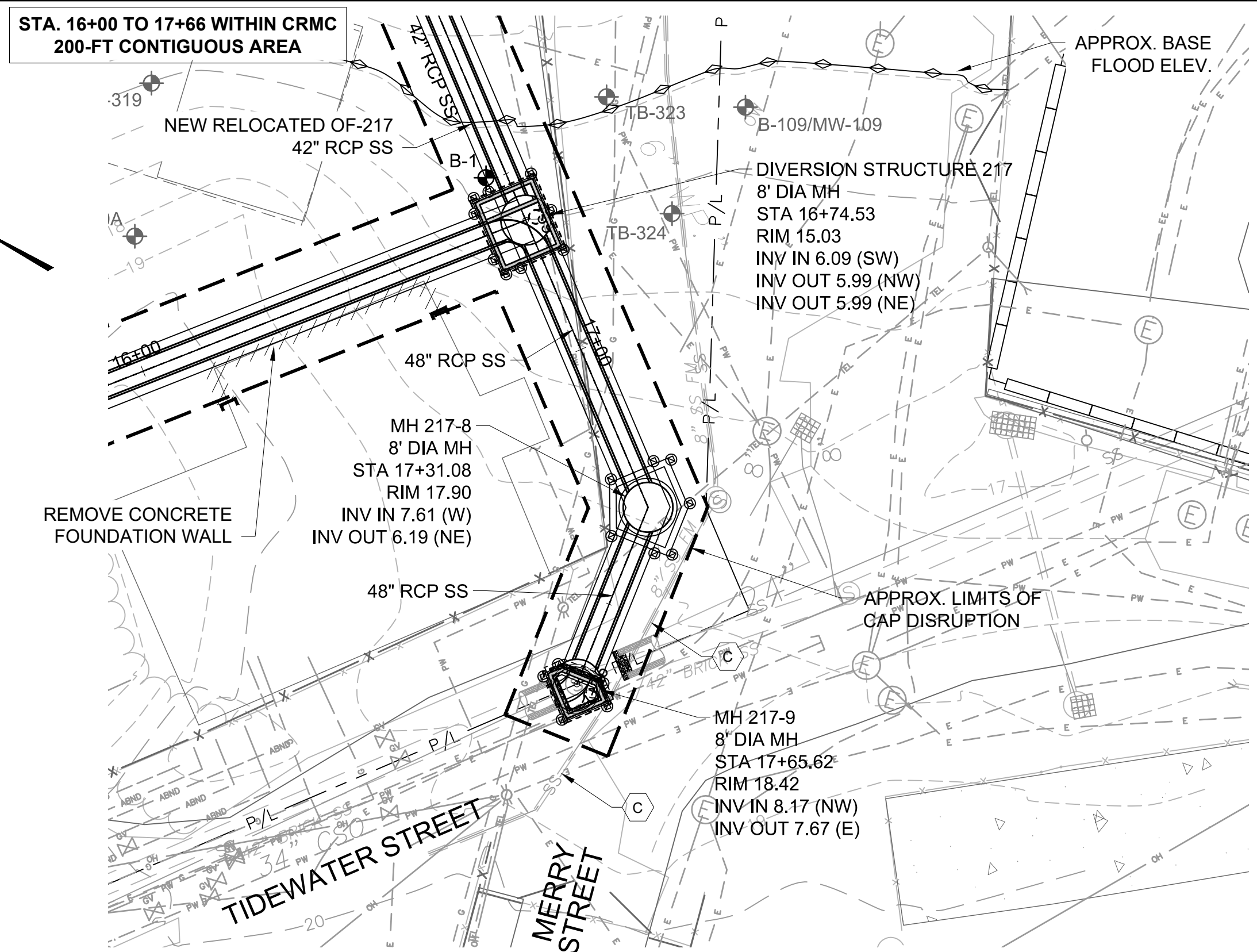
NBC CONTRACT NO 308.XXC
 CIVIL
 OF-217 CONSOLIDATION CONDUIT
 PLAN AND PROFILE 4: STA 12+00 - 16+00

SHEET
 C-7
 195130165

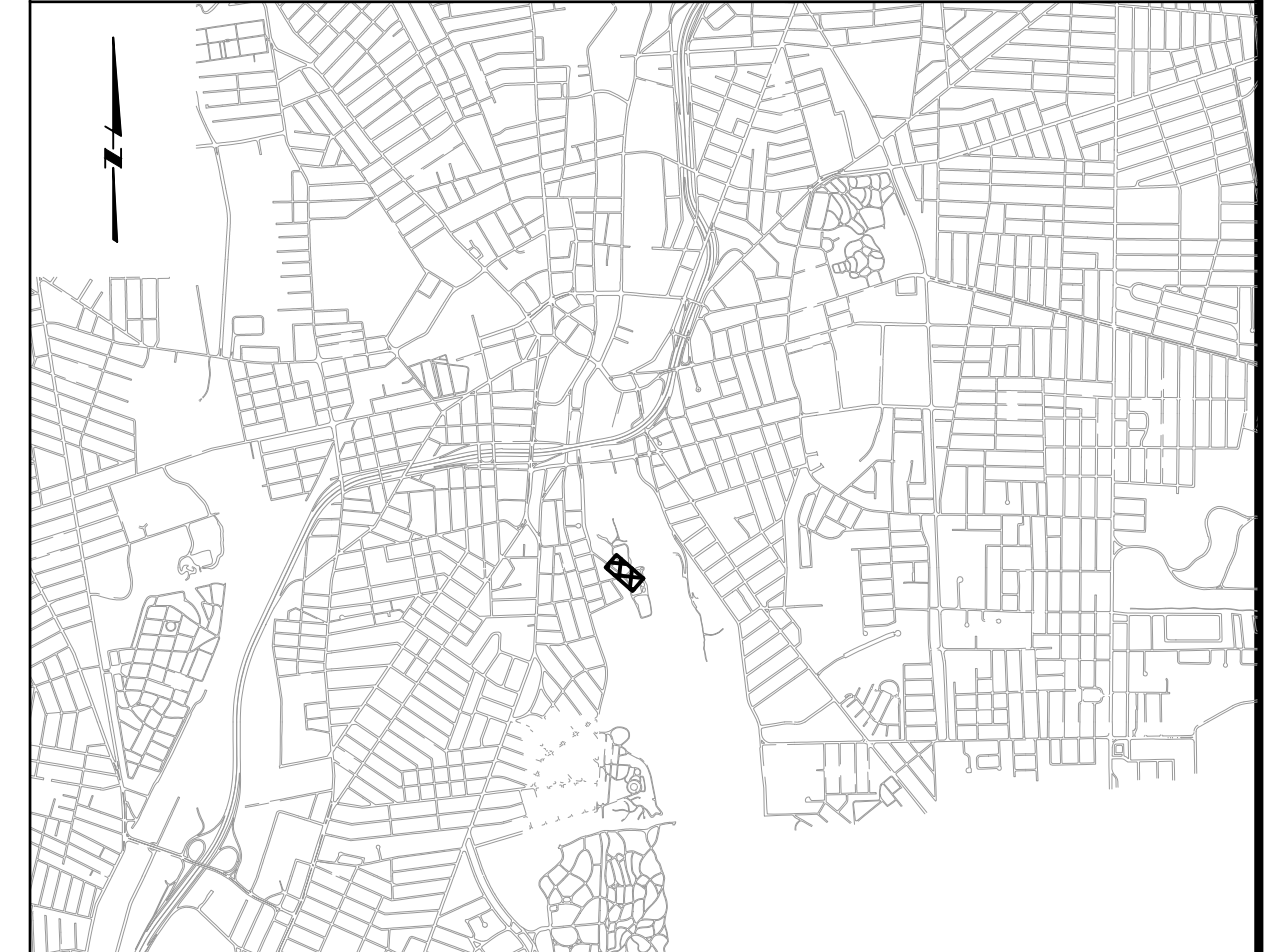
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KEY PLAN



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2. UTILITY INFORMATION DEPICTED, PROVIDED BY NATIONAL GRID
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- NORTH OF DIVISION STREET BRIDGE: AE ELEVATION 12.8
- SOUTH OF DIVISION STREET BRIDGE: VE ELEVATION 13.8
4. WORK IS IN PROPERTY OWNED BY NATIONAL GRID
5. CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GREY SHADING FOR COORDINATION.

SHEET KEYNOTES

- A. MICROTUNNEL:
- B. RELOCATE WATER MAIN:
- C. RELOCATE SEWER FORCE MAIN:

REV	DATE	BY	DESCRIPTION

SCALE
H. SCALE 1" = 20'
V. SCALE 1" = 5'

WARNING
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED C. CRONIN
DRAWN B. MARINI
CHECKED C. CRONIN

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PHASE III COMBINED SEWER OVERFLOW PROGRAM

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CIVIL

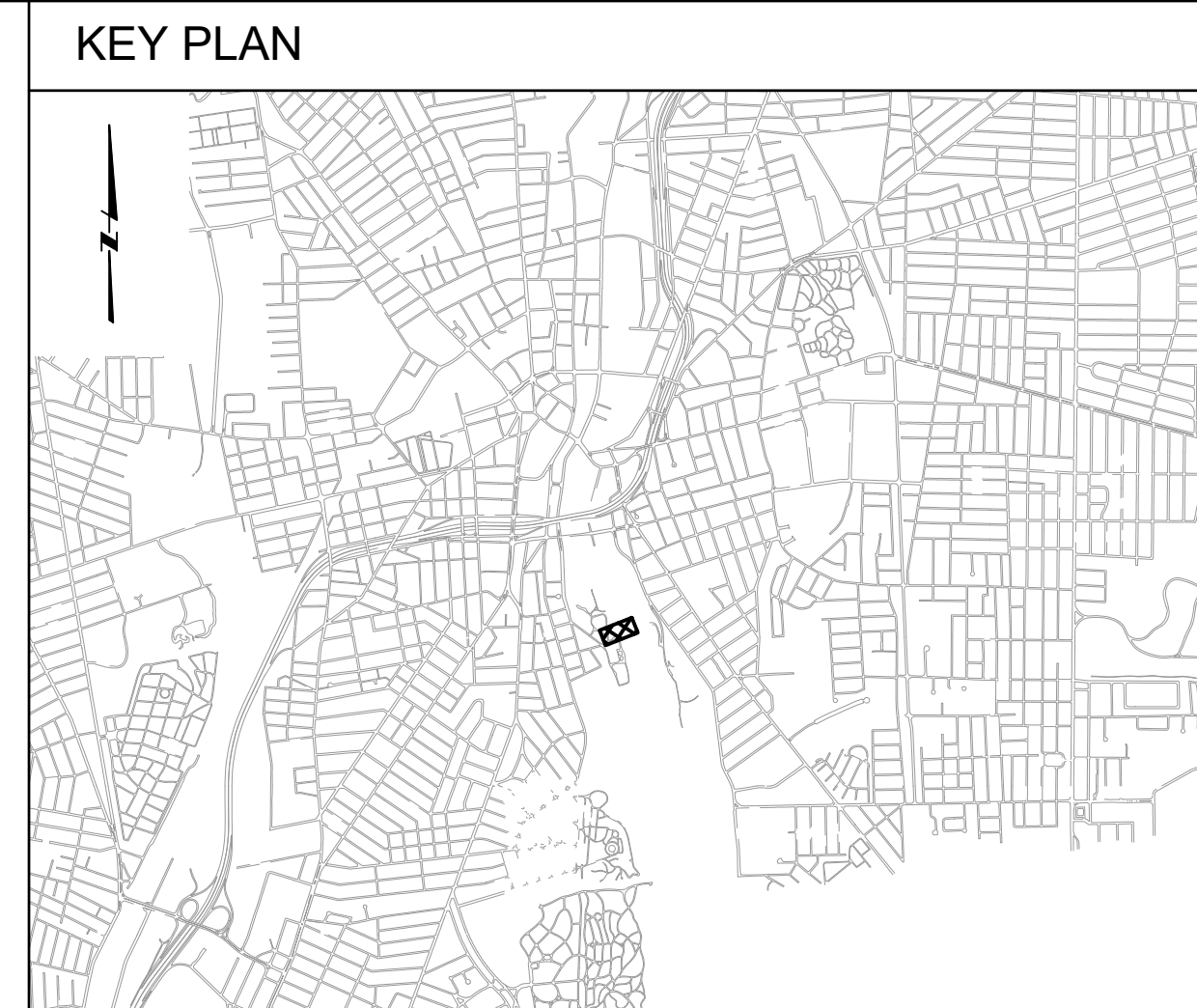
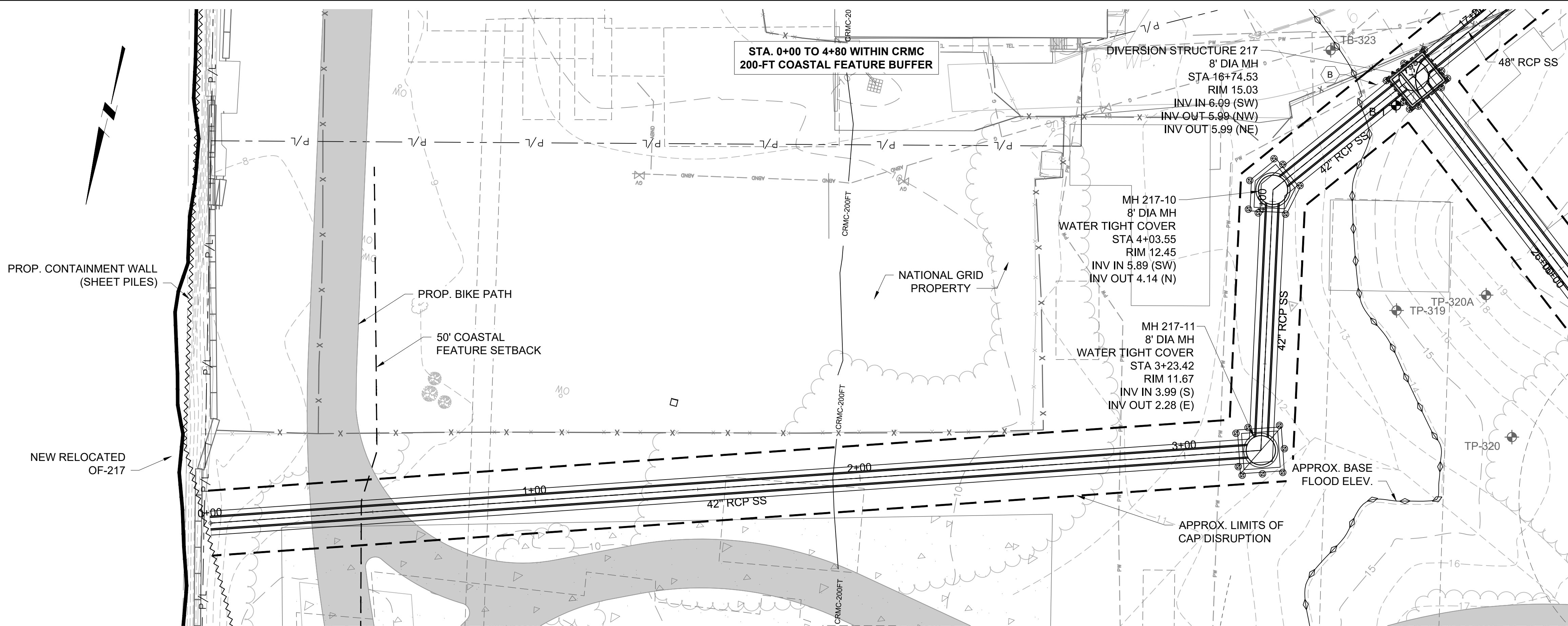
OF-217 CONSOLIDATION CONDUIT
PLAN AND PROFILE 5: STA 16+00 - 18+00

SHEET
C-8
195130165

BY: JAMIE PAYNE

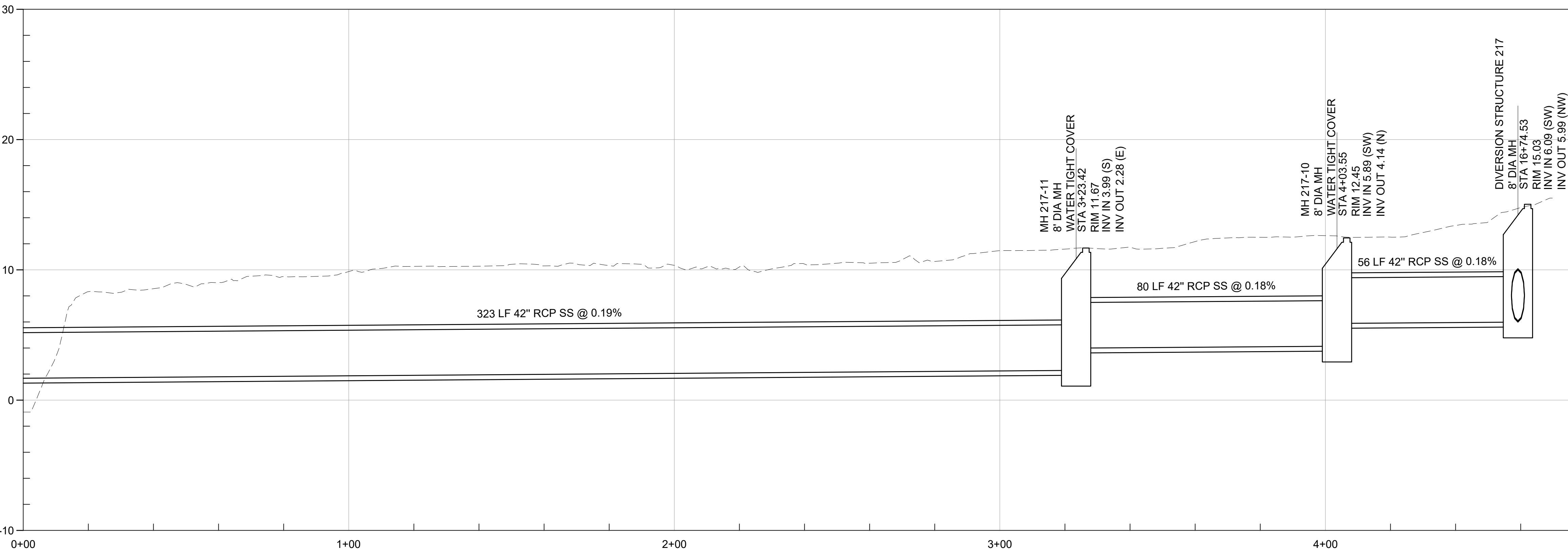
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- GENERAL SHEET NOTES**
1. SURVEY INFORMATION PROVIDED BY BRYANT AND ASSOCIATES, INC. NOVEMBER 2019, VERTICAL DATUM NGVD 1929, HORIZONTAL DATUM, STATE PLAN COORDINATE SYSTEM.
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 4. WORK IS IN PROPERTY OWNED BY NATIONAL GRID
 5. CITY PROPOSED BIKE PATH PROJECT DEPICTED IN GREY SHADING FOR COORDINATION.

- SHEET KEYNOTES**
- A. MICROTUNNEL:
 - B. RELOCATE WATER MAIN: AT OF-217 DIVERSION STRUCTURE



REV	DATE	BY	DESCRIPTION

SCALE
 H. SCALE 1" = 20'
 V. SCALE 1" = 5'

WARNING
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 PHASE III COMBINED SEWER
 OVERFLOW PROGRAM

Stantec PARE

NBC CONTRACT NO 308.XXC
 CIVIL

OF-217 CONSOLIDATION CONDUIT
 PLAN AND PROFILE 6: STA 0+00 - 4+80

SHEET
 C-9
 195130165

APPENDIX A

EDR REGULATORY DATABASE REPORT EXECUTIVE SUMMARY

Taft St

Taft St

Pawtucket, RI 02860

Inquiry Number: 5664991.2s

May 28, 2019

The EDR Radius Map™ Report with GeoCheck®



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
 Please contact EDR at 1-800-352-0050
 with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

TAFT ST
PAWTUCKET, RI 02860

COORDINATES

Latitude (North): 41.8725630 - 41° 52' 21.22"
Longitude (West): 71.3847390 - 71° 23' 5.06"
Universal Transverse Mercator: Zone 19
UTM X (Meters): 302096.2
UTM Y (Meters): 4638163.5
Elevation: 10 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map: 5644908 PROVIDENCE, RI
Version Date: 2012

Northeast Map: 5641995 ATTLEBORO, MA
Version Date: 2012

Southeast Map: 5642183 EAST PROVIDENCE, RI
Version Date: 2012

Northwest Map: 5644906 PAWTUCKET, RI
Version Date: 2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from: 20140718
Source: USDA

MAPPED SITES SUMMARY

Target Property Address:
TAFT ST
PAWTUCKET, RI 02860

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	TOWN LANDING	TAFT STREET	US BROWNFIELDS		TP
A2	PET FOOD EXPERTS LLC	175 MAIN STREET	RI SHWS, RI AUL	Higher	1 ft.
3	NEW ENGLAND GAS CO T	91 TIDEWATER ST	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	23, 0.004, South
B4	TIDEWATER COAL GASIF	OFF TIDEWATER AVE	EDR MGP	Higher	53, 0.010, SSE
C5	NEW ENGLAND TELEPHON	2 PLEASANT ST	RI UST	Higher	58, 0.011, North
A6	S. PAPADOPOULOU & K.	30 EAST AVE	RI UST	Higher	67, 0.013, North
A7	SAMOS PRESS	30 EAST AVE	RCRA NonGen / NLR, RI MANIFEST	Higher	67, 0.013, North
A8	BLACKSTONE VALLEY CO	30 EAST AVENUE, SUIT	RCRA-CESQG	Higher	67, 0.013, North
B9	TIDEWATER COAL GASSI	OFF TIDEWATER AVENUE	SEMS	Higher	68, 0.013, SSE
A10	SOVEREIGN BANK	210 MAIN STREET	RI SHWS, RI AUL, RI SPILLS	Higher	89, 0.017, North
A11	COMMERCIAL PROPERTY	40 EAST AVE	RI UST	Higher	96, 0.018, North
D12	SPINGARN ANDREW CO	88 PLEASANT ST	RCRA NonGen / NLR, FINDS, ECHO	Higher	98, 0.019, NNW
D13	SPRINGARN ANDREW CO	88 PLEASANT ST	RCRA NonGen / NLR	Higher	98, 0.019, NNW
D14	GEM AIR POWER INC	80 PLEASANT ST	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	105, 0.020, NNW
E15	REGAL CAR CARE	65 EAST ST	RI UST	Higher	117, 0.022, North
E16	ADAMS FURNITURE	65 EAST AVE	RI UST	Higher	117, 0.022, North
E17	ADAMS FURNITURE	65 EAST AVENUE	RI LUST	Higher	117, 0.022, North
A18	VITALI PROPERTY	216 MAIN ST	RI UST	Higher	127, 0.024, North
C19	SHOVE INSURANCE REAL	100 EAST AVE	RI UST	Higher	140, 0.027, NNW
B20	TIDEWATER COAL GASSI	TIDEWATER STREET	RI SHWS	Higher	159, 0.030, SSE
B21	VALLEY GAS COMPANY	TIDEWATER ST	RI UST	Higher	159, 0.030, SSE
22	SLATER MILL WALL REP	67 ROOSEVELT AVENUE	RI SHWS	Higher	195, 0.037, NNE
F23	LAWN TERRACE APARTME	180-226 PLEASANT ST	RI SHWS, RI UST, RI AUL	Higher	199, 0.038, SW
G24	COMMERCIAL PROPERTY	228-230 MAIN ST	RI UST	Higher	205, 0.039, North
25	BLACKSTONE VALLEY EL	MERRY ST	RI UST	Higher	248, 0.047, SSE
H26	PRIDE HYUNDAI	20 DIVISION ST	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	277, 0.052, ENE
H27	RIDOT - 20 DIVISION	20 DIVISION ST	RI UST	Higher	277, 0.052, ENE
F28	E & A TAVERN	25 PAWTUCKET AVE	RI UST	Higher	279, 0.053, WSW
I29	APEX AUTOMOTIVE SERV	1 SCHOOL ST	RCRA-SQG, FINDS, ECHO, RI MANIFEST	Higher	322, 0.061, NNE
I30	APEX DEVELOPMENT CO.	1 SCHOOL ST	RI UST	Higher	322, 0.061, NNE
H31	BLACKSTONE AUTO BODY	28 DIVISION ST	RCRA NonGen / NLR, FINDS, ECHO	Higher	354, 0.067, East
G32	COMMERCIAL PROPERTY	250 MAIN ST	RI UST	Higher	387, 0.073, North
H33	MERCHANTS TIRE	21 DIVISION ST	RI SHWS, RI UST, RI AUL, RCRA NonGen / NLR, FINDS,...	Higher	411, 0.078, East
J34	PODIATRY SERVICES LT	10 SUMMER ST	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	446, 0.084, North
35	APEX INC	100 MAIN ST	RI SHWS, RI AUL, RCRA NonGen / NLR, FINDS, ECHO,...	Higher	459, 0.087, NE
K36	MR USA 1 HOUR CLEANI	224 EAST AVE	RI AIRS, RI DRYCLEANERS	Higher	472, 0.089, WSW
K37	MR USA 1 HOUR CLEANE	224 EAST AVE	RCRA-SQG, US AIRS, ECHO, RI MANIFEST	Higher	472, 0.089, WSW
K38	STANLEY SYSTEM DRY C	224 EAST AVE	EDR Hist Cleaner	Higher	472, 0.089, WSW
K39	DZIALO WALTER M DDS	225 EAST AVE	RCRA NonGen / NLR, RI MANIFEST	Higher	506, 0.096, WSW

MAPPED SITES SUMMARY

Target Property Address:
TAFT ST
PAWTUCKET, RI 02860

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
K40	COMMERCIAL OFFICE BU	225 EAST AVE	RI UST	Higher	506, 0.096, WSW
L41	MANNING-HEFFRON FUNE	68 BROADWAY	RI UST	Higher	562, 0.106, NNE
M42	PARTY WAREHOUSE	310 EAST AVE	RI UST	Higher	583, 0.110, SW
M43	CREST PHOTO LABS	324 EAST AVE	RI UST	Higher	593, 0.112, SSW
N44	LANTAU ISLAND, INC.	286 MAIN ST	RI UST	Higher	594, 0.112, North
J45	YMCA	20 SUMMER ST	RI UST	Higher	610, 0.116, North
J46	YOUNG MEN CHRISTIAN	20 SUMMER STREET	RI LUST	Higher	610, 0.116, North
O47	DISPLAY CREATIONS	93 PARK PL	RI UST	Higher	625, 0.118, NNW
P48	ST. PAUL'S EPISCOPAL	50 PARK PL	RI UST	Higher	629, 0.119, NNW
J49	NYNEX CTL OFF	85 HIGH ST	RCRA NonGen / NLR, FINDS, ECHO, RI AIRS, RI...	Higher	630, 0.119, North
J50	VERIZON NEW ENGLAND,	85 HIGH ST	RI UST	Higher	630, 0.119, North
P51	JAMES CORDANO	36 PARK PL	RI UST	Higher	631, 0.120, NNW
P52	BLACKSTONE VALLEY CO	42 PARK PLACE	RCRA-SQG, RI MANIFEST	Higher	637, 0.121, NNW
P53	BLACKSTONE VALLEY CO	42 PARK PL	RI UST	Higher	637, 0.121, NNW
N54	LANTAU, INC. PROPERT	298 MAIN ST	RI UST	Higher	650, 0.123, NNW
N55	NORTHERN PLAZA	301 MAIN ST	RI UST	Higher	660, 0.125, NNW
N56	NORTHERN PLAZA ASSOC	301 MAIN ST.	RI AST	Higher	660, 0.125, NNW
Q57	RIDOT PROJECT	50 DIVISION ST	NY MANIFEST	Higher	673, 0.127, East
O58	PRESERVATION SOCIETY	67 PARK PL	RI UST	Higher	694, 0.131, NNW
R59	WEINBERG COMMERCIAL	26 SUMMER STREET	RI SHWS, RI AUL	Higher	697, 0.132, North
S60	PILAVIN PROPERTIES,	33 MAIN STREET	RI SHWS	Higher	699, 0.132, NE
S61	ST GEORGE'S CHURCH (	46 MAIN STREET	RI SHWS, RI AUL	Higher	705, 0.134, NE
L62	PAWTUCKET CONGREGATI	40 WALCOTT ST	RI UST	Higher	716, 0.136, NE
T63	SALVATION ARMY -- PA	102 HIGH ST	RI UST	Higher	724, 0.137, North
L64	OLD MONTGOMERY DISTR	100 BROADWAY	RI UST	Higher	726, 0.138, NE
65	LARRY SHUSHANSKI RES	351 EAST AVE	RI UST	Higher	733, 0.139, SSW
66	APEX DEVELOPMENT 2 -	10 SCHOOL STREET	RI SHWS, RI AUL	Higher	739, 0.140, NE
S67	PITCHER STREET REALT	26 MAIN ST	RI UST	Higher	751, 0.142, NE
U68	EDDY CHEVROLET & BUI	45-55 DIVISION STREE	NY MANIFEST	Higher	782, 0.148, ESE
U69	EDDY CHEVROLET (FORM	45-55 DIVISION ST	RI UST	Higher	782, 0.148, ESE
U70	VIKING CHEVROLET GEO	45-55 DIVISION ST	RI SHWS, RI LUST, RCRA NonGen / NLR, FINDS, ECHO,...	Higher	782, 0.148, ESE
R71	MCGRATH PHILIP DR	23 BROAD ST	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	789, 0.149, North
Q72	WIDE WATER PARKWAY	55 DIVISION ST	RCRA NonGen / NLR, FINDS, ECHO	Higher	796, 0.151, East
T73	HALL INSTITUTE (FORM	120 HIGH ST	RI UST	Higher	815, 0.154, North
V74	CITY OF PAWTUCKET	137 ROOSEVELT AVE	RI UST	Higher	816, 0.155, NNE
M75	PAWTUCKET LAYOVER FA	PLAT 59 & 61, LOT 22	RI SHWS	Higher	831, 0.157, SW
Q76	PAWTUCKET BUSINESS A	123 SCHOOL ST	RI UST	Higher	833, 0.158, ENE
Q77	LAPRADE ANDRE J DMD	123 SCHOOL ST	RCRA-SQG	Higher	833, 0.158, ENE
Q78	PHOTOPOULOS D JAMES	123 SCHOOL ST	RCRA-SQG, RI SHWS, RI AUL, FINDS, ECHO, RI...	Higher	833, 0.158, ENE

MAPPED SITES SUMMARY

Target Property Address:
TAFT ST
PAWTUCKET, RI 02860

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MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
Q79	PHOTOPOULOS D JAMES	123 SCHOOL ST	RCRA-SQG, RI MANIFEST	Higher	833, 0.158, ENE
V80	TOLMAN HIGH SCHOOL	EXCHANGE STREET	RI LUST	Higher	839, 0.159, NNE
81	VARIEUR ELEMENTARY S	468 PLEASANT STREET	RI SHWS	Higher	844, 0.160, South
82	PAWTUCKET REDEVELOPM	370 MAIN ST	RI UST	Higher	846, 0.160, NNW
83	LANMAR APARTMENTS -	19 HARRISON ST	RI UST	Higher	849, 0.161, WNW
84	BROADWAY STREET HOLD	169 GEORGE ST	RI UST	Higher	850, 0.161, SW
R85	FAMILY SERVICES SOCI	33 SUMMER ST	RI UST	Higher	850, 0.161, North
W86	GIBBY'S SERVICE	385 EAST ST	RI UST	Higher	881, 0.167, SSW
87	BROADWAY APARTMENTS	142-144 BROADWAY	RI UST	Higher	910, 0.172, NE
88	ROWE AUTOMATIC SALES	51 S UNION ST	RCRA NonGen / NLR, RI MANIFEST	Higher	911, 0.173, NW
X89	ST JOSEPH HEALTH CEN	40 BROAD ST	RCRA NonGen / NLR, RI MANIFEST	Higher	917, 0.174, North
Y90	SUNOCO STATION	35 CEDAR STREET	RI LUST	Higher	917, 0.174, WNW
Y91	SUNOCO #0006-0582	35 CEDAR ST	RI UST	Higher	917, 0.174, WNW
Y92	SUNOCO SERVICE STA	35 CEDAR ST	RCRA-SQG, RI MANIFEST	Higher	917, 0.174, WNW
Z93	NORTHEAST INSULATION	279 SCHOOL ST	RCRA NonGen / NLR, FINDS, ECHO	Higher	927, 0.176, SE
Z94	B.V. MEDICAL	279 SCHOOL ST	RI UST	Higher	927, 0.176, SE
AA95	CARITAS HOUSE GROUP	166 PAWTUCKET AVE	RI UST	Higher	928, 0.176, SW
W96	ORTHOPAEDICS OF NEW	407 EAST AVE SUITE 1	RCRA NonGen / NLR	Higher	939, 0.178, SSW
W97	FORTUNA ROBERT J MD	407 EAST AVE SUITE 1	RCRA NonGen / NLR, RI MANIFEST	Higher	939, 0.178, SSW
W98	CVI PAWTUCKET	407 EAST AVENUE	RCRA-CESQG	Higher	962, 0.182, SSW
AB99	OLD COLONY BANK PARK	MAIN STREET	US BROWNFIELDS	Higher	963, 0.182, NNW
AB100	OLD COLONY BANK	335 MAIN STREET	US BROWNFIELDS	Higher	963, 0.182, NNW
AC101	SPORTS MEDICINE ORTH	127 SCHOOL ST	RCRA NonGen / NLR, RI MANIFEST	Higher	972, 0.184, East
AC102	SUNOCO SERVICE STA	81 SCHOOL ST	RI LUST, RI UST, RCRA NonGen / NLR, FINDS, ECHO,...	Higher	972, 0.184, ENE
AD103	PAWTUCKET EVENING TI	23 EXCHANGE ST	RI UST	Higher	990, 0.188, North
AD104	TIMES THE	23 EXCHANGE ST	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	990, 0.188, North
105	DIVISION STREET PROJ	SCHOOL AND POND STRE	US BROWNFIELDS, FINDS	Higher	995, 0.188, ESE
AC106	BOWERS REALTY, INC.	79 DIVISION ST	RI UST	Higher	996, 0.189, East
107	THE PAWTUCKET SPOT	72 EXCHANGE ST	RI LUST, RI UST	Higher	1002, 0.190, North
AE108	CITY OF PAWTUCKET PR	100 TIM HEALEY WAY	RI UST	Higher	1011, 0.191, SE
AE109	DR. GOLF	100 TIM HEALEY WAY	US BROWNFIELDS	Higher	1011, 0.191, SE
AE110	DR. GOLF (SEE NJD-26	100 TIM HEALEY WAY	RI SHWS, RI BROWNFIELDS	Higher	1011, 0.191, SE
AC111	MCKEE BROS. OIL CORP	76 SCHOOL ST	RI UST	Higher	1011, 0.191, ENE
X112	NATIONAL GRID - VAUL	GOFF & BROAD STREET	RI SHWS	Higher	1028, 0.195, North
AF113	C V S #2234	425 EAST AVE	RCRA-LQG, RI MANIFEST	Higher	1050, 0.199, SSW
AG114	ROGUE PAUL G DDS	32 GOFF AVE RM 205	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	1065, 0.202, NNW
AB115	J.P. REALTY	450 MAIN ST	RI UST	Higher	1087, 0.206, NW
AB116	PARKIN YARN (FORMER)	21 COMMERCE STREET	RI SHWS, RI AUL	Higher	1100, 0.208, NNW
X117	CENTENIAL TOWERS	35 GOFF STREET	RI SHWS, RI AUL	Higher	1109, 0.210, NNW

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MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
118	ROOSEVELT AVENUE DIS	ROOSEVELT AVENUE	RI SHWS	Higher	1121, 0.212, NNE
AA119	ROYAL CLEANSERS INC	191 PAWTUCKET AVE	RCRA NonGen / NLR, FINDS, ECHO	Higher	1123, 0.213, SW
Y120	SHELL STATION	71 CEDAR STREET	RI LUST	Higher	1143, 0.216, WNW
Y121	JOE'S CEDAR STREET S	71 CEDAR ST & PINE	RCRA-SQG, FINDS, ECHO, RI MANIFEST	Higher	1143, 0.216, WNW
Y122	JOE'S CEDAR ST. SHEL	71 CEDAR ST	RI UST	Higher	1143, 0.216, WNW
AG123	TEXACO STATION	GOFF AVENUE & DEXTER	RI LUST	Higher	1147, 0.217, NNW
AH124	HASKELL WILLIAM H MF	24 COMMERCE ST	RI LUST, RCRA NonGen / NLR, FINDS, ECHO, RI...	Higher	1153, 0.218, NNW
AH125	KELLAWAY	24 COMMERCE ST	RI UST	Higher	1153, 0.218, NNW
AI126	SLATER COTTON MILL	46 CHURCH ST	RI UST	Higher	1167, 0.221, NW
AI127	HUTCHINSON GROUP THE	46 CHURCH ST	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	1167, 0.221, NW
AJ128	GEORGE H FULLER AND	151 EXCHANGE ST	RI LUST, FINDS, RI AIRS	Higher	1171, 0.222, NNE
AJ129	GEORGE H FULLER AND	151 EXCHANGE ST	RI UST	Higher	1171, 0.222, NNE
AJ130	FULLER GEORGE H & SO	151 EXCHANGE ST	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	1171, 0.222, NNE
AF131	APARTMENT HOUSE	447 EAST AVE	RI UST	Higher	1190, 0.225, SSW
AE132	BLACKSTONE VALLEY ME	333 SCHOOL ST	RI UST	Higher	1210, 0.229, SE
AE133	R I MEDICAL IMAGING	333 SCHOOL ST	RCRA-SQG, FINDS, ECHO, RI MANIFEST	Higher	1210, 0.229, SE
AE134	SILVERMAN ANDREW B D	333 SCHOOL ST STE 20	RCRA-SQG, RI MANIFEST	Higher	1210, 0.229, SE
AG135	GOFF GAS	75 GOFF AVE	RI UST	Higher	1222, 0.231, NNW
AG136	TEXACO STA/COLEMAN T	75 GOFF AVE	RCRA NonGen / NLR, FINDS, ECHO	Higher	1222, 0.231, NNW
AJ137	WILLIAM E. TOLMAN SR	150 EXCHANGE ST	RI UST	Higher	1224, 0.232, NNE
AK138	AIME & SONS AUTOMOTI	79 GOFF AVE	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	1233, 0.234, NNW
AK139	PROFESSIONAL PLATERS	79 GOFF AVE	RCRA NonGen / NLR, RI MANIFEST	Higher	1233, 0.234, NNW
140	ST. MARY'S CHURCH AN	103 PINE ST	RI UST	Higher	1240, 0.235, WSW
141	LANMAR APARTMENTS -	85 PROSPECT ST	RI UST	Higher	1242, 0.235, East
142	CENTRAL AUTO RADIATO	188 PINE ST	RCRA-SQG, FINDS, ECHO, RI MANIFEST	Higher	1245, 0.236, WNW
AJ143	THOMAS STREET STUDIO	163 EXCHANGE ST	RCRA NonGen / NLR, FINDS, ECHO	Higher	1254, 0.237, NNE
AJ144	MORRIS NATHANSON DES	163 EXCHANGE ST	RI LUST, RI UST	Higher	1254, 0.237, NNE
145	DARLENE JEWELRY MFG	483 MAIN ST	RCRA NonGen / NLR, FINDS, ECHO, NY MANIFEST, RI...	Higher	1271, 0.241, NW
146	TALLMAN ENTERPRISES	44A PINE ST	RCRA NonGen / NLR	Higher	1289, 0.244, SW
AI147	GANSETT AUTO PARTS	206 PINE ST	RCRA-SQG, FINDS, ECHO, RI MANIFEST	Higher	1301, 0.246, NW
AL148	LEROY THEATRE	84 BROAD ST	RI UST	Higher	1301, 0.246, North
AL149	ASBESTOS REMOVAL & C	84 BROAD ST SUITE 21	RCRA NonGen / NLR, FINDS, ECHO	Higher	1301, 0.246, North
AI150	SILES DANA PHOTOGRAP	498 MAIN ST	RCRA NonGen / NLR, FINDS, ECHO, RI MANIFEST	Higher	1308, 0.248, NW
AJ151	PAWTUCKET ARMORY	172 EXCHANGE STREET	RI SHWS, RI AUL, RI BROWNFIELDS	Higher	1327, 0.251, NNE
AJ152	PAWTUCKET ARMORY	172 EXCHANGE STREET	US BROWNFIELDS	Higher	1327, 0.251, NNE
AM153	FOGARTY MANOR APARTM	214 ROOSEVELT AVENUE	RI SHWS	Higher	1335, 0.253, NNE
AI154	MAACO AUTO PAINTING	501 MAIN ST	RCRA-SQG, RI SHWS, RI AUL, FINDS, ECHO, RI...	Higher	1347, 0.255, NW
155	FESTIVAL PIER	SCHOOL STREET	US BROWNFIELDS	Higher	1399, 0.265, SE
156	DENNIS PRINTING COMP	69 MONTGOMERY STREET	RI SHWS, RI AUL	Higher	1403, 0.266, North

MAPPED SITES SUMMARY

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TAFT ST
PAWTUCKET, RI 02860

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MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
157	UNION WADDING CO.	125 GOFF AVE	RI LUST, RI AIRS	Higher	1466, 0.278, NNW
AM158	CAROL CABLE (NO FILE	249 ROOSEVELT AVENUE	RI SHWS, RI LUST, RI SPILLS	Higher	1498, 0.284, NNE
159	MIRROR IMAGE INC.	190 EXCHANGE ST	RI LUST, RCRA NonGen / NLR, FINDS, ECHO, RI...	Higher	1517, 0.287, NNE
160	PINE STREET ASSOCIAT	258 PINE STREET	RI SHWS, RI AUL	Higher	1700, 0.322, NW
161	ST RAPHAEL'S ACADEMY	123 WALCOTT STREET	RI LUST	Higher	1795, 0.340, NE
AN162	HARTY REALTY	59 BLACKSTONE AVENUE	RI LUST	Higher	1895, 0.359, NNE
AN163	HARTY REALTY	59-65 BLACKSTONE AVE	RI SHWS, RI AUL	Higher	1895, 0.359, NNE
164	VAZ PROPERTY - HEATI	178 MULBERRY STREET	RI SHWS	Higher	1976, 0.374, WSW
AN165	HARTY REALTY II	70 BLACKSTONE AVENUE	RI SHWS, RI AUL	Higher	1991, 0.377, NNE
AO166	C-TOWN - LOT 539	300 BARTON STREET	US BROWNFIELDS	Higher	2008, 0.380, NNW
AO167	C-TOWN	300 BARTON STREET	RI SHWS, RI BROWNFIELDS	Higher	2008, 0.380, NNW
AO168	C-TOWN - LOT 541	300 BARTON STREET	US BROWNFIELDS, FINDS	Higher	2008, 0.380, NNW
AO169	C-TOWN - LOT 540	300 BARTON STREET	US BROWNFIELDS	Higher	2008, 0.380, NNW
170	CUMBERLAND FARMS #38	193 DIVISION ST	RI LUST, RI UST, RCRA NonGen / NLR, FINDS, ECHO,...	Higher	2034, 0.385, East
171	145 BARTON STREET	145 BARTON STREET	US BROWNFIELDS	Higher	2054, 0.389, NNW
172	76 JEFFERSON AVENUE	76 JEFFERSON AVENUE	US BROWNFIELDS	Higher	2073, 0.393, WSW
173	101 BARTON STREET	101 BARTON STREET	US BROWNFIELDS	Higher	2078, 0.394, North
174	EMERGENCY SHELTER	183 BARTON STREET	RI LUST, RI SPILLS	Higher	2084, 0.395, NNW
AO175	AUTO ZONE	262 BARTON STREET	RI SHWS, RI AUL	Higher	2144, 0.406, NNW
176	MEMORIAL HOSPITAL OF	111 BREWSTER ST	RCRA-SQG, RI LUST, RI UST, ICIS, US AIRS, FINDS,...	Higher	2165, 0.410, East
177	GENERAL FABRICS	45 WASHINGTON STREET	RI LUST	Higher	2255, 0.427, WSW
178	15 JACKSON STREET	15 JACKSON STREET	US BROWNFIELDS	Higher	2261, 0.428, North
179	WOODLAWN SUNOCO SPRI	75 MINERAL SPRING AV	RI LUST	Higher	2285, 0.433, WNW
180	HARMONY MILLS	10 DUNNELL LANE	RI SHWS, RI LUST	Higher	2289, 0.434, SE
181	PAWTUCKET AUTO SUPPL	306 BROAD STREET	RI LUST	Higher	2359, 0.447, North
AP182	PCF 2016 PHASE I - 3	36 MIDDLE STREET	US BROWNFIELDS, FINDS	Higher	2370, 0.449, NNE
AP183	MONETA CAPITAL CORP.	105 FRONT STREET	RI SHWS	Higher	2407, 0.456, NNE
AQ184	TEKNICOTE INC	396 ROOSEVELT AVE	RI SHWS, RI LUST, RCRA NonGen / NLR, FINDS, ECHO,...	Higher	2569, 0.487, North
AR185	COSTA SERVICE	355 BROAD STREET	RI LUST	Higher	2609, 0.494, North
AS186	COLLETTE TRAVEL - 1	164 FRONT STREET	RI SHWS, RI AUL	Higher	2630, 0.498, NNE
AS187	FRONT STREET PARCELS	164 FRONT STREET	US BROWNFIELDS, FINDS	Higher	2630, 0.498, NNE
AQ188	KILMARTIN REALTY	413 ROOSEVELT AVENUE	RI SHWS	Higher	2661, 0.504, North
189	UPTOWN AUTO	50 DUNNELL LANE	RI SHWS	Higher	2674, 0.506, SE
AR190	CHARISMA MANUFACTURI	400 BROAD ST	RI SHWS, RI AUL, RI AIRS	Higher	2789, 0.528, North
AT191	STANDARD UNIFORM	354 PINE ST	RI SHWS, RI LUST, RI UST, RI BROWNFIELDS, RCRA...	Higher	2801, 0.530, NW
AT192	MONARCH BRASS & COPP	371 PINE STREET	RI SHWS	Higher	2865, 0.543, NW
193	PRATA FUNERAL HOME	372 BROADWAY AVE	RI SHWS, RI LUST, RI UST	Higher	2899, 0.549, NNE
AU194	COLLETTE TRAVEL -2	182-210 FRONT STREET	RI SHWS, RI AUL	Higher	2926, 0.554, NNE
AU195	COLLETTE TRAVEL - 3	183 FRONT STREET	RI SHWS	Higher	2942, 0.557, NNE

MAPPED SITES SUMMARY

Target Property Address:
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MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
196	NORTH EAST KNITTING	179 CONANT ST	RI SHWS, RI AIRS, RI ASBESTOS	Higher	2975, 0.563, NW
197	LATIMER PROPERTY	618 EAST AVENUE	RI SHWS	Higher	3029, 0.574, SSW
AV198	ART LOFTS - TALLMAN	390 -392 PINE STREET	RI SHWS	Higher	3143, 0.595, NW
199	NAVIGANT CREDIT UNIO	501 ROOSEVELT AVENUE	RI SHWS, RI LUST, RI AUL	Higher	3200, 0.606, North
200	OFFENHAUSER RI /CONT	11 WEBB STREET	RI SHWS, RI AUL	Higher	3263, 0.618, WSW
AV201	PARAMOUNT CARDS	400 PINE STREET	RI SHWS	Higher	3265, 0.618, NW
202	CUMBERLAND FARMS #38	478 BROAD ST	RI SHWS, RI LUST, RI AUL, RCRA NonGen / NLR, US...	Higher	3272, 0.620, North
AW203	SLATER DYE WORKS, IN	700 SCHOOL STREET	RI SHWS, RI AUL	Higher	3282, 0.622, SE
204	FRONT STREET AUTO SA	205 FRONT STREET	RI SHWS, RI SPILLS	Higher	3310, 0.627, NNE
205	CONANT STREET MILL	200 CONANT STREET	RI SHWS, RI AUL	Higher	3341, 0.633, NW
206	SLATER DYE WORKS INC	727 SCHOOL ST	RI SHWS, RI AUL, RCRA NonGen / NLR, ICIS, FINDS,...	Higher	3432, 0.650, SSE
AW207	INTERNATIONAL ACCESS	717 SCHOOL ST	RI SHWS, RI UST, RCRA NonGen / NLR, FINDS, ECHO,...	Higher	3436, 0.651, SSE
208	ELIZABETH WEBBING MI	521 ROOSEVELT AVENUE	RI SHWS, RI LUST, RI AUL, RI SPILLS	Higher	3489, 0.661, North
AX209	PAWTUCKET GAS CO	HIGH STREET	EDR MGP	Higher	3535, 0.670, North
AX210	CASCADE BEVERAGE COM	500 HIGH STREET	RI SHWS, RI LUST, RI AUL	Higher	3536, 0.670, North
211	HEALTH TEX BUILDING	558 ROOSEVELT AVENUE	RI SHWS, RI LUST, RI AUL	Higher	3698, 0.700, North
212	NULCO MFG. CO.	30 BEECHER ST	RI SHWS, RI AUL, RI AIRS	Higher	3742, 0.709, WNW
213	COLLETTE TRAVEL - MI	192 MIDDLE STREET	RI SHWS, RI AUL	Higher	3891, 0.737, NNE
214	EFRAIN PLEITEZ (BANC	502-510 DEXTER STREE	RI SHWS, RI AUL	Higher	3913, 0.741, NNW
215	SLATER SCREEN PRINT	750 SCHOOL ST	RI SHWS, RI AUL, RCRA NonGen / NLR, RI MANIFEST	Higher	3940, 0.746, SSE
AY216	NEW ENGLAND LINE NET	63 BEVERAGE HILL AVE	RI SHWS	Higher	3954, 0.749, SE
217	WOODLAWN LAUNDRY & C	479 WEST AVE	RI SHWS, RCRA NonGen / NLR, RI MANIFEST	Higher	3964, 0.751, SW
218	TRITON FLEET SERVICE	350 WALCOTT ST	RCRA-SQG, RI SHWS, RI AUL, FINDS, ECHO, RI...	Higher	4126, 0.781, ENE
AY219	COMMERCIAL PAINTING,	75 BEVERAGE HILL AVE	RI SHWS, RI AUL	Higher	4127, 0.782, SE
220	DARTMOUTH REALTY	210 DARTMOUTH STREET	RI SHWS	Higher	4150, 0.786, SSW
221	BASF FACILITY	201 ARMISTICE BLVD.	RI SHWS	Higher	4160, 0.788, ENE
222	INTERNATIONAL ROLLIN	81 BEVERAGE HILL AVE	RI SHWS	Higher	4168, 0.789, SE
223	BURNS MANOR	95 PARK ST	RI SHWS, RI ASBESTOS	Higher	4236, 0.802, NNE
224	CRYSTAL TOOL & DIE C	51 CHARLTON AVE	RI SHWS, RCRA NonGen / NLR, RI AIRS, RI MANIFEST	Higher	4269, 0.809, SE
225	RAND STREET COMPLEX	280 RAND STREET	RI SHWS, RI SPILLS	Higher	4471, 0.847, NW
226	T&C WOODWORKING, INC	31 PRIVET ST	RCRA-CESQG, RI SHWS, RI AUL, RI BROWNFIELDS,...	Higher	4474, 0.847, WNW
227	SCHOOLHOUSE CANDY	1005 MAIN ST/75-77 E	RI SHWS	Higher	4656, 0.882, SW
228	RI TEXTILE	400 YORK AVENUE	RI SHWS, RI LUST, RI AUL	Higher	4697, 0.890, ESE
229	AGAR MACHINING & WEL	270 YORK AVE	RCRA-SQG, RI SHWS, FINDS, ECHO, RI MANIFEST	Higher	4723, 0.895, ESE
230	BEACON STREET DISPOS	BEACON & WASHINGTON	RI SHWS	Higher	4801, 0.909, NNW
231	SARGEANT & WILBUR HE	170 YORK AVE	RI SHWS, RCRA NonGen / NLR, FINDS, ECHO, RI...	Higher	4913, 0.930, ESE
AZ232	BRANCH STREET PARCEL	0, 30, 34, 41, 43 AN	RI SHWS, RI BROWNFIELDS	Higher	5060, 0.958, North
AZ233	BRANCH STREET PARCEL	4, 18, 24 BRANCH STR	RI SHWS, RI BROWNFIELDS	Higher	5060, 0.958, North
234	FREIGHT STREET LOT 4	25 FREIGHT STREET	RI SHWS	Higher	5085, 0.963, NE

MAPPED SITES SUMMARY

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 TAFT ST
 PAWTUCKET, RI 02860

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MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
235	MCDONALD'S	839 BROAD STREET	RI SHWS, RI AUL	Higher	5116, 0.969, North
236	U S POSTAL SERVICE	30 MONTICELLO ROAD	RI SHWS	Higher	5169, 0.979, ESE
237	L'HEUREUX PROPERTY	512 YORK AVENUE	RI SHWS	Higher	5182, 0.981, East
238	NARRAGANSETT GROUP	1125 MAIN STREET	RI SHWS, RI AUL, RCRA NonGen / NLR, ICIS, FINDS,...	Higher	5191, 0.983, SW

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 8 of the attached EDR Radius Map report:

<u>Site</u>	<u>Database(s)</u>	<u>EPA ID</u>
TOWN LANDING TAFT STREET PAWTUCKET, RI 02860	US BROWNFIELDS ACRES property ID: 125345	N/A

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY..... Federal Facility Site Information listing

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE..... Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal institutional controls / engineering controls registries

LUCIS..... Land Use Control Information System
US ENG CONTROLS..... Engineering Controls Sites List

EXECUTIVE SUMMARY

US INST CONTROL..... Sites with Institutional Controls

Federal ERNS list

ERNS..... Emergency Response Notification System

State and tribal landfill and/or solid waste disposal site lists

RI SWF/LF..... Solid Waste Management Facilities

RI LCP..... Landfill Closure Program Sites in RI

State and tribal leaking storage tank lists

INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

FEMA UST..... Underground Storage Tank Listing

INDIAN UST..... Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

INDIAN VCP..... Voluntary Cleanup Priority Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands

DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations

ODI..... Open Dump Inventory

IHS OPEN DUMPS..... Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL..... Delisted National Clandestine Laboratory Register

RI CDL..... Clandestine Drug Lab Information Listing

US CDL..... National Clandestine Laboratory Register

Local Land Records

LIENS 2..... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS..... Hazardous Materials Information Reporting System

RI SPILLS 90..... SPILLS 90 data from FirstSearch

Other Ascertainable Records

FUDS..... Formerly Used Defense Sites

DOD..... Department of Defense Sites

SCRD DRYCLEANERS..... State Coalition for Remediation of Drycleaners Listing

US FIN ASSUR..... Financial Assurance Information

EXECUTIVE SUMMARY

EPA WATCH LIST.....	EPA WATCH LIST
2020 COR ACTION.....	2020 Corrective Action Program List
TSCA.....	Toxic Substances Control Act
TRIS.....	Toxic Chemical Release Inventory System
SSTS.....	Section 7 Tracking Systems
ROD.....	Records Of Decision
RMP.....	Risk Management Plans
RAATS.....	RCRA Administrative Action Tracking System
PRP.....	Potentially Responsible Parties
PADS.....	PCB Activity Database System
FTTS.....	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS.....	Material Licensing Tracking System
COAL ASH DOE.....	Steam-Electric Plant Operation Data
COAL ASH EPA.....	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER.....	PCB Transformer Registration Database
RADINFO.....	Radiation Information Database
HIST FTTS.....	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS.....	Incident and Accident Data
CONSENT.....	Superfund (CERCLA) Consent Decrees
INDIAN RESERV.....	Indian Reservations
FUSRAP.....	Formerly Utilized Sites Remedial Action Program
UMTRA.....	Uranium Mill Tailings Sites
LEAD SMELTERS.....	Lead Smelter Sites
US MINES.....	Mines Master Index File
ABANDONED MINES.....	Abandoned Mines
UXO.....	Unexploded Ordnance Sites
DOCKET HWC.....	Hazardous Waste Compliance Docket Listing
FUELS PROGRAM.....	EPA Fuels Program Registered Listing
RI Financial Assurance.....	Financial Assurance Information
RI LEAD.....	Lead Inspections Database
RI NPDES.....	Permit and Facility Data

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR Hist Auto..... EDR Exclusive Historical Auto Stations

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RI RGA HWS..... Recovered Government Archive State Hazardous Waste Facilities List
RI RGA LF..... Recovered Government Archive Solid Waste Facilities List
RI RGA LUST..... Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property. Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

Federal CERCLIS list

SEMS: SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly known as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the SEMS list, as provided by EDR, and dated 04/11/2019 has revealed that there is 1 SEMS site within approximately 0.5 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
TIDEWATER COAL GASSI Site ID: 0101413 EPA Id: RID981885106	OFF TIDEWATER AVENUE	SSE 0 - 1/8 (0.013 mi.)	B9	38

Federal RCRA generators list

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 03/25/2019 has revealed that there is 1 RCRA-LQG site within approximately 0.25 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
C V S #2234 EPA ID:: RIR000500157	425 EAST AVE	SSW 1/8 - 1/4 (0.199 mi.)	AF113	325

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 03/25/2019 has revealed that there are 12 RCRA-SQG sites within approximately 0.25 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
APEX AUTOMOTIVE SERV	1 SCHOOL ST	NNE 0 - 1/8 (0.061 mi.)	I29	71

EXECUTIVE SUMMARY

EPA ID:: RID987470606				
MR USA 1 HOUR CLEAN	224 EAST AVE	WSW 0 - 1/8 (0.089 mi.)	K37	120
EPA ID:: RID980909345				
BLACKSTONE VALLEY CO	42 PARK PLACE	NNW 0 - 1/8 (0.121 mi.)	P52	162
EPA ID:: RI5000001032				
LAPRADE ANDRE J DMD	123 SCHOOL ST	ENE 1/8 - 1/4 (0.158 mi.)	Q77	204
EPA ID:: RIR000504068				
PHOTOPOULOS D JAMES	123 SCHOOL ST	ENE 1/8 - 1/4 (0.158 mi.)	Q78	206
EPA ID:: RID987475829				
PHOTOPOULOS D JAMES	123 SCHOOL ST	ENE 1/8 - 1/4 (0.158 mi.)	Q79	217
EPA ID:: RID987486214				
SUNOCO SERVICE STA	35 CEDAR ST	WNW 1/8 - 1/4 (0.174 mi.)	Y92	247
EPA ID:: RID000843656				
JOE'S CEDAR STREET S	71 CEDAR ST & PINE	WNW 1/8 - 1/4 (0.216 mi.)	Y121	357
EPA ID:: RID987470374				
R I MEDICAL IMAGING	333 SCHOOL ST	SE 1/8 - 1/4 (0.229 mi.)	AE133	402
EPA ID:: RID982543944				
SILVERMAN ANDREW B D	333 SCHOOL ST STE 20	SE 1/8 - 1/4 (0.229 mi.)	AE134	412
EPA ID:: RIR000506733				
CENTRAL AUTO RADIATO	188 PINE ST	WNW 1/8 - 1/4 (0.236 mi.)	142	441
EPA ID:: RID987486867				
GANSETT AUTO PARTS	206 PINE ST	NW 1/8 - 1/4 (0.246 mi.)	AI147	468
EPA ID:: RID987478468				

RCRA-CESQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-CESQG list, as provided by EDR, and dated 03/25/2019 has revealed that there are 2 RCRA-CESQG sites within approximately 0.25 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
BLACKSTONE VALLEY CO EPA ID:: RIR000517367	30 EAST AVENUE, SUIT	N 0 - 1/8 (0.013 mi.)	A8	34
CVI PAWTUCKET EPA ID:: RIR000517417	407 EAST AVENUE	SSW 1/8 - 1/4 (0.182 mi.)	W98	266

State- and tribal - equivalent CERCLIS

RI SHWS: This list includes sites that have been investigated under the Federal CERCLIS program (SFA sites) as well as sites that have notified under the state program or have been investigated for hazardous substances (HWM sites).

A review of the RI SHWS list, as provided by EDR, and dated 01/16/2019 has revealed that there are 85

EXECUTIVE SUMMARY

RI SHWS sites within approximately 1 mile of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
PET FOOD EXPERTS LLC Facility Status: Active Project Code: PFEL-HWM Siterem Site Number: SR-26-1750	175 MAIN STREET	0 - 1/8 (0.000 mi.)	A2	18
SOVEREIGN BANK Facility Status: Inactive Project Code: SOVE-HWM Siterem Site Number: SR-26-1457	210 MAIN STREET	N 0 - 1/8 (0.017 mi.)	A10	40
TIDEWATER COAL GASSI Facility Status: Active Project Code: TWC-SFA Project Code: TWC-HWM Siterem Site Number: SR-26-0934 B Siterem Site Number: SR-26-0934 A	TIDEWATER STREET	SSE 0 - 1/8 (0.030 mi.)	B20	56
SLATER MILL WALL REP Facility Status: Active Project Code: SMPL-HWM Project Code: BRSM-HWM Siterem Site Number: SR-26-1919 Siterem Site Number: SR-26-1706	67 ROOSEVELT AVENUE	NNE 0 - 1/8 (0.037 mi.)	22	56
LAWN TERRACE APARTME Facility Status: Inactive Project Code: LAWN-HWM Siterem Site Number: SR-26-0933	180-226 PLEASANT ST	SW 0 - 1/8 (0.038 mi.)	F23	57
MERCHANTS TIRE Facility Status: Inactive Project Code: TPRO-HWM Siterem Site Number: SR-26-1540	21 DIVISION ST	E 0 - 1/8 (0.078 mi.)	H33	83
APEX INC Facility Status: Inactive Project Code: APEX1-HWM Siterem Site Number: SR-26-1710 A	100 MAIN ST	NE 0 - 1/8 (0.087 mi.)	35	105
WEINBERG COMMERCIAL Facility Status: Inactive Project Code: WCP2-HWM Siterem Site Number: SR-26-1789 B	26 SUMMER STREET	N 1/8 - 1/4 (0.132 mi.)	R59	173
PILAVIN PROPERTIES, Facility Status: Active Project Code: PPLP-HWM Siterem Site Number: SR-26-1812	33 MAIN STREET	NE 1/8 - 1/4 (0.132 mi.)	S60	174
ST GEORGE'S CHURCH (Facility Status: Inactive Project Code: SGEO-HWM Siterem Site Number: SR-26-1468	46 MAIN STREET	NE 1/8 - 1/4 (0.134 mi.)	S61	174
APEX DEVELOPMENT 2 - Facility Status: Inactive Project Code: APEX2-HWM Siterem Site Number: SR-26-1710 B	10 SCHOOL STREET	NE 1/8 - 1/4 (0.140 mi.)	66	176
VIKING CHEVROLET GEO	45-55 DIVISION ST	ESE 1/8 - 1/4 (0.148 mi.)	U70	179

EXECUTIVE SUMMARY

Facility Status: Active Project Code: DSHL-HWM Siterem Site Number: SR-26-0422				
PAWTUCKET LAYOVER FA	PLAT 59 & 61, LOT 22	SW 1/8 - 1/4 (0.157 mi.)	M75	204
Facility Status: Active Project Code: PALF-DOT Siterem Site Number: SR-26-1310				
PHOTOPOULOS D JAMES	123 SCHOOL ST	ENE 1/8 - 1/4 (0.158 mi.)	Q78	206
Facility Status: Inactive Project Code: PABA-HWM Siterem Site Number: SR-26-1076				
VARIEUR ELEMENTARY S	468 PLEASANT STREET	S 1/8 - 1/4 (0.160 mi.)	81	227
Facility Status: Inactive Project Code: VAR-NJD Siterem Site Number: NJD-26-86				
DR. GOLF (SEE NJD-26	100 TIM HEALEY WAY	SE 1/8 - 1/4 (0.191 mi.)	AE110	323
Facility Status: Inactive Project Code: DRG-NJD Project Code: DRG-TBA Project Code: DRG-SUBC Siterem Site Number: NJD-26-0082 Siterem Site Number: SR-26-0388				
NATIONAL GRID - VAUL	GOFF & BROAD STREET	N 1/8 - 1/4 (0.195 mi.)	X112	325
Facility Status: Inactive Project Code: NE355-HWM Siterem Site Number: SR-26-0946				
PARKIN YARN (FORMER)	21 COMMERCE STREET	NNW 1/8 - 1/4 (0.208 mi.)	AB116	354
Facility Status: Inactive Project Code: PARY-HWM Siterem Site Number: SR-26-1063				
GENTENIAL TOWERS	35 GOFF STREET	NNW 1/8 - 1/4 (0.210 mi.)	X117	355
Facility Status: Inactive Project Code: CENT-HWM Siterem Site Number: SR-26-0228				
ROOSEVELT AVENUE DIS	ROOSEVELT AVENUE	NNE 1/8 - 1/4 (0.212 mi.)	118	355
Facility Status: Inactive Project Code: ROO-HWM Siterem Site Number: SR-26-1284				
PAWTUCKET ARMORY	172 EXCHANGE STREET	NNE 1/4 - 1/2 (0.251 mi.)	AJ151	491
Facility Status: Inactive Project Code: PAWA-HWM Project Code: PAWA-RLF Siterem Site Number: SR-26-1075				
FOGARTY MANOR APARTM	214 ROOSEVELT AVENUE	NNE 1/4 - 1/2 (0.253 mi.)	AM153	518
Facility Status: Inactive Project Code: FMAC-HWM Siterem Site Number: SR-26-1749				
MAACO AUTO PAINTING	501 MAIN ST	NW 1/4 - 1/2 (0.255 mi.)	AI154	519
Facility Status: Inactive Project Code: MACO-HWM Siterem Site Number: SR-26-0768				
DENNIS PRINTING COMP	69 MONTGOMERY STREET	N 1/4 - 1/2 (0.266 mi.)	156	557

EXECUTIVE SUMMARY

Facility Status: Inactive Project Code: DENP-HWM Siterem Site Number: SR-26-0369				
CAROL CABLE (NO FILE) Facility Status: Inactive Project Code: CCPA-HWM Siterem Site Number: SR-26-0222	249 ROOSEVELT AVENUE	NNE 1/4 - 1/2 (0.284 mi.)	AM158	559
PINE STREET ASSOCIAT Facility Status: Active Project Code: PINE-HWM Siterem Site Number: SR-26-1109	258 PINE STREET	NW 1/4 - 1/2 (0.322 mi.)	160	571
HARTY REALTY Facility Status: Active Project Code: HARR-HWM Siterem Site Number: SR-26-0591 A	59-65 BLACKSTONE AVE	NNE 1/4 - 1/2 (0.359 mi.)	AN163	572
VAZ PROPERTY - HEATI Facility Status: Active Project Code: VPHOS-HWM Siterem Site Number: SR-26-1619	178 MULBERRY STREET	WSW 1/4 - 1/2 (0.374 mi.)	164	573
HARTY REALTY II Facility Status: Active Project Code: HAR2-HWM Siterem Site Number: SR-26-0591 B	70 BLACKSTONE AVENUE	NNE 1/4 - 1/2 (0.377 mi.)	AN165	573
C-TOWN Facility Status: Active Project Code: CTN-SUBC Siterem Site Number: SR-26-0322 B	300 BARTON STREET	NNW 1/4 - 1/2 (0.380 mi.)	AO167	583
AUTO ZONE Facility Status: Active Project Code: AUTOZ-HWM Siterem Site Number: SR-26-0322 A	262 BARTON STREET	NNW 1/4 - 1/2 (0.406 mi.)	AO175	616
HARMONY MILLS Facility Status: Inactive Project Code: HARM-HWM Siterem Site Number: SR-26-0583	10 DUNNELL LANE	SE 1/4 - 1/2 (0.434 mi.)	180	671
MONETA CAPITAL CORP. Facility Status: Inactive Project Code: MOCA-HWM Siterem Site Number: SR-26-0835	105 FRONT STREET	NNE 1/4 - 1/2 (0.456 mi.)	AP183	675
TEKNICOTE INC Facility Status: Monitoring Project Code: RAR-HWM Siterem Site Number: SR-04-1850	396 ROOSEVELT AVE	N 1/4 - 1/2 (0.487 mi.)	AQ184	675
COLLETTE TRAVEL - 1 Facility Status: Inactive Project Code: COL1-HWM Siterem Site Number: SR-26-0276 A	164 FRONT STREET	NNE 1/4 - 1/2 (0.498 mi.)	AS186	686
KILMARTIN REALTY Facility Status: Active Project Code: KILM-HWM Siterem Site Number: SR-04-0704	413 ROOSEVELT AVENUE	N 1/2 - 1 (0.504 mi.)	AQ188	690
UPTOWN AUTO	50 DUNNELL LANE	SE 1/2 - 1 (0.506 mi.)	189	690

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Facility Status: Inactive Project Code: UPTO-HWM Siterem Site Number: SR-26-1609				
CHARISMA MANUFACTURI	400 BROAD ST	N 1/2 - 1 (0.528 mi.)	AR190	690
Facility Status: Inactive Project Code: FDP-HWM Siterem Site Number: SR-04-1753				
STANDARD UNIFORM	354 PINE ST	NW 1/2 - 1 (0.530 mi.)	AT191	694
Facility Status: Active Project Code: STAN-SUBC Project Code: STAN-HWM Siterem Site Number: SR-26-1472				
MONARCH BRASS & COPP	371 PINE STREET	NW 1/2 - 1 (0.543 mi.)	AT192	705
Facility Status: Inactive Project Code: MOBC-NJD Siterem Site Number: NJD-26-0027				
PRATA FUNERAL HOME	372 BROADWAY AVE	NNE 1/2 - 1 (0.549 mi.)	193	705
Facility Status: Inactive Project Code: PRFH-HWM Siterem Site Number: SR-26-1132				
COLLETTE TRAVEL -2	182-210 FRONT STREET	NNE 1/2 - 1 (0.554 mi.)	AU194	706
Facility Status: Inactive Project Code: COL2-HWM Siterem Site Number: SR-26-0276 C				
COLLETTE TRAVEL - 3	183 FRONT STREET	NNE 1/2 - 1 (0.557 mi.)	AU195	706
Facility Status: Active Project Code: COL3-HWM Siterem Site Number: SR-26-1785				
NORTH EAST KNITTING	179 CONANT ST	NW 1/2 - 1 (0.563 mi.)	196	707
Facility Status: Inactive Project Code: GLNF-HWM Siterem Site Number: SR-26-0542				
LATIMER PROPERTY	618 EAST AVENUE	SSW 1/2 - 1 (0.574 mi.)	197	710
Facility Status: Inactive Project Code: LATI-HWM Siterem Site Number: SR-18-0728				
ART LOFTS - TALLMAN	390 -392 PINE STREET	NW 1/2 - 1 (0.595 mi.)	AV198	710
Facility Status: Active Project Code: ART-HWM Siterem Site Number: SR-26-0073				
NAVIGANT CREDIT UNIO	501 ROOSEVELT AVENUE	N 1/2 - 1 (0.606 mi.)	199	710
Facility Status: Inactive Project Code: NCUP-HWM Siterem Site Number: SR-04-0133				
OFFENHAUSER RI /CONT	11 WEBB STREET	WSW 1/2 - 1 (0.618 mi.)	200	711
Facility Status: Active Project Code: OFFH-HWM Siterem Site Number: SR-26-1036				
PARAMOUNT CARDS	400 PINE STREET	NW 1/2 - 1 (0.618 mi.)	AV201	711
Facility Status: Inactive Project Code: PCAR-HWM				

EXECUTIVE SUMMARY

Siterem Site Number: SR-26-1059				
CUMBERLAND FARMS #38	478 BROAD ST	N 1/2 - 1 (0.620 mi.)	202	712
Facility Status: Active				
Project Code: CFBS-HWM				
Siterem Site Number: SR-04-1758				
SLATER DYE WORKS, IN	700 SCHOOL STREET	SE 1/2 - 1 (0.622 mi.)	AW203	723
Facility Status: Inactive				
Project Code: SDWI-HWM				
Siterem Site Number: SR-26-1441 A				
FRONT STREET AUTO SA	205 FRONT STREET	NNE 1/2 - 1 (0.627 mi.)	204	723
Facility Status: Inactive				
Project Code: FSAS-HWM				
Siterem Site Number: SR-26-0502				
CONANT STREET MILL	200 CONANT STREET	NW 1/2 - 1 (0.633 mi.)	205	724
Facility Status: Inactive				
Project Code: COSM-HWM				
Siterem Site Number: SR-26-0284 A				
SLATER DYE WORKS INC	727 SCHOOL ST	SSE 1/2 - 1 (0.650 mi.)	206	724
Facility Status: Inactive				
Project Code: SDW2-HWM				
Siterem Site Number: SR-26-1441 B				
INTERNATIONAL ACCESS	717 SCHOOL ST	SSE 1/2 - 1 (0.651 mi.)	AW207	737
Facility Status: Active				
Project Code: IPC-HWM				
Siterem Site Number: SR-26-1857				
ELIZABETH WEBBING MI	521 ROOSEVELT AVENUE	N 1/2 - 1 (0.661 mi.)	208	742
Facility Status: Active				
Project Code: EWM-HWM				
Siterem Site Number: SR-04-0432				
CASCADE BEVERAGE COM	500 HIGH STREET	N 1/2 - 1 (0.670 mi.)	AX210	743
Facility Status: Inactive				
Project Code: CBC-HWM				
Siterem Site Number: SR-04-0230				
HEALTH TEX BUILDING	558 ROOSEVELT AVENUE	N 1/2 - 1 (0.700 mi.)	211	743
Facility Status: Inactive				
Project Code: HTB-HWM				
Siterem Site Number: SR-04-0597				
NULCO MFG. CO.	30 BEECHER ST	WNW 1/2 - 1 (0.709 mi.)	212	744
Facility Status: Inactive				
Project Code: NULC-HWM				
Siterem Site Number: SR-26-1026				
COLLETTE TRAVEL - MI	192 MIDDLE STREET	NNE 1/2 - 1 (0.737 mi.)	213	748
Facility Status: Inactive				
Project Code: COLM-HWM				
Siterem Site Number: SR-26-0276 B				
EFRAIN PLEITEZ (BANC	502-510 DEXTER STREE	NNW 1/2 - 1 (0.741 mi.)	214	749
Facility Status: Inactive				
Project Code: EFRP-HWM				
Siterem Site Number: SR-04-0425				
SLATER SCREEN PRINT	750 SCHOOL ST	SSE 1/2 - 1 (0.746 mi.)	215	749

EXECUTIVE SUMMARY

Facility Status: Inactive Project Code: SLSP-HWM Siterem Site Number: SR-26-1443				
NEW ENGLAND LINE NET	63 BEVERAGE HILL AVE	SE 1/2 - 1 (0.749 mi.)	AY216	759
Facility Status: Active Project Code: NELN-HWM Siterem Site Number: SR-26-1908				
WOODLAWN LAUNDRY & C	479 WEST AVE	SW 1/2 - 1 (0.751 mi.)	217	759
Facility Status: Inactive Project Code: WLCL-HWM Siterem Site Number: SR-26-1688				
TRITON FLEET SERVICE	350 WALCOTT ST	ENE 1/2 - 1 (0.781 mi.)	218	769
Facility Status: Inactive Project Code: MONA-HWM Siterem Site Number: SR-26-0832				
COMMERCIAL PAINTING,	75 BEVERAGE HILL AVE	SE 1/2 - 1 (0.782 mi.)	AY219	782
Facility Status: Inactive Project Code: CPI-HWM Siterem Site Number: SR-26-0279				
DARTMOUTH REALTY	210 DARTMOUTH STREET	SSW 1/2 - 1 (0.786 mi.)	220	783
Facility Status: Inactive Project Code: DRE-HWM Siterem Site Number: SR-26-0346				
BASF FACILITY	201 ARMISTICE BLVD.	ENE 1/2 - 1 (0.788 mi.)	221	783
Facility Status: Active Project Code: BASF-HWM Siterem Site Number: SR-26-0105				
INTERNATIONAL ROLLIN	81 BEVERAGE HILL AVE	SE 1/2 - 1 (0.789 mi.)	222	783
Facility Status: Active Project Code: IRM-HWM Siterem Site Number: SR-26-0321 B				
BURNS MANOR	95 PARK ST	NNE 1/2 - 1 (0.802 mi.)	223	784
Facility Status: Inactive Project Code: 95PS-HWM Siterem Site Number: SR-26-1886				
CRYSTAL TOOL & DIE C	51 CHARLTON AVE	SE 1/2 - 1 (0.809 mi.)	224	784
Facility Status: Active Project Code: CRY5-HWM Siterem Site Number: SR-26-0321 A				
RAND STREET COMPLEX	280 RAND STREET	NW 1/2 - 1 (0.847 mi.)	225	795
Facility Status: Active Project Code: RAND-HWM Siterem Site Number: SR-04-1206				
T&C WOODWORKING, INC	31 PRIVET ST	WNW 1/2 - 1 (0.847 mi.)	226	795
Facility Status: Inactive Project Code: PRIV-HWM Project Code: PRI-SUBC Siterem Site Number: SR-26-1137 A Siterem Site Number: SR-26-1137 B				
SCHOOLHOUSE CANDY	1005 MAIN ST/75-77 E	SW 1/2 - 1 (0.882 mi.)	227	809
Facility Status: Active				

EXECUTIVE SUMMARY

Project Code: SCHC-HWM Siterem Site Number: SR-26-1407				
RI TEXTILE	400 YORK AVENUE	ESE 1/2 - 1 (0.890 mi.)	228	809
Facility Status: Inactive Project Code: RIT-HWM Siterem Site Number: SR-26-1159				
AGAR MACHINING & WEL	270 YORK AVE	ESE 1/2 - 1 (0.895 mi.)	229	809
Facility Status: Inactive Project Code: SSPC-NJD Siterem Site Number: NJD-26-0047				
BEACON STREET DISPOS	BEACON & WASHINGTON	NNW 1/2 - 1 (0.909 mi.)	230	820
Facility Status: Inactive Project Code: BSD-HWM Siterem Site Number: SR-04-0111				
SARGEANT & WILBUR HE	170 YORK AVE	ESE 1/2 - 1 (0.930 mi.)	231	820
Facility Status: Inactive Project Code: GPRO-HWM Siterem Site Number: SR-26-0516				
BRANCH STREET PARCEL	0, 30, 34, 41, 43 AN	N 1/2 - 1 (0.958 mi.)	AZ232	824
Facility Status: Active Project Code: BSP-HWM Project Code: BSP-SUBC Siterem Site Number: SR-26-0155 A Siterem Site Number: SR-26-0155 B				
BRANCH STREET PARCEL	4, 18, 24 BRANCH STR	N 1/2 - 1 (0.958 mi.)	AZ233	825
Facility Status: Active Project Code: BSP2-SUBC Siterem Site Number: SR-26-0155 C				
FREIGHT STREET LOT 4	25 FREIGHT STREET	NE 1/2 - 1 (0.963 mi.)	234	825
Facility Status: Active Project Code: FSL4-HWM Siterem Site Number: SR-26-1927				
MCDONALD'S	839 BROAD STREET	N 1/2 - 1 (0.969 mi.)	235	826
Facility Status: Inactive Project Code: MDON-HWM Siterem Site Number: SR-04-0797				
U S POSTAL SERVICE	30 MONTICELLO ROAD	ESE 1/2 - 1 (0.979 mi.)	236	826
Facility Status: Inactive Project Code: USPS-HWM Siterem Site Number: SR-26-1611				
L'HEUREUX PROPERTY	512 YORK AVENUE	E 1/2 - 1 (0.981 mi.)	237	826
Facility Status: Inactive Project Code: LHP-HWM Siterem Site Number: SR-26-0739				
NARRAGANSETT GROUP	1125 MAIN STREET	SW 1/2 - 1 (0.983 mi.)	238	827
Facility Status: Inactive Project Code: NARW-HWM Siterem Site Number: SR-26-0909 B				

EXECUTIVE SUMMARY

State and tribal leaking storage tank lists

RI LUST: The LUST Case List is a summary of UST Facilities in RI with leaking USTs, which includes information on the date of release discovery and the status of the LUST Case (active, soil removal only, or inactive).

A review of the RI LUST list, as provided by EDR, and dated 12/26/2018 has revealed that there are 26 RI LUST sites within approximately 0.5 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
ADAMS FURNITURE Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required Facility Id: 19135 Project Number: 2695-ST	65 EAST AVENUE	N 0 - 1/8 (0.022 mi.)	E17	55
YOUNG MEN CHRISTIAN Facility Status: Soil Removal Only; No Further Action Required Facility Id: 16935 Project Number: 2630-LS	20 SUMMER STREET	N 0 - 1/8 (0.116 mi.)	J46	149
VIKING CHEVROLET GEO Facility Status: Soil Removal Only; No Further Action Required Facility Id: 18524 Project Number: 2671-ST	45-55 DIVISION ST	ESE 1/8 - 1/4 (0.148 mi.)	U70	179
TOLMAN HIGH SCHOOL Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required Facility Id: 1425 Project Number: 2639-ST	EXCHANGE STREET	NNE 1/8 - 1/4 (0.159 mi.)	V80	227
SUNOCO STATION Facility Status: Active; Investigation/Remed. Required Facility Id: 620 Project Number: 2605-LS	35 CEDAR STREET	WNW 1/8 - 1/4 (0.174 mi.)	Y90	245
SUNOCO SERVICE STA Facility Status: Soil Removal Only; No Further Action Required Facility Id: 621 Project Number: 2607-LS	81 SCHOOL ST	ENE 1/8 - 1/4 (0.184 mi.)	AC102	290
THE PAWTUCKET SPOT Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required Facility Id: 1828 Project Number: 2673-LS	72 EXCHANGE ST	N 1/8 - 1/4 (0.190 mi.)	107	317
SHELL STATION Facility Status: Active; Investigation/Remed. Required Facility Id: 808 Project Number: 26105-LS	71 CEDAR STREET	WNW 1/8 - 1/4 (0.216 mi.)	Y120	357
TEXACO STATION Facility Status: Soil Removal Only; No Further Action Required Facility Id: 544 Project Number: 2601-LS	GOFF AVENUE & DEXTER	NNW 1/8 - 1/4 (0.217 mi.)	AG123	367
HASKELL WILLIAM H MF Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required Facility Id: 19 Project Number: 2648A-ST Project Number: 2648-LS	24 COMMERCE ST	NNW 1/8 - 1/4 (0.218 mi.)	AH124	367
GEORGE H FULLER AND	151 EXCHANGE ST	NNE 1/8 - 1/4 (0.222 mi.)	AJ128	387

EXECUTIVE SUMMARY

Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required				
Facility Id: 4534				
Project Number: 26111-ST				
MORRIS NATHANSON DES	163 EXCHANGE ST	NNE 1/8 - 1/4 (0.237 mi.)	AJ144	452
Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required				
Facility Id: 18259				
Project Number: 2663-ST				
UNION WADDING CO.	125 GOFF AVE	NNW 1/4 - 1/2 (0.278 mi.)	157	558
Facility Status: Soil Removal Only; No Further Action Required				
Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required				
Facility Id: 10				
Project Number: 26107A-ST				
Project Number: 26107-ST				
CAROL CABLE (NO FILE)	249 ROOSEVELT AVENUE	NNE 1/4 - 1/2 (0.284 mi.)	AM158	559
Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required				
Facility Id: 18518				
Project Number: 2650-ST				
MIRROR IMAGE INC.	190 EXCHANGE ST	NNE 1/4 - 1/2 (0.287 mi.)	159	560
Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required				
Facility Id: 18539				
Project Number: 2662-LS				
ST RAPHAEL'S ACADEMY	123 WALCOTT STREET	NE 1/4 - 1/2 (0.340 mi.)	161	572
Facility Status: Soil Removal Only; No Further Action Required				
Facility Id: 3638				
Project Number: 2629-ST				
HARTY REALTY	59 BLACKSTONE AVENUE	NNE 1/4 - 1/2 (0.359 mi.)	AN162	572
Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required				
Facility Id: 4033				
Project Number: 26102-LS				
CUMBERLAND FARMS #38	193 DIVISION ST	E 1/4 - 1/2 (0.385 mi.)	170	597
Facility Status: Soil Removal Only; No Further Action Required				
Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required				
Facility Id: 779				
Project Number: 2672A-LS				
Project Number: 2672-LS				
EMERGENCY SHELTER	183 BARTON STREET	NNW 1/4 - 1/2 (0.395 mi.)	174	616
Facility Status: Soil Removal Only; No Further Action Required				
Facility Id: 16669				
Project Number: 2621-LS				
MEMORIAL HOSPITAL OF	111 BREWSTER ST	E 1/4 - 1/2 (0.410 mi.)	176	617
Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required				
Facility Id: 3420				
Project Number: 26110-ST				
GENERAL FABRICS	45 WASHINGTON STREET	WSW 1/4 - 1/2 (0.427 mi.)	177	668
Facility Status: Inactive; Investigation/Remed. Complete, No Further Action Required				
Facility Id: 18538				
Project Number: 2667-ST				
WOODLAWN SUNOCO SPRI	75 MINERAL SPRING AV	WNW 1/4 - 1/2 (0.433 mi.)	179	671
Facility Status: Soil Removal Only; No Further Action Required				
Facility Id: 3032				
Project Number: 2678-LS				
HARMONY MILLS	10 DUNNELL LANE	SE 1/4 - 1/2 (0.434 mi.)	180	671

EXECUTIVE SUMMARY

Tank Status: Permanently Closed				
LAWN TERRACE APARTME	180-226 PLEASANT ST	SW 0 - 1/8 (0.038 mi.)	F23	57
Facility Id: UST-1540				
Tank Status: Permanently Closed				
COMMERCIAL PROPERTY	228-230 MAIN ST	N 0 - 1/8 (0.039 mi.)	G24	58
Facility Id: UST-19250				
Tank Status: Permanently Closed				
BLACKSTONE VALLEY EL	MERRY ST	SSE 0 - 1/8 (0.047 mi.)	25	58
Facility Id: UST-568				
Tank Status: Permanently Closed				
RIDOT - 20 DIVISION	20 DIVISION ST	ENE 0 - 1/8 (0.052 mi.)	H27	70
Facility Id: UST-4741				
Tank Status: Permanently Closed				
Tank Status: Abandoned				
E & A TAVERN	25 PAWTUCKET AVE	WSW 0 - 1/8 (0.053 mi.)	F28	70
Facility Id: UST-4222				
Tank Status: Permanently Closed				
APEX DEVELOPMENT CO.	1 SCHOOL ST	NNE 0 - 1/8 (0.061 mi.)	I30	81
Facility Id: UST-16081				
Tank Status: Permanently Closed				
COMMERCIAL PROPERTY	250 MAIN ST	N 0 - 1/8 (0.073 mi.)	G32	83
Facility Id: UST-18945				
Tank Status: Permanently Closed				
MERCHANTS TIRE	21 DIVISION ST	E 0 - 1/8 (0.078 mi.)	H33	83
Facility Id: UST-15769				
Tank Status: Permanently Closed				
COMMERCIAL OFFICE BU	225 EAST AVE	WSW 0 - 1/8 (0.096 mi.)	K40	147
Facility Id: UST-18261				
Tank Status: Permanently Closed				
MANNING-HEFFRON FUNE	68 BROADWAY	NNE 0 - 1/8 (0.106 mi.)	L41	148
Facility Id: UST-16653				
Tank Status: Permanently Closed				
PARTY WAREHOUSE	310 EAST AVE	SW 0 - 1/8 (0.110 mi.)	M42	148
Facility Id: UST-15193				
Tank Status: Permanently Closed				
CREST PHOTO LABS	324 EAST AVE	SSW 0 - 1/8 (0.112 mi.)	M43	148
Facility Id: UST-15660				
Tank Status: Permanently Closed				
LANTAU ISLAND, INC.	286 MAIN ST	N 0 - 1/8 (0.112 mi.)	N44	149
Facility Id: UST-188				
Tank Status: Permanently Closed				
YMCA	20 SUMMER ST	N 0 - 1/8 (0.116 mi.)	J45	149
Facility Id: UST-16935				
Tank Status: Permanently Closed				
DISPLAY CREATIONS	93 PARK PL	NNW 0 - 1/8 (0.118 mi.)	O47	150
Facility Id: UST-1429				
Tank Status: Permanently Closed				
ST. PAUL'S EPISCOPAL	50 PARK PL	NNW 0 - 1/8 (0.119 mi.)	P48	150
Facility Id: UST-18769				

EXECUTIVE SUMMARY

Tank Status: Permanently Closed				
VERIZON NEW ENGLAND, Facility Id: UST-1204 Tank Status: In Use Tank Status: Permanently Closed	85 HIGH ST	N 0 - 1/8 (0.119 mi.)	J50	161
JAMES CORDANO Facility Id: UST-16538 Tank Status: Permanently Closed	36 PARK PL	NNW 0 - 1/8 (0.120 mi.)	P51	161
BLACKSTONE VALLEY CO Facility Id: UST-15893 Tank Status: Permanently Closed	42 PARK PL	NNW 0 - 1/8 (0.121 mi.)	P53	170
LANTAU, INC. PROPERT Facility Id: UST-4027 Tank Status: Permanently Closed	298 MAIN ST	NNW 0 - 1/8 (0.123 mi.)	N54	171
NORTHERN PLAZA Facility Id: UST-3346 Tank Status: Permanently Closed	301 MAIN ST	NNW 0 - 1/8 (0.125 mi.)	N55	171
PRESERVATION SOCIETY Facility Id: UST-18940 Tank Status: Permanently Closed	67 PARK PL	NNW 1/8 - 1/4 (0.131 mi.)	O58	173
PAWTUCKET CONGREGATI Facility Id: UST-4286 Tank Status: Permanently Closed	40 WALCOTT ST	NE 1/8 - 1/4 (0.136 mi.)	L62	175
SALVATION ARMY -- PA Facility Id: UST-4653 Tank Status: Permanently Closed	102 HIGH ST	N 1/8 - 1/4 (0.137 mi.)	T63	175
OLD MONTGOMERY DISTR Facility Id: UST-15593 Tank Status: Permanently Closed	100 BROADWAY	NE 1/8 - 1/4 (0.138 mi.)	L64	175
LARRY SHUSHANSKI RES Facility Id: UST-4274 Tank Status: Permanently Closed	351 EAST AVE	SSW 1/8 - 1/4 (0.139 mi.)	65	176
PITCHER STREET REALT Facility Id: UST-4485 Tank Status: Permanently Closed	26 MAIN ST	NE 1/8 - 1/4 (0.142 mi.)	S67	176
EDDY CHEVROLET (FORM Facility Id: UST-18524 Tank Status: Permanently Closed	45-55 DIVISION ST	ESE 1/8 - 1/4 (0.148 mi.)	U69	178
HALL INSTITUTE (FORM Facility Id: UST-16998 Tank Status: Permanently Closed	120 HIGH ST	N 1/8 - 1/4 (0.154 mi.)	T73	203
CITY OF PAWTUCKET Facility Id: UST-2524 Facility Id: UST-2564 Tank Status: Permanently Closed Tank Status: In Use	137 ROOSEVELT AVE	NNE 1/8 - 1/4 (0.155 mi.)	V74	203
PAWTUCKET BUSINESS A Facility Id: UST-19072 Tank Status: Permanently Closed	123 SCHOOL ST	ENE 1/8 - 1/4 (0.158 mi.)	Q76	204
PAWTUCKET REDEVELOPM	370 MAIN ST	NNW 1/8 - 1/4 (0.160 mi.)	82	227

EXECUTIVE SUMMARY

Facility Id: UST-17292 Tank Status: Permanently Closed				
LANMAR APARTMENTS - Facility Id: UST-4707 Tank Status: Permanently Closed	19 HARRISON ST	WNW 1/8 - 1/4 (0.161 mi.)	83	228
BROADWAY STREET HOLD Facility Id: UST-18511 Tank Status: Permanently Closed	169 GEORGE ST	SW 1/8 - 1/4 (0.161 mi.)	84	228
FAMILY SERVICES SOCI Facility Id: UST-4367 Tank Status: Permanently Closed	33 SUMMER ST	N 1/8 - 1/4 (0.161 mi.)	R85	228
GIBBY'S SERVICE Facility Id: UST-1330 Tank Status: Permanently Closed	385 EAST ST	SSW 1/8 - 1/4 (0.167 mi.)	W86	229
BROADWAY APARTMENTS Facility Id: UST-3193 Tank Status: Permanently Closed	142-144 BROADWAY	NE 1/8 - 1/4 (0.172 mi.)	87	229
SUNOCO #0006-0582 Facility Id: UST-620 Tank Status: Permanently Closed Tank Status: In Use	35 CEDAR ST	WNW 1/8 - 1/4 (0.174 mi.)	Y91	245
B.V. MEDICAL Facility Id: UST-16292 Tank Status: Permanently Closed	279 SCHOOL ST	SE 1/8 - 1/4 (0.176 mi.)	Z94	258
CARITAS HOUSE GROUP Facility Id: UST-15962 Tank Status: Permanently Closed	166 PAWTUCKET AVE	SW 1/8 - 1/4 (0.176 mi.)	AA95	259
SUNOCO SERVICE STA Facility Id: UST-621 Tank Status: Permanently Closed Tank Status: In Use	81 SCHOOL ST	ENE 1/8 - 1/4 (0.184 mi.)	AC102	290
PAWTUCKET EVENING TI Facility Id: UST-15641 Tank Status: Permanently Closed	23 EXCHANGE ST	N 1/8 - 1/4 (0.188 mi.)	AD103	302
BOWERS REALTY, INC. Facility Id: UST-829 Tank Status: Permanently Closed	79 DIVISION ST	E 1/8 - 1/4 (0.189 mi.)	AC106	316
THE PAWTUCKET SPOT Facility Id: UST-1828 Tank Status: Permanently Closed Tank Status: In Use	72 EXCHANGE ST	N 1/8 - 1/4 (0.190 mi.)	107	317
CITY OF PAWTUCKET PR Facility Id: UST-4125 Tank Status: Permanently Closed	100 TIM HEALEY WAY	SE 1/8 - 1/4 (0.191 mi.)	AE108	318
MCKEE BROS. OIL CORP Facility Id: UST-1895 Tank Status: Permanently Closed	76 SCHOOL ST	ENE 1/8 - 1/4 (0.191 mi.)	AC111	324
J.P. REALTY Facility Id: UST-15929	450 MAIN ST	NW 1/8 - 1/4 (0.206 mi.)	AB115	354

EXECUTIVE SUMMARY

Tank Status: Permanently Closed				
JOE'S CEDAR ST. SHEL Facility Id: UST-808 Tank Status: Permanently Closed Tank Status: In Use	71 CEDAR ST	WNW 1/8 - 1/4 (0.216 mi.)	Y122	366
KELLAWAY Facility Id: UST-19 Tank Status: Permanently Closed	24 COMMERCE ST	NNW 1/8 - 1/4 (0.218 mi.)	AH125	375
SLATER COTTON MILL Facility Id: UST-4259 Tank Status: Permanently Closed	46 CHURCH ST	NW 1/8 - 1/4 (0.221 mi.)	AI126	376
GEORGE H FULLER AND Facility Id: UST-4534 Tank Status: Permanently Closed	151 EXCHANGE ST	NNE 1/8 - 1/4 (0.222 mi.)	AJ129	390
APARTMENT HOUSE Facility Id: UST-3856 Tank Status: Permanently Closed	447 EAST AVE	SSW 1/8 - 1/4 (0.225 mi.)	AF131	401
BLACKSTONE VALLEY ME Facility Id: UST-2379 Tank Status: Permanently Closed	333 SCHOOL ST	SE 1/8 - 1/4 (0.229 mi.)	AE132	401
GOFF GAS Facility Id: UST-544 Tank Status: Permanently Closed Tank Status: Abandoned	75 GOFF AVE	NNW 1/8 - 1/4 (0.231 mi.)	AG135	422
WILLIAM E. TOLMAN SR Facility Id: UST-1425 Tank Status: Permanently Closed	150 EXCHANGE ST	NNE 1/8 - 1/4 (0.232 mi.)	AJ137	425
ST. MARY'S CHURCH AN Facility Id: UST-1037 Tank Status: Permanently Closed	103 PINE ST	WSW 1/8 - 1/4 (0.235 mi.)	140	441
LANMAR APARTMENTS - Facility Id: UST-4775 Tank Status: Permanently Closed	85 PROSPECT ST	E 1/8 - 1/4 (0.235 mi.)	141	441
MORRIS NATHANSON DES Facility Id: UST-18259 Tank Status: Permanently Closed	163 EXCHANGE ST	NNE 1/8 - 1/4 (0.237 mi.)	AJ144	452
LEROY THEATRE Facility Id: UST-18294 Tank Status: Permanently Closed	84 BROAD ST	N 1/8 - 1/4 (0.246 mi.)	AL148	479

RI AST: The Aboveground Storage Tank database contains registered ASTs. The data come from the Department of Environmental Management's Master List of AST Facilities & Their Associated Tanks.

A review of the RI AST list, as provided by EDR, and dated 08/09/2018 has revealed that there is 1 RI AST site within approximately 0.25 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
NORTHERN PLAZA ASSOC	301 MAIN ST.	NNW 0 - 1/8 (0.125 mi.)	N56	171

EXECUTIVE SUMMARY

Facility ID: 260012
 Tank Status: O-Other

State and tribal institutional control / engineering control registries

RI AUL: This list was developed by RIDEM for use as a general reference and are not meant to be legally authoritative source for the location of hazardous materials, nor for the status, condition or permissible use of a site.

A review of the RI AUL list, as provided by EDR, and dated 01/16/2019 has revealed that there are 19 RI AUL sites within approximately 0.5 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
PET FOOD EXPERTS LLC Siterem Site Number: SR-26-1750	175 MAIN STREET	0 - 1/8 (0.000 mi.)	A2	18
SOVEREIGN BANK Siterem Site Number: SR-26-1457	210 MAIN STREET	N 0 - 1/8 (0.017 mi.)	A10	40
LAWN TERRACE APARTME Siterem Site Number: SR-26-0933	180-226 PLEASANT ST	SW 0 - 1/8 (0.038 mi.)	F23	57
MERCHANTS TIRE Siterem Site Number: SR-26-1540	21 DIVISION ST	E 0 - 1/8 (0.078 mi.)	H33	83
APEX INC Siterem Site Number: SR-26-1710 A	100 MAIN ST	NE 0 - 1/8 (0.087 mi.)	35	105
WEINBERG COMMERCIAL Siterem Site Number: SR-26-1789 B	26 SUMMER STREET	N 1/8 - 1/4 (0.132 mi.)	R59	173
ST GEORGE'S CHURCH (Siterem Site Number: SR-26-1468	46 MAIN STREET	NE 1/8 - 1/4 (0.134 mi.)	S61	174
APEX DEVELOPMENT 2 - Siterem Site Number: SR-26-1710 B	10 SCHOOL STREET	NE 1/8 - 1/4 (0.140 mi.)	66	176
PHOTOPOULOS D JAMES Siterem Site Number: SR-26-1076	123 SCHOOL ST	ENE 1/8 - 1/4 (0.158 mi.)	Q78	206
PARKIN YARN (FORMER) Siterem Site Number: SR-26-1063	21 COMMERCE STREET	NNW 1/8 - 1/4 (0.208 mi.)	AB116	354
CENTENIAL TOWERS Siterem Site Number: SR-26-0228	35 GOFF STREET	NNW 1/8 - 1/4 (0.210 mi.)	X117	355
PAWTUCKET ARMORY Siterem Site Number: SR-26-1075	172 EXCHANGE STREET	NNE 1/4 - 1/2 (0.251 mi.)	AJ151	491
MAACO AUTO PAINTING Siterem Site Number: SR-26-0768	501 MAIN ST	NW 1/4 - 1/2 (0.255 mi.)	AI154	519
DENNIS PRINTING COMP Siterem Site Number: SR-26-0369	69 MONTGOMERY STREET	N 1/4 - 1/2 (0.266 mi.)	156	557
PINE STREET ASSOCIAT Siterem Site Number: SR-26-1109	258 PINE STREET	NW 1/4 - 1/2 (0.322 mi.)	160	571
HARTY REALTY Siterem Site Number: SR-26-0591 A	59-65 BLACKSTONE AVE	NNE 1/4 - 1/2 (0.359 mi.)	AN163	572
HARTY REALTY II	70 BLACKSTONE AVENUE	NNE 1/4 - 1/2 (0.377 mi.)	AN165	573

EXECUTIVE SUMMARY

Siterem Site Number: SR-26-0591 B				
AUTO ZONE	262 BARTON STREET	NNW 1/4 - 1/2 (0.406 mi.)	AO175	616
Siterem Site Number: SR-26-0322 A				
COLLETTE TRAVEL - 1	164 FRONT STREET	NNE 1/4 - 1/2 (0.498 mi.)	AS186	686
Siterem Site Number: SR-26-0276 A				

State and tribal Brownfields sites

RI BROWNFIELDS: Brownfields are real properties where the expansion, redevelopment or reuse may be complicated by the actual or reuse may be complicated by the actual or potential presence of a hazardous substance, pollutant, or contaminant.

A review of the RI BROWNFIELDS list, as provided by EDR, and dated 01/16/2019 has revealed that there are 3 RI BROWNFIELDS sites within approximately 0.5 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
DR. GOLF (SEE NJD-26) Status: I Project: DRG-TBA Project: DRG-SUBC	100 TIM HEALEY WAY	SE 1/8 - 1/4 (0.191 mi.)	AE110	323
PAWTUCKET ARMORY Status: I Project: PAWA-RLF	172 EXCHANGE STREET	NNE 1/4 - 1/2 (0.251 mi.)	AJ151	491
C-TOWN Status: A Project: CTN-SUBC	300 BARTON STREET	NNW 1/4 - 1/2 (0.380 mi.)	AO167	583

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: The EPA's listing of Brownfields properties from the Cleanups in My Community program, which provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

A review of the US BROWNFIELDS list, as provided by EDR, and dated 12/17/2018 has revealed that there are 15 US BROWNFIELDS sites within approximately 0.5 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
OLD COLONY BANK PARK ACRES property ID: 139541	MAIN STREET	NNW 1/8 - 1/4 (0.182 mi.)	AB99	268
OLD COLONY BANK ACRES property ID: 125347	335 MAIN STREET	NNW 1/8 - 1/4 (0.182 mi.)	AB100	271
DIVISION STREET PROJ ACRES property ID: 177664	SCHOOL AND POND STRE	ESE 1/8 - 1/4 (0.188 mi.)	105	313
DR. GOLF	100 TIM HEALEY WAY	SE 1/8 - 1/4 (0.191 mi.)	AE109	318

EXECUTIVE SUMMARY

ACRES property ID: 35142				
PAWTUCKET ARMORY ACRES property ID: 42761	172 EXCHANGE STREET	NNE 1/4 - 1/2 (0.251 mi.)	AJ152	491
FESTIVAL PIER ACRES property ID: 35181	SCHOOL STREET	SE 1/4 - 1/2 (0.265 mi.)	155	530
C-TOWN - LOT 539 ACRES property ID: 125191	300 BARTON STREET	NNW 1/4 - 1/2 (0.380 mi.)	AO166	573
C-TOWN - LOT 541 ACRES property ID: 135201	300 BARTON STREET	NNW 1/4 - 1/2 (0.380 mi.)	AO168	584
C-TOWN - LOT 540 ACRES property ID: 135181	300 BARTON STREET	NNW 1/4 - 1/2 (0.380 mi.)	AO169	587
145 BARTON STREET ACRES property ID: 125363	145 BARTON STREET	NNW 1/4 - 1/2 (0.389 mi.)	171	608
76 JEFFERSON AVENUE ACRES property ID: 111162	76 JEFFERSON AVENUE	WSW 1/4 - 1/2 (0.393 mi.)	172	611
101 BARTON STREET ACRES property ID: 125362	101 BARTON STREET	N 1/4 - 1/2 (0.394 mi.)	173	613
15 JACKSON STREET ACRES property ID: 125348	15 JACKSON STREET	N 1/4 - 1/2 (0.428 mi.)	178	668
PCF 2016 PHASE I - 3 ACRES property ID: 219842	36 MIDDLE STREET	NNE 1/4 - 1/2 (0.449 mi.)	AP182	672
FRONT STREET PARCELS ACRES property ID: 70028	164 FRONT STREET	NNE 1/4 - 1/2 (0.498 mi.)	AS187	687

Other Ascertainable Records

RCRA NonGen / NLR: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 03/25/2019 has revealed that there are 36 RCRA NonGen / NLR sites within approximately 0.25 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
NEW ENGLAND GAS CO T EPA ID:: RIR000501130	91 TIDEWATER ST	S 0 - 1/8 (0.004 mi.)	3	18
SAMOS PRESS EPA ID:: RIR000500074	30 EAST AVE	N 0 - 1/8 (0.013 mi.)	A7	31
SPINGARN ANDREW CO EPA ID:: RID987476884	88 PLEASANT ST	NNW 0 - 1/8 (0.019 mi.)	D12	41
SPRINGARN ANDREW CO EPA ID:: RID987486701	88 PLEASANT ST	NNW 0 - 1/8 (0.019 mi.)	D13	43
GEM AIR POWER INC EPA ID:: RID144768785	80 PLEASANT ST	NNW 0 - 1/8 (0.020 mi.)	D14	44
PRIDE HYUNDAI	20 DIVISION ST	ENE 0 - 1/8 (0.052 mi.)	H26	59

EXECUTIVE SUMMARY

EPA ID:: RID981885288				
BLACKSTONE AUTO BODY	28 DIVISION ST	E 0 - 1/8 (0.067 mi.)	H31	81
EPA ID:: RID981062912				
MERCHANTS TIRE	21 DIVISION ST	E 0 - 1/8 (0.078 mi.)	H33	83
EPA ID:: RID982200545				
PODIATRY SERVICES LT	10 SUMMER ST	N 0 - 1/8 (0.084 mi.)	J34	94
EPA ID:: RID001713387				
APEX INC	100 MAIN ST	NE 0 - 1/8 (0.087 mi.)	35	105
EPA ID:: RID987478419				
DZIALO WALTER M DDS	225 EAST AVE	WSW 0 - 1/8 (0.096 mi.)	K39	137
EPA ID:: RID987478484				
NYNEX CTL OFF	85 HIGH ST	N 0 - 1/8 (0.119 mi.)	J49	151
EPA ID:: RID000841528				
VIKING CHEVROLET GEO	45-55 DIVISION ST	ESE 1/8 - 1/4 (0.148 mi.)	U70	179
EPA ID:: RID982747370				
MCGRATH PHILIP DR	23 BROAD ST	N 1/8 - 1/4 (0.149 mi.)	R71	190
EPA ID:: RID987469152				
WIDE WATER PARKWAY	55 DIVISION ST	E 1/8 - 1/4 (0.151 mi.)	Q72	201
EPA ID:: RID980913834				
ROWE AUTOMATIC SALES	51 S UNION ST	NW 1/8 - 1/4 (0.173 mi.)	88	230
EPA ID:: RID018521633				
ST JOSEPH HEALTH CEN	40 BROAD ST	N 1/8 - 1/4 (0.174 mi.)	X89	234
EPA ID:: RIR000505412				
NORTHEAST INSULATION	279 SCHOOL ST	SE 1/8 - 1/4 (0.176 mi.)	Z93	257
EPA ID:: RID980732119				
ORTHOPAEDICS OF NEW	407 EAST AVE SUITE 1	SSW 1/8 - 1/4 (0.178 mi.)	W96	259
EPA ID:: RIR000016188				
FORTUNA ROBERT J MD	407 EAST AVE SUITE 1	SSW 1/8 - 1/4 (0.178 mi.)	W97	260
EPA ID:: RID987470093				
SPORTS MEDICINE ORTH	127 SCHOOL ST	E 1/8 - 1/4 (0.184 mi.)	AC101	281
EPA ID:: RIR000504878				
SUNOCO SERVICE STA	81 SCHOOL ST	ENE 1/8 - 1/4 (0.184 mi.)	AC102	290
EPA ID:: RID000843078				
TIMES THE	23 EXCHANGE ST	N 1/8 - 1/4 (0.188 mi.)	AD104	302
EPA ID:: RID987466141				
ROGUE PAUL G DDS	32 GOFF AVE RM 205	NNW 1/8 - 1/4 (0.202 mi.)	AG114	344
EPA ID:: RID987486099				
ROYAL CLEANSERS INC	191 PAWTUCKET AVE	SW 1/8 - 1/4 (0.213 mi.)	AA119	355
EPA ID:: RI5000001917				
HASKELL WILLIAM H MF	24 COMMERCE ST	NNW 1/8 - 1/4 (0.218 mi.)	AH124	367
EPA ID:: RID082609983				
HUTCHINSON GROUP THE	46 CHURCH ST	NW 1/8 - 1/4 (0.221 mi.)	AI127	377
EPA ID:: RID987468808				
FULLER GEORGE H & SO	151 EXCHANGE ST	NNE 1/8 - 1/4 (0.222 mi.)	AJ130	391
EPA ID:: RID001200096				
TEXACO STA/COLEMAN T	75 GOFF AVE	NNW 1/8 - 1/4 (0.231 mi.)	AG136	423

EXECUTIVE SUMMARY

EPA ID:: RI5000002014				
AIME & SONS AUTOMOTI	79 GOFF AVE	NNW 1/8 - 1/4 (0.234 mi.)	AK138	425
EPA ID:: RID987473766				
PROFESSIONAL PLATERS	79 GOFF AVE	NNW 1/8 - 1/4 (0.234 mi.)	AK139	436
EPA ID:: RID080819543				
THOMAS STREET STUDIO	163 EXCHANGE ST	NNE 1/8 - 1/4 (0.237 mi.)	AJ143	451
EPA ID:: RIR000501346				
DARLENE JEWELRY MFG	483 MAIN ST	NW 1/8 - 1/4 (0.241 mi.)	145	453
EPA ID:: RID001190610				
TALLMAN ENTERPRISES	44A PINE ST	SW 1/8 - 1/4 (0.244 mi.)	146	466
EPA ID:: RID987477643				
ASBESTOS REMOVAL & C	84 BROAD ST SUITE 21	N 1/8 - 1/4 (0.246 mi.)	AL149	479
EPA ID:: RID980525570				
SILES DANA PHOTOGRAP	498 MAIN ST	NW 1/8 - 1/4 (0.248 mi.)	AI150	480
EPA ID:: RIR000502534				

RI DRYCLEANERS: A listing of drycleaner locations.

A review of the RI DRYCLEANERS list, as provided by EDR, and dated 01/31/2018 has revealed that there is 1 RI DRYCLEANERS site within approximately 0.25 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
MR USA 1 HOUR CLEANI Alternative Site Id: AIR1018	224 EAST AVE	WSW 0 - 1/8 (0.089 mi.)	K36	116

RI MANIFEST: Hazardous waste manifest information

A review of the RI MANIFEST list, as provided by EDR, and dated 12/31/2017 has revealed that there are 37 RI MANIFEST sites within approximately 0.25 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
NEW ENGLAND GAS CO T EPA Id: RIR000501130 Manifest Document Number: MAM686768	91 TIDEWATER ST	S 0 - 1/8 (0.004 mi.)	3	18
SAMOS PRESS EPA Id: RIR000500074 Manifest Document Number: MAQ918137	30 EAST AVE	N 0 - 1/8 (0.013 mi.)	A7	31
GEM AIR POWER INC EPA Id: RID144768785 Manifest Document Number: RIG0179509	80 PLEASANT ST	NNW 0 - 1/8 (0.020 mi.)	D14	44
PRIDE HYUNDAI EPA Id: RID981885288 Manifest Document Number: RIG0189772	20 DIVISION ST	ENE 0 - 1/8 (0.052 mi.)	H26	59
APEX AUTOMOTIVE SERV EPA Id: RID987470606 Manifest Document Number: RIH0018822	1 SCHOOL ST	NNE 0 - 1/8 (0.061 mi.)	I29	71
MERCHANTS TIRE	21 DIVISION ST	E 0 - 1/8 (0.078 mi.)	H33	83

EXECUTIVE SUMMARY

EPA Id: RID982200545				
Manifest Document Number: MAF306915				
PODIATRY SERVICES LT	10 SUMMER ST	N 0 - 1/8 (0.084 mi.)	J34	94
EPA Id: RID001713387				
Manifest Document Number: MAQ130784				
APEX INC	100 MAIN ST	NE 0 - 1/8 (0.087 mi.)	35	105
EPA Id: RID987478419				
Manifest Document Number: 000958564SKS				
MR USA 1 HOUR CLEANE	224 EAST AVE	WSW 0 - 1/8 (0.089 mi.)	K37	120
EPA Id: RID980909345				
Manifest Document Number: MAF113604				
DZIALO WALTER M DDS	225 EAST AVE	WSW 0 - 1/8 (0.096 mi.)	K39	137
EPA Id: RID987478484				
Manifest Document Number: MAJ171903				
NYNEX CTL OFF	85 HIGH ST	N 0 - 1/8 (0.119 mi.)	J49	151
EPA Id: RID000841528				
Manifest Document Number: MAG110959				
BLACKSTONE VALLEY CO	42 PARK PLACE	NNW 0 - 1/8 (0.121 mi.)	P52	162
EPA Id: RI5000001032				
Manifest Document Number: 000500014VES				
VIKING CHEVROLET GEO	45-55 DIVISION ST	ESE 1/8 - 1/4 (0.148 mi.)	U70	179
EPA Id: RID982747370				
Manifest Document Number: RIG0008824				
MCGRATH PHILIP DR	23 BROAD ST	N 1/8 - 1/4 (0.149 mi.)	R71	190
EPA Id: RID987469152				
Manifest Document Number: MAG162216				
PHOTOPOULOS D JAMES	123 SCHOOL ST	ENE 1/8 - 1/4 (0.158 mi.)	Q78	206
EPA Id: RID987475829				
Manifest Document Number: MAF367131				
PHOTOPOULOS D JAMES	123 SCHOOL ST	ENE 1/8 - 1/4 (0.158 mi.)	Q79	217
EPA Id: RID987486214				
Manifest Document Number: MAF367567				
ROWE AUTOMATIC SALES	51 S UNION ST	NW 1/8 - 1/4 (0.173 mi.)	88	230
EPA Id: RID018521633				
Manifest Document Number: MAG139538				
ST JOSEPH HEALTH CEN	40 BROAD ST	N 1/8 - 1/4 (0.174 mi.)	X89	234
EPA Id: RIR000505412				
Manifest Document Number: 004722944FLE				
SUNOCO SERVICE STA	35 CEDAR ST	WNW 1/8 - 1/4 (0.174 mi.)	Y92	247
EPA Id: RID000843656				
Manifest Document Number: MAF015204				
FORTUNA ROBERT J MD	407 EAST AVE SUITE 1	SSW 1/8 - 1/4 (0.178 mi.)	W97	260
EPA Id: RID987470093				
Manifest Document Number: MAC898119				
SPORTS MEDICINE ORTH	127 SCHOOL ST	E 1/8 - 1/4 (0.184 mi.)	AC101	281
EPA Id: RIR000504878				
Manifest Document Number: 1222158				
SUNOCO SERVICE STA	81 SCHOOL ST	ENE 1/8 - 1/4 (0.184 mi.)	AC102	290
EPA Id: RID000843078				

EXECUTIVE SUMMARY

Manifest Document Number: NHC0022995				
TIMES THE	23 EXCHANGE ST	N 1/8 - 1/4 (0.188 mi.)	AD104	302
EPA Id: RID987466141				
Manifest Document Number: MAC898090				
C V S #2234	425 EAST AVE	SSW 1/8 - 1/4 (0.199 mi.)	AF113	325
EPA Id: RIR000500157				
Manifest Document Number: 003625507JJK				
ROGUE PAUL G DDS	32 GOFF AVE RM 205	NNW 1/8 - 1/4 (0.202 mi.)	AG114	344
EPA Id: RID987486099				
Manifest Document Number: MAG162504				
JOE'S CEDAR STREET S	71 CEDAR ST & PINE	WNW 1/8 - 1/4 (0.216 mi.)	Y121	357
EPA Id: RID987470374				
Manifest Document Number: MAC221128				
HASKELL WILLIAM H MF	24 COMMERCE ST	NNW 1/8 - 1/4 (0.218 mi.)	AH124	367
EPA Id: RID082609983				
Manifest Document Number: RIA0012795				
HUTCHINSON GROUP THE	46 CHURCH ST	NW 1/8 - 1/4 (0.221 mi.)	AI127	377
EPA Id: RID987468808				
Manifest Document Number: MAG100566				
FULLER GEORGE H & SO	151 EXCHANGE ST	NNE 1/8 - 1/4 (0.222 mi.)	AJ130	391
EPA Id: RID001200096				
Manifest Document Number: RIH0000634				
R I MEDICAL IMAGING	333 SCHOOL ST	SE 1/8 - 1/4 (0.229 mi.)	AE133	402
EPA Id: RID982543944				
Manifest Document Number: B/L 2146				
SILVERMAN ANDREW B D	333 SCHOOL ST STE 20	SE 1/8 - 1/4 (0.229 mi.)	AE134	412
EPA Id: RIR000506733				
Manifest Document Number: 000540149GBF				
AIME & SONS AUTOMOTI	79 GOFF AVE	NNW 1/8 - 1/4 (0.234 mi.)	AK138	425
EPA Id: RID987473766				
Manifest Document Number: RIG0175902				
PROFESSIONAL PLATERS	79 GOFF AVE	NNW 1/8 - 1/4 (0.234 mi.)	AK139	436
EPA Id: RID080819543				
Manifest Document Number: RIA0012295				
CENTRAL AUTO RADIATO	188 PINE ST	WNW 1/8 - 1/4 (0.236 mi.)	142	441
EPA Id: RID987486867				
Manifest Document Number: 005776243SKS				
DARLENE JEWELRY MFG	483 MAIN ST	NW 1/8 - 1/4 (0.241 mi.)	145	453
EPA Id: RID001190610				
Manifest Document Number: RIC0026989				
GANSETT AUTO PARTS	206 PINE ST	NW 1/8 - 1/4 (0.246 mi.)	AI147	468
EPA Id: RID987478468				
Manifest Document Number: RIG0189750				
SILES DANA PHOTOGRAP	498 MAIN ST	NW 1/8 - 1/4 (0.248 mi.)	AI150	480
EPA Id: RIR000502534				
Manifest Document Number: MAU210955				

EXECUTIVE SUMMARY

NY MANIFEST: Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

A review of the NY MANIFEST list, as provided by EDR, and dated 01/01/2019 has revealed that there are 3 NY MANIFEST sites within approximately 0.25 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
RIDOT PROJECT EPA ID: RIP000033216	50 DIVISION ST	E 1/8 - 1/4 (0.127 mi.)	Q57	172
EDDY CHEVROLET & BUI EPA ID: RIP000001582	45-55 DIVISION STREE	ESE 1/8 - 1/4 (0.148 mi.)	U68	177
DARLENE JEWELRY MFG EPA ID: RID001190610	483 MAIN ST	NW 1/8 - 1/4 (0.241 mi.)	145	453

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

A review of the EDR MGP list, as provided by EDR, has revealed that there are 2 EDR MGP sites within approximately 1 mile of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
TIDEWATER COAL GASIF PAWTUCKET GAS CO	OFF TIDEWATER AVE HIGH STREET	SSE 0 - 1/8 (0.010 mi.) N 1/2 - 1 (0.670 mi.)	B4 AX209	30 743

EDR Hist Cleaner: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Cleaner list, as provided by EDR, has revealed that there is 1 EDR Hist Cleaner site within approximately 0.125 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
STANLEY SYSTEM DRY C	224 EAST AVE	WSW 0 - 1/8 (0.089 mi.)	K38	136

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 99 records.

Site Name	Database(s)
MAIN ST	RI SPILLS 90
EAST ST	RI SPILLS 90
OCEAN STATE STEEL INC	CORRACTS, RCRA NonGen / NLR, 2020 COR ACTION, RI MANIFEST
NBC CENTRAL FALLS CSO - PCBS	RI SHWS, RI AUL
WEINBERG COMMERCIAL PROPERTY	RI SHWS, RI AUL
HORD CRYSTAL CORPORATION	RI SHWS, RI AUL
PAWTUCKET TRAIN STATION (FORMER)	RI SHWS, RI AUL
PETULA ASSOCIATES (ALSO SEE BEATTY J & K SALES CO INC	RI SHWS, RI AUL
LAUREL HILL (PLAYGROUND)	RI SHWS, RI AUL, RCRA NonGen / NLR, RI MANIFEST
FESTIVAL PIER	RI SHWS, RI AUL, RI BROWNFIELDS RI SHWS, RI AUL, RI BROWNFIELDS, RI SPILLS
HOSPITAL-ELM REALTY, LLC	RI SHWS, RI AUL
BROWN UNIVERSITY - SOUTH WALK	RI SHWS, RI AUL
JOHNSON & WALES - FORMER CLAVERICK	RI SHWS, RI AUL
ROUTE 195 DOT PROJECT 87	RI SHWS, RI AUL
STARWOOD WASSERMAN	RI SHWS, RI AUL
NATIONAL GRID - INDOOR SUBSTATION	RI SHWS, RI AUL
METCALF PARKING LOT	RI SHWS, RI AUL
MAIN WATER POWER PLANT	RI SHWS, RI AUL
UNION STATION PLAZA HOTEL	RI SHWS, RI AUL
ROUTE 195 DOT PROJECT 83	RI SHWS, RI AUL
ROUTE 195 DOT PROJECT 84	RI SHWS, RI AUL
MEETING STREET SCHOOL - FREEWAY PL	RI SHWS, RI AUL
FOX PLACE (OMNI)	RI SHWS, RI AUL
NATIONAL GRID - CENTRAL FALLS SUBS	RI SHWS
RIVER STREET PARK	RI SHWS
DEXTER STREET LOFTS, LLC	RI SHWS
PAWTUCKET BRIDGE #550 REMEDIATION	RI SHWS
PAWTUCKET REDEVELOPMENT AGENCY- BA	RI SHWS, RI BROWNFIELDS
CONANT STREET MILL SITE - LOT 569	RI SHWS
ARMANDO REALTY LLC - GOFF AVENUE P	RI SHWS
GROTTO AVENUE LOT 236 (ALSO PROCAC	RI SHWS, RI BROWNFIELDS
AFRICO PROPERTY II (FORMER)	RI SHWS
MAX READ FIELD	RI SHWS
EAST STREET PARK	RI SHWS
TOWN LANDING (PAWTUCKET LANDING)	RI SHWS, RI BROWNFIELDS
BLACKSTONE VALLEY ELECT STOR (FORM	RI SHWS
ROUTE 195 DOT PROJECT CONTRACT 17	RI SHWS
MAGNOLIA STREET BRIDGE REMOVAL (6/ RIDOT-PROVIDENCE VIADUCT-BRIDGE 57	RI SHWS
OCTOBER 3 2018 GASOLINE TANKER ROL	RI SHWS
ALGONQUIN LNG LINE	RI SHWS
MIRIAM HOSPITAL SEVENTH ST. PARKIN	RI SHWS
PROCAP HOUSING, INC.	RI SHWS
BROWN UNIVERSITY - UTILITY UPGRADE	RI SHWS
RI HOSPITAL PARKING LOT C -ADDITIO	RI SHWS
RI HOSPITAL (SEE CNC CHEMICAL FILE	RI SHWS
NATIONAL GRID - FIELD'S POINT SUBS	RI SHWS
RIDOT - BRIDGE NO. 065901	RI SHWS
CAPITAL CENTER PROJECT (SEE PARCEL	RI SHWS
STATE OF RI - DOA (FRANCIS ST PARK	RI SHWS
CAPITAL CTR PROJ PARCEL 9 (SEE SR- NG - PROVIDENCE RIVER CABLE RELOCA	RI SHWS
BROWN UNIVERSITY MAIN GREEN	RI SHWS
HARRIS RAILROAD BRIDGE #510 & TOBE	RI SHWS
RI DOT - HAYWARD PARK	RI SHWS

EXECUTIVE SUMMARY

ROUTE 195 DOT PROJECT 92	RI SHWS
BUTTON HOLE GOLF COURSE	RI SHWS, RI BROWNFIELDS
FARM FRESH RHODE ISLAND - PROVIDEN	RI SHWS, RI LUST
STARWOOD WASSERMAN	RI SHWS
MANTON AVENUE BRIDGE NO.78	RI SHWS
MANTON AVENUE SKATE PARK	RI SHWS
NATIONAL GRID - VAULT # 35	RI SHWS
NATIONAL GRID - VAULT #26	RI SHWS
ROUTE 195 DOT PROJECT 61	RI SHWS
ROUTE 195 DOT PROJECT 13 (SEE 12)	RI SHWS
ROUTE 195 DOT PROJECT 19	RI SHWS
ROUTE 195 DOT PROJECT 23	RI SHWS
ROUTE 195 DOT PROJECT 89	RI SHWS
ROUTE 195 DOT PROJECT 8	RI SHWS
ROUTE 195 DOT PROJECT 79	RI SHWS
ROUTE 195 DOT PROJECT 78	RI SHWS
ROUTE 195 DOT PROJECT 59	RI SHWS
ROUTE 195 DOT PROJECT 12	RI SHWS
ROUTE 195 DOT PROJECT 90	RI SHWS
ROUTE 195 DOT PROJECT 9	RI SHWS
GRAY REALTY PROPERTY	RI SHWS
DOT BRIDGE 327 - PROVIDENCE	RI SHWS
FURNITURE BANK OF RI - FORMER LOCA	RI SHWS
RIDOT ROW SMITHFIELD AVENUE (ROUTE	RI SHWS
80 SOUTH STREET	RI SHWS
R. WILLIAMS HOME SITE (SEE MANDELL	RI SHWS
NATIONAL GRID - TRANSMISSION LINE	RI SHWS
EAST TRANSIT STREET BOAT RAMP	RI SHWS
BLACKSTONE RIVER BIKEWAY - SEGMENT	RI SHWS
NATIONAL GRID -UNION STREET VAULT	RI SHWS
EASTERN REPAIR AND WATERPROOFING	RI SHWS
WASHINGTON BRIDGE	RI SHWS
PLEASANT STREET MERCURY SPILL	SEMS-ARCHIVE
E - O INCORPORATED	RI LUST
LANMAR APARTMENTS 93-95 HARRISON S	RI LUST
TEKNOR APEX - 1	RI LUST
BLACKSTONE VALLEY ELECTRIC COMPANY	RI LUST
WOODLAWN LAUNDRY & CLEANERS	RI LUST
MARCELLO BUILDING	RI LUST
COMMUNITY CENTER	RI LUST
CAPITAL CENTER PROJECT	RI LUST
SHELL STATION	RI LUST
EAST ST SERVICE CENTER	EDR Hist Auto

OVERVIEW MAP - 5664991.2S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

Indian Reservations BIA

County Boundary

Power transmission lines

100-year flood zone

500-year flood zone

National Wetland Inventory

State Wetlands














This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Taft St
 ADDRESS: Taft St
 Pawtucket RI 02860
 LAT/LONG: 41.872563 / -71.384739

CLIENT: Beta Engineering Inc.
 CONTACT: Joe Mcloughlin
 INQUIRY #: 5664991.2s
 DATE: May 28, 2019 12:21 pm

DETAIL MAP - 5664991.2S



-  Target Property
-  Sites at elevations higher than or equal to the target property
-  Sites at elevations lower than the target property
-  Manufactured Gas Plants
-  Sensitive Receptors
-  National Priority List Sites
-  Dept. Defense Sites
-  Indian Reservations BIA
-  Power transmission lines
-  100-year flood zone
-  500-year flood zone
-  National Wetland Inventory
-  State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Taft St
 ADDRESS: Taft St
 Pawtucket RI 02860
 LAT/LONG: 41.872563 / -71.384739

CLIENT: Beta Engineering Inc.
 CONTACT: Joe Mcloughlin
 INQUIRY #: 5664991.2s
 DATE: May 28, 2019 12:23 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
<i>Federal NPL site list</i>								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
<i>Federal Delisted NPL site list</i>								
Delisted NPL	1.000		0	0	0	0	NR	0
<i>Federal CERCLIS list</i>								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		1	0	0	NR	NR	1
<i>Federal CERCLIS NFRAP site list</i>								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
<i>Federal RCRA CORRACTS facilities list</i>								
CORRACTS	1.000		0	0	0	0	NR	0
<i>Federal RCRA non-CORRACTS TSD facilities list</i>								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
<i>Federal RCRA generators list</i>								
RCRA-LQG	0.250		0	1	NR	NR	NR	1
RCRA-SQG	0.250		3	9	NR	NR	NR	12
RCRA-CESQG	0.250		1	1	NR	NR	NR	2
<i>Federal institutional controls / engineering controls registries</i>								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
<i>Federal ERNS list</i>								
ERNS	TP		NR	NR	NR	NR	NR	0
<i>State- and tribal - equivalent CERCLIS</i>								
RI SHWS	1.000		7	13	15	50	NR	85
<i>State and tribal landfill and/or solid waste disposal site lists</i>								
RI SWF/LF	0.500		0	0	0	NR	NR	0
RI LCP	0.500		0	0	0	NR	NR	0
<i>State and tribal leaking storage tank lists</i>								
RI LUST	0.500		2	10	14	NR	NR	26
INDIAN LUST	0.500		0	0	0	NR	NR	0
<i>State and tribal registered storage tank lists</i>								
FEMA UST	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
RI UST	0.250		29	38	NR	NR	NR	67
RI AST	0.250		1	0	NR	NR	NR	1
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
RI AUL	0.500		5	6	8	NR	NR	19
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
RI BROWNFIELDS	0.500		0	1	2	NR	NR	3
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500	1	0	4	11	NR	NR	16
Local Lists of Landfill / Solid Waste Disposal Sites								
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
RI CDL	TP		NR	NR	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
RI SPILLS	TP		NR	NR	NR	NR	NR	0
RI SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		12	24	NR	NR	NR	36
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
RI AIRS	TP		NR	NR	NR	NR	NR	0
RI ASBESTOS	TP		NR	NR	NR	NR	NR	0
RI DRYCLEANERS	0.250		1	0	NR	NR	NR	1
RI Financial Assurance	TP		NR	NR	NR	NR	NR	0
RI LEAD	TP		NR	NR	NR	NR	NR	0
RI MANIFEST	0.250		12	25	NR	NR	NR	37
NJ MANIFEST	0.250		0	0	NR	NR	NR	0
NY MANIFEST	0.250		0	3	NR	NR	NR	3
RI NPDES	TP		NR	NR	NR	NR	NR	0

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	1.000		1	0	0	1	NR	2
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		1	NR	NR	NR	NR	1

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RI RGA HWS	TP		NR	NR	NR	NR	NR	0
------------	----	--	----	----	----	----	----	---

MAP FINDINGS SUMMARY

<u>Database</u>	<u>Search Distance (Miles)</u>	<u>Target Property</u>	<u>< 1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>> 1</u>	<u>Total Plotted</u>
RI RGA LF	TP		NR	NR	NR	NR	NR	0
RI RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		1	76	135	50	51	0	313

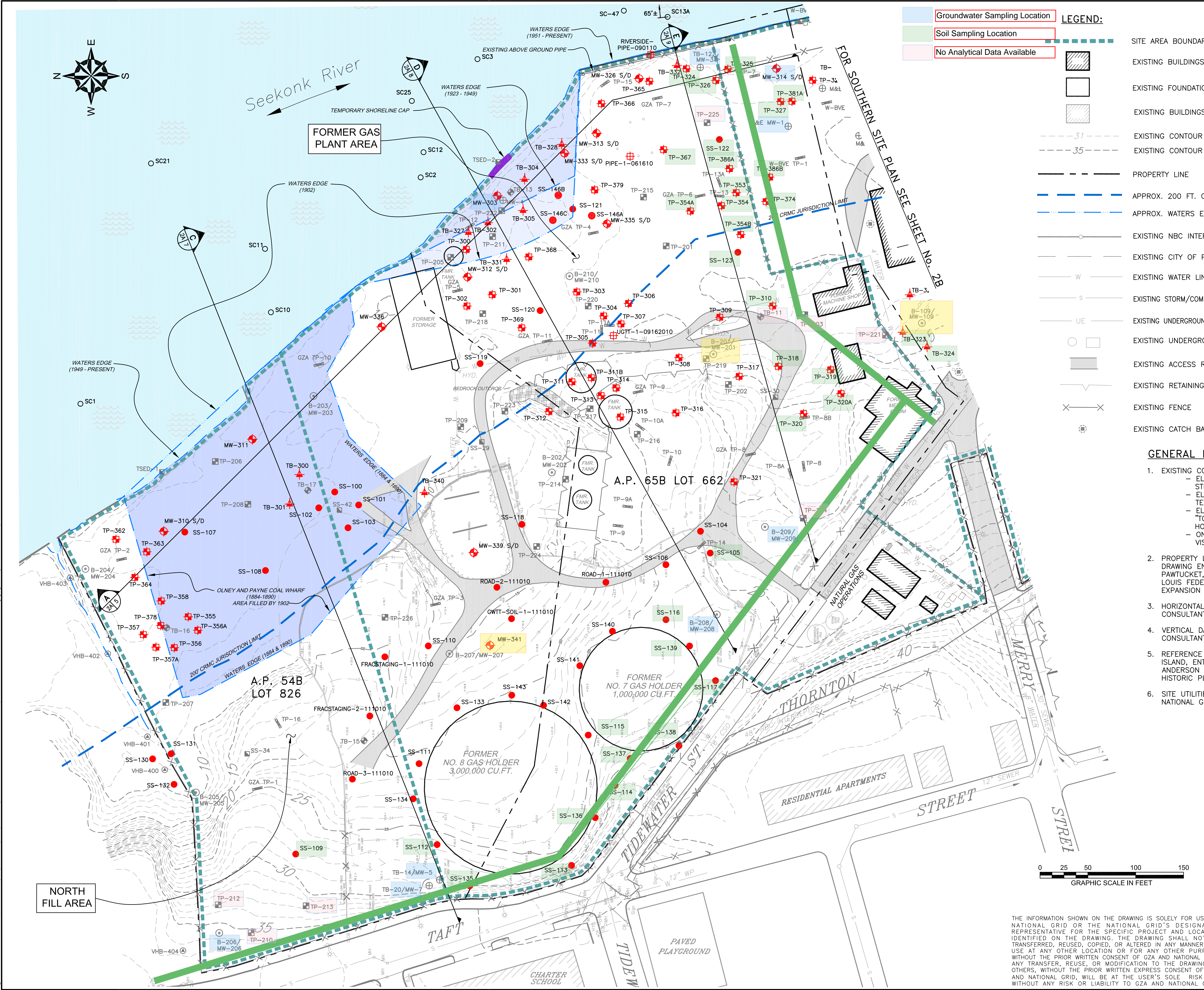
NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

APPENDIX B
HISTORIC REPORTS



LEGEND:

- Groundwater Sampling Location
- Soil Sampling Location
- No Analytical Data Available

- SITE AREA BOUNDARIES
- EXISTING BUILDINGS ON-SITE
- EXISTING FOUNDATION/PAD ON-SITE
- EXISTING BUILDINGS/STRUCTURES OFF-SITE
- EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- PROPERTY LINE
- APPROX. 200 FT. CRMC JURISDICTION LIMIT
- APPROX. WATERS EDGE
- EXISTING NBC INTERCEPTOR SANITARY SEWER
- EXISTING CITY OF PAWTUCKET STORM DRAIN
- EXISTING WATER LINE
- EXISTING STORM/COMBINED SAN. SEWER OVERFLOW
- EXISTING UNDERGROUND ELECTRIC CABLE IN CONDUIT
- EXISTING UNDERGROUND ELECTRIC MH/STRUCTURE
- EXISTING ACCESS ROAD
- EXISTING RETAINING WALLS
- EXISTING FENCE
- EXISTING CATCH BASIN LOCATIONS

SAMPLE LEGEND

- SS-9 ATLANTIC SURFACE SOIL SAMPLE LOCATION
- TSED-6 ATLANTIC SEDIMENT SAMPLE LOCATION
- W-BVE SS-3 WESTON/BLACKSTONE VALLEY ELECTRIC SEDIMENT SAMPLE LOCATION
- RIDEM SS-3 RIDEM SURFACE SOIL SAMPLE LOCATION
- B-109/MW-109 MONITORING WELL/BORING (VHB) SURVEYED
- TP-3A ATLANTIC TEST PIT LOCATION
- W-BVE WESTON/BLACKSTONE VALLEY ELECTRIC TEST PIT LOCATION
- GZA TP-8 GZA/VALLEY GAS TEST PIT LOCATION
- TB-15 ATLANTIC SOIL BORING LOCATION
- MW-3 ATLANTIC MONITORING WELL LOCATION
- M&E MW-1 METCALF & EDDY MONITORING WELL LOCATION
- VHB-400 VHB SURFACE SOIL SAMPLE LOCATION NON-SURVEYED
- TP-204 VHB TEST PIT (2006)
- GZ-01 GZA TEST PIT (2009)
- TB-300 TB-300 TEST BORING LOCATION (2010)
- MW-320 S/D GZA MONITORING WELL LOCATION (2010)
- TP-306 GZA TEST PIT LOCATION (2010)
- SS-100 GZA SURFACE SOIL SAMPLE LOCATION (2010)
- SC31 ARCADIS SEDIMENT SAMPLE LOCATION (2008)
- PIPE-1-061610 GZA RESIDUAL MATERIAL SAMPLE (2010)

- GENERAL NOTES:**
- EXISTING CONDITIONS BASE MAP DEVELOPED FROM THE FOLLOWING:
 - ELECTRONIC FILES FROM GEI CONSULTANTS, INC. (FORMERLY AES) ENTITLED "HISTORIC STRUCTURES AND SAMPLE LOCATIONS", ORIGINAL SCALE 1"=80', DATED JULY 1999
 - ELECTRONIC FILES FROM VANASSE HANGEN BRUSTLIN, INC. ENTITLED "SOIL BORING, TEST PIT AND MONITOR WELL LOCATIONS", SCALE: 1"=60', UNDATED
 - ELECTRONIC FILES FROM WELSH ASSOCIATES LAND SURVEYORS, INC. ENTITLED "TOPOGRAPHIC SURVEY (AS-BUILT), FORMER TIDEWATER FACILITY, DEMOLITION OF GAS HOLDERS NOS. 7 & 8", DATED DECEMBER 17, 2010
 - ON-SITE INVESTIGATIONS AND SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS DURING 2009 AND 2010.
 - PROPERTY LINES AND LOT INFORMATION ESTABLISHED FROM INFORMATION PROVIDED ON A DRAWING ENTITLED "PERIMETER SURVEY OF LAND AT THE TIDEWATER FORMER MGP SITE IN PAWTUCKET, RHODE ISLAND FOR ATLANTIC ENVIRONMENTAL SERVICES INC." DEVELOPED BY LOUIS FEDERICI AND ASSOCIATES AND AN AUTO CAD FILE ENTITLED "MAX READ FIELD TRACK EXPANSION 2007" PROVIDED BY THE CITY OF PAWTUCKET.
 - HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY GEI CONSULTANTS, INC.
 - VERTICAL DATUM IS BASED ON NGVD 1929 (MSL) FROM BASE MAPPING PROVIDED BY GEI CONSULTANTS, INC.
 - REFERENCE SEWER DATA FROM SCANNED IMAGE PROVIDED BY THE CITY OF PAWTUCKET, RHODE ISLAND, ENTITLED "STUDY OF SEWERAGE FACILITIES" BY WATERMAN ENGINEERING CO. & ANDERSON NICHOLS CO. DATED NOV. 1975, ORIGINAL SCALE 1"=400' & SCANNED IMAGES OF HISTORIC PLAN & PROFILE DRAWINGS PROVIDED BY THE CITY OF PAWTUCKET, RHODE ISLAND.
 - SITE UTILITIES TAKEN FROM 1984 SANBORN MAP AND HISTORIC FIGURES PROVIDED BY NATIONAL GRID. ALL UTILITY LOCATIONS ARE APPROXIMATE AND SHOWN FOR REFERENCE ONLY.



NO.	ISSUE/DESCRIPTION	BY	DATE
FORMER TIDEWATER FACILITY			
PAWTUCKET, RHODE ISLAND			
EXPLORATION LOCATION PLAN NORTH FILL AREA AND FORMER GAS PLANT AREA			
PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists 530 BROADWAY PROVIDENCE, RHODE ISLAND 02909 (401) 421-4140		NATIONAL GRID	
PROJ MGR:	MSK	REVIEWED BY:	WF
DESIGNED BY:	WF	DRAWN BY:	CRD
DATE:	JANUARY 2011	CHECKED BY:	MSK
		SCALE:	1"=50"
		REVISION NO.:	0
		PROJECT NO.:	43654.00
		FIGURE	2A
		SHEET NO.	1 OF 24

THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NATIONAL GRID OR THE NATIONAL GRID'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA AND NATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.

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GZA Groundwater Analytical Results
NBC Phase III CSO Program Consolidation Conduits - Phase IIA-4 and IIIA-5
Pawtucket, Rhode Island

Sample Designation Sample Date	MW-314D									MW-341	MW-341 DUP	RIDEM GB UCL	RIDEM GB Objective	NBC Bucklin Point Daily Maximum	NBC Bucklin Point Monthly Average
	6/29/2010	Jul-11	Jul-12	Aug-13	Oct-14	Nov-15	Nov-16	Oct-17	10/23/2018	12/10/2010	12/10/2010				
Volatile Organic Compounds, µg/L															
sec-Butylbenzene	-	-	-	-	-	-	-	-	-	-	-	NE	NE	NE	NE
n-Butylbenzene	-	-	-	-	-	-	-	-	-	-	-	NE	NE	NE	NE
Isopropylbenzene	-	-	-	-	-	-	-	-	-	-	-	NE	NE	NE	NE
n-Propylbenzene	-	-	-	-	-	-	-	-	-	-	-	NE	NE	NE	NE
Chloroform	-	-	-	-	-	-	-	-	-	-	-	NE	NE	NE	NE
Naphthalene	2.3	-	-	-	-	-	-	-	-	3,900	3,800	NE	2,670	NE	NE
Acetone	-	-	-	-	-	-	-	-	-	-	-	NE	NE	NE	NE
Styrene	-	-	-	-	-	-	-	-	-	1,200	1,200	50,000	2,200	NE	NE
Benzene	1.6	1	-	-	-	-	-	-	-	-	-	18,000	140	NE	NE
Toluene	-	-	-	-	-	-	-	-	-	1,000	980	21,000	1,700	NE	NE
p-Isopropyltoluene	-	-	-	-	-	-	-	-	-	-	-	NE	NE	NE	NE
Ethylbenzene	-	-	-	-	-	-	-	-	-	330	330	16,000	1,600	NE	NE
1,3,5-Trimethylbenzene	-	-	-	-	-	-	-	-	-	140	150	NE	NE	NE	NE
1,2,4-Trimethylbenzene	-	-	-	-	-	-	-	-	-	550	540	NE	NE	NE	NE
Xylene P,M	-	-	-	-	-	-	36.6	-	-	2,000	2,000	NE	NE	NE	NE
Xylene O	-	-	-	-	-	-	16.5	-	-	910	920	NE	NE	NE	NE
Total VOCs	3.9	1	-	-	-	-	53.1	-	-	10,030	9,920	NE	NE	NE	NE
Semi-Volatile Organic Compounds, µg/L															
2-Methylnaphthalene	-	-	-	-	-	NA	NA	NA	NA	240	270	NE	NE	NE	NE
Acenaphthylene	-	-	0.3	0.2	-	NA	NA	NA	NA	110	120	NE	NE	NE	NE
Acenaphthene	3.7	2.7	3	3.1	1.3	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Anthracene	-	-	-	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Benzo(a)anthracene	-	-	-	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Benzo(a)pyrene	-	-	-	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Benzo(b)fluoranthene	-	-	-	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Benzo(g,h,i)perylene	-	-	-	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Benzo(k)fluoranthene	-	-	-	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Chrysene	-	-	-	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Dibenzo(a,h)Anthracene	-	-	-	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Fluorene	-	-	0.4	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Fluoranthene	-	-	0.2	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Indeno(1,2,3-cd)Pyrene	-	-	-	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Naphthalene	-	-	4	0.4	-	NA	NA	NA	NA	2,000	2,100	NE	2,670	NE	NE
Phenanthrene	2	-	0.2	-	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Pyrene	-	-	0.3	0.2	-	NA	NA	NA	NA	-	-	NE	NE	NE	NE
Total SVOCs	5.7	2.7	8.4	3.9	1.3	NA	NA	NA	NA	2,350	2,490	NE	NE	NE	NE
Total Petroleum Hydrocarbons, µg/L															
Total Petroleum Hydrocarbons	-	330	1,690	530	370	NA	NA	NA	NA	12,000	14,000	NE	NE	NE	NE
Total Metals, µg/L															
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	200	100
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	2,770	1,630
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	1,200	1,200
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	690	290
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	1,620	1,620
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	1,670	1,390
Dissolved Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE
Dissolved Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE
Dissolved Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE
Dissolved Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE
Dissolved Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE
Dissolved Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE
Dissolved Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE
Cyanide, mg/L															
Total Cyanide	0.46	0.32	0.1440	0.317	0.16	NA	NA	NA	NA	0.01	-	NE	NE	0.5	0.5
Physically Available Cyanide	-	NA	NA	NA	NA	NA	NA	NA	NA	-	-	NE	NE	NE	NE

Notes

Bold indicates detection above laboratory detection limit

Bold and yellow shading indicates exceedance of RIDEM GB Objective

Bold and green shading indicates exceedance of RIDEM GB Upper Concentration Limit

Bold and blue shading indicates exceedance of NBC Bucklin Point Daily Maximum Standard

Bold and orange shading indicates exceedance of NBC Bucklin Point Monthly Average Standard

NE = Standard not established

NA = Not analyzed

- = Analyte not detected above laboratory minimum detection limits

Table 6
Summary of Monitoring Well and Groundwater Elevations
Measured on September 30, 2011

Town Landing
Pawtucket, Rhode Island

Site Investigation Report/Targeted Brownfields Assessment
Prepared for RIDEM

April 2013

Location	Well Casing Elevation (feet) ^[1]	Depth to Groundwater ^[2]	Groundwater Elevation (feet) ^[1]
MW-01	71.44	6.08	65.36
MW-02	70.99	6.45	64.54
MW-03	72.51	5.47	67.04
MW-05	76.01	4.07	71.94
MW-06	100.00	25.30	74.70
MW-09	72.61	7.90	64.71

NOTES:

MW: monitoring well
PVC: polyvinyl chloride

Created by: PHG

Checked by: AMB

[1] Well elevations and associated groundwater elevations are based on an elevation survey conducted by Fuss & O'Neill on September 30, 2011. Elevations are based on an arbitrary 100.00 ft benchmark set at the top of the PVC riser pipe of monitoring well MW-6.

[2] Depth to groundwater was measured from the highest point of the PVC well casing, prior to purging and sampling.

Table 7
Summary of Groundwater Analytical Data
Collected September 30, 2011

Town Landing
Pawtucket, Rhode Island

Site Investigation Report/Targeted Brownfields Assessment
Prepared for RIDEM

April 2013

Sample Location	MW-01	MW-02	MW-03	MW-05		MW-06*	MW-09	RIDEM Regulatory Criteria	RIDEM Reference Criteria
Sample Number	0930-05	0930-04	0930-03	0930-01	0930-02	0930-07	0930-06		
Sample Type	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary		
Screened Interval (fbg)	5-15	3-13	2-8	2-12		17-27	7-17	GB-GO	GA-GO
Field Measurements									
	UNITS								
pH	---	4.99	5.68	6.88	6.06	6.64	4.83	NE	NE
Specific Conductance	µS/cm	584	1,157	620	477	426	525	NE	NE
Temperature	C deg	16.14	16.14	15.92	16.68	14.78	16.46	NE	NE
Turbidity	ntu	4.90	103.0	0.90	2.79	NM	14.5	NE	NE
Dissolved Oxygen	mg/L	4.00	1.01	1.28	4.40	12.51	6.83	NE	NE
ORP	mv	-227.4	-260.5	-303.4	-190.9	-272.2	-191.3	NE	NE
Dissolved Metals (USEPA Method 6010/7470A)									
Barium	mg/L	NA	0.040	NA	NA	NA	0.031	NE	2
Manganese	mg/L	NA	0.064	NA	NA	NA	0.025	NE	NE
Nickel	mg/L	NA	0.038	NA	NA	NA	0.0044	NE	0.1
Zinc	mg/L	NA	0.032	NA	NA	NA	0.0071	NE	NE
Total Metals (USEPA Method 6010/7470A)									
Barium	mg/L	0.030	NA	0.048	0.047	0.047	0.050	NA	2
Copper	mg/L	ND < 0.0020	NA	0.0059	0.0032	0.0034	0.0060	NA	NE
Manganese	mg/L	0.016	NA	0.042	0.13	0.12	0.052	NA	NE
Nickel	mg/L	0.0037	NA	0.0044	0.0036	ND < 0.0020	0.0034	NA	0.1
Vanadium	mg/L	ND < 0.0020	NA	0.0025	ND < 0.0020	ND < 0.0020	ND < 0.0020	NA	NE
Zinc	mg/L	0.0053	NA	0.0062	0.0057	0.0066	0.035	NA	NE
Dissolved Cyanide (USEPA Method 9012)									
	mg/L	NA	ND < 0.010	NA	NA	NA	NA	ND < 0.010	NE
Total Cyanide (USEPA Method 9012)									
	mg/L	ND < 0.010	NA	ND < 0.010	ND < 0.010	ND < 0.010	ND < 0.010	NA	NE
SVOC (USEPA Method 8270C)									
	µg/L	ND < varies	ND < varies	ND < varies	ND < varies	ND < varies	ND < varies	ND < varies	NE
VOC (USEPA Method 8260B)									
Chloroform	µg/L	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	1.2	NE
Tetrachloroethene (PCE)	µg/L	ND < 1.0	ND < 1.0	ND < 1.0	2.3	2.1	ND < 1.0	ND < 1.0	150

NOTES:

RIDEM: Rhode Island Department of Environmental Management
USEPA: United States Environmental Protection Agency
MW: monitoring well
VOC: volatile organic compounds
SVOC: semi-volatile organic compounds
mg/L: milligrams per liter
µg/L: micrograms per liter
fbg: feet below grade
ORP: oxidation-reduction potential
µS/cm: microsiemens per centimeter

C deg: degrees Celsius
ntu: nephelometric turbidity units
mv: millivolts
ND < X: compound not detected above laboratory reporting limit
NE: not established
NA: not analyzed
GB-GO: GB Groundwater Objectives
GA-GO: GA Groundwater Objectives
Only the last six digits of the sample number are listed.

Created by: PHG
Checked by: AMB

*Depth to groundwater was too deep to use low flow sampling procedures. Instead, one field measurement was taken and a grab sample was collected using a dedicated disposable polyethylene bailer.

Table 8
Summary of Disposal Characterization Analytical Data
Collected May 30, 2012

Town Landing
Pawtucket, Rhode Island

Site Investigation Report/Targeted Brownfields Assessment
Prepared for RIDEM

April 2013

	Location	SB-101, SB-102, SB-103					SB-104, SB-105, SB-106		SB-104		SB-106	RIRRC ACM ^[1] Acceptance Criteria	MassDEP Policy #COMM 97-001 ^[2]		RCRA Characteristic Hazardous Waste Criteria (40 CFR §261.21- §261.24)	
		0-2		2-4			0-2	2-4	2-4		0-2		Lined Landfills	Unlined Landfills	Total ^[3]	TCLP
		Sample Number	Sample Number	Sample Number	Sample Number	Sample Number	Sample Number	Sample Number	Sample Number	Sample Number	Sample Number					
Sample Type	Composite/ Primary	Composite/ Primary	Composite/ Primary	Composite/ Primary	Composite/ Primary	Primary	Primary	Primary	Duplicate	Primary						
Total Metals (USEPA Method 6010/7471)	Units															
Arsenic	mg/Kg	4.9	13	20	7.2	5.4	----	----	----	----	7.0	40	40	100	----	
Barium	mg/Kg	79	98	68	55	50	----	----	----	----	10,000	NE	NE	2,000	----	
Cadmium	mg/Kg	0.82	2.4	1.2	0.96	0.99	----	----	----	----	1,000	80	30	20	----	
Chromium	mg/Kg	21	21	21	11	15	----	----	----	----	10,000	1,000	1,000	100	----	
Lead	mg/Kg	120	170	180	100	43	----	----	----	----	500	2,000	1,000	100	----	
Mercury	mg/Kg	0.12	0.94	0.61	0.069	0.049	----	----	----	----	610	10	10	4	----	
Selenium	mg/Kg	ND <0.28	ND <0.29	ND <0.29	ND <0.29	ND <0.28	----	----	----	----	10,000	NE	NE	20	----	
Silver	mg/Kg	ND <0.11	ND <0.12	ND <0.11	ND <0.11	ND <0.11	----	----	----	----	10,000	NE	NE	100	----	
TCLP Metals (USEPA Method 1311/6010)																
Lead	mg/L	0.24	0.76	0.27	0.051	----	----	----	----	----	NE	5.0	5.0	----	5.0	
Total Cyanide (USEPA Method 9012)	mg/Kg	ND <0.55	1.4	0.75	ND <0.57	ND <0.55	----	----	----	----	10,000	non-reactive	non-reactive	non-reactive	----	
Total Sulfide (USEPA Method 9030)	mg/Kg	ND <5.5	ND <5.7	ND <5.3	ND <5.5	ND <5.5	----	----	----	----	NE	non-reactive	non-reactive	non-reactive	----	
Detected PCB Aroclors (USEPA Method 8082)																
Aroclor 1260	µg/Kg	170	98	150	180	59	----	----	----	----	NE	NE	NE	----	----	
Total Detected PCB Aroclors	µg/Kg	170	98	150	180	59	----	----	----	----	10,000	2,000	2,000	----	----	
TPH (USEPA Method 8100)																
C16-C36 Heavy Petroleum Distillate	mg/Kg	280	830	640	300	85	----	----	----	----	2,500	5,000	2,500	----	----	
pH/Corrosivity (USEPA Method 9045)	pH units	8.1	8.2	8.2	9.1	9.9	----	----	----	----	NE	2 < pH < 12.5	2 < pH < 12.5	2 < pH < 12.5	----	
Ignitability (USEPA Method 1010)	°F	>160	>160	>160	>160	>160	----	----	----	----	NE	>140	>140	>140	----	
Specific Conductance (USEPA Method 9050)	micromhos/cm	50	60	70	83	96	----	----	----	----	NE	8,000	4,000	NE	----	
Free Liquids Test (USEPA Method 9095)	Pass/Fail	Pass	Pass	Pass	Pass	Pass	----	----	----	----	Pass	Pass	Pass	NE	----	
Detected VOC (USEPA Method 8260)																
Acetone	µg/Kg	----	----	----	----	----	ND <2,500	24	ND <9.0	ND <9.3	27	10,000,000	NE	NE	NE	----
2-Butanone (methyl ethyl ketone)	µg/Kg	----	----	----	----	----	ND <2,500	ND <18	ND <9.0	ND <9.3	15	10,000,000	NE	NE	4,000,000	----
Tetrachloroethene (PCE)	µg/Kg	----	----	----	----	----	ND <490	87	ND <4.5	ND <4.6	ND <6.6	110,000	NE	NE	14,000	----
Naphthalene	µg/Kg	----	----	----	----	----	960	ND <9.1	ND <4.5	ND <4.6	ND <6.6	10,000,000	NE	NE	NE	----
Total Detected VOC	µg/Kg	----	----	----	----	----	960	111	ND <18	ND <18	42	NE	10,000	4,000	NE	----
Detected SVOC (USEPA Method 8270)																
Acenaphthene	µg/Kg	ND <1,800	ND <9,700	14,000	ND <1,900	ND <370	----	----	----	----	10,000,000	NE	NE	NE	NE	
Anthracene	µg/Kg	ND <1,800	16,000	43,000	ND <1,900	ND <370	----	----	----	----	10,000,000	NE	NE	NE	NE	
Benzo(a)anthracene	µg/Kg	2,400	31,000	68,000	4,900	860	----	----	----	----	7,800	NE	NE	NE	NE	
Benzo(a)pyrene	µg/Kg	2,400	30,000	59,000	4,500	810	----	----	----	----	800	NE	NE	NE	NE	
Benzo(b)fluoranthene	µg/Kg	2,800	34,000	71,000	6,600	1,200	----	----	----	----	7,800	NE	NE	NE	NE	
Benzo(ghi)perylene	µg/Kg	ND <1,800	9,900	15,000	ND <1,900	ND <370	----	----	----	----	10,000,000	NE	NE	NE	NE	
Benzo(k)fluoranthene	µg/Kg	ND <1,800	14,000	29,000	2,200	370	----	----	----	----	78,000	NE	NE	NE	NE	
Chrysene	µg/Kg	2,400	30,000	60,000	5,000	1,000	----	----	----	----	780,000	NE	NE	NE	NE	
Fluoranthene	µg/Kg	4,600	60,000	120,000	9,200	1,700	----	----	----	----	10,000,000	NE	NE	NE	NE	
Fluorene	µg/Kg	ND <1,800	ND <9,700	23,000	ND <1,900	ND <370	----	----	----	----	10,000,000	NE	NE	NE	NE	
Indeno (1,2,3-cd)pyrene	µg/Kg	ND <1,800	14,000	23,000	2,400	490	----	----	----	----	7,800	NE	NE	NE	NE	
Phenanthrene	µg/Kg	2,900	71,000	150,000	8,900	1,800	----	----	----	----	10,000,000	NE	NE	NE	NE	
Pyrene	µg/Kg	4,600	58,000	120,000	9,400	1,600	----	----	----	----	10,000,000	NE	NE	NE	NE	
Total Detected SVOC	µg/Kg	22,100	367,900	795,000	53,100	9,830	----	----	----	----	NE	100,000	100,000	NE	NE	

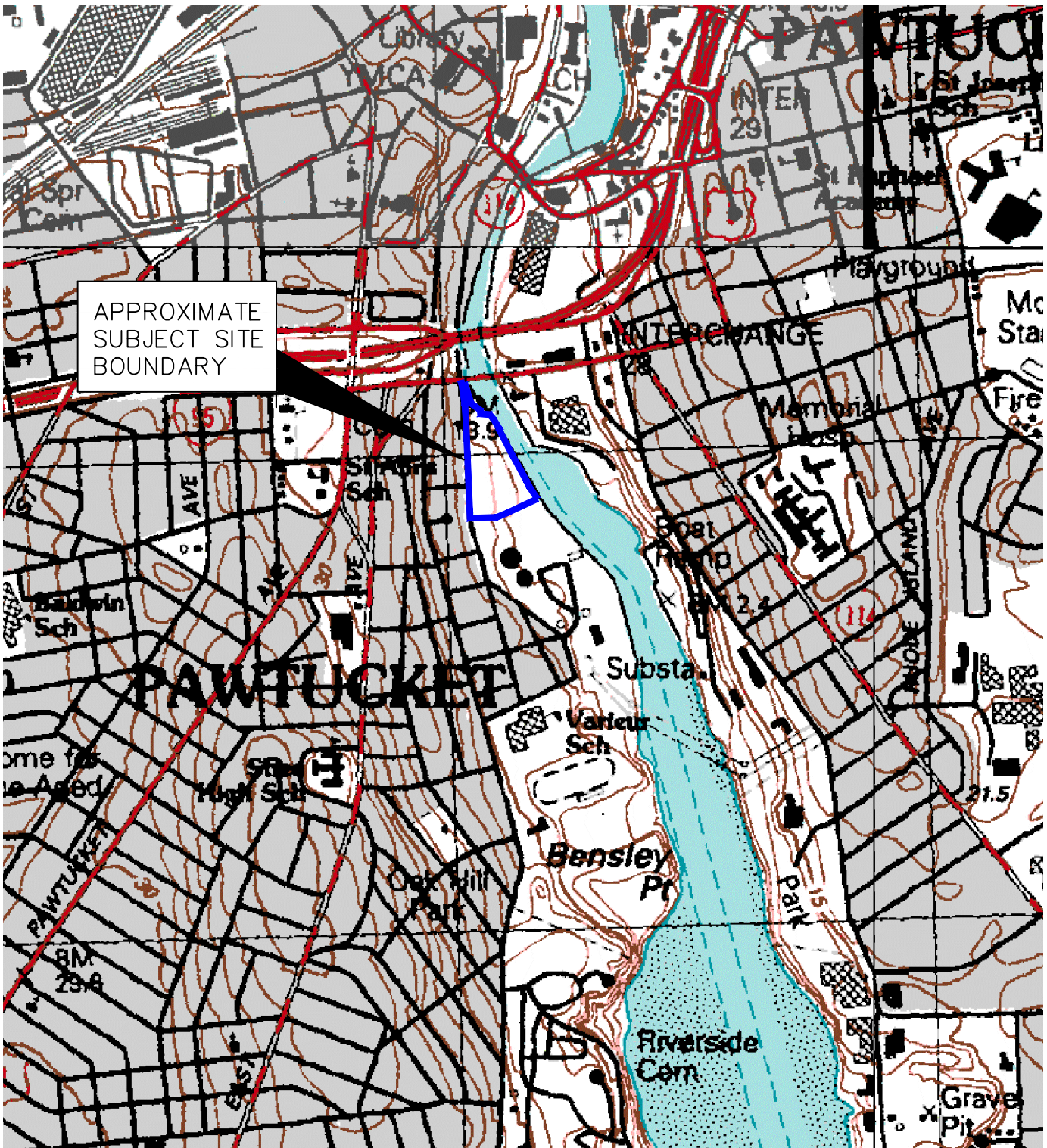
NOTES:
RIDEM: Rhode Island Department of Environmental Management
MassDEP: Massachusetts Department of Environmental Protection
USEPA: United States Environmental Protection Agency
RCRA: Resource Conservation and Recovery Act
TCLP: toxicity characteristic leaching procedure
PCB: polychlorinated biphenyls
VOC: volatile organic compounds
TPH: total petroleum hydrocarbons

SVOC: semi-volatile organic compounds
SB: soil boring
mg/Kg: milligrams per kilogram
µg/Kg: micrograms per kilogram
mg/L: milligrams per liter
ftg: feet below grade
ND < X: compound not detected above laboratory reporting limit
----: not analyzed or not applicable

NE: criterion is not established
Only the last six digits of the sample number are listed.
[1] Alternative Cover Material Policy, Rhode Island Resource Recovery Corporation (RIRRC), amended June 2010
[2] MassDEP Policy #COMM-97-001: Reuse & Disposal of Contaminated Soil at Massachusetts Landfills
[3] "Total" criteria were calculated by multiplying the associated TCLP value by a factor of 20.
Bold values indicate concentration exceeds TCLP value listed in 40 CFR §261.24 by a factor of 20 or greater.
Bold and shaded values exceed one or more of the listed criteria.

Created by: SAH
Checked by: TJC

Figures



MAP REFERENCE

THIS MAP WAS PREPARED FROM THE FOLLOWING 7.5X15 MINUTE
 USGS TOPOGRAPHIC QUADRANGLES PROVIDED BY RIGIS:
 PROVIDENCE RI-MA, 1987
 ATLEBORO MA-RI, 1987

SCALE:	
HORZ.:	1" = 1000'
VERT.:	
DATUM:	
HORZ.:	
VERT.:	
GRAPHIC SCALE	

FUSS & O'NEILL
 317 IRON HORSE WAY, SUITE 204
 PROVIDENCE, RI 02908
 401.861.3070
 www.fando.com

RIDEM
 SITE LOCATION MAP
 TOWN LANDING
 TAFT STREET PAWTUCKET, RHODE ISLAND

PROJ. No.: 20101382.A10
 DATE: APRIL 2013
FIGURE 1



LEGEND

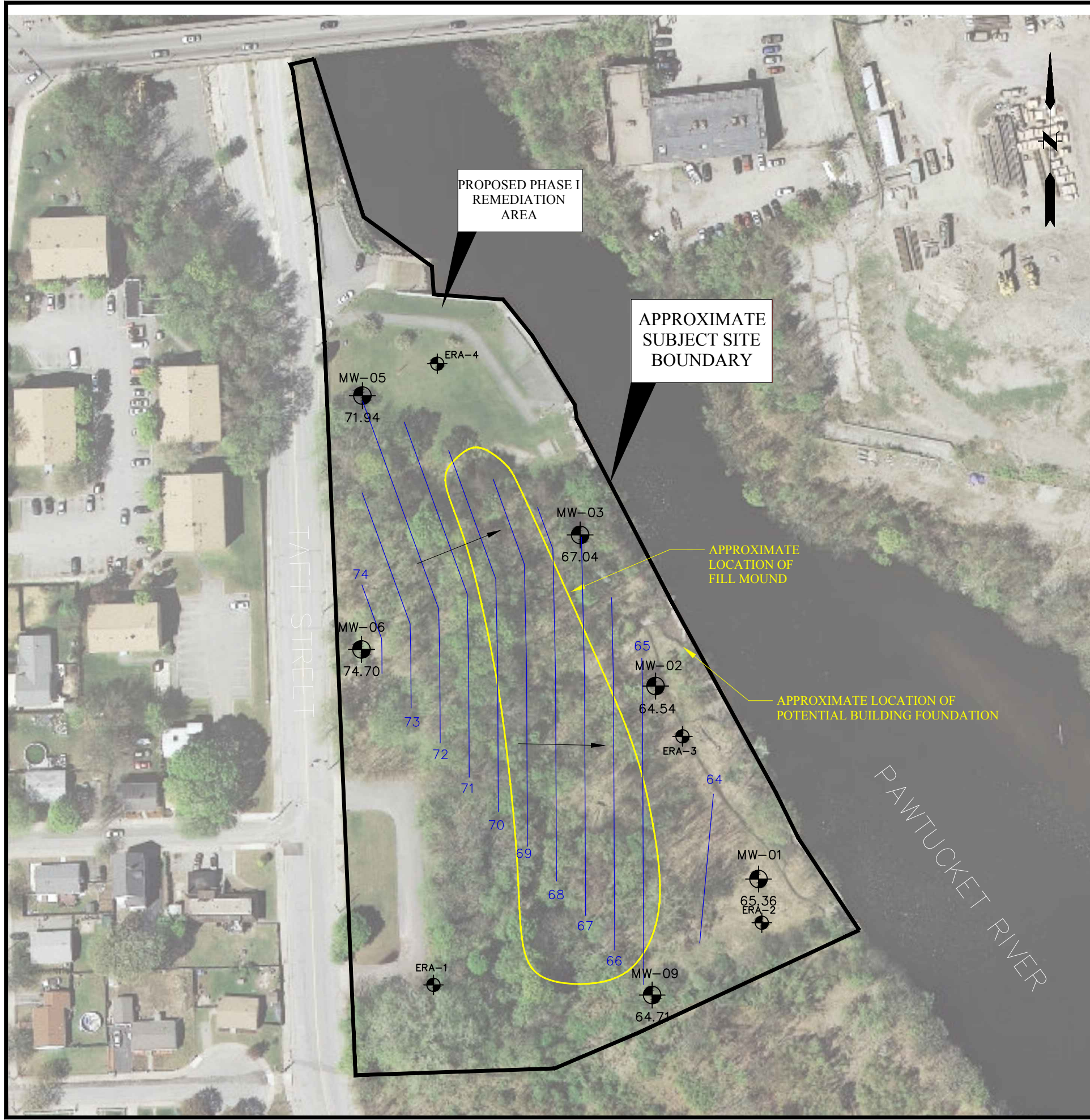
- 100-YEAR FLOOD PLAIN BOUNDARY
- 2011-2012 TARGETED BROWNFIELDS ASSESSMENT:**
- MW-01 MONITORING WELL
- SB-02 SOIL BORING
- SS-01 SURFACE SOIL SAMPLE
- SB-101 PRE-DISPOSAL SOIL CHARACTERIZATION SAMPLE
- PRE-2011 INVESTIGATIONS:**
- TP-1 ERA 1988 TEST PIT LOCATION
- ERA-1 ERA 1988 MONITORING WELL (COULD NOT BE LOCATED)
- VHB-400 VHB 2006 SURFACE SOIL SAMPLE
- SS-130 GZA 2010 SURFACE SOIL SAMPLE

MAP REFERENCES AND NOTES





AERIAL PHOTOGRAPHY ACQUIRED APRIL-MAY 2011, © 2011 RHODE ISLAND GEOGRAPHIC INFORMATION SYSTEM (RIGIS).
 SITE FEATURES AND SAMPLING LOCATIONS ARE APPROXIMATE.
 TOTAL SITE AREA: 5.35 ACRES (25,894 SQUARE YARDS)
 TOTAL SITE AREA WITHIN THE 100-YEAR FLOOD PLAIN: APPROX. 3.70 ACRES

SCALE:	HORIZ.: 1" = 100'
	VERT.: 1" = 100'
	DATUM:
	HORIZ.: 1" = 100'
	VERT.: 1" = 100'
	GRAPHIC SCALE

File Path: C:\Temp\AcPublish_144420101382A10_GW001-SIR.dwg, Layout: FIGURE 3, Plotted: Mon, Mar 25, 2013, 3:50 PM User: shubbs
 MIS VIEW: PLOTTER: DWG TO PDF.PC3 CTB File: FO 2008 COLOR (HALF).CTB



LEGEND

-  MW-01
65.36
MONITORING WELL AND GROUNDWATER ELEVATION (FEET) MEASURED SEPTEMBER 30, 2011
-  1.00-FEET GROUNDWATER EQUIPOTENTIAL CONTOUR
-  INFERRED DIRECTION OF GROUNDWATER FLOW
-  ERA-1

MAP REFERENCES AND NOTES

AERIAL PHOTOGRAPHY ACQUIRED APRIL-MAY 2011, © 2011 RHODE ISLAND GEOGRAPHIC INFORMATION SYSTEM (RIGIS).
 SITE FEATURES AND SAMPLE LOCATIONS ARE APPROXIMATE.
 GROUNDWATER ELEVATIONS ARE RELATIVE TO AN ARBITRARY 100.00-FEET BENCHMARK AT THE TOP OF THE PVC CASING OF MW-06. ELEVATIONS ARE BASED ON A SURVEY CONDUCTED BY FUSS & O'NEILL ON SEPTEMBER 30, 2011.

SCALE:	HORIZ.: 1" = 100'
	VERT.: 1" = 50'
DATUM:	HORIZ.: NAD 83
	VERT.: NAVD 83
GRAPHIC SCALE	

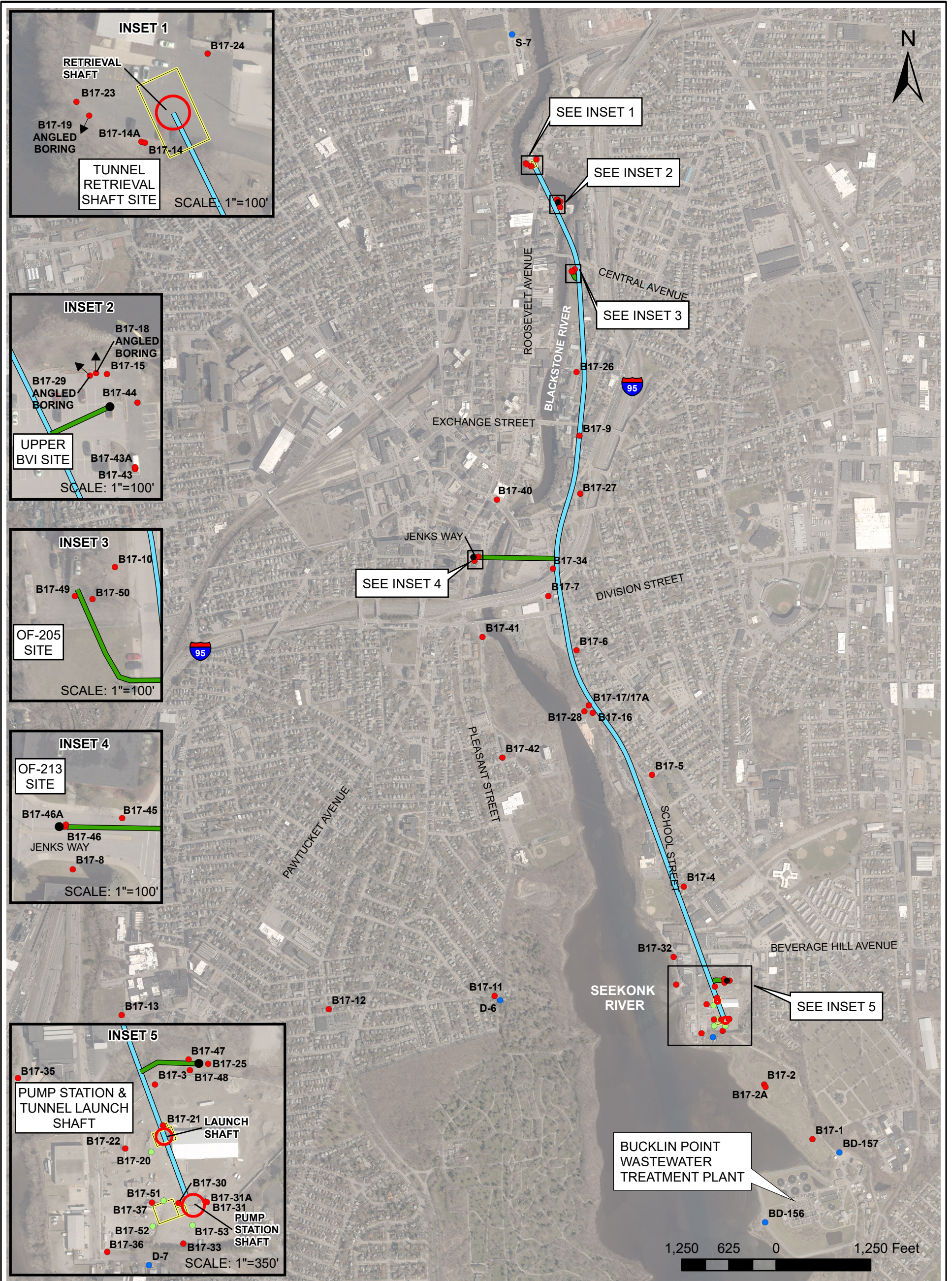
FUSS & O'NEILL
 317 IRON HORSE WAY, SUITE 204
 PROVIDENCE, RI 02908
 401.861.3070
 www.fandob.com

RIDEM
 GROUNDWATER FLOW MAP
 SITE INVESTIGATION REPORT / TARGETED BROWNFIELDS ASSESSMENT
 TOWN LANDING
 PAWTUCKET, RHODE ISLAND

PROJ. No.: 20101382.A10
 DATE: APRIL 2013

FIGURE 3

APPENDIX C
PROGRAM BORINGS



Legend

- Existing Boring (completed or ongoing as of 6/10/19)
- Proposed Boring (approximate location)
- Non-Project Borings Along the Pawtucket Alignment
- Proposed Drop Shaft (approximate location)
- Proposed Pawtucket Tunnel (approximate alignment)
- Proposed Adit Tunnel (approximate location)

REVISED JUNE 10, 2019

TITLE:

BORING LOCATION PLAN

PHASE III CSO CONTROL FACILITIES PROGRAM

REFERENCE(S): DATE: JUNE 2019
 Coordinate System: NAD 1983 StatePlane Rhode Island FIPS 3800 Feet
 Units: Foot US



FIGURE:



Phase III CSO Program Summary Data Table: B17-39



Laboratory Sample Designation Sample Designation Sample Date Sample Depth PID**	RIDEM R DEC	RIDEM I/C DEC	GA Leach	GB Leach	RIRRC ACM	19H0058-01 B17-39 08/02/2019 0-2 ft 0	19H0058-02 B17-39 08/02/2019 2-4 ft 0	19H0058-03 B17-39 08/02/2019 4-6 ft 0.1	19H0058-04 B17-39 08/02/2019 6-8 ft 0	19H0058-05 B17-39 08/02/2019 8-10 ft 4.8	19H0058-06 B17-39 08/02/2019 10-14 ft 1.15
VOCs - Low - mg/kg											
Acetone	7800	10000	NS	NS	NS	0.0620	< 0.0341	< 0.0483	< 0.0394	0.0452	0.0523
Tetrachloroethene	12	110	0.1	NS	NS	< 0.0036	< 0.0034	< 0.0048	< 0.0039	0.0066	0.0253
SVOCs - mg/kg											
Benzo(a)anthracene	0.9	7.8	NS	NS	100	1.13	< 0.336	0.482	0.460	< 0.359	< 0.4
Benzo(a)pyrene	0.4	0.8	240	NS	4	0.934	0.253	0.474	0.439	0.236	< 0.201
Benzo(b)fluoranthene	0.9	7.8	NS	NS	100	0.924	< 0.336	0.435	< 0.373	< 0.359	< 0.4
Benzo(g,h,i)perylene	0.8	10000	NS	NS	100	0.528	< 0.336	< 0.332	< 0.373	< 0.359	< 0.4
Benzo(k)fluoranthene	0.9	78	NS	NS	100	0.761	< 0.336	0.392	0.429	< 0.359	< 0.4
Chrysene	0.4	780	NS	NS	100	1.05	0.333	0.459	0.510	0.303	< 0.201
Dibenzo(a,h)Anthracene	0.4	0.8	NS	NS	100	0.203	< 0.169	< 0.166	< 0.187	< 0.18	< 0.201
Fluoranthene	20	10000	NS	NS	100	2.13	0.781	0.963	0.948	0.656	< 0.4
Indeno(1,2,3-cd)Pyrene	0.9	7.8	NS	NS	100	0.501	< 0.336	< 0.332	< 0.373	< 0.359	< 0.4
Phenanthrene	40	10000	NS	NS	100	0.983	0.564	0.480	0.567	0.421	< 0.4
Pyrene	13	10000	NS	NS	100	1.71	0.635	0.853	0.756	0.495	< 0.4
TPH - ETPH - mg/kg											
Total Petroleum Hydrocarbons	500	2500	500	2500	2500	248	115	51.3	- 80.9	- 58.5	< 42.3
Total Metals - mg/kg											
Arsenic	7	7	NS	NS	19	5.85	< 2.27	2.63	< 2.65	3.97	< 2.66
Barium	5500	10000	NS	NS	10000	705	16.8	31.0	- 82.6	54.9	16.7
Cadmium	39	1000	NS	NS	1000	21.1	< 0.45	0.69	- 0.58	< 0.52	< 0.53
Chromium	1400	10000	NS	NS	10000	64.3	8.64	10.3	- 14.1	13.4	11.9
Lead	150	500	NS	NS	2000	2340	54.2	108	- 148	234	21.6
Mercury	23	610	NS	NS	610	1.34 D	0.084	0.595 D	- 0.345	0.434	0.030
Selenium	390	10000	NS	NS	10000	1.71	< 4.55	< 0.45	- 0.64	0.82	< 5.32
Silver	200	10000	NS	NS	10000	< 0.52	< 0.45	1.44	< 0.53	< 0.52	< 0.53
TCLP Metals - mg/kg											
Cadmium	5	5	1.1	NS	NS	0.458	NT	NT	NT	NT	NT
Lead	5	5	0.04	NS	NS	6.81	NT	< 0.05	0.524	0.081	NT
PCBs - mg/kg											
Aroclor 1260	10	10	10	10	10	0.08	< 0.05	< 0.05	< 0.06	< 0.06	< 0.06

Qualifier	Description
All Entries	Data is summarized above for convenience purposes only. Refer to complete laboratory analytical reports for actual data.
*	Only those compounds which were detected in at least one sample were summarized above. See laboratory report for a complete list of target analytes.
**	Recorded in parts per million (volume basis), maximum PID value recorded at depth.
<	Less than.
NS	No standard established.
NT	Not tested.
D	Diluted.
ND	Not detected.
Bold	Reported value is detected above laboratory Method Reporting Limit (MRL).
Yellow	Reported above RIDEM RDEC but below I/C DEC.
Orange	Reported above RIDEM I/C DEC.



Phase III CSO Program Summary Data Table: B17-40



Laboratory Sample Designation	RIDEM	RIDEM	GA	GB	RIRRC	1805331-06	1805331-07	1805331-08	1805331-09	1805331-10
Sample Designation	R DEC	I/C DEC	Leach	Leach	ACM	B17-40	B17-40	B17-40	B17-40	B17-40
Sample Date						05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018
Sample Depth						0.5-2.5ft	2.5-4.5ft	4.5-6ft	6-8ft	8-10ft
PID**						0	0	0	0	0
VOCs - Low - mg/kg						ND	ND	ND	ND	ND
SVOCs - mg/kg										
Benzo(a)anthracene	0.9	7.8	NS	NS	100	< 0.366	0.488	< 0.35	< 0.372	NT
Benzo(a)pyrene	0.4	0.8	240	NS	4	< 0.184	0.439	< 0.176	< 0.187	NT
Benzo(g,h,i)perylene	0.8	10000	NS	NS	100	< 0.366	0.377	< 0.35	< 0.372	NT
Benzo(k)fluoranthene	0.9	78	NS	NS	100	< 0.366	0.380	< 0.35	< 0.372	NT
bis(2-Ethylhexyl)phthalate	46	410	NS	NS	100	< 0.366	< 0.363	0.355	0.545	NT
Chrysene	0.4	780	NS	NS	100	< 0.184	0.432	< 0.176	< 0.187	NT
Di-n-butylphthalate	NS	NS	NS	NS	100	< 0.366	< 0.363	< 0.35	0.377	NT
Fluoranthene	20	10000	NS	NS	100	< 0.366	0.727	< 0.35	< 0.372	NT
Pyrene	13	10000	NS	NS	100	< 0.366	0.804	< 0.35	< 0.372	NT
TPH - ETPH - mg/kg										
Total Petroleum Hydrocarbons	500	2500	500	2500	2500	94.6	93.0	< 40.9	< 40.9	NT
Total Metals - mg/kg										
Arsenic	7	7	NS	NS	19	3.50	6.51	3.43	5.44	NT
Barium	5500	10000	NS	NS	10000	21.1	20.7	17.1	20.8	NT
Cadmium	39	1000	NS	NS	1000	< 0.42	< 0.47	< 0.47	< 0.46	NT
Chromium	1400	10000	NS	NS	10000	5.37	16.3	6.92	15.3	NT
Lead	150	500	NS	NS	2000	7.53	31.4	25.1	23.7	NT
Mercury	23	610	NS	NS	610	0.053	0.103	0.034	< 0.029	NT
Selenium	390	10000	NS	NS	10000	< 0.85	< 0.93	< 0.94	< 0.91	NT
Silver	200	10000	NS	NS	10000	< 0.42	< 0.47	< 0.47	< 0.46	NT
PCBs - mg/kg										
	10	10	10	10	10	ND	ND	ND	ND	NT

Qualifier	Description
All Entries	Data is summarized above for convenience purposes only. Refer to complete laboratory analytical reports for actual data.
*	Only those compounds which were detected in at least one sample were summarized above. See laboratory report for a complete list of target analytes.
**	Recorded in parts per million (volume basis), maximum PID value recorded at depth.
<	Less than.
NS	No standard established.
D	Diluted.
ND	Not detected.
Bold	Reported value is detected above laboratory Method Reporting Limit (MRL).
Yellow	Reported above RIDEM RDEC but below I/C DEC.
Orange	Reported above RIDEM I/C DEC.



Phase III CSO Program Summary Data Table: B17-45



Laboratory Sample Designation Sample Designation Sample Date Sample Depth PID**	RIDEM R DEC	RIDEM I/C DEC	GA Leach	GB Leach	RIRRC ACM	1904057-01 B17-45 04/02/2019 0.75-2 FT 0	1904057-02 B17-45 04/02/2019 2-4 FT 0	1904057-03 B17-45 04/02/2019 4-8 FT 0.3	1904057-04 B17-45 04/02/2019 8-12 FT 0	1904057-05 B17-45 04/02/2019 12-14 FT 0
VOCs - Low - mg/kg						ND	ND	ND	ND	ND
SVOCs - mg/kg										
Acenaphthylene	23	10000	NS	NS	100	< 0.368	< 0.74 D	2.30	< 0.412	< 0.439
Anthracene	35	10000	NS	NS	100	< 0.368	< 0.74 D	2.71	< 0.412	< 0.439
Benzo(a)anthracene	0.9	7.8	NS	NS	100	0.419	< 0.74 D	9.48	1.21	0.958
Benzo(a)pyrene	0.4	0.8	240	NS	4	0.359	< 0.371 D	7.98	1.18	0.944
Benzo(b)fluoranthene	0.9	7.8	NS	NS	100	< 0.368	< 0.74 D	8.51	0.941	0.761
Benzo(g,h,i)perylene	0.8	10000	NS	NS	100	< 0.368	< 0.74 D	5.13	0.702	0.518
Benzo(k)fluoranthene	0.9	78	NS	NS	100	< 0.368	< 0.74 D	3.99	0.868	0.606
Chrysene	0.4	780	NS	NS	100	0.323	< 0.371 D	7.56	1.01	0.733
Dibenzo(a,h)Anthracene	0.4	0.8	NS	NS	100	< 0.185	< 0.371 D	2.70	0.327	0.246
Dibenzofuran	NS	NS	NS	NS	100	< 0.368	< 0.74 D	0.394	< 0.412	< 0.439
Fluoranthene	20	10000	NS	NS	100	0.825	< 0.74 D	21.4	D 2.06	1.47
Indeno(1,2,3-cd)Pyrene	0.9	7.8	NS	NS	100	< 0.368	< 0.74 D	4.75	0.644	0.461
Naphthalene	54	10000	0.8	NS	100	< 0.368	< 0.74 D	0.506	< 0.412	< 0.439
Phenanthrene	40	10000	NS	NS	100	< 0.368	< 0.74 D	8.28	0.552	< 0.439
Pyrene	13	10000	NS	NS	100	0.695	< 0.74 D	18.1	D 2.09	1.71
Pyridine	NS	NS	NS	NS	100	< 1.85	< 3.71 D	< 1.93	< 2.07	< 2.2
TPH - ETPH - mg/kg										
Total Petroleum Hydrocarbons	500	2500	500	2500	2500	63.9	252 D	462 D	67.2	138
Total Metals - mg/kg										
Arsenic	7	7	NS	NS	19	2.45	2.02	3.33	3.60	4.07
Barium	5500	10000	NS	NS	10000	20.0	20.7	34.8	142	61.4
Cadmium	39	1000	NS	NS	1000	< 0.47	< 0.31	< 0.23	< 0.23	< 0.24
Chromium	1400	10000	NS	NS	10000	7.72	8.44	9.16	10.4	17.7
Lead	150	500	NS	NS	2000	29.6	19.5	60.2	678	898
Mercury	23	610	NS	NS	610	< 0.036	< 0.014	0.315	0.746 D	0.255
Selenium	390	10000	NS	NS	10000	< 4.73	< 3.09	< 2.25	< 2.32	< 2.35
Silver	200	10000	NS	NS	10000	< 0.47	< 0.31	< 0.23	< 0.23	< 0.24
TCLP Metals - mg/kg										
Lead	5	5	0.04	NS	NS	NT	NT	NT	0.926	0.233
PCBs - mg/kg										
	10	10	10	10	10	ND	ND	ND	ND	ND

Qualifier	Description
All Entries	Data is summarized above for convenience purposes only. Refer to complete laboratory analytical reports for actual data.
*	Only those compounds which were detected in at least one sample were summarized above. See laboratory report for a complete list of target analytes.
**	Recorded in parts per million (volume basis), maximum PID value recorded at depth.
<	Less than.
NS	No standard established.
NT	Not tested.
D	Diluted.
ND	Not detected.
Bold	Reported value is detected above laboratory Method Reporting Limit (MRL).
Yellow	Reported above RIDEM RDEC but below I/C DEC.
Orange	Reported above RIDEM I/C DEC.



Phase III CSO Program Summary Data Table: B17-46



Laboratory Sample Designation	RIDEM R DEC	RIDEM I/C DEC	GA Leach	GB Leach	RIRRC ACM	1904132-01 B17-46 04/03/2019 1-4 FT	1904132-02 B17-46 04/03/2019 4-6 FT	1904132-03 B17-46 04/03/2019 6-8 FT	1904132-04 B17-46 04/03/2019 8-10 FT	1904132-05 B17-46 04/03/2019 10-11.5 FT
PID**						0.1	0	0	0	0
VOCs - Low - mg/kg										
Naphthalene	54	10000	0.8	NS	100	< 0.0145	< 0.0154	0.0251	< 0.0167	0.0452
Tetrachloroethene	12	110	0.1	4.2	NS	< 0.0145	0.0157	< 0.0139	0.0240	0.0154
SVOCs - mg/kg										
Acenaphthene	43	10000	NS	NS	100	< 0.383	< 0.411	0.402	< 0.39	< 0.406
Acenaphthylene	23	10000	NS	NS	100	< 0.383	< 0.411	2.06	< 0.39	0.410
Anthracene	35	10000	NS	NS	100	< 0.383	< 0.411	6.14	0.539	0.999
Benzo(a)anthracene	0.9	7.8	NS	NS	100	< 0.383	0.808	9.38 D	1.05	2.00
Benzo(a)pyrene	0.4	0.8	240	NS	4	< 0.192	0.663	8.58	0.904	1.64
Benzo(b)fluoranthene	0.9	7.8	NS	NS	100	< 0.383	0.552	7.30	0.776	1.32
Benzo(g,h,i)perylene	0.8	10000	NS	NS	100	< 0.383	< 0.411	4.81	0.577	0.872
Benzo(k)fluoranthene	0.9	7.8	NS	NS	100	< 0.383	0.532	5.77	0.622	1.21
Carbazole	NS	NS	NS	NS	100	< 0.383	< 0.411	2.87	< 0.39	0.441
Chrysene	0.4	780	NS	NS	100	< 0.192	0.637	7.83	0.913	1.70
Dibenzo(a,h)Anthracene	0.4	0.8	NS	NS	100	< 0.192	< 0.206	2.29	0.262	0.446
Dibenzofuran	NS	NS	NS	NS	100	< 0.383	< 0.411	0.844	< 0.39	0.503
Fluoranthene	20	10000	NS	NS	100	< 0.383	1.83	24.0 D	2.69	4.42
Fluorene	28	10000	NS	NS	100	< 0.383	< 0.411	1.61	< 0.39	0.552
Indeno(1,2,3-cd)Pyrene	0.9	7.8	NS	NS	100	< 0.383	< 0.411	4.52	0.495	0.847
Naphthalene	54	10000	0.8	NS	100	< 0.383	< 0.411	0.503	< 0.39	0.513
Phenanthrene	40	10000	NS	NS	100	< 0.383	1.11	23.0 D	2.51	4.47
Pyrene	13	10000	NS	NS	100	< 0.383	1.46	21.6 D	2.16	3.33
TPH - ETPH - mg/kg										
Total Petroleum Hydrocarbons	500	2500	500	2500	2500	44.6	60.6	225	< 46	< 42.4
Total Metals - mg/kg										
Arsenic	7	7	NS	NS	19	< 2.66	3.43	4.22	3.80	2.73
Barium	5500	10000	NS	NS	10000	27.0	38.4	39.3	39.0	29.3
Cadmium	39	1000	NS	NS	1000	< 0.53	< 0.43	< 0.23	< 0.24	< 0.21
Chromium	1400	10000	NS	NS	10000	6.52	9.86	8.64	8.18	13.0
Lead	150	500	NS	NS	2000	28.0	102	137	98.6	109
Mercury	23	610	NS	NS	610	0.065	0.827 D	0.207	0.383	0.168
Selenium	390	10000	NS	NS	10000	< 5.31	< 4.3	< 2.29	< 2.35	< 2.12
Silver	200	10000	NS	NS	10000	< 0.53	< 0.43	< 0.23	< 0.24	< 0.21
TCLP Metals - mg/kg										
Lead	5	5	0.04	NS	NS	NT	0.108	0.465	NT	NT
PCBs - mg/kg										
	10	10	10	10	10	ND	ND	ND	ND	ND

Qualifier	Description
All Entries	Data is summarized above for convenience purposes only. Refer to complete laboratory analytical reports for actual data.
*	Only those compounds which were detected in at least one sample were summarized above. See laboratory report for a complete list of target analytes.
**	Recorded in parts per million (volume basis), maximum PID value recorded at depth.
<	Less than.
NS	No standard established.
NT	Not tested.
D	Diluted.
ND	Not detected.
Bold	Reported value is detected above laboratory Method Reporting Limit (MRL).
Yellow	Reported above RIDEM RDEC but below I/C DEC.
Orange	Reported above RIDEM I/C DEC.



Phase III CSO Program Summary Data Table: Consolidation Conduit Soil Data



				B17-40					B17-41				B17-42			
Laboratory Sample Designation	RES DEC	IC DEC		1805331-06 B17-40 S1	1805331-07 B17-40 S2	1805331-08 B17-40 S3	1805331-09 B17-40 S4	1805331-10 B17-40 S5	1805125-01 B-17-41 S1	1805125-02 B-17-41 S3	1805125-03 B-17-41 S4	1805125-04 B-17-41 S5	1805146-01 B-17-42 S1	1805146-02 B-17-42 S2	1805146-03 B-17-42 S3	1805146-04 B-17-42 S4
Sample Designation																
Sample Date				05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/03/2018	05/03/2018	05/03/2018	05/03/2018	05/04/2018	05/04/2018	05/04/2018	05/04/2018
Sample Depth				0.5-2.5ft	2.5-4.5ft	4.5-6ft	6-8ft	8-10ft	0.75-2.75ft	4-6ft	6-8ft	8-10ft	0.67-2.67ft	2.67-4ft	4-6ft	6-8ft
Soil Type																
Group Designation																
PID				0	0	0	0	0	0	0	0	0	0	0	0	0
VOCs																
1,2-Dibromo-3-Chloropropane	mg/k	0.5	4.1	< 0.0031	< 0.0028	< 0.003	< 0.0032	< 0.0032	< 0.661	< 0.681	< 0.657	< 0.668	< 0.462	< 0.466	< 0.522	< 0.486
1,2-Dibromoethane	mg/k	0.01	0.07	< 0.0031	< 0.0028	< 0.003	< 0.0032	< 0.0032	< 0.132	< 0.136	< 0.131	< 0.134	< 0.0924	< 0.0932	< 0.104	< 0.0972
Vinyl Chloride	mg/k	0.02	3	< 0.0063	< 0.0055	< 0.006	< 0.0064	< 0.0064	< 0.132	< 0.136	< 0.131	< 0.134	< 0.0924	< 0.0932	< 0.104	< 0.0972
SVOCs																
Benzo(a)pyrene	mg/k	0.4	0.8	< 0.184	< 0.439	< 0.176	< 0.187	---	0.499	< 0.196	< 0.18	< 0.2	< 0.176	< 0.182	< 0.178	< 0.187
Chrysene	mg/k	0.4	780	< 0.184	< 0.432	< 0.176	< 0.187	---	0.332	< 0.196	< 0.18	< 0.2	< 0.176	< 0.182	< 0.178	< 0.187
TPH - ETPH																
Total Petroleum Hydrocarbons	mg/k	500	2500	94.6	< 93.0	< 40.9	< 40.9	---	45.8	< 42	< 41.4	< 41.7	< 38.3	< 39.1	< 38.3	< 42
Total Metals																
Arsenic	mg/k	7	7	3.50	< 6.51	3.43	5.44	---	4.36	3.72	6.32	2.68	4.64	10.1	3.13	11.4
Barium	mg/k	5500	10000	21.1	< 20.7	17.1	20.8	---	19.1	26.0	12.8	15.4	8.73	10.6	10.7	22.1
Cadmium	mg/k	39	1000	< 0.42	< 0.47	< 0.47	< 0.46	---	< 0.48	< 0.49	< 0.44	< 0.51	< 0.49	< 0.47	< 0.42	< 0.47
Chromium	mg/k	1400	10000	5.37	16.3	6.92	15.3	---	9.39	7.68	6.99	9.55	6.61	8.38	6.98	10.0
Lead	mg/k	150	500	7.53	31.4	25.1	23.7	---	19.9	12.5	16.1	8.28	5.12	< 4.67	< 4.16	< 9.77
Mercury	mg/k	23	610	0.053	0.103	0.034	< 0.029	---	0.030	< 0.024	< 0.031	< 0.034	< 0.024	< 0.026	< 0.025	< 0.032
Selenium	mg/k	390	10000	< 0.85	< 0.93	< 0.94	< 0.91	---	< 0.95	< 0.99	< 0.89	< 1.03	< 0.98	< 0.93	< 0.83	< 0.95
Silver	mg/k	200	10000	< 0.42	< 0.47	< 0.47	< 0.46	---	< 0.48	< 0.49	< 0.44	< 0.51	< 0.49	< 0.47	< 0.42	< 0.47
PCBs																
				< 0.06	< 0.06	< 0.05	< 0.05	---	< 0.06	< 0.06	< 0.05	< 0.06	< 0.05	< 0.05	< 0.05	< 0.05

All results reported in milligrams per kilogram (mg/kg) equivalent to parts per million.

Qualifier	Description
All Entries	Data is summarized above for convenience purposes only. Refer to complete laboratory analytical reports for actual data.
*	Only those compounds which were detected in at least one sample were summarized above. See laboratory report for a complete list of target analytes.
**	Recorded in parts per million (volume basis), maximum PID value recorded at depth interval specified above.
<	Less than the detection value presented to the right of the less than symbol.
EL	Elevated Method Reporting Limits due to simple matrix (EL).
J	Reported between Mean Detection Limit and Mean Regulatory Limit.
ND	Not detected.
D	Diluted.
---	Not Analyzed.
Bold	Bold values above RI DEC limits.
Yellow	Detected value is above RIDEDEC.
Red	Reported above the RIDEDEC industrial limit.

APPENDIX D

SITE SPECIFIC HEALTH AND SAFETY PLAN

Narragansett Bay Commission

**Engineering Design Services for:
Phase IIIA-4 OF 210-213-214 Facilities and
Phase IIIA-5 OF-217 Facilities**

*Phase III CSO Control Program – Contract No. 13:308.00D
August 2019*

HEALTH & SAFETY PLAN

Revised for Tidewater Property
August 2019
Revised for Tidewater (2)
January 2020

Engineering Design Services for: Phase IIIA-4 OF 210-213-214 Facilities and Phase IIIA-5 OF-217 Facilities

Narragansett Bay Commission

Phase III CSO Control Program – Contract No. 13:308.00D

HEALTH & SAFETY PLAN

Prepared by: **BETA GROUP, INC.**

Prepared for: Stantec Consulting Ltd.

August 2019

Revised for Tidewater Property

August 2019

Revised for Tidewater Property

January 2020



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1

BETA Health and Safety Plan

This Health and Safety Plan (HASP) has been prepared to identify potential hazards at the referenced site and work practices that should be performed during the field activities. This HASP has been prepared using Appendix C of OSHA 1910.120 Hazardous Waste Operations and Emergency Response as guidance. This HASP applies to activities to be performed by BETA Group, Inc. (BETA) personnel. Any and all subcontractors involved in this project will be responsible for their employee's health and safety and will be required to prepare their own Site-specific HASP.

General Site Information

Site Name: Narragansett Bay Commission
Contract No. 13:308.00D
Phase III Combined Sewer Overflow (CSO) Control Program –
Engineering Design Services for Phase IIIA-4 OF 210-213-214
Facilities and IIIA-5 OF 217 Facilities
Pawtucket, Rhode Island

BETA Project No. 06412.00

Emergency Notification Procedures

In the event of an emergency, notify the following in the order listed:

Fire / Police / Medical Emergency	911 or *77 (cell Phone)
Nicholas Corvello, Associate, BETA Group, Inc.	(401) 333-2382 ext. 137 (401) 632-6508 (cell phone)
Christopher Cronin, Vice President, BETA Group, Inc.	(401) 333-2382 ext. 138 (401) 525-8008 (cell phone)
William Skerpan, Vice President, BETA Group, Inc.	(401) 333-2382 ext. 139 (401) 447-4503 (cell phone)
Ken Lento, National Grid Representative	(617) 791-2627 (cell phone)

Site/Hazard Overview

Site Description

The project is located within the City of Pawtucket, Rhode Island (the "City") near the western bank of the Seekonk River along Taft Street and Roosevelt Ave. Extension, bound by Main Street to the north and the end of Tidewater Street to the south. A portion of the work will be conducted within the Tidewater site, a known contaminated area.

Tasks

Expected field tasks for this project include:

- Site reconnaissance / visual confirmation of topographic survey information;
- Non man-entry (above-grade) investigation of existing structures;
- Pre-marking for utility location by Dig Safe;
- Soil boring observation;
- Groundwater monitoring well development;
- Soil and groundwater sampling during geotechnical investigation; and
- Handling and management of investigation derived waste.

Hazard Assessment

Hazards of Concern (check as many as apply):

Traffic Hazards	General Construction	X Inorganic Chemicals
Confined Space	X Physical Hazards	X Organic Chemicals
Oxygen Deficient	X Biological	Radiological
X Heat Stress	Man-Entry of Sewers, Drains and Structures	X Noise
X Cold Stress	X Volatile compounds	Other (Specify)

The dangers which may be attributed to these hazards are discussed below.

Heat Stress

During the summer months, warm weather may become a health factor. Personnel working on-site may have to wear protective clothing and respirators, which would increase the chance of workers suffering from heat-related problems. The situation will be monitored periodically on days when the heat index exceeds 75° F. Workers must be briefed on the signs and symptoms of heat-related problems and on preventive measures if work is performed when the heat index exceeds 75° F.

There are three levels of Heat Stress which include the following:

- ⇒ Heat Cramps;
- ⇒ Heat Exhaustion; and
- ⇒ Heat Stroke.

Symptoms for heat cramps include painful muscle spasms. Treatment includes providing liquids with electrolytes. Symptoms for heat exhaustion include weakness, fatigue, dizziness, heavy sweating, headache, nausea, fainting and pale, cool, moist skin. Treatment includes resting in a cool place and providing liquids with electrolytes if the person is conscious; if unconscious, get medical help immediately. Symptoms for heat stroke include very dry, hot skin, mottled blue or red appearance, confusion, convulsions, rapidly rising temperature and unconsciousness. Treatment includes attaining medical attention immediately. **Heat stroke is a life-threatening emergency.**

When tyvek suits are being used and the heat index exceeds 75° F, cool liquids will be available on the Site and a cool down area identified on the Site for breaks.

Cold Stress

Cold injury (frostbite and hypothermia) and impaired ability to work are dangers at low temperatures and when the wind-chill factor is low. “Low” temperatures are subjective as hypothermia can develop at temperatures above 32° F. To guard against cold-stress: wear appropriate clothing; have warm shelter readily available; carefully schedule work and rest periods; and monitor workers’ physical conditions.

Physical Hazards

Potential physical hazards at the Site include heavy construction equipment, and uneven terrain. BETA personnel shall note these hazards at each Site location and take necessary precautions. When working around heavy equipment, Level D personal protective equipment shall be utilized.

Biological

Biologicals may be encountered in the form of ticks, mosquitoes, reptiles, rodents and poison oak and ivy. Care should be taken when traversing through overgrown areas. BETA personnel should wear long sleeve shirts and pants, work gloves and steel toe and shank boots.

Volatile Organic Compounds (VOCs)

Total VOCs will be monitored in the air and soil during the drilling and sampling activities. If action levels are exceeded, an increase in personal protective equipment shall be performed.

Corrosives

Corrosive acid preservatives (hydrochloric acid and methanol) are contained in sampling media. Care to prevent skin contact should be taken when collecting samples with media preserved with corrosive acids. Appropriate personal protective equipment should be donned prior to collecting samples with preserved sampling media.

Chemical Exposures

Table 1 summarizes chemicals that could be present on the Site and associated symptoms of acute exposure to such contaminants. Since additional unsuspected hazards may exist at the Site, periodic air quality monitoring and evaluation of site conditions will be performed during all on-site activities. As contaminants-of-concern are identified, this HASP will be modified, if necessary.

**Table 1
Possible Chemical Contaminants**

<u>Chemical Contaminants*</u>	<u>Potential Hazards</u>	<u>OSHA PEL</u>	<u>NIOSH REL</u>
Arsenic	Harmful if inhaled, ingested, absorbed, or consumed. May cause ulceration of nasal septum, GI disturbances, respiratory irritation, and hyperpigmentation of skin	0.010 mg/m ³	0.002 mg/m ³
Lead	Harmful if inhaled or ingested. May cause weakness, exhaustion, partial paralysis, and kidney disease	0.015 mg/m ³	Not established
Volatile Organics	Toxic by ingestion, inhalation, skin absorption, and eye contact. Irritant to eyes, nose. Headache, dilated pupils, tearing, confusion, dizziness, and nervousness may occur.	benzene: 1 ppm ethylbenzene, toluene, xylenes: 100 ppm Naphthalene: 10 ppm	80 ppm
Polychlorinated Biphenyls	toxic/carcinogenic by ingestion, inhalation and skin absorption	0.5 mg/m ³ (for 8 hrs)	0.001 mg/m ³ (for 8 hrs)
Polynuclear aromatic Hydrocarbons	Harmful if inhaled, and absorbed through skin.	Not established	Not established
Petroleum	Harmful if inhaled, ingested, or consumed. May cause headaches, dizziness, nausea, chemical pneumonitis, and dry cracked skin.	2000 mg/m ³	350 mg/m ³
Cyanide	Eyes, nose, and throat irritation. High exposure to Cyanide can cause Cyanide poisoning with headache, weakness, confusion, nausea, pounding of the heart, coma and even death	5 mg/m ³ (4.7 ppm)	5 mg/m ³

* Refer to Attachment D for NIOSH Chemical Hazards Guides.

Symptoms of Chemical Exposure

On-site workers should be aware of the specific symptoms of acute chemical exposure listed in Table 1. In general, workers should also be aware of some indications of toxic effects of chemical exposure which are described below:

- Observable by others:
 - Changes in complexion, skin discoloration
 - Lack of coordination
 - Changes in demeanor
 - Excessive salivation, papillary response
 - Changes in speech pattern

- Non-observable by others:
 - Headaches
 - Dizziness
 - Blurred vision
 - Cramps
 - Irritation of eyes, skin, or respiratory tract

Noise

Elevated noise levels may be encountered during the project due to construction equipment. Persons working in close proximity to construction equipment shall wear sufficient hearing protection. This hearing protection may include foam ear plugs or foam ear muffs. Hand signals must be used for communication in these situations. Hand signals shall be established and practiced prior to donning protective hearing protection.

On-Site Control

Nicholas Corvello is designated to coordinate access control to the work zone. No unauthorized personnel should enter the work zone without appropriate 40-hour OSHA site worker safety training. Control boundaries within the Tidewater site have been established as follows:

- **Work Zone:** A 20 foot circumference around the drilling location will be treated as the Exclusion Zone.
- **Work Zone Perimeter:** An area at least 50 feet from the drilling location will be treated as the Work Zone Perimeter. All equipment will be decontaminated in this zone prior to being transferred to the Support Zone.
- **Support Zone:** The area located outside the Work Zone Perimeter.

These control boundaries are subject to change based on varying site conditions.

Monitoring Procedures

Within the Tidewater site, BETA personnel will not enter the Work Zone Perimeter. If entry into this area (within 50 feet of the drilling location) is required, BETA will use a RAE systems MiniRAE Photoionization Detector (PID) with a 10.6 eV lamp and a DustTrack dust monitor to periodically monitor air quality within the breathing zone. The PID and DustTrack will run continuously (with logging) within the Work Zone. Every 2 hours, the PID and DustTrack will be used to collect readings within the Work Zone Perimeter. Logged data will be provided to National Grid daily.

On-Site Personnel

Site Safety Officer:	Nicholas Corvello
Regulatory Authority	RIDEM
Federal Agency Reps.	USEPA
State Agency Reps.	RIDEM
Local Agency Reps.	NBC
Contractors:	Geologic Drilling

Work party(ies) consisting of two people will perform tasks.

Party Team Leader:	Nicholas Corvello (401) 632-6508 (cell)
Rescue Team (in entries to IDLH environment	N/A
Decontamination Team	N/A
Emergency Contact	Christopher Cronin (401) 525-8008 (cell)

General Safety Requirements

The following General Safety Procedures shall be followed by all persons entering and/or working on the Site:

- No employee may be allowed on Site without the prior knowledge and consent of the Site Safety Officer and review of these Health and Safety Procedures.
- Each contractor and subcontractor on the Site is responsible for their own Health and Safety Program and Health and Safety Plan.
- A subcontractor's Health and Safety Plan must be at least as protective as that developed herewithin.
- There will be no activities conducted on Site without sufficient backup personnel. At a minimum, two persons must be present at the site except for routine site reconnaissance activities.
- All contractor or subcontractor personnel shall bring to the attention of the Site Safety Officer or Supervisors any unsafe condition or practice associated with the site activities that they are unable to correct themselves.
- There will be no smoking, eating, chewing gum or tobacco, applying cosmetics or drinking in restricted areas.
- Hands shall be thoroughly cleaned prior to smoking, eating or other activities outside restricted areas.
- Team members must avoid unnecessary contamination, where applicable (i.e., walking through known or suspected restricted zones or contaminated puddles, kneeling or sitting on the ground, leaning against potentially contaminated barrels or equipment).
- Respiratory devices may not be worn with beards, long sideburns, or under other conditions that prevent a proper seal.
- No visitors will be allowed access without the knowledge and consent of the Site Manager and/or Safety Officer. All visitors will be required to be briefed on safety procedures and will be required to be escorted while on Site.

Personal Protective Equipment

Based on an evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks.

<u>Location</u>	<u>Job Function</u>	<u>Level of Protection</u>				
Exclusion Zone	Non Man-Entry Structure Inspections	A	B	C	D	Other
	Soil / Groundwater Sampling	A	B	C	D	Other
Contamination Reduction Zone	Decontamination	A	B	C	D	Other
Support Zone	Support vehicle(s)	A	B	C	D	Other

Action Levels and Personnel Protection

For BETA personnel outside of the Work Zone Perimeter at the Tidewater site, the general level of personnel protection will be Level D. If entry into this area (within 50 feet of the drilling location) is required, the following table lists the appropriate action level within each zone. (Action items reference GZA Health and Safety Plan for Tidewater Site included in RAWP)

<u>Location</u>	<u>Action Level</u>	<u>Response</u>
Work Area	1 ppm to 10 ppm TVOC	Temporarily halt work activities (5 minutes minimum) and continue to monitor levels
	1 mg/m ³ of dust in the ambient air	Implement dust control measures (water)
	Persistently > 10 ppm	Temporarily halt work activities ID source of vapors, complete corrective action to mitigate vapors, continue to monitor levels, resume work f levels drop below 10 ppm. If levels persist upgrade to level C. If sustained (1-5 minutes) breathing zone registers 1ppm or greater, monitor for benzene using a Draeger table.
Work Area Perimeter	0.1 ppm TVOC	Temporarily halt work activities (5 minutes minimum) and continue to monitor levels
	0.150 mg/m ³ of dust in the ambient air	Implement dust control measures (water)
	Persistently > 10 ppm	Temporarily halt work activities ID source of vapors, complete corrective action to mitigate vapors, continue to monitor levels, resume work f levels drop below 10 ppm. If levels persist upgrade to level C. If sustained (1-5 minutes) breathing zone registers 1ppm or greater, monitor for benzene using a Draeger table. Upgrade to level C

Level D personal protection will include:

The initial level of personal protection for all field activities will be Level D.

- Coveralls or work uniform
- High-visibility safety vest or clothing
- Gloves
- Boots/shoes, leather or chemical-resistant, steel toe and shank.
- Rubber overboots (in wet environments)
- Safety glasses or chemical splash goggles (optional unless required for specific job function).
- Hard hat
- Hearing protection

Level C Personal Protection will be required only if contaminants are discovered and an upgrade to Level C Personal Protection is required for BETA employees to conduct their work.

Level D (modified) personnel protection will include:

- Tyvek coveralls;
- Hard hat;
- Boots/shoes, steel toe and shank;
- Chemical-resistant outer boots;
- Inner and outer gloves; and
- Hearing protection.

Level C personnel protection will include:

- Tyvek coveralls
- Air purifying respirator with dust and organic vapor cartridge (full-faced mask)
- Hard hat
- Boots/shoes, steel toe and shank
- Chemical-resistant outer boots
- Inner and outer gloves
- Hearing protection.

Decontamination Procedures

Level D Decontamination Procedures

The decontamination procedure for **Level D** requires the disposal of gloves and boot covers (if used) in plastic lined containers on-site. Non-disposal equipment will be cleaned according to the following Standard Operating Protocols:

- Wash with Alconox detergent (or soap) and water
- Rinse with deionized water

Level C Decontamination Procedures

Level C Decontamination will be required for BETA employees to conduct their work only if contaminants are discovered . The decontamination procedures to be utilized for **Level C** site conditions will consist of the following nine-step process:

- Sampling devices, monitoring instruments and other equipment used on Site will be segregated on polyethylene sheeting and decontaminated as necessary.
- Outer boots and gloves will be washed with soap and water and then rinsed with water or appropriately disposed.
- Tape around outer boots and gloves will be removed and deposited into a polyethylene-lined container.
- Outer boots will be removed and placed on the polyethylene.
- Outer gloves will be removed and disposed of in polyethylene-lined containers.
- Tyvek coveralls will be removed and disposed of in polyethylene-lined containers.
- Respirator will be removed and washed with clean water and sanitized.
- Inner gloves will be removed and disposed in a polyethylene-lined container.
- Worker's hands and face will be washed with soap and water before leaving the Site.

Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The standard **Level D** Decontamination Protocol shall be instituted at the decontamination stations.

Emergency Medical Care

The following are qualified on-site First Aid Responders and/or EMTs: None

First Aid equipment is available on-site at the following locations:

First Aid Kit: Located in field vehicle

Emergency Eye Wash: Located in field vehicle

Emergency Shower: None

Other (Specify): _____

Site Resource(s) and Locations.

Water Supply: Located in field vehicle

Telephones: Personnel will carry personal cell phones at all times

Communication Systems: Same as above

Other: _____

Table 1
Emergency Information and Local Resources,
City of Pawtucket, MA

<u>Public and Private Resources</u>	<u>Telephone Numbers</u>
Pawtucket Fire/Police/Medical Emergency	911
Hospital Emergency	911
Pawtucket Police Department, non-emergency	401-729-5846
Pawtucket Fire Department, non-emergency	401-725-1422
Pawtucket Department of Public Works	401-728-0500 x236
Pawtucket Water Supply Board	401-729-5005
Narragansett Bay Commission	401-461-8848
National Grid Gas Emergency Center	1-800-640-1595
National Grid Electric	1-800-465-1212
Verizon	1-800-870-9999
Cox Communications	1-888-633-4266
Regional Center for Poison Control and Prevention	1-800-222-1222
National Response Center	1-800-424-8802

Nearest Hospital: The Miriam Hospital – 401-793-2500
164 Summit Ave., Providence RI

Refer to Appendix A for Hospital locations.

Emergency Procedures

The following standard emergency procedures will be used by on-site personnel. These procedures may be modified as appropriate and required for each incident. The Site Safety Officer will be notified of any on-site emergencies and will be responsible for ensuring that the appropriate procedures are followed.

- **Fire/Explosion:** The fire department will be notified and all personnel moved to a safe distance from the involved area.
- **Personal Protective Equipment Failure:** If any site worker experiences a failure or malfunction of personal protective equipment that adversely affects the protection factor, that person and his/her buddy will immediately leave the Exclusion Zone. Re-entry will not be permitted until the equipment has been repaired or replaced.
- **Other Equipment Failure:** If any other equipment on-site fails to operate properly, the Site Manager and Site Safety Officer will be notified and will then evaluate the effect of such failure on continuing operations. If the failure affects personnel safety or prevents completion of the investigation activities, all personnel will leave the Exclusion Zone until the situation is remedied through appropriate action(s).

First Aid

General first aid procedures for exposure include, but are not limited to, the following procedures:

- If contaminant contacts the eyes, irrigate immediately with large amounts of water
- If contaminant contacts skin, wash with soap and water promptly
- If contaminant is inhaled, move the exposed person to fresh air at once. If the worker's breathing has stopped, call 911 and request appropriate medical attention as soon as possible using telephone number(s) listed in Table 1 (Emergency Information and Local Resources). If appropriately trained and currently certified by the Red Cross, perform artificial respiration.

On-site BETA personnel will keep a First-Aid kit at the Site during inspection activities.

Signature Page

I have read, understood, and agree to comply with the provisions set forth in this Site-specific Health and Safety Plan and as reviewed in the Health and Safety briefing by the Site Safety Officer.

Prepared By:

<u>Joseph McLoughlin</u>	_____	—
Health and Safety Coordinator	Signature	Date

Approved By:

<u>Joseph D'Alesio</u>	_____	—
Sr. Vice President	Signature	Date
<u>Nicholas Corvello</u>	_____	—
Site Safety Officer	Signature	Date

Site Personnel

<u>Signature</u>	<u>Affiliation</u>	<u>Date</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Appendix A

Hospital Location

APPENDIX E
SOIL BORING AND MONITORING WELL LOGS

SOIL

Soil description on logs of subsurface explorations are based on Standard Penetration Test (SPT) results, visual-manual examination of exposed soil samples, and the results of laboratory tests on selected samples. The criteria, descriptive terms, and definitions are presented herein. The natural soils are identified and described by visual-manual procedures (ASTM D2488) and in accordance with the United Soil Classification System (USCS) (ASTM D2487) as practiced by McMillen Jacobs Associates. Fill materials may not be classified by USCS criteria.

PENETRATION RESISTANCE

Standard penetration resistance (SPT) (ASTM D1586) - Number of blows required to drive a standard 2 in. O.D. split spoon sampler one foot with a 140 lb. weight falling 30 inches freely downward.

DENSITY / CONSISTENCY

Coarse - Grained Soils	
Apparent Density	SPT Resistance, N (BPF)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

Fine - Grained Soils	
Apparent Consistency	SPT Resistance, N (BPF)
Very Soft	0 - 2
Soft	2 - 4
Medium Stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	>30

Notes: BPF = Blows Per Foot (uncorrected)

WOR = Weight of Rod

COLOR

Basic colors (black, brown, gray, olive, red, and yellow) and combinations (i.e. gray-brown, olive-brown, olive-gray, red-gray, red-brown, yellow-brown, and red-yellow). Modifiers such as light and dark may be used.

SUPPLEMENTAL SOIL DESCRIPTIONS AND STRUCTURE:

- Laminating - 0 to 1/16 in. thick (cohesive)
- Parting - 0 to 1/16 in. thick (granular)
- Seam - 1/16 to 1/2 in. thick
- Layer - 1/2 to 12 in. thick
- Stratum - > 12 in. thick
- Pocket - Small, erratic deposit less than 12 in. size
- Lens - Lenticular deposit larger than a pocket
- Occasional - One or less per 12 in. of thickness
- Frequent - More than one per 12 in. of thickness
- Interbedded - Alternating soil layers of differing composition
- Varved - Alternating thin seams of silt and clay
- Mottled - Variation of color

SAMPLE SYMBOLS

- X SPT Sample 2 in. OD
- X SPT Sample 3 in. OD
- █ Shelby Tube Sample

ADDITIONAL GRAPHIC DESCRIPTIONS

- █ Asphalt
- █ Fill

SOIL IDENTIFICATION AND DESCRIPTION

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS Based on ASTM D2488 & D2487)				
MAJOR DIVISIONS	GROUP/SYMBOL	TYPICAL DESCRIPTION		
GRAVELS (more than 50% retained on No. 4 sieve)	CLEAN GRAVELS (less than 5% fines)	GW	WELL-GRADED GRAVEL	
		GP	POORLY GRADED GRAVEL	
	GRAVELS WITH SILT (with 5 to 12% fines)	GW-GM	WELL-GRADED GRAVEL WITH SILT	
		GW-GC	WELL-GRADED GRAVEL WITH CLAY	
		GP-GM	POORLY GRADED GRAVEL WITH SILT	
		GP-GC	POORLY GRADED GRAVEL WITH CLAY	
	GRAVELS WITH FINES (more than 12% fines)	GM	SILTY GRAVEL	
		GC	CLAYEY GRAVEL	
	SANDS (less than 50% retained on No. 4 sieve)	CLEAN SANDS (less than 5% fines)	SW	WELL-GRADED SAND
			SP	POORLY GRADED SAND
SANDS WITH SILT (with 5 to 12% fines)		SW-SM	WELL-GRADED SAND WITH SILT	
		SW-SC	WELL-GRADED SAND WITH CLAY	
		SP-SM	POORLY GRADED SAND WITH SILT	
		SP-SC	POORLY GRADED SAND WITH CLAY	
SANDS WITH FINES (more than 12% fines)		SM	SILTY SAND	
		SC	CLAYEY SAND	
SILTS & CLAYS (liquid limit less than 50)		INORGANIC	ML	SILT
			CL	LEAN CLAY
	ORGANIC	OL	LOW PLASTICITY ORGANIC CLAY	
		MH	ELASTIC SILT	
	INORGANIC	CH	FAT CLAY	
		OH	HIGH PLASTICITY ORGANIC CLAY	
	SILT CLAY (liquid limit between 50 and 75)	CL-ML	CLAYEY SILT / SILTY CLAY	
		PT	PEAT	

Notes:
1. Dual symbols (symbols separated by a hyphen, e.g. SP-SM, slightly silty fine SAND) are used for soils between 5% and 12% fines or when liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.

ROCK

Rock descriptions noted on logs of subsurface explorations are based on visual-manual examination of exposed rock outcrops and core samples. The criteria, descriptive terms and definitions used are as follows:

FIELD HARDNESS / STRENGTH

- (after ISRM, 1978; CGS, 1985; Marinos & Hoek, 2001)
- Extremely Strong Cannot be scratched with a knife point or sharp pick; can only be chipped with repeated heavy hammer blows.
- Very Strong Cannot be scratched with a knife point or sharp pick; core breaks with repeated heavy hammer blows.
- Strong Can be scratched with a knife or pick; core breaks with heavy hammer blow.
- Moderately Weak Can be grooved 1/16 in. deep by knife or sharp pick; core breaks with light hammer blow.
- Weak Can be grooved easily with a knife or pick; can be scratched with fingernail; core breaks with light pressure.
- Very Weak Can be readily indented; grooved with fingernail or carved with a knife; core breaks with light pressure.

WEATHERING (after ISRM, 1978)

- The action of organic and inorganic chemical and physical processes resulting in alteration of color, texture, and composition
- Fresh No visible sign of alteration, except perhaps slight discoloration on major discontinuity surfaces
- Slight Discoloration of rock material and discontinuity surfaces
- Moderate Less than half the rock material decomposed to soil. Some fresh rock; continuous "framework".
- High More than half the rock material decomposed and/or disintegrated to soil.
- Completely All rock material disintegrated to soil, but mass still intact
- Residual Soil All rock material converted to soil. Material has not been significantly transported.

COLOR:

Basic colors and combinations: gray, light gray, brown, red-brown

TEXTURE

- Size, shape and arrangements of constituents
- Aphanitic Individual grains invisible
- Fine-grained Grains barely visible to the unaided eye, up to 1/16 in. dia.
- Medium Grained Grains between 1/16 and 3/16 in. dia.
- Coarse Grained Grains between 3/16 and 1/4 in. dia.
- Very Coarse Grained Grains larger than 1/4 in. dia.

LITHOLOGY

Rock Classification and modifiers; accepted formation names

DISCONTINUITIES:

- | Type | Definition |
|---------------------|--|
| Joint | A natural fracture along which no displacement has occurred. May occur in parallel groups called sets. |
| Shear | A natural fracture along which displacement has occurred. Surface may be slickensided or striated. |
| Fault | A natural fracture along which displacement has occurred. Usually lined with gouge and slickensides. |
| Shear or Fault Zone | Zone of fractured rock and gouge bordering the displacement plane. |

ORIENTATION / ATTITUDE

Term	Angle (degrees)
Horizontal	0-5
Low Angle	6-35
Moderately Dipping	36-55
High Angle	56-85
Vertical	86-100

SPACING

Term	Inches
Extremely Close	<3/4
Very Close	3/4 - 2-1/2
Close	2-1/2 - 8
Moderate	8 - 24
Wide	24 - 80
Very Wide	80- 20 ft.
Extremely Wide	> 20 ft.

ROUGHNESS OF DISCONTINUITY SURFACE

Term	Abbreviation	Description
Very Rough	VR	Near-vertical steps and ridges
Rough	R	Ridges, side-steps, and asperities evident; abrasive to the touch
Slightly Rough	SR	Asperities can be felt.
Smooth	SM	Smooth to the touch
Slickensided	SL	Smooth glossy finish with visible striations

APERTURE/GAP

Term	MM	INFILLING Material	Abbreviation
Very Tight	< .1	Clay	CL
Tight	0.1 - 0.25	Silt	SI
Partly Open	0.25 - 0.5	Sand	SA
Open	0.5 - 2.5	Serpentine	SE
Moderately Wide	2.5 - 10	Sulfide	SL
Wide	> 10	Calcite	CA
Very Wide	10 - 100	Pyrite	PY
Extremely Wide	100 - 1000	Quartz	QZ
Cavernous	> 1000	Chlorite	CH
		Iron Oxide Staining	FE
		Could not be determined	X

BEDDING

Term	Inches	Term	Inches
Very Thin	< 2.5	Thick	25-36
Thin	2.5 - 8	Very Thick	< 36
Medium	9 - 24		

GENERAL NOTES:

- Logs of subsurface exploration depict soil, rock and groundwater conditions only at the boring locations specified on the dates indicated. Subsurface conditions may vary at other locations and at other times.
- Water levels, where noted on the logs, were measured at the times under the conditions indicated. During test boring drilling, these water levels could have been affected by the introduction of water in to the borehole, extraction of tools or other procedures and thus may not reflect actual groundwater levels at the test boring location. Groundwater level fluctuations may also occur as a results of variations in precipitation, temperature, season, tides, river stage, adjacent construction operations, construction dewatering systems, water supply well pumping, and other conditions.







SUBSURFACE EXPLORATION KEY

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-1

Date(s) Drilled 09/05/2019 - 09/06/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 22.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 14.5 ft / NGVD 1929	
Location Southerly end of Tidewater Site	Coordinates 360205.11E,285935.78N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-10								Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	13/24	18-18-17-20 (N=35)	SM		Moist, dense, brown, fine SAND and gravel, little silt (FILL)	PID=0
		8-10	S-2	10/24	14-30-22-19 (N=52)	SP-SM		Moist, very dense, brown, fine SAND, some gravel (FILL)	
								Top of possible boulder/bedrock. See Core Boring Report for rock details.	
0	∞	15-16.9	S-3	14/23	16-27-31-50/5" (N=58)	SW-SM		Wet, very dense, gray, SAND, some gravel and silt (Completely Weathered Bedrock)	PID=30
-5								See Core Boring Report for Rock Details	



∞ - Water Level at Time of Drilling

Boring B-1

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits Project Location: Pawtucket, RI Project Number: 5980.0	Core Boring B-1
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Date(s) Drilled: 09/05/2019 - 09/06/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 22.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 14.5 ft / NGVD 1929	
Location: Southerly end of Tidewater Site	Coordinates: 360205.11E,285935.78N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES						
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL	
			4						See Test Boring Report for Overburden Details								
			4														
	10-15		3	2	C-1	24/ 40%	20/ 33%	Strong, gray, moderately weathered, medium-grained CONGLOMERATE. Mechanical breaks at 10.5 ft, 11.3 ft, and 11.8 ft.									
			1														
0			2														
	15								Sample obtained using split spoon sampler. See Test Boring Report for details.								
			2					Strong, gray, moderately weathered, fine-grained SILTSTONE		17.3	J	30	S	1.00	FR		
	17-22		2	2	C-2	45/ 75%	17/ 28%				18.8	J	30	SR	1.00	FR	
											19.1	J	40	SR	1.00	FR	
-5			2								19.8	J	40	SR	1.00	FR	



Boring B-1

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-1

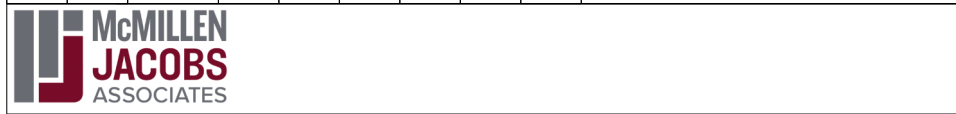
Date(s) Drilled: 09/05/2019 - 09/06/2019 Geotechnical Consultant: **McMillen Jacobs Associates** Logged By: S. Wilbur Checked By: W. Kilker

Drilling Method/Rig Type: **Mud Rotary/CME 45** Drilling Contractor: **Geologic Earth Exploration, Inc.** Total Depth of Borehole: **22.0 ft**

Borehole Diameter: **4.00 in** Core Barrel Type / Size: **NX / 2 in** Ground Surface Elevation/Datum: **14.5 ft / NGVD 1929**

Location: **Southerly end of Tidewater Site** Coordinates: **360205.11E,285935.78N** Elevation Source: **Field Survey**

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES						
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL	
		17-22	6	2	C-2	45/ 75%	17/ 28%	XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX	Strong, gray, moderately weathered, fine-grained SILTSTONE	20.0	J	30	SR	5.00	FR		
			5							20.1	J	30	R	5.00	FR		
									Bottom of borehole at 22.0 ft.								



Boring B-1

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-2

Date(s) Drilled 09/03/2019 - 09/05/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 34.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 22.2 ft / NGVD 1929	
Location Tidewater Site	Coordinates 359851.53E,286363.91N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
18								Vacuum excavated from about 0 to 6 ft (FILL)	
	5	6-8	S-1	24/24	2-1-2-4 (N=3)	CL		Moist, soft, grayish brown, silty CLAY (FILL)	PID=20
13		8-10	S-2	18/24	1-1-0-3 (N=1)	ML		Moist, very soft, gray, SILT (FILL)	PID=32
	10	10-12	S-3	12/24	1-4-1-17 (N=5)	ML		Wet, medium stiff, light gray, SILT, some gravel, little fine sand (FILL)	PID=50
		12-14	S-4	12/24	9-6-7-12 (N=13)	SP		Wet, medium dense, brown, medium SAND some gravel, little silt (FILL)	PID=20
8	15	14-16	S-5	8/24	8-8-5-8 (N=13)	SW-SM		Wet, medium dense, brown, coarse to fine SAND, some gravel, trace fines (ALLUVIUM)	PID=3
		16-18	S-6	20/24	7-3-3-11 (N=6)	ML		Wet, medium stiff, light brown, SILT, some fine sand (ALLUVIUM)	PID=0
3		18-20	S-7	9/24	9-7-6-9 (N=13)			Wet, medium dense, brown, fine to medium SAND, some silt (ALLUVIUM)	PID=0



∇ - Water Level at Time of Drilling

Boring B-2

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-2

Date(s) Drilled 09/03/2019 - 09/05/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 34.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 22.2 ft / NGVD 1929	
Location Tidewater Site	Coordinates 359851.53E,286363.91N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-2						SM		Wet, medium dense, brown, fine to medium SAND, some silt (ALLUVIUM)	Occasional rig chatter starting at 21'
	25	24-26	S-8	6/24	9-8-8-8 (N=16)	SC		Wet, medium dense, gray and brown SAND, some clay, little gravel (GLACIAL TILL)	
-7		29-29	S-9	0/0	50/0"			Top of Bedrock at 29.0 ft. See Core Boring Report for rock details.	
-12		35							
-17									



∇ - Water Level at Time of Drilling

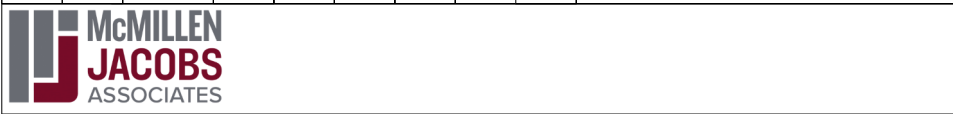
Boring B-2

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-2

Date(s) Drilled: 09/03/2019 - 09/05/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 34.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 22.2 ft / NGVD 1929	
Location: Tidewater Site	Coordinates: 359851.53E,286363.91N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
-2	25								See Test Boring Report for Overburden Details						
-7		29-34	5	1	C-1	56/ 93%	36/ 60%	.....	Strong, fresh, gray, medium-grained SANDSTONE	29.5	J	40	SR	1.00	FR



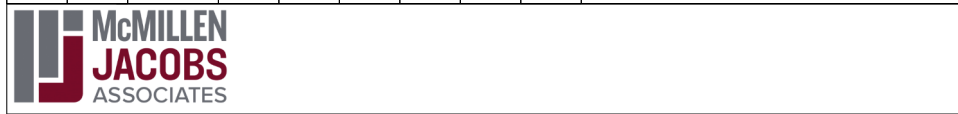
Boring B-2

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-2

Date(s) Drilled: 09/03/2019 - 09/05/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 34.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 22.2 ft / NGVD 1929	
Location: Tidewater Site	Coordinates: 359851.53E,286363.91N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES									
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL				
-12	35	29-34	4	1	C-1	56/ 93%	36/ 60%	.....	Strong, fresh, gray, medium-grained SANDSTONE	30.7	J	40	SR	5.00	FR				
										31.2	J	40	S	1.00	FR					
										31.6	J	20	S	5.00	FR					
										31.8	J	30	S	1.00	FR					
										32.0	J	20	SR	1.00	FR					
										32.8	J	20	SR	1.00	SL					
										32.9	J	20	S	1.00	FR					
										33.0	J	20	S	1.00	FR					
										33.2	J	10	S	1.00	FR					
										33.3	J	40	SR	5.00	FR					
										33.5	J	20	S	1.00	FR					
										33.7	J	20	R	5.00	SL					
										Bottom of borehole at 34.0 ft.										



Boring B-2

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-3

Date(s) Drilled 09/06/2019 - 09/09/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 37.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 37.4 ft / NGVD 1929	
Location Northwestern corner of Tidewater Site	Coordinates 359575.63E,286640.16N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
33		5						Vacuum excavated from about 0 to 6 ft (FILL)	
								Drilled from 6 to 8 ft without sampling (FILL)	Rig Chatter/Slow Drilling
28		8-10	S-1	19/24	15-35-20-19 (N=55)			Moist, very dense, brown, SAND, little gravel and silt. Fragments of brick. (FILL)	PID=0
						SP-SM			
23	∇	14-16	S-2	9/24	14-10-9-8 (N=19)			Wet, medium dense, tan, coarse to fine SAND, trace gravel and fines (ALLUVIUM)	PID=0
						SM			
18								Wet, medium dense, tan, coarse to fine SAND, trace gravel and fines (ALLUVIUM)	



∇ - Water Level at Time of Drilling

Boring B-3

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-3

Date(s) Drilled 09/06/2019 - 09/09/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 37.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 37.4 ft / NGVD 1929	
Location Northwestern corner of Tidewater Site	Coordinates 359575.63E,286640.16N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-13	25	19-21	S-3	9/24	10-9-9-9 (N=18)	SM		Wet, medium dense, tan, coarse to fine SAND, trace gravel and fines (ALLUVIUM)	PID=0
		23-25	S-4	10/24	15-21-26-38 (N=47)	CL-GC		Wet, hard, brown, sandy CLAY and coarse to fine gravel (GLACIAL TILL)	PID=0
		25-27	S-5	13/24	16-34-34-28 (N=68)	SM-GM		Wet, very dense, brown, SAND and gravel, little silt (GLACIAL TILL)	PID=0
-8	30							Top of Bedrock at 27.0 ft. See Core Boring Report for rock details.	
-3	35								
-2									



∇ - Water Level at Time of Drilling

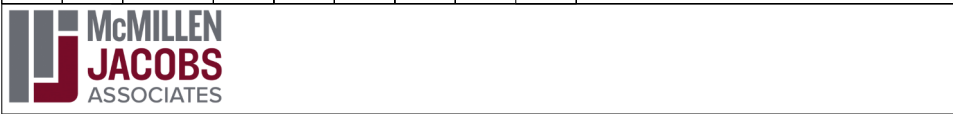
Boring B-3

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-3

Date(s) Drilled: 09/06/2019 - 09/09/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 37.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 37.4 ft / NGVD 1929	
Location: Northwestern corner of Tidewater Site	Coordinates: 359575.63E,286640.16N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
13	25								See Test Boring Report for Overburden Details							
			3					xxxxxx		27.3	J	30	SR	1.00	FR	
								xxxxxx		27.4	J	30	SR	1.00	FR	
		27-32	1	2	C-1	22/37%	14/24%	xxxxxx	Strong, slightly weathered, purple, fine-grained SILTSTONE. No water return while coring run C-1.	28.4	J	20	SR	1.00	FR	
8			2					xxxxxx								



Boring B-3

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-4A

Date(s) Drilled 08/28/2019 - 08/28/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 8.9 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 19.9 ft / NGVD 1929	
Location Taft St north of I-95 bridge	Coordinates	Elevation Source Google Earth	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
15	∞						(ASPHALT)		
		0.5-2	S-1	13/18	23-24-30 (N=54)	SP		Moist, very dense, reddish brown, coarse to fine SAND, little gravel (FILL)	PID=0
		2-4	S-2	10/24	23-26-21-16 (N=47)	SP-SM		Moist, dense, gray, medium to fine SAND, some gravel, little fines (FILL)	PID=0
		4-6	S-3	10/24	19-19-10-5 (N=29)	ML-SM		Wet, very stiff, light brown, medium to fine sandy SILT, little gravel. Fragments of brick and glass. (FILL)	PID=0
		6-8	S-4	6/24	5-5-6-13 (N=11)	SP-SM		Wet, medium dense, dark brown, medium to fine SAND, some gravel, trace fines (FILL)	
		8-8.9	S-5	4/11	71-50/5" (N=50/5")	SP-SM		Wet, very dense, light brown, coarse to fine SAND, some gravel, trace silt. Pieces of concrete. (FILL)	PID=0
10							Bottom of borehole at 8.9 ft.		
							Pieces of possible concrete in tip of sampler. Relocated to new location at Boring B-4B.		



∞ - Water Level at Time of Drilling

Boring B-4A

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-4B

Date(s) Drilled 08/28/2019 - 08/28/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 10.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 19.9 ft / NGVD 1929	
Location Taft St north of I-95 bridge	Coordinates	Elevation Source Google Earth	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
15	5							No sampling from 0 to 8 ft (FILL)	Offset hole about 1 ft from B-4A and continued drilling and sampling from 8 ft below ground surface.
10	40	8-10	S-1	14/24	15-12-14-23 (N=26)	SP-SM		Wet, medium dense, light brown, medium to fine SAND, some gravel, trace fines (FILL)	PID=0
5	15							Bottom of borehole at 10.0 ft. Pieces of possible concrete in tip of sample. Relocated to new location at Boring B-4C.	



∇ - Water Level at Time of Drilling

Boring B-4B

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-4C

Date(s) Drilled 08/29/2019 - 08/29/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 35.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 19.9 ft / NGVD 1929	
Location Taft St north of I-95 bridge	Coordinates 359477.61E,288205.01N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
15	5							No sampling from 0 to 9.5 ft (FILL)	Offset hole about 3 ft from B-4B and continued drilling and sampling from 9.5 ft below ground surface. Occasional rig chatter from 0 to 9.5 ft.
10	10	9.5-11.5	S-1	14/24	18-18-29-23 (N=47)	SP		Dry, dense, light brown, coarse to fine SAND, some gravel, trace fines. Possible concrete. (FILL)	PID=0
5	15	14-16	S-2	10/24	15-10-10-15 (N=20)	SP-SM		Moist, dense, light brown, coarse to fine SAND, little gravel, trace fines (FILL)	PID=0
∞						GP		Wet, dense, dark brown, GRAVEL, little sand, trace fines (FILL)	



∞ - Water Level at Time of Drilling

Boring B-4C

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-4C

Date(s) Drilled 08/29/2019 - 08/29/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 35.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 19.9 ft / NGVD 1929	
Location Taft St north of I-95 bridge	Coordinates 359477.61E,288205.01N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
		19-21	S-3	14/24	10-23-18-12 (N=41)	ML-SM		Wet, hard, red, SILT and fine to medium SAND, trace gravel (GLACIOFLUVIAL)	PID=0
-5		24-26	S-4	13/24	38-29-20-16 (N=49)	GP-GM		Wet, dense, gray, coarse to fine GRAVEL, little sand (GLACIAL TILL)	PID=0 Rig Chatter
-10		29-29.5	S-5	6/6	70-50/0"	ML		Wet, very stiff, gray, sandy SILT, little gravel (GLACIAL TILL)	
-15								Top of Bedrock at 29.5 ft. See Core Boring Report for rock details.	



∇ - Water Level at Time of Drilling

Boring B-4C

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits Project Location: Pawtucket, RI Project Number: 5980.0	Core Boring B-4C
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Date(s) Drilled: 08/29/2019 - 08/29/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 35.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 19.9 ft / NGVD 1929	
Location: Taft St north of I-95 bridge	Coordinates: 359477.61E,288205.01N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
-15	35		3					xxxxxx	See Test Boring Report for Overburden Details							
			4					xxxxxx								
		30-35	4	1	C-1	60/100%	26/43%	xxxxxx		Strong, slightly weathered, purple, fine-grained SILTSTONE	33.4	J	40	S	1.00	FR
			4					xxxxxx			33.5	J	40	SR	1.00	FR
			4					xxxxxx			34.2	J	50	SR	1.00	FR
			4					xxxxxx		34.5	J	40	SR	1.00	FR	
								xxxxxx		34.6	J	10	S	1.00	FR	
								xxxxxx	Bottom of borehole at 35.0 ft.							



Boring B-4C

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-5

Date(s) Drilled 08/27/2019 - 08/27/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 35.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 26.8 ft / NGVD 1929	
Location Intersection of Taft St. and Jenks Way	Coordinates 359511.82E,288453.92N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
							(ASPHALT)		
		0.5-2	S-1	14/18	44-30-30 (N=60)	SM		Dry, very dense, dark gray, coarse to fine SAND, little gravel and silt (FILL)	PID=0
		2-4	S-2	15/24	22-23-19-16 (N=42)	SM		Dry, very dense, light brown, medium to fine SAND, little silt, trace gravel (FILL)	PID=0
22	5	4-6	S-3	6/24	15-8-5-4 (N=13)	GP		Moist, medium dense, gray, coarse GRAVEL (FILL)	
		6-8	S-4	10/24	7-10-12-5 (N=22)	SM		Moist, medium dense, dark gray, coarse to fine SAND and GRAVEL, little silt (FILL)	PID=0
17	10	8-10	S-5	0/24	7-6-6-6 (N=12)			No recovery. Gravel stuck in tip of sampler. (FILL)	PID=0
		10-12	S-6	11/24	5-6-6-7 (N=12)	ML		Moist, stiff, light brown SILT, trace gravel (FILL)	PID=0
12	15	14-16	S-7	9/24	5-7-5-3 (N=12)				PID=0
						GW		Wet, medium dense, gray, coarse to fine GRAVEL, little sand, trace fines. Fragments of brick. (FILL)	Cobble from 16-17.5 ft
7								Wet, dense, brownish-gray, coarse GRAVEL and sand, little silt (GLACIAL TILL)	



∇ - Water Level at Time of Drilling

Boring B-5

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-5

Date(s) Drilled 08/27/2019 - 08/27/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 35.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 26.8 ft / NGVD 1929	
Location Intersection of Taft St. and Jenks Way	Coordinates 359511.82E,288453.92N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-2	∇	19-21	S-8	10/24	10-21-19-29 (N=40)	GM		Wet, dense, brownish-gray, coarse GRAVEL, little sand and silt (GLACIAL TILL)	PID=0
		24-26	S-9	12/24	13-16-19-29 (N=35)	SM		Wet, dense, brownish-gray, SAND, some gravel, little silt (GLACIAL TILL)	PID=0
								Top of Bedrock at 27.0 ft. See Core Boring Report for rock details.	
-3		30							
-8		35							
-13									



∇ - Water Level at Time of Drilling

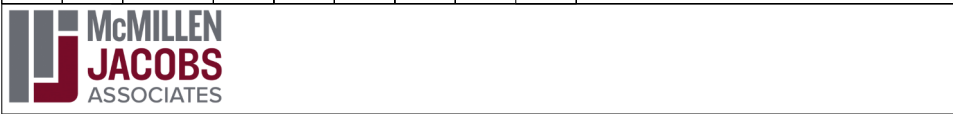
Boring B-5

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-5

Date(s) Drilled: 08/27/2019 - 08/27/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 35.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 26.8 ft / NGVD 1929	
Location: Intersection of Taft St. and Jenks Way	Coordinates: 359511.82E,288453.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
2	25								See Test Boring Report for Overburden Details						
		27-32	2	1	C-1	58/ 97%	47/ 78%		Strong, fresh, gray, medium-grained SANDSTONE	28.9	J	40	SR	5.00	FR
-3			2												



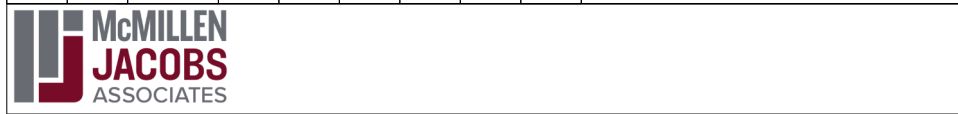
Boring B-5

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-5

Date(s) Drilled: 08/27/2019 - 08/27/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 35.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 26.8 ft / NGVD 1929	
Location: Intersection of Taft St. and Jenks Way	Coordinates: 359511.82E,288453.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
-8	35	27-32	4	1	C-1	58/ 97%	47/ 78%	Strong, fresh, gray, medium-grained SANDSTONE	30.5	J	40	SR	5.00	FR	
			30.6							J	40	SR	5.00	FR		
		32-35	3	1	C-2	32/ 90%	24/ 67%			32.6	J	40	SR	1.00	FR	
			33.7							J	30	R	5.00	FR		
-13									Bottom of borehole at 35.0 ft.							



Boring B-5

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-6

Date(s) Drilled 08/29/2019 - 08/29/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 4.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	
Location On Roosevelt Ave Ext. north of Jenks Way	Coordinates	Elevation Source Google Earth	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
							(ASPHALT)		
		0.5-2	S-1	10/18	9-9-11 (N=20)	SW		Moist, medium dense, brown, coarse to fine SAND with gravel, trace silt (FILL)	
		2-4	S-2	15/24	5-5-6-39 (N=11)	SP		Moist, medium dense, dark brown, medium to fine SAND, little gravel, trace silt. Trace brick fragments. Possible concrete in tip. (FILL)	
-5	5							Bottom of borehole at 4.0 ft.	
-10	10							Pieces of possible concrete in tip of sampler. Relocated to new location at Boring B-6A.	
-15	15								



∇ - Water Level at Time of Drilling

Boring B-6

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-6A

Date(s) Drilled 09/18/2019 - 09/18/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 31.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 25.4 ft / NGVD 1929	
Location On Roosevelt Ave Ext. north of Jenks Way	Coordinates 359521.28E,288557.54N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
21								Vacuum excavated from about 0 to 6 ft (FILL)	
		5							
		6-8	S-1	8/24	7-4-5-8 (N=9)	SM		Moist, loose, brown, medium to fine SAND, little silt. Black sand in tip of sampler. (FILL)	PID=0
		8-10	S-2	8/24	10-14-20-15 (N=34)	SP-SM		Moist, dense, brown to black, medium to fine SAND, trace silt (FILL)	PID=0
16	∇ 10								Water loss while drilling from 10-14 ft PID=0
		10-12	S-3	10/24	7-6-4-3 (N=10)	SP-SM		Wet, medium dense, dark brown, medium to fine SAND, little gravel, trace fines (FILL)	
11		14-16	S-4	8/24	12-5-13-9 (N=18)	SP-SM		Wet, medium dense, gray, SAND, some coarse to fine gravel, little silt. Pieces of glass. (FILL)	PID=0
6								Wet, very dense, gray, SAND and gravel, little silt (GLACIAL TILL)	



∇ - Water Level at Time of Drilling

Boring B-6A

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-6A

Date(s) Drilled 09/18/2019 - 09/18/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 31.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 25.4 ft / NGVD 1929	
Location On Roosevelt Ave Ext. north of Jenks Way	Coordinates 359521.28E,288557.54N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
		19-21	S-5	15/24	26-35-39-38 (N=74)				PID=0
						SM		Wet, very dense, gray, SAND and GRAVEL, little silt (GLACIAL TILL)	Rig Chatter
-1		24-24.1	S-6	1/1	50/1"	GW		Wet, very dense, gray, coarse to fine GRAVEL, little silt (GLACIAL TILL)	Rig Chatter
-4								Top of Bedrock at 26.0 ft. See Core Boring Report for rock details.	Rollerbit from 24.1 ft to 26 ft and hit refusal
-9									
-14									



∇ - Water Level at Time of Drilling

Boring B-6A

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-6A

Date(s) Drilled: 09/18/2019 - 09/18/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 31.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 25.4 ft / NGVD 1929	
Location: On Roosevelt Ave Ext. north of Jenks Way	Coordinates: 359521.28E,288557.54N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
1	25								See Test Boring Report for Overburden Details							
-4	26-31	3	3	C-1	59/ 98%	34/ 57%	xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx	Strong, fresh, gray, fine-grained SILTSTONE	26.5	J	40	R	1.00	FR		
									26.7	J	40	SR	1.00	FR		
									26.9	J	30	SR	1.00	SL		
		27.6							J	30	SR	1.00	FR			
		27.6							J	20	S	1.00	FR			
		27.9							J	40	S	1.00	SL			
		28.0							J	10	S	1.00	FR			
		28.2							J	40	SR	1.00	FR			
		28.7							J	40	S	1.00	FR			
		28.8							J	40	SR	1.00	FR			
		29.0							J	30	SR	1.00	FR			
		29.0							J	20	S	1.00	FR			
29.2	J	20	SR	5.00	FR											



Boring B-6A

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-6A

Date(s) Drilled: 09/18/2019 - 09/18/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 31.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 25.4 ft / NGVD 1929	
Location: On Roosevelt Ave Ext. north of Jenks Way		Coordinates: 359521.28E,288557.54N	Elevation Source: Field Survey

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
		26-31	5	3	C-1	59/98%	34/57%	XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX	Strong, fresh, gray, fine-grained SILTSTONE	30.1 30.2 30.6 30.7	J J J J	50 30 30 40	SR S SR SR	5.00 1.00 1.00 5.00	FR FR FR FR	
									Bottom of borehole at 31.0 ft.							



Boring B-6A

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-7

Date(s) Drilled 08/30/2019 - 08/30/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 29.2 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 23.3 ft / NGVD 1929	
Location On Roosevelt Ave Ext. across from National Grid Property	Coordinates 359529.70E,288817.39N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
							(ASPHALT)		
		0.5-2	S-1	11/18	5-11-17 (N=28)	SP-SM		Moist, medium dense, light brown/red, coarse to fine SAND, some gravel, trace silt (FILL)	PID=0
		2-4	S-2	16/24	11-11-7-6 (N=18)	SP-SM		Moist, medium dense, black, medium to fine SAND, little gravel, trace silt (FILL)	PID=0
19	∞	4-6	S-3	4/24	4-2-3-2 (N=5)	SP-SM		Wet, loose, black, medium to fine SAND, little gravel, trace silt (FILL)	
		6-8	S-4	6/24	1-2-1-0 (N=3)	GW		Wet, very loose, black, coarse to fine GRAVEL, little sand (FILL)	PID=0
14		8-10	S-5	8/24	1-1-18-6 (N=19)	GW-GM		Wet, medium dense, black, coarse to fine GRAVEL, trace sand and silt (FILL)	PID=0
		10-12	S-6	15/24	10-47-34-18 (N=81)	GW		Wet, very dense, dark brown decomposed wood. Bottom 3": Gray coarse to fine GRAVEL, some silt, little sand (FILL)	3 in split spoon sample. PID=0
9		14-16	S-7	13/24	8-9-24-36 (N=33)				PID=0
						SM		Wet, dense, light brown, medium to fine SAND, some gravel, little silt (GLACIOFLUVIAL)	Rig Chatter
4		19-20.8	S-8	15/22	21-35-52-50/4" (N=87)			Wet, very dense, light brown, medium to fine SAND, little gravel, trace silt (GLACIOFLUVIAL)	



∞ - Water Level at Time of Drilling

Boring B-7

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-7

Date(s) Drilled 08/30/2019 - 08/30/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 29.2 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 23.3 ft / NGVD 1929	
Location On Roosevelt Ave Ext. across from National Grid Property	Coordinates 359529.70E,288817.39N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
									PID=0
						SP		Wet, very dense, light brown, medium to fine SAND, little gravel, trace silt (GLACIOFLUVIAL)	
-1		24-24.08	S-9	1/1	80/1"				
		25							
						SC		Wet, very dense, gray, fine SAND and clay, some fractured rock (GLACIAL TILL)	Rig Chatter
-6		29-29.13	S-10	0/2	50/2"				
		30						Bottom of borehole at 29.2 ft.	
-11		35							
-16									



∇ - Water Level at Time of Drilling

Boring B-7

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-8

Date(s) Drilled 09/10/2019 - 09/10/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By S. Wilbur	Checked By W. Kilker
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 25.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 31.1 ft / NGVD 1929	
Location Intersection of Roosevelt Ave. Ext. and Main St.	Coordinates 359697.13E,289110.39N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
27		5						Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	6/24	14-8-5-8 (N=13)	SM		Moist, stiff, brown, SAND, some silt, little gravel (FILL)	PID=0
22		8-10	S-2	9/24	7-4-4-5 (N=8)	SP		Wet, loose, brown, coarse to fine SAND, little gravel, trace silt (GLACIOFLUVIAL)	PID=0
	∇ 10	10-12	S-3	7/24	6-5-2-1 (N=7)	SM		Wet, loose, brown, SAND, some silt, little gravel (GLACIOFLUVIAL)	PID=0
17		14-14.08	S-4	1/1	50/1"	GW		Wet, very dense, gray, coarse to fine GRAVEL, trace silt (GLACIAL TILL)	No casing advancement
									Sampler refusal at 14.1 ft. Rollerbit from 14.1 ft to 16 ft.
								See Core Boring Report for rock details	
12									



∇ - Water Level at Time of Drilling

Boring B-8

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-8

Date(s) Drilled: 09/10/2019 - 09/10/2019	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: S. Wilbur	Checked By: W. Kilker
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 25.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 31.1 ft / NGVD 1929	
Location: Intersection of Roosevelt Ave. Ext. and Main St.	Coordinates: 359697.13E,289110.39N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
17	15								See Test Boring Report for Overburden Details							
12	16-21		3	3	C-1	58/97%	16/27%	Strong, fresh, gray, medium-grained SANDSTONE	16.3	J	30	SR	5.00	FR	
			16.4							J	30	SR	10.0	FR		
			16.5							J	30	S	0	FR		
			16.8							J	40	R	1.00	FR		
			16.8							J	20	SR	10.0	FR		
			16.9							J	50	SR	0	FR		
			17.2							J	30	SR	10.0	FR	FE	
			17.3							J	30	SR	0	FR	FE	
			17.6							J	40	SR	5.00	FR	FE	
			17.7							J	40	R	5.00	FR	FE	
			17.8							J	40	SR	5.00	FR		
			17.9							J	40	SR	10.0	FR		
			18.0							J	50	R	0	FR	FE	
			18.7							J	50	SR	10.0	FR	FE	
			19.0							J	40	SR	0	FR		
19.2	J	30	SR	5.00	FR											
19.3	J	40	SR	5.00	FR											
19.4	J	50	SR		FR											
19.5	J	50	SR		FR											



Boring B-8

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-8

Date(s) Drilled: **09/10/2019 - 09/10/2019** Geotechnical Consultant: **McMillen Jacobs Associates** Logged By: **S. Wilbur** Checked By: **W. Kilker**

Drilling Method/ Rig Type: **Mud Rotary/CME 45** Drilling Contractor: **Geologic Earth Exploration, Inc.** Total Depth of Borehole: **25.0 ft**

Borehole Diameter: **4.00 in** Core Barrel Type / Size: **NX / 2 in** Ground Surface Elevation/Datum: **31.1 ft / NGVD 1929**

Location: **Intersection of Roosevelt Ave. Ext. and Main St.** Coordinates: **359697.13E,289110.39N** Elevation Source: **Field Survey**

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES									
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL				
	16-21	2	3	C-1	58/97%	16/27%		Strong, fresh, gray, medium-grained SANDSTONE	19.8 20.0 20.6 20.7	J J J J	20 30 10 30	SR SR SR SR	10.0 0 5.00 1.00	FR FR FR FR						
	21-25	3	2	3	C-2	42/88%	11/23%	Strong, fresh, gray, medium-grained SANDSTONE with conglomeratic material between 21-22.2 ft	21.1 21.2 21.5 21.6 21.7 21.9 22.2	J J J J J J J	10 50 40 40 50 40 40	SR SR SR SR S SR SR	5.00 10.0 0 10.0 0 10.0 0	FR FR FR FR FR FR FR						
	25	8	1						23.7 24.0	J J	30 30	R SR	5.00 1.00 5.00 1.00	SL FR						
													Bottom of borehole at 25.0 ft.							

Boring B-8



Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-9

Date(s) Drilled 02/10/2020 - 02/10/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 39.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 28.0 ft / NGVD 1929	
Location Across Taft St. from charter school on Tidewater Site	Coordinates 359657.08E,286344.74N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
24	5							Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	6/24	7-16-19-19 (N=35)	SP		Moist, dense, brown, fine SAND little gravel, trace silt (FILL)	PID=0
19		8-10	S-2	20/24	13-16-13-9 (N=29)	SP		Top 7": Moist, brown, SAND, some gravel (FILL)	PID=0
						ML		Bottom 13": Moist, very stiff, light brown, SILT, trace sand (ALLUVIUM)	
14		14-16	S-3	6/24	15-11-5-5 (N=16)	ML		Moist, very stiff, brown, SILT, trace sand (ALLUVIUM)	PID=0
						ML		Wet, medium stiff, dark gray, clayey SILT (ALLUVIUM)	PID=0
9	∇	17-19	S-4	20/24	6-3-2-3 (N=5)	ML		Wet, medium stiff, dark gray, clayey SILT (ALLUVIUM)	PID=0
								Wet, medium stiff, dark gray, clayey SILT (ALLUVIUM)	



∇ - Water Level at Time of Drilling

Boring B-9

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-9

Date(s) Drilled 02/10/2020 - 02/10/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 39.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 28.0 ft / NGVD 1929	
Location Across Taft St. from charter school on Tidewater Site	Coordinates 359657.08E,286344.74N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
		19-21	S-5	19/24	5-1-6-23 (N=7)	ML		Wet, medium stiff, dark gray, clayey SILT (ALLUVIUM)	PID=0
		21-23	S-6	16/24	19-28-19-26 (N=47)	SW		Moist, dense, orange brown, coarse to medium SAND, little gravel (GLACIAL TILL)	PID=0
4		23-25	S-7	16/24	42-38-50- 58 (N=88)	GM		Moist, very dense, gray, coarse to fine GRAVEL, some clayey silt, little sand (GLACIAL TILL)	PID=0
	25	25-27	S-8	16/24	62-44-37-52 (N=81)	SM		Moist, very dense, gray, medium to fine SAND and coarse to fine GRAVEL, little silt (GLACIAL TILL)	PID=0
		27-28.75	S-9	17/21	38-30-32-100/3" (N=62)	SM		Moist, very dense, gray, medium to fine SAND and coarse to fine GRAVEL, little clayey silt (GLACIAL TILL)	PID=0. Rock fragments in tip of sampler.
	-1							Top of Bedrock at 29.0 ft. See Core Boring Report for rock details.	
	30								
	-6								
	35								
	-11								



∇ - Water Level at Time of Drilling

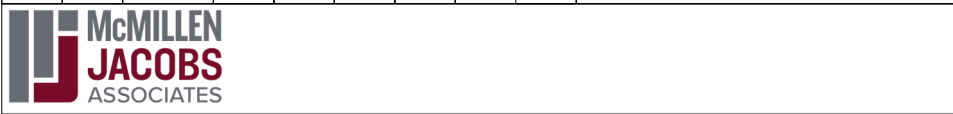
Boring B-9

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-9

Date(s) Drilled: 02/10/2020 - 02/10/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 39.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 28.0 ft / NGVD 1929	
Location: Across Taft St. from charter school on Tidewater Site	Coordinates: 359657.08E,286344.74N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
4	25								See Test Boring Report for Overburden Details							
-1		29-34	6	5	C-1	58/ 97%	41/ 68%	.....	Strong, slightly weathered, dark gray, medium-grained SANDSTONE							



Boring B-9

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-9

Date(s) Drilled: 02/10/2020 - 02/10/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 39.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 28.0 ft / NGVD 1929	
Location: Across Taft St. from charter school on Tidewater Site	Coordinates: 359657.08E,286344.74N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
-6	35	29-34	4	5	C-1	58/97%	41/68%	Dotted	Strong, slightly weathered, dark gray, medium-grained SANDSTONE	30.9	HJ	30				
			31.4							J	35	SR	0.50	SW	SL	
			31.8							J	30	SM	0.50	SW		
			32.0							HJ	40					
			32.3							J	40	SM	1.00	SW	SL	
		32.3	J	30	SM	0.50	SW	SL								
		32.5	J	30	SM	0.50	SW									
		32.7	J	30	SM	0.50	SW									
		32.8	J	30	SM	0.50	SW	SL								
		32.9	J	30	0.50	SW										
	33.2	J	30													
	33.3	HJ	30	SR	0.50	SW										
	33.6	J	30	SM	0.50	SW										
	33.7	HJ	30													
	33.8	J	25													
	34.1	HJ	40	SM	0.50	SW	SL									
	34.3	HJ	70													
	34.5	J	35													
	34.6	HJ	20	SR	0.50	SW										
	34.8	HJ	45													
35.1	J	50														
-11	34-39	2	5	C-2	60/100%	39/65%	Dotted	Strong, slightly weathered, dark gray, medium-grained SANDSTONE	36.0	J	40	SR	0.50	SW	SL	
									36.8	J	45	SR	0.50	SW	SL	
		37.0							J	40	SR	0.50	SW			
		37.2							J	35	SL	0.50	SW			
		37.7							J	65	SL	0.50	SW			
	37.8	J	35	SL	0.50	SW										
	38.0	F/S	40	SL	5.00	MW	CS									
	38.4	J	40	SM	0.50	SW	SL									
	38.5	J	40	SM	0.50	SW	SL									
	38.6	J	40	SM	0.50	SW	SL									
38.7	J	40	SM	0.50	SW	SL										
38.8	J	35	SR	0.50	SW											
								Bottom of borehole at 39.0 ft.								











Boring B-9

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-10

Date(s) Drilled 02/05/2020 - 02/05/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 31.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 23.7 ft / NGVD 1929	
Location Southerly end of field on Tidewater Site	Coordinates 359996.52E,286103.11N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-19	5							Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	11/24	17-16-18-20 (N=34)	SP		Moist, dense, brown, medium SAND, trace gravel (FILL)	PID=0
		8-10	S-2	21/24	17-15-17-17 (N=32)	SP		Moist, dense, brown, medium SAND (FILL)	PID=0
14	10	10-12	S-3	9/24	15-10-12-16 (N=22)	SP		Moist, medium dense, dark brown, medium to fine SAND, little gravel, trace silt (FILL)	PID=0
		12-14	S-4	20/24	14-12-19-18 (N=31)	SP		Moist, dense, dark brown, medium to fine SAND, little gravel, trace silt (FILL)	PID=0
9	15	14-16	S-5	9/24	19-13-14-10 (N=27)	SP		Moist, medium dense, dark brown, medium to fine SAND, little gravel, trace silt (FILL)	PID=0
		16-18	S-6	4/24	11-10-12-11 (N=22)	SP		Moist, medium dense, dark brown, medium SAND, trace gravel and silt. Fragments of brick. (FILL)	PID=0. Rock fragments in tip of sampler.
4		18-20	S-7	12/24	19-23-30-46 (N=53)	SP		Moist, very dense, brown, coarse to fine SAND, some gravel, trace silt (FILL)	PID=0




∇ - Water Level at Time of Drilling

Boring B-10

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-10

Date(s) Drilled 02/05/2020 - 02/05/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 31.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 23.7 ft / NGVD 1929	
Location Southerly end of field on Tidewater Site	Coordinates 359996.52E,286103.11N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-1		20-21	S-8	9/12	73-103 (Refusal)	GM		Wet, very dense, dark gray, coarse to fine GRAVEL, little sand and silt (GLACIAL TILL)	PID=3. Petroleum odor, oily appearance, rock fragments in tip of sampler.
-6							Top of Bedrock at 21.0 ft. See Core Boring Report for rock details.		
-11									
-16									



∇ - Water Level at Time of Drilling

Boring B-10

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-10

Date(s) Drilled: 02/05/2020 - 02/05/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 31.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 23.7 ft / NGVD 1929	
Location: Southerly end of field on Tidewater Site	Coordinates: 359996.52E,286103.11N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
									See Test Boring Report for Overburden Details							
		21-26	3							21.3	J	65	SM	1.00	FR	
										21.7	J	30	R	1.00	SW	SI
			3							22.2	J	25	R		SW	
										22.8	J	45	SM		SW	
										23.2	J	60	VR	1.00	SW	PY
			4	4	C-1	56/93%	37/62%		Strong, slightly weathered, dark gray, medium-grained SANDSTONE	23.4	J	35	R	0.50	SW	
										23.7	J	35	R	0.25	SW	
										23.9	J	40	R	2.00	SW	
										24.4	J	40	R	1.00	SW	
			5							24.7	J	40	R	0.50	SW	
										24.9	J	45	R	2.00	SW	
										25.2	J	20	VR	2.00	SW	
			10							25.4	J	35	R		SW	
		26-31	2							27.2	J	50	SR	1.00	SW	CA
										27.6	HJ	70			SW	
			3							27.7	J	40	SR	2.00	SW	
				4	C-2	60/100%	52/87%		Strong, slightly weathered, dark gray, medium-grained SANDSTONE							
										28.9	J	45	SR	1.00	SW	SI
										29.0	J	50	SR	0.25	SW	
										29.1	J	40	SM	1.00	SW	
										29.4	J	45	SM	1.00	SW	
			2							29.8	J	35	SM	1.00	SW	



Boring B-10

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-10

Date(s) Drilled: 02/05/2020 - 02/05/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 31.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 23.7 ft / NGVD 1929	
Location: Southerly end of field on Tidewater Site	Coordinates: 359996.52E,286103.11N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
		26-31	3	4	C-2	60/100%	52/87%	.....	Strong, slightly weathered, dark gray, medium-grained SANDSTONE	30.0	J	35	SM	0.50	SW	
										30.5	J	25	SM	0.25	SW	
										30.7	J	40	SM	0.25	SW	
									Bottom of borehole at 31.0 ft.							



Boring B-10

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-11

Date(s) Drilled 02/07/2020 - 02/10/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 39.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 25.7 ft / NGVD 1929	
Location Tidewater Site	Coordinates 359825.47E,286216.96N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
								Vacuum excavated from about 0 to 1 ft: Encountered existing concrete tank foundation (1ft thick from 1-2ft below grade) (FILL)	
		2-4	S-1	24/24	20-23-42-21 (N=65)	SW		Moist, very dense, brown, medium to fine SAND, some gravel (FILL)	PID=0
21		4-6	S-2	12/24	20-22-56-36 (N=78)	SW		Moist, very dense, brown, medium to coarse SAND and gravel, trace silt (FILL)	Rig Chatter. PID=0
						SW			
16		9-11	S-3	14/24	14-9-13-10 (N=22)	ML		Moist, very stiff, light brown SILT, trace fine sand, trace clay (ALLUVIUM)	PID=0
						ML			
		13-15	S-4	17/24	7-3-8-8 (N=11)	ML		Moist, stiff, light brown, clayey SILT, trace sand (ALLUVIUM)	PID=0
11		15-17	S-5	7/24	19-22-16-16 (N=38)	GM		Moist, dense, brown, coarse to fine GRAVEL, some coarse to fine sand, little silt (GLACIOFLUVIAL)	PID=0
						GM			
		17-19	S-6	12/24	15-10-10-12 (N=20)	GM		Moist, medium dense, brown, coarse to fine GRAVEL, some sand, little silt (GLACIOFLUVIAL)	PID=0
6									



∇ - Water Level at Time of Drilling

Boring B-11

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-11

Date(s) Drilled 02/07/2020 - 02/10/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 39.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 25.7 ft / NGVD 1929	
Location Tidewater Site	Coordinates 359825.47E,286216.96N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
-1		19-21	S-7	10/24	14-15-9-10 (N=24)	SP-SM		Moist, medium dense, light brown, coarse to medium SAND, some gravel, trace silt (GLACIOFLUVIAL)	Rig Chatter. PID=0
		21-23	S-8	16/24	9-6-14-20 (N=20)	ML		Moist, very stiff, dark gray, clayey SILT, some sand (GLACIOFLUVIAL)	PID=0. Rock fragments in tip of sampler
		23-25	S-9	8/24	24-22-26-24 (N=48)	GM		Moist, dense, gray, coarse to fine GRAVEL, some sand, little clayey silt (GLACIAL TILL)	PID=0
		25-27	S-10	15/24	26-48-18-52 (N=66)	GM		Moist, very dense, gray, coarse to fine GRAVEL, some sand, little clayey silt (GLACIAL TILL)	PID=0. Rock fragments in tip of sampler
-4		30						Top of Bedrock at 29.0 ft. See Core Boring Report for rock details.	
-9		35							
-14								Bottom of borehole at 39.0 ft.	



∇ - Water Level at Time of Drilling

Boring B-11

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-11

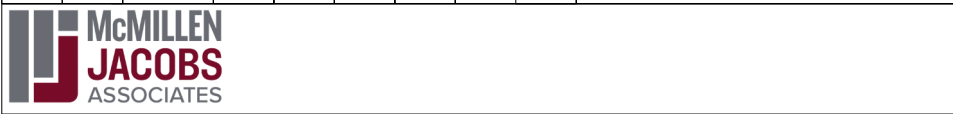
Date(s) Drilled: **02/07/2020 - 02/10/2020** Geotechnical Consultant: **McMillen Jacobs Associates** Logged By: **M. Macinnis** Checked By: **J. Freitas**

Drilling Method/Rig Type: **Mud Rotary/Acker Scout** Drilling Contractor: **Geologic Earth Exploration, Inc.** Total Depth of Borehole: **39.0 ft**

Borehole Diameter: **4.00 in** Core Barrel Type / Size: **NX / 2 in** Ground Surface Elevation/Datum: **25.7 ft / NGVD 1929**

Location: **Tidewater Site** Coordinates: **359825.47E,286216.96N** Elevation Source: **Field Survey**

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
1	25								See Test Boring Report for Overburden Details						
-4		29-33	2	4	C-1	25/52%	5/10%	.....	Strong, moderately to completely weathered, dark gray, medium-grained SANDSTONE						



Boring B-11

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-11

Date(s) Drilled: 02/07/2020 - 02/10/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 39.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 25.7 ft / NGVD 1929	
Location: Tidewater Site	Coordinates: 359825.47E,286216.96N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
-9	29-33	1	1	4	C-1	25/52%	5/10%	Dotted	Strong, moderately to completely weathered, dark gray, medium-grained SANDSTONE	30.5	J	45	R	1.00	MW	FE
										30.8	J	30	R		MW	FE
										31.0	J	15	R		SW	
										31.2	J	50	VR		MW	FE
	31.5	J	40	SR	MW	FE										
										Split spoon sample attempted at 34 ft. with blow count of 50/0"						
	35	34-39	4	4	C-2	52/87%	41/68%	Dotted	Strong, slightly weathered, gray, medium-grained SANDSTONE	34.1	J	45	SR	1.00	SW	SI
										34.9	J	45	SM	1.00	SW	
										35.2	J	45	SR	2.00	SW	SI
										35.4	J	35	VR	2.00	SW	SI
										35.5	J	40	SR	0.50	SW	SI
										35.7	J	50	VR	0.50	SW	SI
36.2										J	45	SR	1.00	SW		
37.0										J	40	SR	1.00	SW		
37.3	J	50	VR	1.00	SW											
37.7	J	55	SR	0.50	SW											
38.0	J	40	SR	0.50	SW											
-14									Bottom of borehole at 39.0 ft.							








Boring B-11

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-12

Date(s) Drilled 02/11/2020 - 02/12/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 51.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 30.1 ft / NGVD 1929	
Location Across Taft St. from Tower St. on Tidewater Site	Coordinates 359643.34E,286494.92N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
26	5							Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	14/24	12-17-14-18 (N=31)	ML		Moist, hard, light brown SILT, little clay (ALLUVIUM)	PID=0
21		8-10	S-2	19/24	13-8-12-14 (N=20)	ML		Moist, very stiff, dark gray, clayey SILT (ALLUVIUM)	PID=0
16		14-16	S-3	11/24	4-8-7-7 (N=15)	ML		Moist, stiff, dark gray, clayey SILT (ALLUVIUM)	PID=0
11						ML		Moist, gray SILT (ALLUVIUM)	



∇ - Water Level at Time of Drilling

Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-12

Date(s) Drilled 02/11/2020 - 02/12/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 51.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 30.1 ft / NGVD 1929	
Location Across Taft St. from Tower St. on Tidewater Site	Coordinates 359643.34E,286494.92N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
6 25 1 30 4 9	∇	19-21	S-4	16/24	9-15-18-21 (N=33)	SP		Moist, dense, brown, fine to medium SAND, trace silt (ALLUVIUM)	PID=0
	23-25	S-5	12/24	24-14-16-20 (N=30)	CL		Moist, hard, light brown CLAY, little silt (GLACIAL TILL)	PID=0	
	25-27	S-6	16/24	34-64-65-54 (N=129)	GC		Moist, very dense, brown, clayey GRAVEL, little sand and silt (GLACIAL TILL)	Sampler would not open. PID=0.	
	27-28.75	S-7	4/21	34-69-48-100/3" (N=117)	GC		Moist, very dense, brown, clayey GRAVEL, little sand (GLACIAL TILL)	PID=0. Rock fragments lodged in tip of sampler.	
								Top of Bedrock at 29.0 ft. See Core Boring Report for rock details.	



∇ - Water Level at Time of Drilling

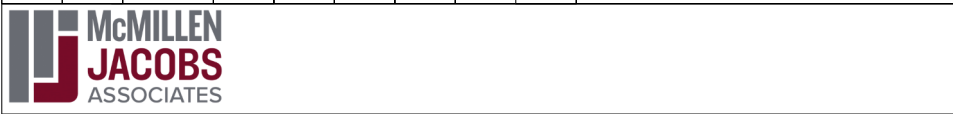
Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-12

Date(s) Drilled: 02/11/2020 - 02/12/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 51.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 30.1 ft / NGVD 1929	
Location: Across Taft St. from Tower St. on Tidewater Site	Coordinates: 359643.34E,286494.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES				
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
6	25								See Test Boring Report for Overburden Details						
1		29-34	3		C-1	9/15%	0/0%	.....	Weak, highly weathered, gray, medium-grained SANDSTONE						



Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-12

Date(s) Drilled: 02/11/2020 - 02/12/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 51.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 30.1 ft / NGVD 1929	
Location: Across Taft St. from Tower St. on Tidewater Site	Coordinates: 359643.34E,286494.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
-4	29-34		3		C-1	9/ 15%	0/ 0%	.....	Weak, highly weathered, gray, medium-grained SANDSTONE							
			4													
			1													
			1													
-4	35	34-37	2		C-2	13/ 36%	0/ 0%	.....	Weak, highly weathered, gray, medium-grained SANDSTONE							
				1												
				6												
-9	37-41		4		C-3	6/ 12%	0/ 0%	.....	Weak, highly weathered, gray, medium-grained SANDSTONE							



Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-12

Date(s) Drilled: 02/11/2020 - 02/12/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 51.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 30.1 ft / NGVD 1929	
Location: Across Taft St. from Tower St. on Tidewater Site	Coordinates: 359643.34E,286494.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES						
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL	
-14		37-41			C-3	6/12%	0/0%		Weak, highly weathered, gray, medium-grained SANDSTONE								
			2							41.4	J	35	SR	0.50	SW	SI	
				3							42.0	J	30	SM	0.50	SW	
											42.8	J	30	SM	0.50	SW	
		41-46		2	5	C-4	59/98%	53/88%		Strong, slightly weathered, dark gray, medium-grained SANDSTONE	43.6	J	20	SR	2.00	SW	SI
				2							44.2	F/S	30	SL	5.00	MW	CS
											45.0	J	25	SM	0.50	SW	
				2							45.4	J	35	SM	0.50	SW	
											45.5	J	35	SM	0.50	SW	
				2							46.1	J	35	SL	0.50	SW	PY
											46.2	J	30	SL	0.50	SW	
											46.4	J	25	SR	0.50	SW	
				2							47.2	J	40	SR	0.50	SW	
	-19		46-51			C-5	59/98%	46/77%		Strong, slightly weathered, purple, medium-grained SANDSTONE	47.3	J	40	SM	0.50	SW	
			2							47.7	J	40	SM	0.50	SW	SL	
										49.4	HJ	20	SM	0.50	SW		
										49.4	J	30	SR	0.50	SW		
				2						49.6	J	40	SR	0.50	SW		



Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-12

Date(s) Drilled: 02/11/2020 - 02/12/2020	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: J. Freitas
Drilling Method/ Rig Type: Mud Rotary/Acker Scout	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 51.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 30.1 ft / NGVD 1929	
Location: Across Taft St. from Tower St. on Tidewater Site	Coordinates: 359643.34E,286494.92N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
		46-51	2	5	C-5	59/ 98%	46/ 77%	.....	Strong, slightly weathered, purple, medium-grained SANDSTONE	50.2 50.2 50.6	HJ J J	35 35 35	SM SR	0.50 0.50 0.50	SW SW	SL
									Bottom of borehole at 51.0 ft.							



Boring B-12

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-13

Date(s) Drilled 02/06/2020 - 02/06/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 21.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 9.7 ft / NGVD 1929	
Location Across Seekonk River from Festival Pier on Tidewater Site	Coordinates 360398.12E,286078.13N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
5	5							Vacuum excavated from about 0 to 6 ft (FILL)	
		6-8	S-1	3/24	75-86-54-12 (N=140)	GW		Moist, very dense, dark gray, coarse to fine GRAVEL, some sand, trace silt (FILL)	PID=0
0	10	8-10	S-2	20/24	2-5-6-2 (N=11)	SM		Moist, medium dense, dark gray, medium to fine SAND, little silt grading to coarse to fine GRAVEL, little silt. Fragments of brick. (FILL)	PID=0. Strong petroleum odor, oily sheen.
		10-12	S-4	1/24	7-4-5-6 (N=9)	GM		Moist, medium dense, dark gray, sandy GRAVEL, little silt (FILL)	PID=2 Rig Chatter
-5	15	14-16	S-5	13/24	30-16-17-26 (N=33)	GW		Wet, dense, dark gray, coarse to fine sandy GRAVEL, trace silt (FILL)	PID=0. Rock fragments in tip of sampler, strong petroleum odor.
-10								Wet, hard, grey/brown clayey SILT, trace fine sand (FILL)	PID>100. Very strong petroleum odor, oily sheen.



∇ - Water Level at Time of Drilling

Boring B-13

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-13

Date(s) Drilled 02/06/2020 - 02/06/2020	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By J. Freitas
Drilling Method/ Rig Type Mud Rotary/Acker Scout	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 21.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Doughnut	Ground Surface Elevation/Datum 9.7 ft / NGVD 1929	
Location Across Seekonk River from Festival Pier on Tidewater Site	Coordinates 360398.12E,286078.13N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
		19-21	S-6	11/24	19-19-23-18 (N=42)	ML		Wet, hard, grey/brown clayey SILT, trace fine sand (FILL)	
-15	25								
-20	30								
-25	35								
-30								Bottom of borehole at 21.0 ft.	



∇ - Water Level at Time of Drilling

Boring B-13



OBSERVATION WELL INSTALLATION REPORT

Well No.
B-2
Boring No.
B-2

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	S. Wilbur
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	9/4/2019-9/5/2019
DRILLER	Paul Fisher	WATER LEVEL	8.60

Ground El.	22.22 ft	Location	Middle of the field on Tidewater Site	<input checked="" type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Type of protective cover/lock	Guard Pipe with Lock
		Height of top of guard pipe above the ground surface	2.5 ft
		Height of top of riser pipe above the ground surface	2 ft
		Type of protective casing:	Guard Pipe
	0-2': Grout	Length	5.0 ft
		Inside Diameter	4.0 in
0-14': Fill - Brown and gray, sands, silts, and gravel		Depth of bottom of guard pipe/roadway box	2.5 ft
	2-3': Bentonite Seal	Type of Seals	Top of Seal (ft) Thickness (ft)
		Grout	0.0 2.0
		Bentonite	2.0 1.0
14-20': Alluvium - Brown silty sands and silt	3-15': Holliston Sand	Type of riser pipe:	Solid PVC
		Inside diameter of riser pipe	2.0 in
		Type of backfill around riser	Holliston Sand
		Diameter of borehole	4.0 in
24-29': Till - Sands, silts and gravels.		Depth to top of well screen	5.0 ft
	15-34': Grout	Type of screen	Slotted PVC Schedule 40
		Screen gauge or size of openings	0.01 in
		Diameter of screen	2.0 in
		Type of backfill around screen	Holliston Sand
29-34': Rock		Depth of bottom of well screen	15.0 ft
		Bottom of Silt trap	- ft
		Depth of bottom of borehole	34.0 ft

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

(Not to Scale)

$$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$$

COMMENTS: _____



OBSERVATION WELL INSTALLATION REPORT

Well No.
B-3
Boring No.
B-3

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	S. Wilbur
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	9/9/2019
DRILLER	Ray Eastwood	WATER LEVEL	

Ground El.	37.45 ft	Location	Northwestern corner of the Tideawter Site	<input checked="" type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Type of protective cover/lock	Guard Pipe with Lock
		Height of top of guard pipe above the ground surface	2.5 ft
		Height of top of riser pipe above the ground surface	2 ft
		Type of protective casing:	Guard Pipe
		Length	5.0 ft
		Inside Diameter	4.0 in
		Depth of bottom of guard pipe/roadway box	2.5 ft
		Type of Seals	Top of Seal (ft) Thickness (ft)
		Grout	0.0 12.5
		Bentonite	12.5 2.0
		Type of riser pipe:	Solid PVC
		Inside diameter of riser pipe	2.0 in
		Type of backfill around riser	Holliston Sand
		Diameter of borehole	4.0 in
		Depth to top of well screen	16.5 ft
		Type of screen	Slotted PVC Schedule 40
		Screen gauge or size of openings	0.01 in
		Diameter of screen	2.0 in
		Type of backfill around screen	Holliston Sand
		Depth of bottom of well screen	26.5 ft
		Bottom of Silt trap	- ft
		Depth of bottom of borehole	37.0 ft

(Bottom of Exploration) (Numbers refer to depth from ground surface in feet)	(Not to Scale)
$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$	

COMMENTS: _____



OBSERVATION WELL INSTALLATION REPORT

Well No.
B-4C
Boring No.
B-4C

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	S. Wilbur
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	8/29/2019
DRILLER	Paul Fisher	WATER LEVEL	18.50

Ground El.	19.87 ft	Location	East side of Roosevelt, across from southern property extents of Masonic Temple	<input type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input checked="" type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Type of protective cover/lock	Roadway Box Cover
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Depth of roadway box below the ground surface</p> <p>Depth of top of riser pipe below the ground surface</p> <p>Type of protective casing:</p> <p style="margin-left: 20px;">Length</p> <p style="margin-left: 20px;">Inside Diameter</p> <p>Depth of bottom of guard pipe/roadway box</p> </div> <div style="width: 45%;"> <p style="text-align: right;">0.0 ft</p> <p style="text-align: right;">0.5 ft</p> <p style="text-align: right;">Roadway Box</p> <p style="text-align: right;">0.5 ft</p> <p style="text-align: right;">6 in</p> <p style="text-align: right;">0.5 ft</p> </div> </div>	
	0-10': Drill Cuttings		
0-20': Fill - Light brown, sands with silt and gravel			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Type of Seals</p> <p style="margin-left: 20px;">Drill Cuttings</p> <p style="margin-left: 20px;">Bentonite</p> </div> <div style="width: 45%;"> <p style="text-align: right;">Top of Seal (ft)</p> <p style="text-align: right;">0.0</p> <p style="text-align: right;">10.0</p> </div> </div>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p style="text-align: right;">Thickness (ft)</p> <p style="text-align: right;">10.0</p> <p style="text-align: right;">2.0</p> </div> </div>
20-24': Glaciofluvial - Red silty sand	10-12': Bentonite Seal		
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Type of riser pipe:</p> <p style="margin-left: 20px;">Inside diameter of riser pipe</p> <p style="margin-left: 20px;">Type of backfill around riser</p> </div> <div style="width: 45%;"> <p style="text-align: right;">Solid PVC</p> <p style="text-align: right;">2.0 in</p> <p style="text-align: right;">Holliston Sand</p> </div> </div>	
24-29.5': Till - Gray, sands, silts and gravels	14-24': Holliston Sand	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Diameter of borehole</p> <p>Depth to top of well screen</p> </div> <div style="width: 45%;"> <p style="text-align: right;">4.0 in</p> <p style="text-align: right;">14.0 ft</p> </div> </div>	
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Type of screen</p> <p style="margin-left: 20px;">Screen gauge or size of openings</p> <p style="margin-left: 20px;">Diameter of screen</p> <p>Type of backfill around screen</p> </div> <div style="width: 45%;"> <p style="text-align: right;">Slotted PVC Schedule 40</p> <p style="text-align: right;">0.01 in</p> <p style="text-align: right;">2.0 in</p> <p style="text-align: right;">Holliston Sand</p> </div> </div>	
29.5 -34': Rock	24-34': Drill Cuttings	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Depth of bottom of well screen</p> <p>Bottom of Silt trap</p> <p>Depth of bottom of borehole</p> </div> <div style="width: 45%;"> <p style="text-align: right;">24.0 ft</p> <p style="text-align: right;">-</p> <p style="text-align: right;">35.0 ft</p> </div> </div>	

(Bottom of Exploration) (Numbers refer to depth from ground surface in feet)	(Not to Scale)
$\text{Riser Pay Length (L1)} + \text{Length of screen (L2)} + \text{Length of silt trap (L3)} = \text{Pay length}$	

COMMENTS: _____



OBSERVATION WELL INSTALLATION REPORT

Well No.
B-7
Boring No.
B-7

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	S. Wilbur
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	8/30/2019
DRILLER	Paul Fisher	WATER LEVEL	8.40

Ground El.	23.28 ft	Location	West side Roosevelt Ave, across from National Grid Hydroelectric facility.	<input type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input checked="" type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Type of protective cover/lock	Roadway Box Cover															
0-14': Fill - brown and black, sand with silt; and gravel with silt	0-6': Drill Cuttings	Depth of roadway box below the ground surface	0.0 ft															
		Depth of top of riser pipe below the ground surface	0.3 ft															
		Type of protective casing:	Roadway Box															
		Length	0.5 ft															
		Inside Diameter	6.0 in															
		Depth of bottom of guard pipe/roadway box	0.5 ft															
		<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 40%;">Type of Seals</th> <th style="width: 20%;">Top of Seal (ft)</th> <th style="width: 40%;">Thickness (ft)</th> </tr> </thead> <tbody> <tr> <td>Drill Cuttings</td> <td style="text-align: center;">0.0</td> <td style="text-align: center;">6.0</td> </tr> <tr> <td>Bentonite Seal</td> <td style="text-align: center;">6.0</td> <td style="text-align: center;">2.0</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Type of Seals	Top of Seal (ft)	Thickness (ft)	Drill Cuttings	0.0	6.0	Bentonite Seal	6.0	2.0						
Type of Seals	Top of Seal (ft)	Thickness (ft)																
Drill Cuttings	0.0	6.0																
Bentonite Seal	6.0	2.0																
	6-8': Bentonite Seal	Type of riser pipe:	Solid PVC															
		Inside diameter of riser pipe	2.0 in															
		Type of backfill around riser	Holliston Sand															
		Diameter of borehole	4.0 in															
		Depth to top of well screen	10.0 ft															
	8-20': Holliston Sand	Type of screen	Slotted PVC Schedule 40															
		Screen gauge or size of openings	0.01 in															
		Diameter of screen	2.0 in															
		Type of backfill around screen	Holliston Sand															
		Depth of bottom of well screen	20.0 ft															
		Bottom of Silt trap	- ft															
		Depth of bottom of borehole	29.2 ft															

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

(Not to Scale)

$$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$$

COMMENTS: _____

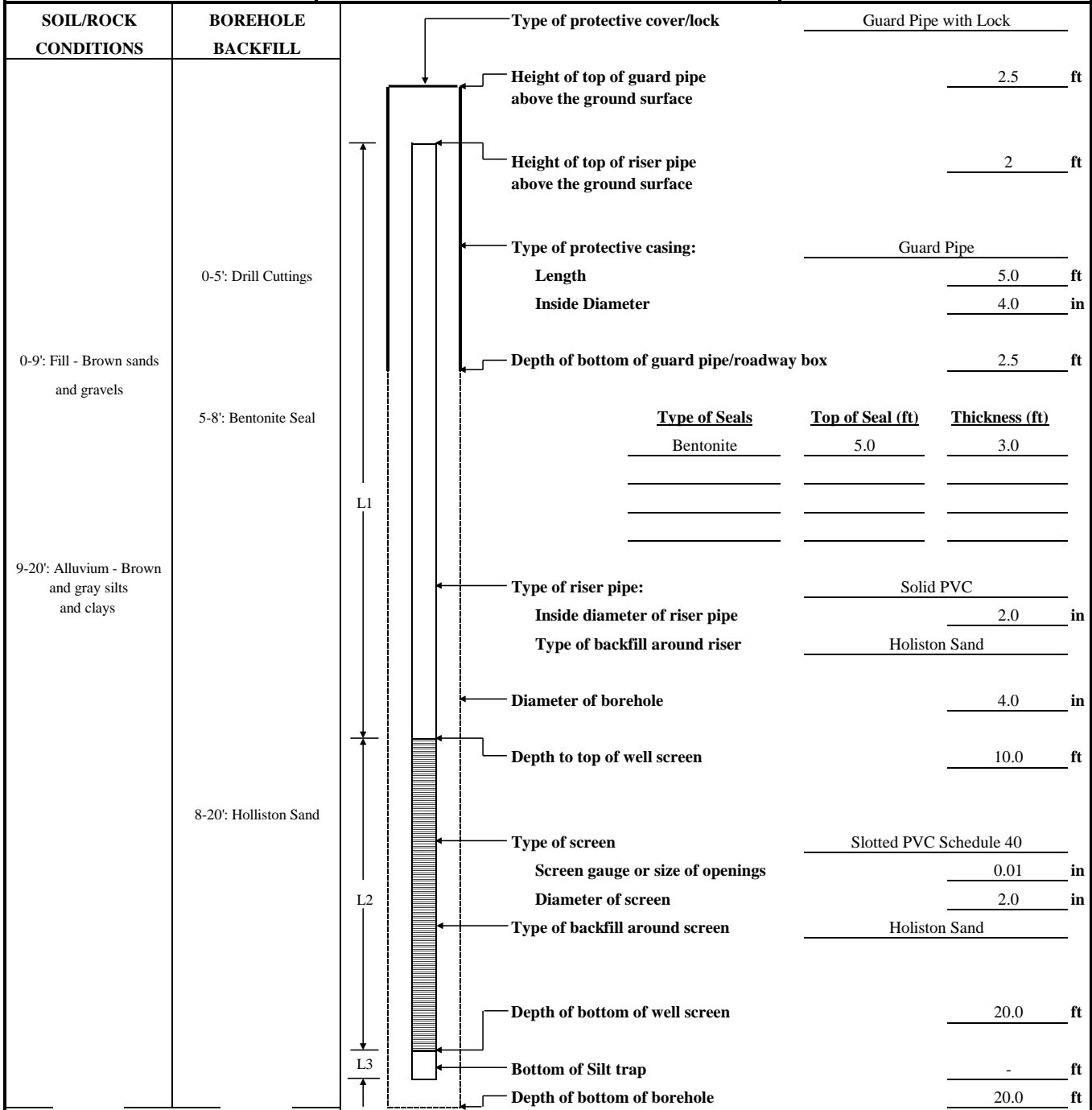


OBSERVATION WELL INSTALLATION REPORT

Well No.
B-9 (OW)
Boring No.
B-9

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	M. MacInnis
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	2/10/2020
DRILLER	John Boyd	WATER LEVEL	10.67'

Ground El.	28.04 ft	Location	Across Taft St. from charter school on Tidewater Site.	<input checked="" type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input type="checkbox"/>	Roadway Box



(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

(Not to Scale)

$$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$$

COMMENTS: _____



OBSERVATION WELL INSTALLATION REPORT

Well No.
B-10 (OW)
Boring No.
B-10

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	M. MacInnis
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	2/6/2020
DRILLER	Dave Sheldon	WATER LEVEL	10.42'

Ground El.	23.74 ft	Location	Southerly end of field on Tidewater Site.	<input checked="" type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Diagram	Measurements
		Type of protective cover/lock	Guard Pipe with Lock
		Height of top of guard pipe above the ground surface	2.75 ft
		Height of top of riser pipe above the ground surface	2.25 ft
		Type of protective casing:	Guard Pipe
	0-2': Drill Cuttings	Length	5.0 ft
		Inside Diameter	4.0 in
0-16': Fill - Brown sand and gravels		Depth of bottom of guard pipe/roadway box	2.2 ft
	2-4': Bentonite Seal	<u>Type of Seals</u>	<u>Top of Seal (ft)</u>
		Bentonite Seal	2.0
		<u>Thickness (ft)</u>	2.0
		Type of riser pipe:	Solid PVC
		Inside diameter of riser pipe	2.0 in
		Type of backfill around riser	Holliston Sand
		Diameter of borehole	4.0 in
		Depth to top of well screen	6.0 ft
	4-16': Holliston Sand	Type of screen	Slotted PVC Schedule 40
		Screen gauge or size of openings	0.01 in
		Diameter of screen	2.0 in
		Type of backfill around screen	Holliston Sand
		Depth of bottom of well screen	16.0 ft
		Bottom of Silt trap	- ft
		Depth of bottom of borehole	16.0 ft

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

(Not to Scale)

$$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$$

COMMENTS: _____

APPENDIX F
SOIL LABORATORY CERTIFICATES OF ANALYSIS



CERTIFICATE OF ANALYSIS

Joe McLoughlin
Beta Engineering
701 George Washington Hwy 2nd FL
Lincoln, RI 02865

RE: NBC III (N/A)
ESS Laboratory Work Order Number: 19H0859

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 4:49 pm, Sep 05, 2019

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 TNI and relative state standards, 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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

SAMPLE RECEIPT

The following samples were received on August 27, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Low Level VOA vials were frozen by ESS Laboratory on 8/27/19 at 15:52.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
19H0859-01	B-5 0-2ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D
19H0859-02	B-5 2-4ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D
19H0859-03	B-5 4-6ft	Soil	6010C, 7471B, 8082A, 8100M, 8260B Low, 8270D
19H0859-04	B-5 6-10ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

PROJECT NARRATIVE

5035/8260B Volatile Organic Compounds / Low Level

- CH92823-BS1 Blank Spike recovery is below lower control limit (B-).
Dichlorodifluoromethane (63% @ 70-130%)
- CH92823-BSD1 Blank Spike recovery is below lower control limit (B-).
Dichlorodifluoromethane (60% @ 70-130%)
- CH92957-BSD1 Blank Spike recovery is below lower control limit (B-).
Dichlorodifluoromethane (68% @ 70-130%)

8100M Total Petroleum Hydrocarbons

- 19H0859-02 Surrogate recovery(ies) diluted below the MRL (SD).
O-Terphenyl (% @ 40-140%)

8270D Semi-Volatile Organic Compounds

- C9H0589-CCV1 Calibration required quadratic regression (Q).
2,4-Dinitrophenol (101% @ 80-120%), 4,6-Dinitro-2-Methylphenol (109% @ 80-120%), Benzoic Acid (102% @ 80-120%), Pentachlorophenol (117% @ 80-120%)
- C9H0589-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).
Hexachlorocyclopentadiene (28% @ 20%)
- C9I0017-CCV1 Calibration required quadratic regression (Q).
2,4-Dinitrophenol (98% @ 80-120%), 4,6-Dinitro-2-Methylphenol (87% @ 80-120%), Benzoic Acid (103% @ 80-120%), Pentachlorophenol (95% @ 80-120%)
- C9I0017-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).
4-Nitrophenol (21% @ 20%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

- [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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

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
- 8015C - 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
- MADEP 18-2.1 - 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
- 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 0-2ft
Date Sampled: 08/27/19 09:00
Percent Solids: 91

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (5.24)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040
Arsenic	ND (2.62)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040
Beryllium	0.73 (0.12)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040
Cadmium	ND (0.52)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040
Chromium	12.1 (1.05)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040
Copper	11.4 (2.62)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040
Lead	8.02 (5.24)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040
Mercury	ND (0.016)		7471B		1	MKS	09/03/19 10:29	1.32	40	CH93041
Nickel	9.89 (2.62)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040
Selenium	ND (5.24)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040
Silver	ND (0.52)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040
Thallium	ND (0.52)		6020A		1	NAR	09/04/19 16:36	2.09	100	CH93040
Zinc	30.3 (2.62)		6010C		1	KJK	09/03/19 23:14	2.09	100	CH93040



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 0-2ft
Date Sampled: 08/27/19 09:00
Percent Solids: 91
Initial Volume: 7.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,1,1-Trichloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,1,2,2-Tetrachloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,1,2-Trichloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,1-Dichloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,1-Dichloroethene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,1-Dichloropropene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,2,3-Trichlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,2,3-Trichloropropane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,2,4-Trichlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,2,4-Trimethylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,2-Dibromo-3-Chloropropane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,2-Dibromoethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,2-Dichlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,2-Dichloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,2-Dichloropropane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,3,5-Trimethylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,3-Dichlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,3-Dichloropropane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,4-Dichlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1,4-Dioxane	ND (0.0694)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
1-Chlorohexane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
2,2-Dichloropropane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
2-Butanone	ND (0.0347)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
2-Chlorotoluene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
2-Hexanone	ND (0.0347)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
4-Chlorotoluene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
4-Isopropyltoluene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
4-Methyl-2-Pentanone	ND (0.0347)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Acetone	ND (0.0347)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Benzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Bromobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-5 0-2ft
 Date Sampled: 08/27/19 09:00
 Percent Solids: 91
 Initial Volume: 7.9
 Final Volume: 10
 Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
 ESS Laboratory Sample ID: 19H0859-01
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Bromodichloromethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Bromoform	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Bromomethane	ND (0.0069)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Carbon Disulfide	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Carbon Tetrachloride	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Chlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Chloroethane	ND (0.0069)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Chloroform	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Chloromethane	ND (0.0069)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
cis-1,2-Dichloroethene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
cis-1,3-Dichloropropene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Dibromochloromethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Dibromomethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Dichlorodifluoromethane	ND (0.0069)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Diethyl Ether	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Di-isopropyl ether	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Ethyl tertiary-butyl ether	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Ethylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Hexachlorobutadiene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Isopropylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Methyl tert-Butyl Ether	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Methylene Chloride	ND (0.0173)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Naphthalene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
n-Butylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
n-Propylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
sec-Butylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Styrene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
tert-Butylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Tertiary-amyl methyl ether	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Tetrachloroethene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Tetrahydrofuran	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 0-2ft
Date Sampled: 08/27/19 09:00
Percent Solids: 91
Initial Volume: 7.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
trans-1,2-Dichloroethene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
trans-1,3-Dichloropropene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Trichloroethene	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Trichlorofluoromethane	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Vinyl Acetate	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Vinyl Chloride	ND (0.0069)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Xylene O	ND (0.0035)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Xylene P,M	ND (0.0069)		8260B Low		1	08/28/19 17:29	C9H0567	CH92823
Xylenes (Total)	ND (0.00694)		8260B Low		1	08/28/19 17:29		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>84 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>87 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>89 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>93 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 0-2ft
Date Sampled: 08/27/19 09:00
Percent Solids: 91
Initial Volume: 20.9
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 8/28/19 16:13

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.05)		8082A		1	08/29/19 13:33		CH92803
Aroclor 1221	ND (0.05)		8082A		1	08/29/19 13:33		CH92803
Aroclor 1232	ND (0.05)		8082A		1	08/29/19 13:33		CH92803
Aroclor 1242	ND (0.05)		8082A		1	08/29/19 13:33		CH92803
Aroclor 1248	ND (0.05)		8082A		1	08/29/19 13:33		CH92803
Aroclor 1254	ND (0.05)		8082A		1	08/29/19 13:33		CH92803
Aroclor 1260	ND (0.05)		8082A		1	08/29/19 13:33		CH92803
Aroclor 1262	ND (0.05)		8082A		1	08/29/19 13:33		CH92803
Aroclor 1268	ND (0.05)		8082A		1	08/29/19 13:33		CH92803

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	48 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	50 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	57 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	59 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 0-2ft
Date Sampled: 08/27/19 09:00
Percent Solids: 91
Initial Volume: 19.1
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/27/19 17:01

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	160 (43.0)		8100M		1	08/28/19 14:30	C9H0564	CH92709
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		93 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 0-2ft
Date Sampled: 08/27/19 09:00
Percent Solids: 91
Initial Volume: 15.9
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
1,2,4-Trichlorobenzene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
1,2-Dichlorobenzene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
1,3-Dichlorobenzene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
1,4-Dichlorobenzene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2,3,4,6-Tetrachlorophenol	ND (1.73)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2,4,5-Trichlorophenol	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2,4,6-Trichlorophenol	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2,4-Dichlorophenol	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2,4-Dimethylphenol	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2,4-Dinitrophenol	ND (1.73)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2,4-Dinitrotoluene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2,6-Dinitrotoluene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2-Chloronaphthalene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2-Chlorophenol	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2-Methylnaphthalene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2-Methylphenol	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2-Nitroaniline	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
2-Nitrophenol	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
3,3'-Dichlorobenzidine	ND (0.690)		8270D		1	09/03/19 19:43	C9I0017	CH92910
3+4-Methylphenol	ND (0.690)		8270D		1	09/03/19 19:43	C9I0017	CH92910
3-Nitroaniline	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
4,6-Dinitro-2-Methylphenol	ND (1.73)		8270D		1	09/03/19 19:43	C9I0017	CH92910
4-Bromophenyl-phenylether	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
4-Chloro-3-Methylphenol	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
4-Chloroaniline	ND (0.690)		8270D		1	09/03/19 19:43	C9I0017	CH92910
4-Chloro-phenyl-phenyl ether	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
4-Nitroaniline	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
4-Nitrophenol	ND (1.73)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Acenaphthene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Acenaphthylene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Acetophenone	ND (0.690)		8270D		1	09/03/19 19:43	C9I0017	CH92910



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 0-2ft
Date Sampled: 08/27/19 09:00
Percent Solids: 91
Initial Volume: 15.9
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.690)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Anthracene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Azobenzene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Benzo(a)anthracene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Benzo(a)pyrene	ND (0.173)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Benzo(b)fluoranthene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Benzo(g,h,i)perylene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Benzo(k)fluoranthene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Benzoic Acid	ND (1.73)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Benzyl Alcohol	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
bis(2-Chloroethoxy)methane	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
bis(2-Chloroethyl)ether	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
bis(2-chloroisopropyl)Ether	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
bis(2-Ethylhexyl)phthalate	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Butylbenzylphthalate	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Carbazole	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Chrysene	ND (0.173)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Dibenzo(a,h)Anthracene	ND (0.173)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Dibenzofuran	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Diethylphthalate	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Dimethylphthalate	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Di-n-butylphthalate	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Di-n-octylphthalate	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Fluoranthene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Fluorene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Hexachlorobenzene	ND (0.173)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Hexachlorobutadiene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Hexachlorocyclopentadiene	ND (1.73)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Hexachloroethane	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Indeno(1,2,3-cd)Pyrene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Isophorone	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Naphthalene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-5 0-2ft
 Date Sampled: 08/27/19 09:00
 Percent Solids: 91
 Initial Volume: 15.9
 Final Volume: 0.5
 Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
 ESS Laboratory Sample ID: 19H0859-01
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: TJ
 Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
N-Nitrosodimethylamine	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
N-Nitroso-Di-n-Propylamine	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
N-nitrosodiphenylamine	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Pentachlorophenol	ND (1.73)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Phenanthrene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Phenol	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Pyrene	ND (0.344)		8270D		1	09/03/19 19:43	C9I0017	CH92910
Pyridine	ND (1.73)		8270D		1	09/03/19 19:43	C9I0017	CH92910

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	59 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	70 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	67 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	65 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	65 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	61 %		30-130
<i>Surrogate: Phenol-d6</i>	67 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	72 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 2-4ft
Date Sampled: 08/27/19 09:15
Percent Solids: 89

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (3.98)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040
Arsenic	3.16 (1.99)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040
Beryllium	0.40 (0.09)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040
Cadmium	ND (0.40)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040
Chromium	14.0 (0.80)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040
Copper	14.3 (1.99)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040
Lead	27.8 (3.98)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040
Mercury	0.033 (0.028)		7471B		1	MKS	09/03/19 10:39	0.79	40	CH93041
Nickel	11.5 (1.99)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040
Selenium	ND (3.98)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040
Silver	ND (0.40)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040
Thallium	ND (0.40)		6020A		1	NAR	09/04/19 17:01	2.81	100	CH93040
Zinc	41.8 (1.99)		6010C		1	KJK	09/03/19 23:44	2.81	100	CH93040



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 2-4ft
Date Sampled: 08/27/19 09:15
Percent Solids: 89
Initial Volume: 7.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,1,1-Trichloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,1,2,2-Tetrachloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,1,2-Trichloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,1-Dichloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,1-Dichloroethene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,1-Dichloropropene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,2,3-Trichlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,2,3-Trichloropropane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,2,4-Trichlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,2,4-Trimethylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,2-Dibromo-3-Chloropropane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,2-Dibromoethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,2-Dichlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,2-Dichloroethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,2-Dichloropropane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,3,5-Trimethylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,3-Dichlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,3-Dichloropropane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,4-Dichlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1,4-Dioxane	ND (0.0708)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
1-Chlorohexane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
2,2-Dichloropropane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
2-Butanone	ND (0.0354)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
2-Chlorotoluene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
2-Hexanone	ND (0.0354)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
4-Chlorotoluene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
4-Isopropyltoluene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
4-Methyl-2-Pentanone	ND (0.0354)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Acetone	ND (0.0354)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Benzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Bromobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 2-4ft
Date Sampled: 08/27/19 09:15
Percent Solids: 89
Initial Volume: 7.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Bromodichloromethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Bromoform	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Bromomethane	ND (0.0071)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Carbon Disulfide	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Carbon Tetrachloride	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Chlorobenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Chloroethane	ND (0.0071)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Chloroform	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Chloromethane	ND (0.0071)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
cis-1,2-Dichloroethene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
cis-1,3-Dichloropropene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Dibromochloromethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Dibromomethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Dichlorodifluoromethane	ND (0.0071)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Diethyl Ether	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Di-isopropyl ether	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Ethyl tertiary-butyl ether	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Ethylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Hexachlorobutadiene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Isopropylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Methyl tert-Butyl Ether	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Methylene Chloride	ND (0.0177)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Naphthalene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
n-Butylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
n-Propylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
sec-Butylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Styrene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
tert-Butylbenzene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Tertiary-amyl methyl ether	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Tetrachloroethene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Tetrahydrofuran	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 2-4ft
Date Sampled: 08/27/19 09:15
Percent Solids: 89
Initial Volume: 7.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
trans-1,2-Dichloroethene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
trans-1,3-Dichloropropene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Trichloroethene	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Trichlorofluoromethane	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Vinyl Acetate	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Vinyl Chloride	ND (0.0071)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Xylene O	ND (0.0035)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Xylene P,M	ND (0.0071)		8260B Low		1	08/28/19 17:54	C9H0567	CH92823
Xylenes (Total)	ND (0.00708)		8260B Low		1	08/28/19 17:54		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>89 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>86 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>92 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>94 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 2-4ft
Date Sampled: 08/27/19 09:15
Percent Solids: 89
Initial Volume: 19.7
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 8/28/19 16:13

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	08/29/19 13:53		CH92803
Aroclor 1221	ND (0.06)		8082A		1	08/29/19 13:53		CH92803
Aroclor 1232	ND (0.06)		8082A		1	08/29/19 13:53		CH92803
Aroclor 1242	ND (0.06)		8082A		1	08/29/19 13:53		CH92803
Aroclor 1248	ND (0.06)		8082A		1	08/29/19 13:53		CH92803
Aroclor 1254	ND (0.06)		8082A		1	08/29/19 13:53		CH92803
Aroclor 1260	ND (0.06)		8082A		1	08/29/19 13:53		CH92803
Aroclor 1262	ND (0.06)		8082A		1	08/29/19 13:53		CH92803
Aroclor 1268	ND (0.06)		8082A		1	08/29/19 13:53		CH92803

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	35 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	38 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	40 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	43 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 2-4ft
Date Sampled: 08/27/19 09:15
Percent Solids: 89
Initial Volume: 19.5
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/27/19 17:01

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	1850 (860)		8100M		20	08/28/19 21:41	C9H0564	CH92709
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		<i>%</i>	<i>SD</i>	<i>40-140</i>				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 2-4ft
Date Sampled: 08/27/19 09:15
Percent Solids: 89
Initial Volume: 15
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
1,2,4-Trichlorobenzene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
1,2-Dichlorobenzene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
1,3-Dichlorobenzene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
1,4-Dichlorobenzene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2,3,4,6-Tetrachlorophenol	ND (1.87)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2,4,5-Trichlorophenol	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2,4,6-Trichlorophenol	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2,4-Dichlorophenol	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2,4-Dimethylphenol	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2,4-Dinitrophenol	ND (1.87)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2,4-Dinitrotoluene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2,6-Dinitrotoluene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2-Chloronaphthalene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2-Chlorophenol	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2-Methylnaphthalene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2-Methylphenol	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2-Nitroaniline	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
2-Nitrophenol	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
3,3'-Dichlorobenzidine	ND (0.746)		8270D		1	09/03/19 20:11	C9I0017	CH92910
3+4-Methylphenol	ND (0.746)		8270D		1	09/03/19 20:11	C9I0017	CH92910
3-Nitroaniline	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
4,6-Dinitro-2-Methylphenol	ND (1.87)		8270D		1	09/03/19 20:11	C9I0017	CH92910
4-Bromophenyl-phenylether	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
4-Chloro-3-Methylphenol	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
4-Chloroaniline	ND (0.746)		8270D		1	09/03/19 20:11	C9I0017	CH92910
4-Chloro-phenyl-phenyl ether	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
4-Nitroaniline	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
4-Nitrophenol	ND (1.87)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Acenaphthene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Acenaphthylene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Acetophenone	ND (0.746)		8270D		1	09/03/19 20:11	C9I0017	CH92910



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 2-4ft
Date Sampled: 08/27/19 09:15
Percent Solids: 89
Initial Volume: 15
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.746)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Anthracene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Azobenzene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Benzo(a)anthracene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Benzo(a)pyrene	ND (0.187)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Benzo(b)fluoranthene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Benzo(g,h,i)perylene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Benzo(k)fluoranthene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Benzoic Acid	ND (1.87)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Benzyl Alcohol	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
bis(2-Chloroethoxy)methane	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
bis(2-Chloroethyl)ether	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
bis(2-chloroisopropyl)Ether	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
bis(2-Ethylhexyl)phthalate	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Butylbenzylphthalate	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Carbazole	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Chrysene	ND (0.187)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Dibenzo(a,h)Anthracene	ND (0.187)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Dibenzofuran	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Diethylphthalate	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Dimethylphthalate	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Di-n-butylphthalate	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Di-n-octylphthalate	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Fluoranthene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Fluorene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Hexachlorobenzene	ND (0.187)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Hexachlorobutadiene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Hexachlorocyclopentadiene	ND (1.87)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Hexachloroethane	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Indeno(1,2,3-cd)Pyrene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Isophorone	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Naphthalene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 2-4ft
Date Sampled: 08/27/19 09:15
Percent Solids: 89
Initial Volume: 15
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
N-Nitrosodimethylamine	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
N-Nitroso-Di-n-Propylamine	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
N-nitrosodiphenylamine	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Pentachlorophenol	ND (1.87)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Phenanthrene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Phenol	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Pyrene	ND (0.372)		8270D		1	09/03/19 20:11	C9I0017	CH92910
Pyridine	ND (1.87)		8270D		1	09/03/19 20:11	C9I0017	CH92910

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	37 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	45 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	43 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	47 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	41 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	35 %		30-130
<i>Surrogate: Phenol-d6</i>	42 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	51 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 4-6ft
Date Sampled: 08/27/19 09:30
Percent Solids: 89

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-03
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (4.49)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Arsenic	4.79 (2.24)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Beryllium	0.32 (0.10)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Cadmium	ND (0.45)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Chromium	11.5 (0.90)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Copper	23.8 (2.24)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Lead	90.3 (4.49)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Mercury	0.215 (0.025)		7471B		1	MKS	09/03/19 10:54	0.88	40	CH93041
Nickel	8.35 (2.24)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Selenium	ND (4.49)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Silver	ND (0.45)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Thallium	ND (4.49)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040
Zinc	68.9 (2.24)		6010C		1	KJK	09/04/19 0:03	2.51	100	CH93040



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 4-6ft
Date Sampled: 08/27/19 09:30
Percent Solids: 89
Initial Volume: 6.4
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,1,1-Trichloroethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,1,2,2-Tetrachloroethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,1,2-Trichloroethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,1-Dichloroethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,1-Dichloroethene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,1-Dichloropropene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,2,3-Trichlorobenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,2,3-Trichloropropane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,2,4-Trichlorobenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,2,4-Trimethylbenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,2-Dibromo-3-Chloropropane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,2-Dibromoethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,2-Dichlorobenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,2-Dichloroethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,2-Dichloropropane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,3,5-Trimethylbenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,3-Dichlorobenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,3-Dichloropropane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,4-Dichlorobenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1,4-Dioxane	ND (0.0880)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
1-Chlorohexane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
2,2-Dichloropropane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
2-Butanone	ND (0.0440)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
2-Chlorotoluene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
2-Hexanone	ND (0.0440)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
4-Chlorotoluene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
4-Isopropyltoluene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
4-Methyl-2-Pentanone	ND (0.0440)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Acetone	ND (0.0440)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Benzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Bromobenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 4-6ft
Date Sampled: 08/27/19 09:30
Percent Solids: 89
Initial Volume: 6.4
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Bromodichloromethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Bromoform	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Bromomethane	ND (0.0088)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Carbon Disulfide	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Carbon Tetrachloride	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Chlorobenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Chloroethane	ND (0.0088)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Chloroform	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Chloromethane	ND (0.0088)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
cis-1,2-Dichloroethene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
cis-1,3-Dichloropropene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Dibromochloromethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Dibromomethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Dichlorodifluoromethane	ND (0.0088)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Diethyl Ether	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Di-isopropyl ether	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Ethyl tertiary-butyl ether	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Ethylbenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Hexachlorobutadiene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Isopropylbenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Methyl tert-Butyl Ether	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Methylene Chloride	ND (0.0220)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Naphthalene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
n-Butylbenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
n-Propylbenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
sec-Butylbenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Styrene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
tert-Butylbenzene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Tertiary-amyl methyl ether	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Tetrachloroethene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Tetrahydrofuran	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 4-6ft
Date Sampled: 08/27/19 09:30
Percent Solids: 89
Initial Volume: 6.4
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
trans-1,2-Dichloroethene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
trans-1,3-Dichloropropene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Trichloroethene	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Trichlorofluoromethane	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Vinyl Acetate	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Vinyl Chloride	ND (0.0088)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Xylene O	ND (0.0044)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Xylene P,M	ND (0.0088)		8260B Low		1	08/29/19 19:58	C9H0616	CH92957
Xylenes (Total)	ND (0.00880)		8260B Low		1	08/29/19 19:58		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>90 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>89 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>86 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>94 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 4-6ft
Date Sampled: 08/27/19 09:30
Percent Solids: 89
Initial Volume: 20.2
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 8/28/19 16:13

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	08/29/19 14:12		CH92803
Aroclor 1221	ND (0.06)		8082A		1	08/29/19 14:12		CH92803
Aroclor 1232	ND (0.06)		8082A		1	08/29/19 14:12		CH92803
Aroclor 1242	ND (0.06)		8082A		1	08/29/19 14:12		CH92803
Aroclor 1248	ND (0.06)		8082A		1	08/29/19 14:12		CH92803
Aroclor 1254	ND (0.06)		8082A		1	08/29/19 14:12		CH92803
Aroclor 1260 [2C]	ND (0.06)		8082A		1	08/29/19 14:12		CH92803
Aroclor 1262	ND (0.06)		8082A		1	08/29/19 14:12		CH92803
Aroclor 1268	ND (0.06)		8082A		1	08/29/19 14:12		CH92803

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	62 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	64 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	62 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	74 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 4-6ft
Date Sampled: 08/27/19 09:30
Percent Solids: 89
Initial Volume: 19.9
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/27/19 17:01

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	233 (42.5)		8100M		1	08/28/19 15:48	C9H0564	CH92709
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		87 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 4-6ft
Date Sampled: 08/27/19 09:30
Percent Solids: 89
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
1,2,4-Trichlorobenzene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
1,2-Dichlorobenzene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
1,3-Dichlorobenzene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
1,4-Dichlorobenzene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2,3,4,6-Tetrachlorophenol	ND (1.92)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2,4,5-Trichlorophenol	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2,4,6-Trichlorophenol	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2,4-Dichlorophenol	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2,4-Dimethylphenol	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2,4-Dinitrophenol	ND (1.92)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2,4-Dinitrotoluene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2,6-Dinitrotoluene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2-Chloronaphthalene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2-Chlorophenol	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2-Methylnaphthalene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2-Methylphenol	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2-Nitroaniline	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
2-Nitrophenol	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
3,3'-Dichlorobenzidine	ND (0.767)		8270D		1	09/03/19 20:40	C9I0017	CH92910
3+4-Methylphenol	ND (0.767)		8270D		1	09/03/19 20:40	C9I0017	CH92910
3-Nitroaniline	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
4,6-Dinitro-2-Methylphenol	ND (1.92)		8270D		1	09/03/19 20:40	C9I0017	CH92910
4-Bromophenyl-phenylether	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
4-Chloro-3-Methylphenol	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
4-Chloroaniline	ND (0.767)		8270D		1	09/03/19 20:40	C9I0017	CH92910
4-Chloro-phenyl-phenyl ether	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
4-Nitroaniline	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
4-Nitrophenol	ND (1.92)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Acenaphthene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Acenaphthylene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Acetophenone	ND (0.767)		8270D		1	09/03/19 20:40	C9I0017	CH92910



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 4-6ft
Date Sampled: 08/27/19 09:30
Percent Solids: 89
Initial Volume: 14.7
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.767)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Anthracene	0.879 (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Azobenzene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Benzo(a)anthracene	2.29 (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Benzo(a)pyrene	1.98 (0.192)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Benzo(b)fluoranthene	1.40 (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Benzo(g,h,i)perylene	1.11 (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Benzo(k)fluoranthene	2.07 (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Benzoic Acid	ND (1.92)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Benzyl Alcohol	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
bis(2-Chloroethoxy)methane	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
bis(2-Chloroethyl)ether	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
bis(2-chloroisopropyl)Ether	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
bis(2-Ethylhexyl)phthalate	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Butylbenzylphthalate	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Carbazole	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Chrysene	2.04 (0.192)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Dibenzo(a,h)Anthracene	0.510 (0.192)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Dibenzofuran	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Diethylphthalate	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Dimethylphthalate	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Di-n-butylphthalate	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Di-n-octylphthalate	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Fluoranthene	4.35 (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Fluorene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Hexachlorobenzene	ND (0.192)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Hexachlorobutadiene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Hexachlorocyclopentadiene	ND (1.92)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Hexachloroethane	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Indeno(1,2,3-cd)Pyrene	1.10 (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Isophorone	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Naphthalene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-5 4-6ft
 Date Sampled: 08/27/19 09:30
 Percent Solids: 89
 Initial Volume: 14.7
 Final Volume: 0.5
 Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
 ESS Laboratory Sample ID: 19H0859-03
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: TJ
 Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
N-Nitrosodimethylamine	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
N-Nitroso-Di-n-Propylamine	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
N-nitrosodiphenylamine	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Pentachlorophenol	ND (1.92)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Phenanthrene	3.52 (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Phenol	ND (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Pyrene	4.02 (0.383)		8270D		1	09/03/19 20:40	C9I0017	CH92910
Pyridine	ND (1.92)		8270D		1	09/03/19 20:40	C9I0017	CH92910

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	47 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	58 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	52 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	53 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	48 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	45 %		30-130
<i>Surrogate: Phenol-d6</i>	52 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	76 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 6-10ft
Date Sampled: 08/27/19 09:45
Percent Solids: 88

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-04
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (5.37)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040
Arsenic	5.09 (2.68)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040
Beryllium	0.67 (0.12)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040
Cadmium	ND (0.54)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040
Chromium	20.1 (1.07)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040
Copper	14.4 (2.68)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040
Lead	60.6 (5.37)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040
Mercury	ND (0.025)		7471B		1	MKS	09/03/19 10:56	0.9	40	CH93041
Nickel	14.1 (2.68)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040
Selenium	ND (5.37)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040
Silver	ND (0.54)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040
Thallium	ND (0.54)		6020A		1	NAR	09/04/19 17:35	2.11	100	CH93040
Zinc	45.9 (2.68)		6010C		1	KJK	09/04/19 0:06	2.11	100	CH93040



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 6-10ft
Date Sampled: 08/27/19 09:45
Percent Solids: 88
Initial Volume: 7.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,1,1-Trichloroethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,1,2,2-Tetrachloroethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,1,2-Trichloroethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,1-Dichloroethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,1-Dichloroethene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,1-Dichloropropene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,2,3-Trichlorobenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,2,3-Trichloropropane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,2,4-Trichlorobenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,2,4-Trimethylbenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,2-Dibromo-3-Chloropropane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,2-Dibromoethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,2-Dichlorobenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,2-Dichloroethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,2-Dichloropropane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,3,5-Trimethylbenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,3-Dichlorobenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,3-Dichloropropane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,4-Dichlorobenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1,4-Dioxane	ND (0.0786)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
1-Chlorohexane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
2,2-Dichloropropane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
2-Butanone	ND (0.0393)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
2-Chlorotoluene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
2-Hexanone	ND (0.0393)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
4-Chlorotoluene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
4-Isopropyltoluene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
4-Methyl-2-Pentanone	ND (0.0393)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Acetone	ND (0.0393)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Benzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Bromobenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 6-10ft
Date Sampled: 08/27/19 09:45
Percent Solids: 88
Initial Volume: 7.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Bromodichloromethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Bromoform	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Bromomethane	ND (0.0079)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Carbon Disulfide	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Carbon Tetrachloride	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Chlorobenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Chloroethane	ND (0.0079)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Chloroform	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Chloromethane	ND (0.0079)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
cis-1,2-Dichloroethene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
cis-1,3-Dichloropropene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Dibromochloromethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Dibromomethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Dichlorodifluoromethane	ND (0.0079)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Diethyl Ether	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Di-isopropyl ether	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Ethyl tertiary-butyl ether	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Ethylbenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Hexachlorobutadiene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Isopropylbenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Methyl tert-Butyl Ether	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Methylene Chloride	ND (0.0197)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Naphthalene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
n-Butylbenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
n-Propylbenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
sec-Butylbenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Styrene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
tert-Butylbenzene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Tertiary-amyl methyl ether	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Tetrachloroethene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Tetrahydrofuran	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 6-10ft
Date Sampled: 08/27/19 09:45
Percent Solids: 88
Initial Volume: 7.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
trans-1,2-Dichloroethene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
trans-1,3-Dichloropropene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Trichloroethene	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Trichlorofluoromethane	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Vinyl Acetate	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Vinyl Chloride	ND (0.0079)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Xylene O	ND (0.0039)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Xylene P,M	ND (0.0079)		8260B Low		1	08/29/19 20:24	C9H0616	CH92957
Xylenes (Total)	ND (0.00786)		8260B Low		1	08/29/19 20:24		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>90 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>87 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>90 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>92 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 6-10ft
Date Sampled: 08/27/19 09:45
Percent Solids: 88
Initial Volume: 20.3
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 8/28/19 16:13

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	08/29/19 14:31		CH92803
Aroclor 1221	ND (0.06)		8082A		1	08/29/19 14:31		CH92803
Aroclor 1232	ND (0.06)		8082A		1	08/29/19 14:31		CH92803
Aroclor 1242	ND (0.06)		8082A		1	08/29/19 14:31		CH92803
Aroclor 1248	ND (0.06)		8082A		1	08/29/19 14:31		CH92803
Aroclor 1254	ND (0.06)		8082A		1	08/29/19 14:31		CH92803
Aroclor 1260	ND (0.06)		8082A		1	08/29/19 14:31		CH92803
Aroclor 1262	ND (0.06)		8082A		1	08/29/19 14:31		CH92803
Aroclor 1268	ND (0.06)		8082A		1	08/29/19 14:31		CH92803

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	76 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	75 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	67 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	82 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 6-10ft
Date Sampled: 08/27/19 09:45
Percent Solids: 88
Initial Volume: 20
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/27/19 17:01

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	136 (42.5)		8100M		1	08/28/19 16:20	C9H0564	CH92709
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		76 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 6-10ft
Date Sampled: 08/27/19 09:45
Percent Solids: 88
Initial Volume: 15.9
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
1,2,4-Trichlorobenzene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
1,2-Dichlorobenzene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
1,3-Dichlorobenzene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
1,4-Dichlorobenzene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2,3,4,6-Tetrachlorophenol	ND (1.78)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2,4,5-Trichlorophenol	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2,4,6-Trichlorophenol	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2,4-Dichlorophenol	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2,4-Dimethylphenol	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2,4-Dinitrophenol	ND (1.78)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2,4-Dinitrotoluene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2,6-Dinitrotoluene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2-Chloronaphthalene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2-Chlorophenol	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2-Methylnaphthalene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2-Methylphenol	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2-Nitroaniline	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
2-Nitrophenol	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
3,3'-Dichlorobenzidine	ND (0.712)		8270D		1	09/03/19 21:08	C9I0017	CH92910
3+4-Methylphenol	ND (0.712)		8270D		1	09/03/19 21:08	C9I0017	CH92910
3-Nitroaniline	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
4,6-Dinitro-2-Methylphenol	ND (1.78)		8270D		1	09/03/19 21:08	C9I0017	CH92910
4-Bromophenyl-phenylether	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
4-Chloro-3-Methylphenol	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
4-Chloroaniline	ND (0.712)		8270D		1	09/03/19 21:08	C9I0017	CH92910
4-Chloro-phenyl-phenyl ether	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
4-Nitroaniline	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
4-Nitrophenol	ND (1.78)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Acenaphthene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Acenaphthylene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Acetophenone	ND (0.712)		8270D		1	09/03/19 21:08	C9I0017	CH92910



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 6-10ft
Date Sampled: 08/27/19 09:45
Percent Solids: 88
Initial Volume: 15.9
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.712)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Anthracene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Azobenzene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Benzo(a)anthracene	0.388 (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Benzo(a)pyrene	0.300 (0.178)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Benzo(b)fluoranthene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Benzo(g,h,i)perylene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Benzo(k)fluoranthene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Benzoic Acid	ND (1.78)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Benzyl Alcohol	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
bis(2-Chloroethoxy)methane	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
bis(2-Chloroethyl)ether	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
bis(2-chloroisopropyl)Ether	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
bis(2-Ethylhexyl)phthalate	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Butylbenzylphthalate	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Carbazole	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Chrysene	0.324 (0.178)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Dibenzo(a,h)Anthracene	ND (0.178)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Dibenzofuran	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Diethylphthalate	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Dimethylphthalate	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Di-n-butylphthalate	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Di-n-octylphthalate	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Fluoranthene	1.02 (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Fluorene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Hexachlorobenzene	ND (0.178)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Hexachlorobutadiene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Hexachlorocyclopentadiene	ND (1.78)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Hexachloroethane	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Indeno(1,2,3-cd)Pyrene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Isophorone	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Naphthalene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-5 6-10ft
Date Sampled: 08/27/19 09:45
Percent Solids: 88
Initial Volume: 15.9
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0859
ESS Laboratory Sample ID: 19H0859-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/29/19 10:15

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
N-Nitrosodimethylamine	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
N-Nitroso-Di-n-Propylamine	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
N-nitrosodiphenylamine	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Pentachlorophenol	ND (1.78)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Phenanthrene	1.12 (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Phenol	ND (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Pyrene	0.844 (0.356)		8270D		1	09/03/19 21:08	C9I0017	CH92910
Pyridine	ND (1.78)		8270D		1	09/03/19 21:08	C9I0017	CH92910

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	45 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	58 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	48 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	49 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	46 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	42 %		30-130
<i>Surrogate: Phenol-d6</i>	46 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	65 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CH93040 - 3050B

Blank

Antimony	ND	5.00	mg/kg wet
Arsenic	ND	2.50	mg/kg wet
Beryllium	ND	0.11	mg/kg wet
Cadmium	ND	0.50	mg/kg wet
Chromium	ND	1.00	mg/kg wet
Copper	ND	2.50	mg/kg wet
Lead	ND	5.00	mg/kg wet
Nickel	ND	2.50	mg/kg wet
Selenium	ND	5.00	mg/kg wet
Silver	ND	0.50	mg/kg wet
Thallium	ND	0.50	mg/kg wet
Thallium	ND	5.00	mg/kg wet
Zinc	ND	2.50	mg/kg wet

LCS

Antimony	51.0	17.9	mg/kg wet	42.40	120	80-120
Arsenic	128	8.93	mg/kg wet	128.0	100	80-120
Beryllium	226	0.39	mg/kg wet	217.0	104	80-120
Cadmium	99.2	1.79	mg/kg wet	99.00	100	80-120
Chromium	125	3.57	mg/kg wet	116.0	108	80-120
Copper	94.3	8.93	mg/kg wet	89.60	105	80-120
Lead	297	17.9	mg/kg wet	277.0	107	40-160
Nickel	114	8.93	mg/kg wet	107.0	106	80-120
Selenium	247	17.9	mg/kg wet	242.0	102	80-120
Silver	65.9	1.79	mg/kg wet	64.30	102	80-120
Thallium	189	8.93	mg/kg wet	183.0	103	80-120
Thallium	198	17.9	mg/kg wet	183.0	108	80-120
Zinc	532	8.93	mg/kg wet	561.0	95	80-120

LCS Dup

Antimony	53.0	18.9	mg/kg wet	42.40	125	40-160	4	20
Arsenic	133	9.43	mg/kg wet	128.0	104	80-120	3	20
Beryllium	226	0.42	mg/kg wet	217.0	104	80-120	0.08	20
Cadmium	98.2	1.89	mg/kg wet	99.00	99	80-120	1	20
Chromium	123	3.77	mg/kg wet	116.0	106	80-120	2	20
Copper	94.4	9.43	mg/kg wet	89.60	105	80-120	0.05	20
Lead	293	18.9	mg/kg wet	277.0	106	80-120	1	20
Nickel	113	9.43	mg/kg wet	107.0	105	80-120	1	20
Selenium	245	18.9	mg/kg wet	242.0	101	80-120	1	20
Silver	65.4	1.89	mg/kg wet	64.30	102	80-120	0.7	20
Thallium	197	18.9	mg/kg wet	183.0	107	80-120	0.7	20
Thallium	193	9.43	mg/kg wet	183.0	105	80-120	2	30
Zinc	531	9.43	mg/kg wet	561.0	95	80-120	0.2	20

Batch CH93041 - 7471B

Blank



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CH93041 - 7471B

Mercury	ND	0.033	mg/kg wet							
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LCS

Mercury	22.3	3.81	mg/kg wet	27.30		82	80-120			
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LCS Dup

Mercury	22.9	3.60	mg/kg wet	27.30		84	80-120	3	20	
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92823 - 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	0.0050	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							
1-Chlorohexane	ND	0.0050	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0500	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0500	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet							
Acetone	ND	0.0500	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							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92823 - 5035

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	0.0050	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	0.0250	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 Acetate	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	0.0371		mg/kg wet	0.05000		74	70-130			
Surrogate: 4-Bromofluorobenzene	0.0432		mg/kg wet	0.05000		86	70-130			
Surrogate: Dibromofluoromethane	0.0415		mg/kg wet	0.05000		83	70-130			
Surrogate: Toluene-d8	0.0478		mg/kg wet	0.05000		96	70-130			

LCS

1,1,1,2-Tetrachloroethane	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
1,1,1-Trichloroethane	0.0478	0.0050	mg/kg wet	0.05000		96	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92823 - 5035

1,1,2,2-Tetrachloroethane	0.0454	0.0050	mg/kg wet	0.05000		91	70-130			
1,1,2-Trichloroethane	0.0462	0.0050	mg/kg wet	0.05000		92	70-130			
1,1-Dichloroethane	0.0497	0.0050	mg/kg wet	0.05000		99	70-130			
1,1-Dichloroethene	0.0559	0.0050	mg/kg wet	0.05000		112	70-130			
1,1-Dichloropropene	0.0493	0.0050	mg/kg wet	0.05000		99	70-130			
1,2,3-Trichlorobenzene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
1,2,3-Trichloropropane	0.0452	0.0050	mg/kg wet	0.05000		90	70-130			
1,2,4-Trichlorobenzene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
1,2,4-Trimethylbenzene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130			
1,2-Dibromo-3-Chloropropane	0.0382	0.0050	mg/kg wet	0.05000		76	70-130			
1,2-Dibromoethane	0.0489	0.0050	mg/kg wet	0.05000		98	70-130			
1,2-Dichlorobenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
1,2-Dichloroethane	0.0397	0.0050	mg/kg wet	0.05000		79	70-130			
1,2-Dichloropropane	0.0485	0.0050	mg/kg wet	0.05000		97	70-130			
1,3,5-Trimethylbenzene	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
1,3-Dichlorobenzene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130			
1,3-Dichloropropane	0.0495	0.0050	mg/kg wet	0.05000		99	70-130			
1,4-Dichlorobenzene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130			
1,4-Dioxane	0.947	0.100	mg/kg wet	1.000		95	70-130			
1-Chlorohexane	0.0604	0.0050	mg/kg wet	0.05000		121	70-130			
2,2-Dichloropropane	0.0494	0.0050	mg/kg wet	0.05000		99	70-130			
2-Butanone	0.235	0.0500	mg/kg wet	0.2500		94	70-130			
2-Chlorotoluene	0.0512	0.0050	mg/kg wet	0.05000		102	70-130			
2-Hexanone	0.210	0.0500	mg/kg wet	0.2500		84	70-130			
4-Chlorotoluene	0.0509	0.0050	mg/kg wet	0.05000		102	70-130			
4-Isopropyltoluene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
4-Methyl-2-Pentanone	0.214	0.0500	mg/kg wet	0.2500		85	70-130			
Acetone	0.201	0.0500	mg/kg wet	0.2500		80	70-130			
Benzene	0.0498	0.0050	mg/kg wet	0.05000		100	70-130			
Bromobenzene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
Bromochloromethane	0.0489	0.0050	mg/kg wet	0.05000		98	70-130			
Bromodichloromethane	0.0416	0.0050	mg/kg wet	0.05000		83	70-130			
Bromoform	0.0424	0.0050	mg/kg wet	0.05000		85	70-130			
Bromomethane	0.0440	0.0100	mg/kg wet	0.05000		88	70-130			
Carbon Disulfide	0.0546	0.0050	mg/kg wet	0.05000		109	70-130			
Carbon Tetrachloride	0.0465	0.0050	mg/kg wet	0.05000		93	70-130			
Chlorobenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Chloroethane	0.0438	0.0100	mg/kg wet	0.05000		88	70-130			
Chloroform	0.0450	0.0050	mg/kg wet	0.05000		90	70-130			
Chloromethane	0.0422	0.0100	mg/kg wet	0.05000		84	70-130			
cis-1,2-Dichloroethene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
cis-1,3-Dichloropropene	0.0495	0.0050	mg/kg wet	0.05000		99	70-130			
Dibromochloromethane	0.0438	0.0050	mg/kg wet	0.05000		88	70-130			
Dibromomethane	0.0443	0.0050	mg/kg wet	0.05000		89	70-130			
Dichlorodifluoromethane	0.0316	0.0100	mg/kg wet	0.05000		63	70-130			B-



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92823 - 5035

Diethyl Ether	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
Di-isopropyl ether	0.0511	0.0050	mg/kg wet	0.05000		102	70-130			
Ethyl tertiary-butyl ether	0.0473	0.0050	mg/kg wet	0.05000		95	70-130			
Ethylbenzene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
Hexachlorobutadiene	0.0552	0.0050	mg/kg wet	0.05000		110	70-130			
Isopropylbenzene	0.0546	0.0050	mg/kg wet	0.05000		109	70-130			
Methyl tert-Butyl Ether	0.0491	0.0050	mg/kg wet	0.05000		98	70-130			
Methylene Chloride	0.0449	0.0250	mg/kg wet	0.05000		90	70-130			
Naphthalene	0.0501	0.0050	mg/kg wet	0.05000		100	70-130			
n-Butylbenzene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
n-Propylbenzene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
sec-Butylbenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
Styrene	0.0557	0.0050	mg/kg wet	0.05000		111	70-130			
tert-Butylbenzene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
Tertiary-amyl methyl ether	0.0507	0.0050	mg/kg wet	0.05000		101	70-130			
Tetrachloroethene	0.0561	0.0050	mg/kg wet	0.05000		112	70-130			
Tetrahydrofuran	0.0426	0.0050	mg/kg wet	0.05000		85	70-130			
Toluene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
trans-1,2-Dichloroethene	0.0541	0.0050	mg/kg wet	0.05000		108	70-130			
trans-1,3-Dichloropropene	0.0408	0.0050	mg/kg wet	0.05000		82	70-130			
Trichloroethene	0.0472	0.0050	mg/kg wet	0.05000		94	70-130			
Trichlorofluoromethane	0.0422	0.0050	mg/kg wet	0.05000		84	70-130			
Vinyl Acetate	0.0416	0.0050	mg/kg wet	0.05000		83	70-130			
Vinyl Chloride	0.0463	0.0100	mg/kg wet	0.05000		93	70-130			
Xylene O	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
Xylene P,M	0.115	0.0100	mg/kg wet	0.1000		115	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0359		mg/kg wet	0.05000		72	70-130			
Surrogate: 4-Bromofluorobenzene	0.0445		mg/kg wet	0.05000		89	70-130			
Surrogate: Dibromofluoromethane	0.0422		mg/kg wet	0.05000		84	70-130			
Surrogate: Toluene-d8	0.0485		mg/kg wet	0.05000		97	70-130			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0503	0.0050	mg/kg wet	0.05000		101	70-130	2	25	
1,1,1-Trichloroethane	0.0459	0.0050	mg/kg wet	0.05000		92	70-130	4	25	
1,1,2,2-Tetrachloroethane	0.0453	0.0050	mg/kg wet	0.05000		91	70-130	0.2	25	
1,1,2-Trichloroethane	0.0450	0.0050	mg/kg wet	0.05000		90	70-130	3	25	
1,1-Dichloroethane	0.0479	0.0050	mg/kg wet	0.05000		96	70-130	4	25	
1,1-Dichloroethene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130	5	25	
1,1-Dichloropropene	0.0473	0.0050	mg/kg wet	0.05000		95	70-130	4	25	
1,2,3-Trichlorobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	0.6	25	
1,2,3-Trichloropropane	0.0444	0.0050	mg/kg wet	0.05000		89	70-130	2	25	
1,2,4-Trichlorobenzene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130	1	25	
1,2,4-Trimethylbenzene	0.0530	0.0050	mg/kg wet	0.05000		106	70-130	2	25	
1,2-Dibromo-3-Chloropropane	0.0379	0.0050	mg/kg wet	0.05000		76	70-130	0.9	25	
1,2-Dibromoethane	0.0493	0.0050	mg/kg wet	0.05000		99	70-130	0.7	25	
1,2-Dichlorobenzene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	3	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92823 - 5035

1,2-Dichloroethane	0.0391	0.0050	mg/kg wet	0.05000		78	70-130	2	25	
1,2-Dichloropropane	0.0473	0.0050	mg/kg wet	0.05000		95	70-130	3	25	
1,3,5-Trimethylbenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	4	25	
1,3-Dichlorobenzene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130	2	25	
1,3-Dichloropropane	0.0495	0.0050	mg/kg wet	0.05000		99	70-130	0	25	
1,4-Dichlorobenzene	0.0512	0.0050	mg/kg wet	0.05000		102	70-130	1	25	
1,4-Dioxane	0.965	0.100	mg/kg wet	1.000		97	70-130	2	20	
1-Chlorohexane	0.0590	0.0050	mg/kg wet	0.05000		118	70-130	2	25	
2,2-Dichloropropane	0.0476	0.0050	mg/kg wet	0.05000		95	70-130	4	25	
2-Butanone	0.227	0.0500	mg/kg wet	0.2500		91	70-130	3	25	
2-Chlorotoluene	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	3	25	
2-Hexanone	0.214	0.0500	mg/kg wet	0.2500		86	70-130	2	25	
4-Chlorotoluene	0.0501	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
4-Isopropyltoluene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130	3	25	
4-Methyl-2-Pentanone	0.212	0.0500	mg/kg wet	0.2500		85	70-130	0.7	25	
Acetone	0.192	0.0500	mg/kg wet	0.2500		77	70-130	5	25	
Benzene	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	3	25	
Bromobenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130	2	25	
Bromochloromethane	0.0471	0.0050	mg/kg wet	0.05000		94	70-130	4	25	
Bromodichloromethane	0.0407	0.0050	mg/kg wet	0.05000		81	70-130	2	25	
Bromoform	0.0429	0.0050	mg/kg wet	0.05000		86	70-130	1	25	
Bromomethane	0.0417	0.0100	mg/kg wet	0.05000		83	70-130	5	25	
Carbon Disulfide	0.0524	0.0050	mg/kg wet	0.05000		105	70-130	4	25	
Carbon Tetrachloride	0.0453	0.0050	mg/kg wet	0.05000		91	70-130	2	25	
Chlorobenzene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130	0.8	25	
Chloroethane	0.0419	0.0100	mg/kg wet	0.05000		84	70-130	4	25	
Chloroform	0.0436	0.0050	mg/kg wet	0.05000		87	70-130	3	25	
Chloromethane	0.0411	0.0100	mg/kg wet	0.05000		82	70-130	3	25	
cis-1,2-Dichloroethene	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
cis-1,3-Dichloropropene	0.0482	0.0050	mg/kg wet	0.05000		96	70-130	3	25	
Dibromochloromethane	0.0441	0.0050	mg/kg wet	0.05000		88	70-130	0.5	25	
Dibromomethane	0.0432	0.0050	mg/kg wet	0.05000		86	70-130	3	25	
Dichlorodifluoromethane	0.0299	0.0100	mg/kg wet	0.05000		60	70-130	6	25	B-
Diethyl Ether	0.0510	0.0050	mg/kg wet	0.05000		102	70-130	0.9	25	
Di-isopropyl ether	0.0499	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
Ethyl tertiary-butyl ether	0.0465	0.0050	mg/kg wet	0.05000		93	70-130	2	25	
Ethylbenzene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	2	25	
Hexachlorobutadiene	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	3	25	
Isopropylbenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	4	25	
Methyl tert-Butyl Ether	0.0480	0.0050	mg/kg wet	0.05000		96	70-130	2	25	
Methylene Chloride	0.0436	0.0250	mg/kg wet	0.05000		87	70-130	3	25	
Naphthalene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	0.1	25	
n-Butylbenzene	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	2	25	
n-Propylbenzene	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	3	25	
sec-Butylbenzene	0.0507	0.0050	mg/kg wet	0.05000		101	70-130	4	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92823 - 5035

Styrene	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	0.5	25	
tert-Butylbenzene	0.0526	0.0050	mg/kg wet	0.05000		105	70-130	3	25	
Tertiary-amyl methyl ether	0.0502	0.0050	mg/kg wet	0.05000		100	70-130	1	25	
Tetrachloroethene	0.0546	0.0050	mg/kg wet	0.05000		109	70-130	3	25	
Tetrahydrofuran	0.0419	0.0050	mg/kg wet	0.05000		84	70-130	2	25	
Toluene	0.0485	0.0050	mg/kg wet	0.05000		97	70-130	5	25	
trans-1,2-Dichloroethene	0.0530	0.0050	mg/kg wet	0.05000		106	70-130	2	25	
trans-1,3-Dichloropropene	0.0401	0.0050	mg/kg wet	0.05000		80	70-130	2	25	
Trichloroethene	0.0462	0.0050	mg/kg wet	0.05000		92	70-130	2	25	
Trichlorofluoromethane	0.0407	0.0050	mg/kg wet	0.05000		81	70-130	4	25	
Vinyl Acetate	0.0408	0.0050	mg/kg wet	0.05000		82	70-130	2	25	
Vinyl Chloride	0.0443	0.0100	mg/kg wet	0.05000		89	70-130	4	25	
Xylene O	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	0.6	25	
Xylene P,M	0.113	0.0100	mg/kg wet	0.1000		113	70-130	1	25	
Surrogate: 1,2-Dichloroethane-d4	0.0354		mg/kg wet	0.05000		71	70-130			
Surrogate: 4-Bromofluorobenzene	0.0451		mg/kg wet	0.05000		90	70-130			
Surrogate: Dibromofluoromethane	0.0424		mg/kg wet	0.05000		85	70-130			
Surrogate: Toluene-d8	0.0493		mg/kg wet	0.05000		99	70-130			

Batch CH92957 - 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	0.0050	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							
1-Chlorohexane	ND	0.0050	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0500	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92957 - 5035

2-Hexanone	ND	0.0500	mg/kg wet
4-Chlorotoluene	ND	0.0050	mg/kg wet
4-Isopropyltoluene	ND	0.0050	mg/kg wet
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet
Acetone	ND	0.0500	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	0.0050	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	0.0250	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 Acetate	ND	0.0050	mg/kg wet



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92957 - 5035

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	0.0422		mg/kg wet	0.05000		84	70-130			
Surrogate: 4-Bromofluorobenzene	0.0439		mg/kg wet	0.05000		88	70-130			
Surrogate: Dibromofluoromethane	0.0439		mg/kg wet	0.05000		88	70-130			
Surrogate: Toluene-d8	0.0472		mg/kg wet	0.05000		94	70-130			

LCS

1,1,1,2-Tetrachloroethane	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
1,1,1-Trichloroethane	0.0511	0.0050	mg/kg wet	0.05000		102	70-130			
1,1,2,2-Tetrachloroethane	0.0448	0.0050	mg/kg wet	0.05000		90	70-130			
1,1,2-Trichloroethane	0.0475	0.0050	mg/kg wet	0.05000		95	70-130			
1,1-Dichloroethane	0.0494	0.0050	mg/kg wet	0.05000		99	70-130			
1,1-Dichloroethene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
1,1-Dichloropropene	0.0491	0.0050	mg/kg wet	0.05000		98	70-130			
1,2,3-Trichlorobenzene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
1,2,3-Trichloropropane	0.0458	0.0050	mg/kg wet	0.05000		92	70-130			
1,2,4-Trichlorobenzene	0.0528	0.0050	mg/kg wet	0.05000		106	70-130			
1,2,4-Trimethylbenzene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130			
1,2-Dibromo-3-Chloropropane	0.0405	0.0050	mg/kg wet	0.05000		81	70-130			
1,2-Dibromoethane	0.0514	0.0050	mg/kg wet	0.05000		103	70-130			
1,2-Dichlorobenzene	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
1,2-Dichloroethane	0.0455	0.0050	mg/kg wet	0.05000		91	70-130			
1,2-Dichloropropane	0.0466	0.0050	mg/kg wet	0.05000		93	70-130			
1,3,5-Trimethylbenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
1,3-Dichlorobenzene	0.0497	0.0050	mg/kg wet	0.05000		99	70-130			
1,3-Dichloropropane	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
1,4-Dichlorobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
1,4-Dioxane	1.01	0.100	mg/kg wet	1.000		101	70-130			
1-Chlorohexane	0.0569	0.0050	mg/kg wet	0.05000		114	70-130			
2,2-Dichloropropane	0.0524	0.0050	mg/kg wet	0.05000		105	70-130			
2-Butanone	0.241	0.0500	mg/kg wet	0.2500		96	70-130			
2-Chlorotoluene	0.0493	0.0050	mg/kg wet	0.05000		99	70-130			
2-Hexanone	0.224	0.0500	mg/kg wet	0.2500		90	70-130			
4-Chlorotoluene	0.0495	0.0050	mg/kg wet	0.05000		99	70-130			
4-Isopropyltoluene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130			
4-Methyl-2-Pentanone	0.221	0.0500	mg/kg wet	0.2500		88	70-130			
Acetone	0.208	0.0500	mg/kg wet	0.2500		83	70-130			
Benzene	0.0485	0.0050	mg/kg wet	0.05000		97	70-130			
Bromobenzene	0.0517	0.0050	mg/kg wet	0.05000		103	70-130			
Bromochloromethane	0.0493	0.0050	mg/kg wet	0.05000		99	70-130			
Bromodichloromethane	0.0450	0.0050	mg/kg wet	0.05000		90	70-130			
Bromoform	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
Bromomethane	0.0466	0.0100	mg/kg wet	0.05000		93	70-130			
Carbon Disulfide	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92957 - 5035

Carbon Tetrachloride	0.0518	0.0050	mg/kg wet	0.05000		104	70-130			
Chlorobenzene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Chloroethane	0.0421	0.0100	mg/kg wet	0.05000		84	70-130			
Chloroform	0.0469	0.0050	mg/kg wet	0.05000		94	70-130			
Chloromethane	0.0443	0.0100	mg/kg wet	0.05000		89	70-130			
cis-1,2-Dichloroethene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
cis-1,3-Dichloropropene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130			
Dibromochloromethane	0.0477	0.0050	mg/kg wet	0.05000		95	70-130			
Dibromomethane	0.0470	0.0050	mg/kg wet	0.05000		94	70-130			
Dichlorodifluoromethane	0.0355	0.0100	mg/kg wet	0.05000		71	70-130			
Diethyl Ether	0.0511	0.0050	mg/kg wet	0.05000		102	70-130			
Di-isopropyl ether	0.0493	0.0050	mg/kg wet	0.05000		99	70-130			
Ethyl tertiary-butyl ether	0.0480	0.0050	mg/kg wet	0.05000		96	70-130			
Ethylbenzene	0.0530	0.0050	mg/kg wet	0.05000		106	70-130			
Hexachlorobutadiene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
Isopropylbenzene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
Methyl tert-Butyl Ether	0.0505	0.0050	mg/kg wet	0.05000		101	70-130			
Methylene Chloride	0.0444	0.0250	mg/kg wet	0.05000		89	70-130			
Naphthalene	0.0494	0.0050	mg/kg wet	0.05000		99	70-130			
n-Butylbenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
n-Propylbenzene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130			
sec-Butylbenzene	0.0498	0.0050	mg/kg wet	0.05000		100	70-130			
Styrene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
tert-Butylbenzene	0.0512	0.0050	mg/kg wet	0.05000		102	70-130			
Tertiary-amyl methyl ether	0.0516	0.0050	mg/kg wet	0.05000		103	70-130			
Tetrachloroethene	0.0556	0.0050	mg/kg wet	0.05000		111	70-130			
Tetrahydrofuran	0.0420	0.0050	mg/kg wet	0.05000		84	70-130			
Toluene	0.0498	0.0050	mg/kg wet	0.05000		100	70-130			
trans-1,2-Dichloroethene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130			
trans-1,3-Dichloropropene	0.0434	0.0050	mg/kg wet	0.05000		87	70-130			
Trichloroethene	0.0477	0.0050	mg/kg wet	0.05000		95	70-130			
Trichlorofluoromethane	0.0461	0.0050	mg/kg wet	0.05000		92	70-130			
Vinyl Acetate	0.0418	0.0050	mg/kg wet	0.05000		84	70-130			
Vinyl Chloride	0.0483	0.0100	mg/kg wet	0.05000		97	70-130			
Xylene O	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
Xylene P,M	0.114	0.0100	mg/kg wet	0.1000		114	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0416</i>		mg/kg wet	<i>0.05000</i>		<i>83</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0471</i>		mg/kg wet	<i>0.05000</i>		<i>94</i>	<i>70-130</i>			
<i>Surrogate: Dibromofluoromethane</i>	<i>0.0458</i>		mg/kg wet	<i>0.05000</i>		<i>92</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0485</i>		mg/kg wet	<i>0.05000</i>		<i>97</i>	<i>70-130</i>			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0520	0.0050	mg/kg wet	0.05000		104	70-130	4	25	
1,1,1-Trichloroethane	0.0504	0.0050	mg/kg wet	0.05000		101	70-130	1	25	
1,1,2,2-Tetrachloroethane	0.0427	0.0050	mg/kg wet	0.05000		85	70-130	5	25	
1,1,2-Trichloroethane	0.0462	0.0050	mg/kg wet	0.05000		92	70-130	3	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92957 - 5035

1,1-Dichloroethane	0.0488	0.0050	mg/kg wet	0.05000		98	70-130	1	25	
1,1-Dichloroethene	0.0529	0.0050	mg/kg wet	0.05000		106	70-130	0.3	25	
1,1-Dichloropropene	0.0491	0.0050	mg/kg wet	0.05000		98	70-130	0.04	25	
1,2,3-Trichlorobenzene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
1,2,3-Trichloropropane	0.0435	0.0050	mg/kg wet	0.05000		87	70-130	5	25	
1,2,4-Trichlorobenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	0.6	25	
1,2,4-Trimethylbenzene	0.0523	0.0050	mg/kg wet	0.05000		105	70-130	0.3	25	
1,2-Dibromo-3-Chloropropane	0.0393	0.0050	mg/kg wet	0.05000		79	70-130	3	25	
1,2-Dibromoethane	0.0479	0.0050	mg/kg wet	0.05000		96	70-130	7	25	
1,2-Dichlorobenzene	0.0501	0.0050	mg/kg wet	0.05000		100	70-130	0.3	25	
1,2-Dichloroethane	0.0438	0.0050	mg/kg wet	0.05000		88	70-130	4	25	
1,2-Dichloropropane	0.0466	0.0050	mg/kg wet	0.05000		93	70-130	0	25	
1,3,5-Trimethylbenzene	0.0509	0.0050	mg/kg wet	0.05000		102	70-130	0.8	25	
1,3-Dichlorobenzene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130	0.2	25	
1,3-Dichloropropane	0.0481	0.0050	mg/kg wet	0.05000		96	70-130	6	25	
1,4-Dichlorobenzene	0.0501	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
1,4-Dioxane	0.969	0.100	mg/kg wet	1.000		97	70-130	4	20	
1-Chlorohexane	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	3	25	
2,2-Dichloropropane	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	2	25	
2-Butanone	0.232	0.0500	mg/kg wet	0.2500		93	70-130	4	25	
2-Chlorotoluene	0.0487	0.0050	mg/kg wet	0.05000		97	70-130	1	25	
2-Hexanone	0.206	0.0500	mg/kg wet	0.2500		82	70-130	8	25	
4-Chlorotoluene	0.0490	0.0050	mg/kg wet	0.05000		98	70-130	1	25	
4-Isopropyltoluene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	0.04	25	
4-Methyl-2-Pentanone	0.208	0.0500	mg/kg wet	0.2500		83	70-130	6	25	
Acetone	0.204	0.0500	mg/kg wet	0.2500		82	70-130	2	25	
Benzene	0.0485	0.0050	mg/kg wet	0.05000		97	70-130	0	25	
Bromobenzene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	2	25	
Bromochloromethane	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	2	25	
Bromodichloromethane	0.0446	0.0050	mg/kg wet	0.05000		89	70-130	1	25	
Bromoform	0.0447	0.0050	mg/kg wet	0.05000		89	70-130	4	25	
Bromomethane	0.0454	0.0100	mg/kg wet	0.05000		91	70-130	3	25	
Carbon Disulfide	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	0.5	25	
Carbon Tetrachloride	0.0516	0.0050	mg/kg wet	0.05000		103	70-130	0.5	25	
Chlorobenzene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	3	25	
Chloroethane	0.0423	0.0100	mg/kg wet	0.05000		85	70-130	0.5	25	
Chloroform	0.0466	0.0050	mg/kg wet	0.05000		93	70-130	0.6	25	
Chloromethane	0.0442	0.0100	mg/kg wet	0.05000		88	70-130	0.2	25	
cis-1,2-Dichloroethene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
cis-1,3-Dichloropropene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130	0.8	25	
Dibromochloromethane	0.0455	0.0050	mg/kg wet	0.05000		91	70-130	5	25	
Dibromomethane	0.0459	0.0050	mg/kg wet	0.05000		92	70-130	2	25	
Dichlorodifluoromethane	0.0338	0.0100	mg/kg wet	0.05000		68	70-130	5	25	B-
Diethyl Ether	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	3	25	
Di-isopropyl ether	0.0489	0.0050	mg/kg wet	0.05000		98	70-130	0.7	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92957 - 5035

Ethyl tertiary-butyl ether	0.0469	0.0050	mg/kg wet	0.05000		94	70-130	2	25	
Ethylbenzene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130	2	25	
Hexachlorobutadiene	0.0533	0.0050	mg/kg wet	0.05000		107	70-130	0.08	25	
Isopropylbenzene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130	0.04	25	
Methyl tert-Butyl Ether	0.0487	0.0050	mg/kg wet	0.05000		97	70-130	4	25	
Methylene Chloride	0.0440	0.0250	mg/kg wet	0.05000		88	70-130	0.9	25	
Naphthalene	0.0478	0.0050	mg/kg wet	0.05000		96	70-130	3	25	
n-Butylbenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	0.1	25	
n-Propylbenzene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	0.7	25	
sec-Butylbenzene	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	0.2	25	
Styrene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	3	25	
tert-Butylbenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	0.1	25	
Tertiary-amyl methyl ether	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	2	25	
Tetrachloroethene	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	4	25	
Tetrahydrofuran	0.0392	0.0050	mg/kg wet	0.05000		78	70-130	7	25	
Toluene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130	0.4	25	
trans-1,2-Dichloroethene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	0.2	25	
trans-1,3-Dichloropropene	0.0430	0.0050	mg/kg wet	0.05000		86	70-130	0.9	25	
Trichloroethene	0.0479	0.0050	mg/kg wet	0.05000		96	70-130	0.4	25	
Trichlorofluoromethane	0.0456	0.0050	mg/kg wet	0.05000		91	70-130	1	25	
Vinyl Acetate	0.0406	0.0050	mg/kg wet	0.05000		81	70-130	3	25	
Vinyl Chloride	0.0482	0.0100	mg/kg wet	0.05000		96	70-130	0.2	25	
Xylene O	0.0486	0.0050	mg/kg wet	0.05000		97	70-130	4	25	
Xylene P,M	0.110	0.0100	mg/kg wet	0.1000		110	70-130	4	25	
Surrogate: 1,2-Dichloroethane-d4	0.0396		mg/kg wet	0.05000		79	70-130			
Surrogate: 4-Bromofluorobenzene	0.0456		mg/kg wet	0.05000		91	70-130			
Surrogate: Dibromofluoromethane	0.0446		mg/kg wet	0.05000		89	70-130			
Surrogate: Toluene-d8	0.0476		mg/kg wet	0.05000		95	70-130			

8082A Polychlorinated Biphenyls (PCB)

Batch CH92803 - 3540C

Blank

Aroclor 1016	ND	0.05	mg/kg wet							
Aroclor 1016 [2C]	ND	0.05	mg/kg wet							
Aroclor 1221	ND	0.05	mg/kg wet							
Aroclor 1221 [2C]	ND	0.05	mg/kg wet							
Aroclor 1232	ND	0.05	mg/kg wet							
Aroclor 1232 [2C]	ND	0.05	mg/kg wet							
Aroclor 1242	ND	0.05	mg/kg wet							
Aroclor 1242 [2C]	ND	0.05	mg/kg wet							
Aroclor 1248	ND	0.05	mg/kg wet							
Aroclor 1248 [2C]	ND	0.05	mg/kg wet							
Aroclor 1254	ND	0.05	mg/kg wet							
Aroclor 1254 [2C]	ND	0.05	mg/kg wet							
Aroclor 1260	ND	0.05	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082A Polychlorinated Biphenyls (PCB)

Batch CH92803 - 3540C

Aroclor 1260 [2C]	ND	0.05	mg/kg wet							
Aroclor 1262	ND	0.05	mg/kg wet							
Aroclor 1262 [2C]	ND	0.05	mg/kg wet							
Aroclor 1268	ND	0.05	mg/kg wet							
Aroclor 1268 [2C]	ND	0.05	mg/kg wet							
<i>Surrogate: Decachlorobiphenyl</i>	<i>0.0211</i>		mg/kg wet	<i>0.02500</i>		<i>85</i>	<i>30-150</i>			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	<i>0.0211</i>		mg/kg wet	<i>0.02500</i>		<i>85</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.0172</i>		mg/kg wet	<i>0.02500</i>		<i>69</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.0178</i>		mg/kg wet	<i>0.02500</i>		<i>71</i>	<i>30-150</i>			

LCS

Aroclor 1016	0.5	0.05	mg/kg wet	0.5000		90	40-140			
Aroclor 1016 [2C]	0.5	0.05	mg/kg wet	0.5000		94	40-140			
Aroclor 1260	0.4	0.05	mg/kg wet	0.5000		88	40-140			
Aroclor 1260 [2C]	0.4	0.05	mg/kg wet	0.5000		89	40-140			
<i>Surrogate: Decachlorobiphenyl</i>	<i>0.0219</i>		mg/kg wet	<i>0.02500</i>		<i>88</i>	<i>30-150</i>			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	<i>0.0218</i>		mg/kg wet	<i>0.02500</i>		<i>87</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.0183</i>		mg/kg wet	<i>0.02500</i>		<i>73</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.0179</i>		mg/kg wet	<i>0.02500</i>		<i>72</i>	<i>30-150</i>			

LCS Dup

Aroclor 1016	0.4	0.05	mg/kg wet	0.5000		89	40-140	1	30	
Aroclor 1016 [2C]	0.5	0.05	mg/kg wet	0.5000		94	40-140	0.3	30	
Aroclor 1260	0.4	0.05	mg/kg wet	0.5000		90	40-140	2	30	
Aroclor 1260 [2C]	0.5	0.05	mg/kg wet	0.5000		93	40-140	4	30	
<i>Surrogate: Decachlorobiphenyl</i>	<i>0.0221</i>		mg/kg wet	<i>0.02500</i>		<i>88</i>	<i>30-150</i>			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	<i>0.0219</i>		mg/kg wet	<i>0.02500</i>		<i>88</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.0180</i>		mg/kg wet	<i>0.02500</i>		<i>72</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.0178</i>		mg/kg wet	<i>0.02500</i>		<i>71</i>	<i>30-150</i>			

8100M Total Petroleum Hydrocarbons

Batch CH92709 - 3546

Blank

Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							
Hexadecane (C16)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							
Octacosane (C28)	ND	0.2	mg/kg wet							
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							



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
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8100M Total Petroleum Hydrocarbons

Batch CH92709 - 3546

Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons	ND	37.5	mg/kg wet							
Triacontane (C30)	ND	0.2	mg/kg wet							

<i>Surrogate: O-Terphenyl</i>	4.66		mg/kg wet	5.000		93	40-140			
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LCS

Decane (C10)	1.9	0.2	mg/kg wet	2.500		75	40-140			
Docosane (C22)	2.2	0.2	mg/kg wet	2.500		89	40-140			
Dodecane (C12)	2.0	0.2	mg/kg wet	2.500		79	40-140			
Eicosane (C20)	2.2	0.2	mg/kg wet	2.500		88	40-140			
Hexacosane (C26)	2.2	0.2	mg/kg wet	2.500		89	40-140			
Hexadecane (C16)	2.1	0.2	mg/kg wet	2.500		84	40-140			
Nonadecane (C19)	2.3	0.2	mg/kg wet	2.500		91	40-140			
Nonane (C9)	1.7	0.2	mg/kg wet	2.500		67	30-140			
Octacosane (C28)	2.2	0.2	mg/kg wet	2.500		89	40-140			
Octadecane (C18)	2.2	0.2	mg/kg wet	2.500		87	40-140			
Tetracosane (C24)	2.2	0.2	mg/kg wet	2.500		89	40-140			
Tetradecane (C14)	2.1	0.2	mg/kg wet	2.500		83	40-140			
Total Petroleum Hydrocarbons	29.7	37.5	mg/kg wet	35.00		85	40-140			
Triacontane (C30)	2.2	0.2	mg/kg wet	2.500		89	40-140			

<i>Surrogate: O-Terphenyl</i>	4.44		mg/kg wet	5.000		89	40-140			
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LCS Dup

Decane (C10)	2.0	0.2	mg/kg wet	2.500		79	40-140	6	25	
Docosane (C22)	2.3	0.2	mg/kg wet	2.500		94	40-140	5	25	
Dodecane (C12)	2.1	0.2	mg/kg wet	2.500		85	40-140	6	25	
Eicosane (C20)	2.3	0.2	mg/kg wet	2.500		92	40-140	5	25	
Hexacosane (C26)	2.3	0.2	mg/kg wet	2.500		93	40-140	5	25	
Hexadecane (C16)	2.2	0.2	mg/kg wet	2.500		90	40-140	6	25	
Nonadecane (C19)	2.4	0.2	mg/kg wet	2.500		95	40-140	5	25	
Nonane (C9)	1.8	0.2	mg/kg wet	2.500		72	30-140	7	25	
Octacosane (C28)	2.3	0.2	mg/kg wet	2.500		94	40-140	5	25	
Octadecane (C18)	2.3	0.2	mg/kg wet	2.500		92	40-140	5	25	
Tetracosane (C24)	2.3	0.2	mg/kg wet	2.500		94	40-140	5	25	
Tetradecane (C14)	2.2	0.2	mg/kg wet	2.500		88	40-140	6	25	
Total Petroleum Hydrocarbons	31.4	37.5	mg/kg wet	35.00		90	40-140	6	25	
Triacontane (C30)	2.3	0.2	mg/kg wet	2.500		93	40-140	5	25	

<i>Surrogate: O-Terphenyl</i>	4.58		mg/kg wet	5.000		92	40-140			
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8270D Semi-Volatile Organic Compounds

Batch CH92910 - 3546

Blank

1,1-Biphenyl	ND	0.333	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.333	mg/kg wet							



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
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8270D Semi-Volatile Organic Compounds

Batch CH92910 - 3546

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							
2,3,4,6-Tetrachlorophenol	ND	1.67	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-Nitroaniline	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							
3-Nitroaniline	ND	0.333	mg/kg wet							
4,6-Dinitro-2-Methylphenol	ND	1.67	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet							
4-Chloro-3-Methylphenol	ND	0.333	mg/kg wet							
4-Chloroaniline	ND	0.667	mg/kg wet							
4-Chloro-phenyl-phenyl ether	ND	0.333	mg/kg wet							
4-Nitroaniline	ND	0.333	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	0.667	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							
Benzoic Acid	ND	1.67	mg/kg wet							
Benzyl Alcohol	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							



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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH92910 - 3546

Carbazole	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	0.167	mg/kg wet							
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachlorocyclopentadiene	ND	1.67	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							
N-Nitroso-Di-n-Propylamine	ND	0.333	mg/kg wet							
N-nitrosodiphenylamine	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							
Pyridine	ND	1.67	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	2.29		mg/kg wet	3.333		69	30-130			
Surrogate: 2,4,6-Tribromophenol	3.17		mg/kg wet	5.000		63	30-130			
Surrogate: 2-Chlorophenol-d4	3.76		mg/kg wet	5.000		75	30-130			
Surrogate: 2-Fluorobiphenyl	2.37		mg/kg wet	3.333		71	30-130			
Surrogate: 2-Fluorophenol	3.79		mg/kg wet	5.000		76	30-130			
Surrogate: Nitrobenzene-d5	2.53		mg/kg wet	3.333		76	30-130			
Surrogate: Phenol-d6	3.81		mg/kg wet	5.000		76	30-130			
Surrogate: p-Terphenyl-d14	2.94		mg/kg wet	3.333		88	30-130			

LCS

1,1-Biphenyl	2.47	0.333	mg/kg wet	3.333		74	40-140			
1,2,4-Trichlorobenzene	2.61	0.333	mg/kg wet	3.333		78	40-140			
1,2-Dichlorobenzene	2.58	0.333	mg/kg wet	3.333		77	40-140			
1,3-Dichlorobenzene	2.47	0.333	mg/kg wet	3.333		74	40-140			
1,4-Dichlorobenzene	2.42	0.333	mg/kg wet	3.333		73	40-140			
2,3,4,6-Tetrachlorophenol	2.39	1.67	mg/kg wet	3.333		72	30-130			
2,4,5-Trichlorophenol	2.55	0.333	mg/kg wet	3.333		76	30-130			
2,4,6-Trichlorophenol	2.44	0.333	mg/kg wet	3.333		73	30-130			
2,4-Dichlorophenol	2.58	0.333	mg/kg wet	3.333		77	30-130			
2,4-Dimethylphenol	2.47	0.333	mg/kg wet	3.333		74	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH92910 - 3546

2,4-Dinitrophenol	2.37	1.67	mg/kg wet	3.333		71	30-130			
2,4-Dinitrotoluene	2.47	0.333	mg/kg wet	3.333		74	40-140			
2,6-Dinitrotoluene	2.66	0.333	mg/kg wet	3.333		80	40-140			
2-Chloronaphthalene	2.47	0.333	mg/kg wet	3.333		74	40-140			
2-Chlorophenol	2.57	0.333	mg/kg wet	3.333		77	30-130			
2-Methylnaphthalene	2.48	0.333	mg/kg wet	3.333		74	40-140			
2-Methylphenol	2.54	0.333	mg/kg wet	3.333		76	30-130			
2-Nitroaniline	2.50	0.333	mg/kg wet	3.333		75	40-140			
2-Nitrophenol	2.37	0.333	mg/kg wet	3.333		71	30-130			
3,3'-Dichlorobenzidine	2.50	0.667	mg/kg wet	3.333		75	40-140			
3+4-Methylphenol	5.58	0.667	mg/kg wet	6.667		84	30-130			
3-Nitroaniline	2.29	0.333	mg/kg wet	3.333		69	40-140			
4,6-Dinitro-2-Methylphenol	2.72	1.67	mg/kg wet	3.333		82	30-130			
4-Bromophenyl-phenylether	2.90	0.333	mg/kg wet	3.333		87	40-140			
4-Chloro-3-Methylphenol	2.61	0.333	mg/kg wet	3.333		78	30-130			
4-Chloroaniline	1.96	0.667	mg/kg wet	3.333		59	40-140			
4-Chloro-phenyl-phenyl ether	2.77	0.333	mg/kg wet	3.333		83	40-140			
4-Nitroaniline	2.45	0.333	mg/kg wet	3.333		74	40-140			
4-Nitrophenol	2.36	1.67	mg/kg wet	3.333		71	30-130			
Acenaphthene	2.41	0.333	mg/kg wet	3.333		72	40-140			
Acenaphthylene	2.20	0.333	mg/kg wet	3.333		66	40-140			
Acetophenone	2.43	0.667	mg/kg wet	3.333		73	40-140			
Aniline	1.97	0.667	mg/kg wet	3.333		59	40-140			
Anthracene	2.58	0.333	mg/kg wet	3.333		77	40-140			
Azobenzene	2.71	0.333	mg/kg wet	3.333		81	40-140			
Benzo(a)anthracene	2.59	0.333	mg/kg wet	3.333		78	40-140			
Benzo(a)pyrene	2.46	0.167	mg/kg wet	3.333		74	40-140			
Benzo(b)fluoranthene	2.48	0.333	mg/kg wet	3.333		74	40-140			
Benzo(g,h,i)perylene	2.56	0.333	mg/kg wet	3.333		77	40-140			
Benzo(k)fluoranthene	2.62	0.333	mg/kg wet	3.333		79	40-140			
Benzoic Acid	2.33	1.67	mg/kg wet	3.333		70	40-140			
Benzyl Alcohol	2.31	0.333	mg/kg wet	3.333		69	40-140			
bis(2-Chloroethoxy)methane	2.53	0.333	mg/kg wet	3.333		76	40-140			
bis(2-Chloroethyl)ether	2.61	0.333	mg/kg wet	3.333		78	40-140			
bis(2-chloroisopropyl)Ether	2.50	0.333	mg/kg wet	3.333		75	40-140			
bis(2-Ethylhexyl)phthalate	2.71	0.333	mg/kg wet	3.333		81	40-140			
Butylbenzylphthalate	2.73	0.333	mg/kg wet	3.333		82	40-140			
Carbazole	2.59	0.333	mg/kg wet	3.333		78	40-140			
Chrysene	2.59	0.167	mg/kg wet	3.333		78	40-140			
Dibenzo(a,h)Anthracene	2.61	0.167	mg/kg wet	3.333		78	40-140			
Dibenzofuran	2.52	0.333	mg/kg wet	3.333		76	40-140			
Diethylphthalate	2.71	0.333	mg/kg wet	3.333		81	40-140			
Dimethylphthalate	2.66	0.333	mg/kg wet	3.333		80	40-140			
Di-n-butylphthalate	2.93	0.333	mg/kg wet	3.333		88	40-140			
Di-n-octylphthalate	2.67	0.333	mg/kg wet	3.333		80	40-140			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH92910 - 3546

Fluoranthene	2.64	0.333	mg/kg wet	3.333		79	40-140			
Fluorene	2.60	0.333	mg/kg wet	3.333		78	40-140			
Hexachlorobenzene	2.71	0.167	mg/kg wet	3.333		81	40-140			
Hexachlorobutadiene	2.48	0.333	mg/kg wet	3.333		74	40-140			
Hexachlorocyclopentadiene	1.51	1.67	mg/kg wet	3.333		45	40-140			
Hexachloroethane	2.26	0.333	mg/kg wet	3.333		68	40-140			
Indeno(1,2,3-cd)Pyrene	2.58	0.333	mg/kg wet	3.333		77	40-140			
Isophorone	2.16	0.333	mg/kg wet	3.333		65	40-140			
Naphthalene	2.53	0.333	mg/kg wet	3.333		76	40-140			
Nitrobenzene	2.43	0.333	mg/kg wet	3.333		73	40-140			
N-Nitrosodimethylamine	2.46	0.333	mg/kg wet	3.333		74	40-140			
N-Nitroso-Di-n-Propylamine	2.62	0.333	mg/kg wet	3.333		78	40-140			
N-nitrosodiphenylamine	2.74	0.333	mg/kg wet	3.333		82	40-140			
Pentachlorophenol	2.58	1.67	mg/kg wet	3.333		77	30-130			
Phenanthrene	2.56	0.333	mg/kg wet	3.333		77	40-140			
Phenol	2.68	0.333	mg/kg wet	3.333		80	30-130			
Pyrene	2.54	0.333	mg/kg wet	3.333		76	40-140			
Pyridine	2.16	1.67	mg/kg wet	3.333		65	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	2.28		mg/kg wet	3.333		68	30-130			
Surrogate: 2,4,6-Tribromophenol	3.78		mg/kg wet	5.000		76	30-130			
Surrogate: 2-Chlorophenol-d4	3.84		mg/kg wet	5.000		77	30-130			
Surrogate: 2-Fluorobiphenyl	2.47		mg/kg wet	3.333		74	30-130			
Surrogate: 2-Fluorophenol	3.94		mg/kg wet	5.000		79	30-130			
Surrogate: Nitrobenzene-d5	2.63		mg/kg wet	3.333		79	30-130			
Surrogate: Phenol-d6	4.01		mg/kg wet	5.000		80	30-130			
Surrogate: p-Terphenyl-d14	2.56		mg/kg wet	3.333		77	30-130			

LCS Dup

1,1-Biphenyl	2.57	0.333	mg/kg wet	3.333		77	40-140	4	30	
1,2,4-Trichlorobenzene	2.76	0.333	mg/kg wet	3.333		83	40-140	6	30	
1,2-Dichlorobenzene	2.69	0.333	mg/kg wet	3.333		81	40-140	4	30	
1,3-Dichlorobenzene	2.57	0.333	mg/kg wet	3.333		77	40-140	4	30	
1,4-Dichlorobenzene	2.53	0.333	mg/kg wet	3.333		76	40-140	4	30	
2,3,4,6-Tetrachlorophenol	2.55	1.67	mg/kg wet	3.333		77	30-130	7	30	
2,4,5-Trichlorophenol	2.63	0.333	mg/kg wet	3.333		79	30-130	3	30	
2,4,6-Trichlorophenol	2.68	0.333	mg/kg wet	3.333		81	30-130	10	30	
2,4-Dichlorophenol	2.75	0.333	mg/kg wet	3.333		82	30-130	6	30	
2,4-Dimethylphenol	2.65	0.333	mg/kg wet	3.333		79	30-130	7	30	
2,4-Dinitrophenol	2.65	1.67	mg/kg wet	3.333		79	30-130	11	30	
2,4-Dinitrotoluene	2.64	0.333	mg/kg wet	3.333		79	40-140	6	30	
2,6-Dinitrotoluene	2.78	0.333	mg/kg wet	3.333		83	40-140	4	30	
2-Chloronaphthalene	2.61	0.333	mg/kg wet	3.333		78	40-140	6	30	
2-Chlorophenol	2.72	0.333	mg/kg wet	3.333		82	30-130	6	30	
2-Methylnaphthalene	2.60	0.333	mg/kg wet	3.333		78	40-140	5	30	
2-Methylphenol	2.66	0.333	mg/kg wet	3.333		80	30-130	4	30	
2-Nitroaniline	2.64	0.333	mg/kg wet	3.333		79	40-140	5	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH92910 - 3546

2-Nitrophenol	2.54	0.333	mg/kg wet	3.333		76	30-130	7	30	
3,3'-Dichlorobenzidine	2.64	0.667	mg/kg wet	3.333		79	40-140	6	30	
3+4-Methylphenol	5.85	0.667	mg/kg wet	6.667		88	30-130	5	30	
3-Nitroaniline	2.44	0.333	mg/kg wet	3.333		73	40-140	7	30	
4,6-Dinitro-2-Methylphenol	2.74	1.67	mg/kg wet	3.333		82	30-130	0.9	30	
4-Bromophenyl-phenylether	3.01	0.333	mg/kg wet	3.333		90	40-140	4	30	
4-Chloro-3-Methylphenol	2.73	0.333	mg/kg wet	3.333		82	30-130	4	30	
4-Chloroaniline	2.04	0.667	mg/kg wet	3.333		61	40-140	4	30	
4-Chloro-phenyl-phenyl ether	2.93	0.333	mg/kg wet	3.333		88	40-140	6	30	
4-Nitroaniline	2.45	0.333	mg/kg wet	3.333		73	40-140	0.2	30	
4-Nitrophenol	2.53	1.67	mg/kg wet	3.333		76	30-130	7	30	
Acenaphthene	2.63	0.333	mg/kg wet	3.333		79	40-140	8	30	
Acenaphthylene	2.31	0.333	mg/kg wet	3.333		69	40-140	5	30	
Acetophenone	2.56	0.667	mg/kg wet	3.333		77	40-140	5	30	
Aniline	2.04	0.667	mg/kg wet	3.333		61	40-140	3	30	
Anthracene	2.62	0.333	mg/kg wet	3.333		79	40-140	1	30	
Azobenzene	2.75	0.333	mg/kg wet	3.333		83	40-140	2	30	
Benzo(a)anthracene	2.73	0.333	mg/kg wet	3.333		82	40-140	5	30	
Benzo(a)pyrene	2.56	0.167	mg/kg wet	3.333		77	40-140	4	30	
Benzo(b)fluoranthene	2.56	0.333	mg/kg wet	3.333		77	40-140	3	30	
Benzo(g,h,i)perylene	2.73	0.333	mg/kg wet	3.333		82	40-140	6	30	
Benzo(k)fluoranthene	2.82	0.333	mg/kg wet	3.333		84	40-140	7	30	
Benzoic Acid	2.56	1.67	mg/kg wet	3.333		77	40-140	10	30	
Benzyl Alcohol	2.38	0.333	mg/kg wet	3.333		71	40-140	3	30	
bis(2-Chloroethoxy)methane	2.70	0.333	mg/kg wet	3.333		81	40-140	6	30	
bis(2-Chloroethyl)ether	2.71	0.333	mg/kg wet	3.333		81	40-140	4	30	
bis(2-chloroisopropyl)Ether	2.59	0.333	mg/kg wet	3.333		78	40-140	4	30	
bis(2-Ethylhexyl)phthalate	2.80	0.333	mg/kg wet	3.333		84	40-140	3	30	
Butylbenzylphthalate	2.90	0.333	mg/kg wet	3.333		87	40-140	6	30	
Carbazole	2.70	0.333	mg/kg wet	3.333		81	40-140	4	30	
Chrysene	2.67	0.167	mg/kg wet	3.333		80	40-140	3	30	
Dibenzo(a,h)Anthracene	2.74	0.167	mg/kg wet	3.333		82	40-140	5	30	
Dibenzofuran	2.61	0.333	mg/kg wet	3.333		78	40-140	3	30	
Diethylphthalate	2.91	0.333	mg/kg wet	3.333		87	40-140	7	30	
Dimethylphthalate	2.88	0.333	mg/kg wet	3.333		87	40-140	8	30	
Di-n-butylphthalate	3.01	0.333	mg/kg wet	3.333		90	40-140	3	30	
Di-n-octylphthalate	2.80	0.333	mg/kg wet	3.333		84	40-140	5	30	
Fluoranthene	2.70	0.333	mg/kg wet	3.333		81	40-140	2	30	
Fluorene	2.78	0.333	mg/kg wet	3.333		83	40-140	7	30	
Hexachlorobenzene	2.73	0.167	mg/kg wet	3.333		82	40-140	0.9	30	
Hexachlorobutadiene	2.68	0.333	mg/kg wet	3.333		81	40-140	8	30	
Hexachlorocyclopentadiene	1.60	1.67	mg/kg wet	3.333		48	40-140	6	30	
Hexachloroethane	2.37	0.333	mg/kg wet	3.333		71	40-140	5	30	
Indeno(1,2,3-cd)Pyrene	2.71	0.333	mg/kg wet	3.333		81	40-140	5	30	
Isophorone	2.26	0.333	mg/kg wet	3.333		68	40-140	5	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH92910 - 3546

Naphthalene	2.73	0.333	mg/kg wet	3.333		82	40-140	8	30	
Nitrobenzene	2.58	0.333	mg/kg wet	3.333		78	40-140	6	30	
N-Nitrosodimethylamine	2.48	0.333	mg/kg wet	3.333		74	40-140	0.8	30	
N-Nitroso-Di-n-Propylamine	2.76	0.333	mg/kg wet	3.333		83	40-140	5	30	
N-nitrosodiphenylamine	2.78	0.333	mg/kg wet	3.333		83	40-140	1	30	
Pentachlorophenol	2.90	1.67	mg/kg wet	3.333		87	30-130	12	30	
Phenanthrene	2.60	0.333	mg/kg wet	3.333		78	40-140	2	30	
Phenol	2.79	0.333	mg/kg wet	3.333		84	30-130	4	30	
Pyrene	2.65	0.333	mg/kg wet	3.333		80	40-140	4	30	
Pyridine	2.30	1.67	mg/kg wet	3.333		69	40-140	6	30	
Surrogate: 1,2-Dichlorobenzene-d4	2.40		mg/kg wet	3.333		72	30-130			
Surrogate: 2,4,6-Tribromophenol	3.79		mg/kg wet	5.000		76	30-130			
Surrogate: 2-Chlorophenol-d4	4.03		mg/kg wet	5.000		81	30-130			
Surrogate: 2-Fluorobiphenyl	2.64		mg/kg wet	3.333		79	30-130			
Surrogate: 2-Fluorophenol	4.03		mg/kg wet	5.000		81	30-130			
Surrogate: Nitrobenzene-d5	2.84		mg/kg wet	3.333		85	30-130			
Surrogate: Phenol-d6	4.20		mg/kg wet	5.000		84	30-130			
Surrogate: p-Terphenyl-d14	2.73		mg/kg wet	3.333		82	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

Notes and Definitions

- U Analyte included in the analysis, but not detected
- SD Surrogate recovery(ies) diluted below the MRL (SD).
- Q Calibration required quadratic regression (Q).
- D Diluted.
- CD- Continuing Calibration %Diff/Drift is below control limit (CD-).
- 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
- RL Reporting Limit
- EDL Estimated Detection Limit
- MF Membrane Filtration
- MPN Most Probably Number
- TNTC Too numerous to Count
- CFU Colony Forming Units



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0859

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

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.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 19H0859

Date Received: 8/27/2019

Shipped/Delivered Via: Client

Project Due Date: 9/4/2019

Days for Project: 5 Day

1. Air bill manifest present? No
Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
Temp: 3.4 Iced with: Ice
5. Was COC signed and dated by client? Yes

6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. Were labs informed about **short holds & rushes**? Yes / No / NA
10. Were any analyses received outside of hold time? Yes No

11. Any Subcontracting needed? Yes No
ESS Sample IDs: _____
Analysis: _____
TAT: _____

12. Were VOAs received? Yes / No
a. Air bubbles in aqueous VOAs? Yes / No
b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes / No
a. If metals preserved upon receipt: Date: 8/27/19 Time: _____ By: _____
b. Low Level VOA vials frozen: Date: 8/27/19 Time: 15:52 By: _____

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes No
a. Was there a need to contact the client? Yes No
Who was contacted? _____ Date: _____ Time: _____ By: _____

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
01	381745	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
01	381752	Yes	NA	Yes	VOA Vial - Other	Other	
01	381753	Yes	NA	Yes	VOA Vial - Other	Other	
01	381757	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
02	381744	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
02	381750	Yes	NA	Yes	VOA Vial - Other	Other	
02	381751	Yes	NA	Yes	VOA Vial - Other	Other	
02	381756	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
03	381743	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
03	381748	Yes	NA	Yes	VOA Vial - Other	Other	
03	381749	Yes	NA	Yes	VOA Vial - Other	Other	
03	381755	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
04	381742	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
04	381746	Yes	NA	Yes	VOA Vial - Other	Other	
04	381747	Yes	NA	Yes	VOA Vial - Other	Other	
04	381754	Yes	NA	Yes	8 oz. Jar - Unpres	NP	

2nd Review

- Were all containers scanned into storage/lab?
Are barcode labels on correct containers?
Are all Flashpoint stickers attached/container ID # circled?
Are all Hex Chrome stickers attached?

Initials [Signature]
Yes / No
Yes / No / NA
Yes / No / NA

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 19H0859

Date Received: 8/27/2019

Are all QC stickers attached?

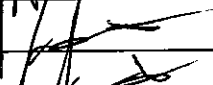
Yes / No / NA

Are VOA stickers attached if bubbles noted?

Yes / No / NA

Completed By: 

Date & Time: 8/27/19 1545

Reviewed By: 

Date & Time: 8/27/19 15:51

Delivered By: 

Date & Time: 8/27/19 15:51

ESS Laboratory

Division of Thielsch Engineering, Inc.
 185 Frances Avenue, Cranston RI 02910
 Tel. (401) 461-7181 Fax (401) 461-4486
 www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time: 5 Days
 Regulatory State: RI
 Is this project for any of the following?
 CT RCP MA MCP RGP
 Project #: NBC IIIA-1 and IIIA-5
 Address: 701 Grove Washington Hwy
 Zip Code: 02865
 Email Address: jmcloughlin@6076-12c.com
 PO #:
 State: RI
 FAX Number:
 Project Name:
 Address:
 Zip Code:
 Email Address:
 PO #:

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Analysis	VOCs	SVOCs	PCBs	TPH	PR-13 mths
1	8/27/16	9:00	Grab	Seal	B-5 0-2'	X	X	X	X	X	X
2	|	9:15	|	|	B-5 2-4'	X	X	X	X	X	X
3	|	9:30	|	|	B-5 4-6'	X	X	X	X	X	X
4	|	9:45	Camp	|	B-5 6-10'	X	X	X	X	X	X

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubittainer J-Jar O-Other P-Poly S-Sterile V-Vial
 Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*
 Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAc2, NaOH 9-NH4Cl 10-DI H2O 11-Other*
 Number of Containers per Sample: 3

Sampled by: S. # Mc
 Comments: Please specify "Other" preservative and containers types in this space

Cooler Present: 13.4 °C Drop Off Pickup
 Seals Intact:

Relinquished by: (Signature, Date & Time) S. # 8/27/16 3:21
 Relinquished by: (Signature, Date & Time) J. # 8/27/16 15:21

Received By: (Signature, Date & Time)
 Relinquished By: (Signature, Date & Time)

ESS Lab # 19A0859
 Reporting Limits RIDEM R01DEC1300a

Electronic Deliverables Data Checker Excel
 Other (Please Specify -->)



CERTIFICATE OF ANALYSIS

Joe McLoughlin
Beta Engineering
701 George Washington Hwy 2nd FL
Lincoln, RI 02865

RE: NBC III (N/A)
ESS Laboratory Work Order Number: 19H0974

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 4:29 pm, Sep 09, 2019

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 TNI and relative state standards, 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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

SAMPLE RECEIPT

The following samples were received on August 29, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Low Level VOA vials were frozen by ESS Laboratory on 8/29/19 at 17:01.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
19H0974-01	B-6 0-2ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D
19H0974-02	B-6 2-4ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

PROJECT NARRATIVE

8270D Semi-Volatile Organic Compounds

- C9H0626-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (106% @ 80-120%), 4,6-Dinitro-2-Methylphenol (104% @ 80-120%), Benzoic Acid (102% @ 80-120%)
- C9H0626-CCV1 **Continuing Calibration %Diff/Drift is above control limit (CD+).**
2-Methylnaphthalene (23% @ 20%)
- C9H0626-CCV1 **Continuing Calibration %Diff/Drift is below control limit (CD-).**
Aniline (23% @ 20%), Hexachlorocyclopentadiene (27% @ 20%), Isophorone (21% @ 20%)
- C9I0054-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (101% @ 80-120%), 4,6-Dinitro-2-Methylphenol (96% @ 80-120%), Benzoic Acid (95% @ 80-120%), Di-n-octylphthalate (110% @ 80-120%), Pentachlorophenol (94% @ 80-120%)
- CH93011-BS1 **Blank Spike recovery is below lower control limit (B-).**
Aniline (39% @ 40-140%), Hexachlorocyclopentadiene (38% @ 40-140%)
- CH93011-BSD1 **Blank Spike recovery is below lower control limit (B-).**
Aniline (39% @ 40-140%), Hexachlorocyclopentadiene (38% @ 40-140%), N-Nitrosodimethylamine (38% @ 40-140%), Pyridine (39% @ 40-140%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

- [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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

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
- 8015C - 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
- MADEP 18-2.1 - 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
- 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 0-2ft
Date Sampled: 08/29/19 08:10
Percent Solids: 86

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (1.97)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446
Arsenic	4.89 (0.99)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446
Beryllium	0.28 (0.04)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446
Cadmium	ND (0.20)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446
Chromium	8.99 (0.39)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446
Copper	25.5 (0.99)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446
Lead	51.6 (1.97)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446
Mercury	0.102 (0.010)		7471B		1	MKS	09/05/19 13:10	2.33	40	CI90447
Nickel	8.26 (0.99)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446
Selenium	ND (1.97)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446
Silver	ND (0.20)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446
Thallium	ND (0.20)		6020A		1	NAR	09/06/19 12:46	5.87	100	CI90446
Zinc	44.4 (0.99)		6010C		1	KJK	09/05/19 16:45	5.87	100	CI90446



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 0-2ft
Date Sampled: 08/29/19 08:10
Percent Solids: 86
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,1,1-Trichloroethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,1,2,2-Tetrachloroethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,1,2-Trichloroethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,1-Dichloroethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,1-Dichloroethene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,1-Dichloropropene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,2,3-Trichlorobenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,2,3-Trichloropropane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,2,4-Trichlorobenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,2,4-Trimethylbenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,2-Dibromo-3-Chloropropane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,2-Dibromoethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,2-Dichlorobenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,2-Dichloroethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,2-Dichloropropane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,3,5-Trimethylbenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,3-Dichlorobenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,3-Dichloropropane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,4-Dichlorobenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1,4-Dioxane	ND (0.0772)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
1-Chlorohexane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
2,2-Dichloropropane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
2-Butanone	ND (0.0386)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
2-Chlorotoluene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
2-Hexanone	ND (0.0386)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
4-Chlorotoluene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
4-Isopropyltoluene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
4-Methyl-2-Pentanone	ND (0.0386)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Acetone	ND (0.0386)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Benzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Bromobenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 0-2ft
Date Sampled: 08/29/19 08:10
Percent Solids: 86
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Bromodichloromethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Bromoform	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Bromomethane	ND (0.0077)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Carbon Disulfide	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Carbon Tetrachloride	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Chlorobenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Chloroethane	ND (0.0077)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Chloroform	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Chloromethane	ND (0.0077)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
cis-1,2-Dichloroethene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
cis-1,3-Dichloropropene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Dibromochloromethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Dibromomethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Dichlorodifluoromethane	ND (0.0077)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Diethyl Ether	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Di-isopropyl ether	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Ethyl tertiary-butyl ether	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Ethylbenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Hexachlorobutadiene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Isopropylbenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Methyl tert-Butyl Ether	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Methylene Chloride	ND (0.0193)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Naphthalene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
n-Butylbenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
n-Propylbenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
sec-Butylbenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Styrene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
tert-Butylbenzene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Tertiary-amyl methyl ether	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Tetrachloroethene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Tetrahydrofuran	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 0-2ft
Date Sampled: 08/29/19 08:10
Percent Solids: 86
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
trans-1,2-Dichloroethene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
trans-1,3-Dichloropropene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Trichloroethene	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Trichlorofluoromethane	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Vinyl Acetate	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Vinyl Chloride	ND (0.0077)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Xylene O	ND (0.0039)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Xylene P,M	ND (0.0077)		8260B Low		1	08/30/19 14:20	C9H0629	CH93021
Xylenes (Total)	ND (0.00772)		8260B Low		1	08/30/19 14:20		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>93 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>82 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>95 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>97 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 0-2ft
Date Sampled: 08/29/19 08:10
Percent Solids: 86
Initial Volume: 20.9
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 8/30/19 15:51

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	09/03/19 13:48		CH93007
Aroclor 1221	ND (0.06)		8082A		1	09/03/19 13:48		CH93007
Aroclor 1232	ND (0.06)		8082A		1	09/03/19 13:48		CH93007
Aroclor 1242	ND (0.06)		8082A		1	09/03/19 13:48		CH93007
Aroclor 1248	ND (0.06)		8082A		1	09/03/19 13:48		CH93007
Aroclor 1254	ND (0.06)		8082A		1	09/03/19 13:48		CH93007
Aroclor 1260	ND (0.06)		8082A		1	09/03/19 13:48		CH93007
Aroclor 1262	ND (0.06)		8082A		1	09/03/19 13:48		CH93007
Aroclor 1268	ND (0.06)		8082A		1	09/03/19 13:48		CH93007

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	67 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	65 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	58 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	64 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 0-2ft
Date Sampled: 08/29/19 08:10
Percent Solids: 86
Initial Volume: 20
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/30/19 10:45

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	390 (86.9)		8100M		2	08/31/19 1:11	C9H0564	CH93012
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		92 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 0-2ft
Date Sampled: 08/29/19 08:10
Percent Solids: 86
Initial Volume: 15.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 10:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
1,2,4-Trichlorobenzene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
1,2-Dichlorobenzene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
1,3-Dichlorobenzene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
1,4-Dichlorobenzene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2,3,4,6-Tetrachlorophenol	ND (1.91)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2,4,5-Trichlorophenol	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2,4,6-Trichlorophenol	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2,4-Dichlorophenol	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2,4-Dimethylphenol	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2,4-Dinitrophenol	ND (1.91)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2,4-Dinitrotoluene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2,6-Dinitrotoluene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2-Chloronaphthalene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2-Chlorophenol	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2-Methylnaphthalene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2-Methylphenol	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2-Nitroaniline	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
2-Nitrophenol	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
3,3'-Dichlorobenzidine	ND (0.762)		8270D		1	09/05/19 15:10	C9I0054	CH93011
3+4-Methylphenol	ND (0.762)		8270D		1	09/05/19 15:10	C9I0054	CH93011
3-Nitroaniline	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
4,6-Dinitro-2-Methylphenol	ND (1.91)		8270D		1	09/05/19 15:10	C9I0054	CH93011
4-Bromophenyl-phenylether	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
4-Chloro-3-Methylphenol	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
4-Chloroaniline	ND (0.762)		8270D		1	09/05/19 15:10	C9I0054	CH93011
4-Chloro-phenyl-phenyl ether	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
4-Nitroaniline	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
4-Nitrophenol	ND (1.91)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Acenaphthene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Acenaphthylene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Acetophenone	ND (0.762)		8270D		1	09/05/19 15:10	C9I0054	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 0-2ft
Date Sampled: 08/29/19 08:10
Percent Solids: 86
Initial Volume: 15.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 10:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.762)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Anthracene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Azobenzene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Benzo(a)anthracene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Benzo(a)pyrene	0.250 (0.191)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Benzo(b)fluoranthene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Benzo(g,h,i)perylene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Benzo(k)fluoranthene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Benzoic Acid	ND (1.91)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Benzyl Alcohol	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
bis(2-Chloroethoxy)methane	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
bis(2-Chloroethyl)ether	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
bis(2-chloroisopropyl)Ether	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
bis(2-Ethylhexyl)phthalate	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Butylbenzylphthalate	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Carbazole	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Chrysene	0.230 (0.191)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Dibenzo(a,h)Anthracene	ND (0.191)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Dibenzofuran	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Diethylphthalate	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Dimethylphthalate	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Di-n-butylphthalate	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Di-n-octylphthalate	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Fluoranthene	0.468 (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Fluorene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Hexachlorobenzene	ND (0.191)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Hexachlorobutadiene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Hexachlorocyclopentadiene	ND (1.91)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Hexachloroethane	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Indeno(1,2,3-cd)Pyrene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Isophorone	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Naphthalene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 0-2ft
Date Sampled: 08/29/19 08:10
Percent Solids: 86
Initial Volume: 15.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 10:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
N-Nitrosodimethylamine	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
N-Nitroso-Di-n-Propylamine	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
N-nitrosodiphenylamine	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Pentachlorophenol	ND (1.91)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Phenanthrene	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Phenol	ND (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Pyrene	0.424 (0.381)		8270D		1	09/05/19 15:10	C9I0054	CH93011
Pyridine	ND (1.91)		8270D		1	09/05/19 15:10	C9I0054	CH93011

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	49 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	70 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	58 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	57 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	57 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	52 %		30-130
<i>Surrogate: Phenol-d6</i>	60 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	71 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 2-4ft
Date Sampled: 08/29/19 08:20
Percent Solids: 89

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (5.20)		6010C		1	KJK	09/05/19 16:48	2.16	100	CI90446
Arsenic	6.57 (2.60)		6010C		1	KJK	09/06/19 8:56	2.16	100	CI90446
Beryllium	0.32 (0.11)		6010C		1	KJK	09/05/19 16:48	2.16	100	CI90446
Cadmium	ND (0.52)		6010C		1	KJK	09/05/19 16:48	2.16	100	CI90446
Chromium	10.8 (1.04)		6010C		1	KJK	09/05/19 16:48	2.16	100	CI90446
Copper	25.7 (2.60)		6010C		1	KJK	09/05/19 16:48	2.16	100	CI90446
Lead	51.4 (5.20)		6010C		1	KJK	09/05/19 16:48	2.16	100	CI90446
Mercury	0.191 (0.025)		7471B		1	MKS	09/05/19 13:16	0.9	40	CI90447
Nickel	9.12 (2.60)		6010C		1	KJK	09/05/19 16:48	2.16	100	CI90446
Selenium	ND (5.20)		6010C		1	KJK	09/05/19 16:48	2.16	100	CI90446
Silver	ND (0.52)		6010C		1	KJK	09/05/19 16:48	2.16	100	CI90446
Thallium	ND (0.52)		6020A		1	NAR	09/06/19 12:50	2.16	100	CI90446
Zinc	48.1 (2.60)		6010C		1	KJK	09/05/19 16:48	2.16	100	CI90446



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 2-4ft
Date Sampled: 08/29/19 08:20
Percent Solids: 89
Initial Volume: 6.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,1,1-Trichloroethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,1,2,2-Tetrachloroethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,1,2-Trichloroethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,1-Dichloroethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,1-Dichloroethene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,1-Dichloropropene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,2,3-Trichlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,2,3-Trichloropropane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,2,4-Trichlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,2,4-Trimethylbenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,2-Dibromo-3-Chloropropane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,2-Dibromoethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,2-Dichlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,2-Dichloroethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,2-Dichloropropane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,3,5-Trimethylbenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,3-Dichlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,3-Dichloropropane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,4-Dichlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1,4-Dioxane	ND (0.0814)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
1-Chlorohexane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
2,2-Dichloropropane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
2-Butanone	ND (0.0407)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
2-Chlorotoluene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
2-Hexanone	ND (0.0407)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
4-Chlorotoluene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
4-Isopropyltoluene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
4-Methyl-2-Pentanone	ND (0.0407)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Acetone	0.0513 (0.0407)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Benzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Bromobenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 2-4ft
Date Sampled: 08/29/19 08:20
Percent Solids: 89
Initial Volume: 6.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Bromodichloromethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Bromoform	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Bromomethane	ND (0.0081)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Carbon Disulfide	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Carbon Tetrachloride	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Chlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Chloroethane	ND (0.0081)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Chloroform	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Chloromethane	ND (0.0081)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
cis-1,2-Dichloroethene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
cis-1,3-Dichloropropene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Dibromochloromethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Dibromomethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Dichlorodifluoromethane	ND (0.0081)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Diethyl Ether	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Di-isopropyl ether	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Ethyl tertiary-butyl ether	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Ethylbenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Hexachlorobutadiene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Isopropylbenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Methyl tert-Butyl Ether	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Methylene Chloride	ND (0.0203)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Naphthalene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
n-Butylbenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
n-Propylbenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
sec-Butylbenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Styrene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
tert-Butylbenzene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Tertiary-amyl methyl ether	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Tetrachloroethene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Tetrahydrofuran	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 2-4ft
Date Sampled: 08/29/19 08:20
Percent Solids: 89
Initial Volume: 6.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
trans-1,2-Dichloroethene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
trans-1,3-Dichloropropene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Trichloroethene	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Trichlorofluoromethane	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Vinyl Acetate	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Vinyl Chloride	ND (0.0081)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Xylene O	ND (0.0041)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Xylene P,M	ND (0.0081)		8260B Low		1	08/30/19 14:45	C9H0629	CH93021
Xylenes (Total)	ND (0.00814)		8260B Low		1	08/30/19 14:45		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>89 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>82 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>93 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>97 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 2-4ft
Date Sampled: 08/29/19 08:20
Percent Solids: 89
Initial Volume: 19.9
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 8/30/19 15:51

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	09/03/19 14:08		CH93007
Aroclor 1221	ND (0.06)		8082A		1	09/03/19 14:08		CH93007
Aroclor 1232	ND (0.06)		8082A		1	09/03/19 14:08		CH93007
Aroclor 1242	ND (0.06)		8082A		1	09/03/19 14:08		CH93007
Aroclor 1248	ND (0.06)		8082A		1	09/03/19 14:08		CH93007
Aroclor 1254	ND (0.06)		8082A		1	09/03/19 14:08		CH93007
Aroclor 1260	ND (0.06)		8082A		1	09/03/19 14:08		CH93007
Aroclor 1262	ND (0.06)		8082A		1	09/03/19 14:08		CH93007
Aroclor 1268	ND (0.06)		8082A		1	09/03/19 14:08		CH93007

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	66 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	64 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	62 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	69 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 2-4ft
Date Sampled: 08/29/19 08:20
Percent Solids: 89
Initial Volume: 19.3
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/30/19 10:45

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	205 (87.3)		8100M		2	08/31/19 1:43	C9H0564	CH93012
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		94 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 2-4ft
Date Sampled: 08/29/19 08:20
Percent Solids: 89
Initial Volume: 15.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 10:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
1,2,4-Trichlorobenzene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
1,2-Dichlorobenzene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
1,3-Dichlorobenzene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
1,4-Dichlorobenzene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2,3,4,6-Tetrachlorophenol	ND (1.85)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2,4,5-Trichlorophenol	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2,4,6-Trichlorophenol	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2,4-Dichlorophenol	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2,4-Dimethylphenol	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2,4-Dinitrophenol	ND (1.85)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2,4-Dinitrotoluene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2,6-Dinitrotoluene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2-Chloronaphthalene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2-Chlorophenol	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2-Methylnaphthalene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2-Methylphenol	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2-Nitroaniline	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
2-Nitrophenol	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
3,3'-Dichlorobenzidine	ND (0.739)		8270D		1	09/05/19 15:36	C9I0054	CH93011
3+4-Methylphenol	ND (0.739)		8270D		1	09/05/19 15:36	C9I0054	CH93011
3-Nitroaniline	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
4,6-Dinitro-2-Methylphenol	ND (1.85)		8270D		1	09/05/19 15:36	C9I0054	CH93011
4-Bromophenyl-phenylether	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
4-Chloro-3-Methylphenol	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
4-Chloroaniline	ND (0.739)		8270D		1	09/05/19 15:36	C9I0054	CH93011
4-Chloro-phenyl-phenyl ether	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
4-Nitroaniline	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
4-Nitrophenol	ND (1.85)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Acenaphthene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Acenaphthylene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Acetophenone	ND (0.739)		8270D		1	09/05/19 15:36	C9I0054	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-6 2-4ft
 Date Sampled: 08/29/19 08:20
 Percent Solids: 89
 Initial Volume: 15.2
 Final Volume: 0.5
 Extraction Method: 3546

ESS Laboratory Work Order: 19H0974
 ESS Laboratory Sample ID: 19H0974-02
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: TJ
 Prepared: 8/30/19 10:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.739)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Anthracene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Azobenzene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Benzo(a)anthracene	0.370 (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Benzo(a)pyrene	0.331 (0.185)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Benzo(b)fluoranthene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Benzo(g,h,i)perylene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Benzo(k)fluoranthene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Benzoic Acid	ND (1.85)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Benzyl Alcohol	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
bis(2-Chloroethoxy)methane	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
bis(2-Chloroethyl)ether	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
bis(2-chloroisopropyl)Ether	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
bis(2-Ethylhexyl)phthalate	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Butylbenzylphthalate	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Carbazole	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Chrysene	0.337 (0.185)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Dibenzo(a,h)Anthracene	ND (0.185)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Dibenzofuran	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Diethylphthalate	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Dimethylphthalate	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Di-n-butylphthalate	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Di-n-octylphthalate	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Fluoranthene	0.665 (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Fluorene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Hexachlorobenzene	ND (0.185)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Hexachlorobutadiene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Hexachlorocyclopentadiene	ND (1.85)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Hexachloroethane	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Indeno(1,2,3-cd)Pyrene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Isophorone	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Naphthalene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6 2-4ft
Date Sampled: 08/29/19 08:20
Percent Solids: 89
Initial Volume: 15.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0974
ESS Laboratory Sample ID: 19H0974-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 10:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
N-Nitrosodimethylamine	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
N-Nitroso-Di-n-Propylamine	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
N-nitrosodiphenylamine	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Pentachlorophenol	ND (1.85)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Phenanthrene	0.376 (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Phenol	ND (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Pyrene	0.593 (0.369)		8270D		1	09/05/19 15:36	C9I0054	CH93011
Pyridine	ND (1.85)		8270D		1	09/05/19 15:36	C9I0054	CH93011

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	46 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	67 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	56 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	51 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	54 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	47 %		30-130
<i>Surrogate: Phenol-d6</i>	59 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	70 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CI90446 - 3050B

Blank

Antimony	ND	5.00	mg/kg wet
Arsenic	ND	2.50	mg/kg wet
Beryllium	ND	0.11	mg/kg wet
Cadmium	ND	0.50	mg/kg wet
Chromium	ND	1.00	mg/kg wet
Copper	ND	2.50	mg/kg wet
Lead	ND	5.00	mg/kg wet
Nickel	ND	2.50	mg/kg wet
Selenium	ND	5.00	mg/kg wet
Silver	ND	0.50	mg/kg wet
Zinc	ND	2.50	mg/kg wet

Blank

Thallium	ND	0.50	mg/kg wet
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LCS

Antimony	44.3	17.5	mg/kg wet	42.40	105	80-120
Arsenic	125	8.77	mg/kg wet	128.0	98	80-120
Beryllium	217	0.39	mg/kg wet	217.0	100	80-120
Cadmium	98.1	1.75	mg/kg wet	99.00	99	80-120
Chromium	116	3.51	mg/kg wet	116.0	100	80-120
Copper	88.9	8.77	mg/kg wet	89.60	99	80-120
Lead	280	17.5	mg/kg wet	277.0	101	80-120
Nickel	106	8.77	mg/kg wet	107.0	99	80-120
Selenium	238	17.5	mg/kg wet	242.0	98	80-120
Silver	64.8	1.75	mg/kg wet	64.30	101	80-120
Zinc	553	8.77	mg/kg wet	561.0	99	80-120

LCS

Thallium	179	8.77	mg/kg wet	183.0	98	80-120
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LCS Dup

Antimony	45.8	19.2	mg/kg wet	42.40	108	80-120	3	20
Arsenic	125	9.62	mg/kg wet	128.0	98	80-120	0.05	20
Beryllium	218	0.42	mg/kg wet	217.0	100	80-120	0.2	20
Cadmium	99.1	1.92	mg/kg wet	99.00	100	80-120	1	20
Chromium	116	3.85	mg/kg wet	116.0	100	80-120	0.3	20
Copper	88.6	9.62	mg/kg wet	89.60	99	80-120	0.4	20
Lead	290	19.2	mg/kg wet	277.0	105	80-120	3	20
Nickel	106	9.62	mg/kg wet	107.0	99	80-120	0.3	20
Selenium	240	19.2	mg/kg wet	242.0	99	80-120	1	20
Silver	64.4	1.92	mg/kg wet	64.30	100	80-120	0.6	20
Zinc	552	9.62	mg/kg wet	561.0	98	80-120	0.2	20

LCS Dup

Thallium	195	9.62	mg/kg wet	183.0	107	80-120	9	30
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Batch CI90447 - 7471B

Blank



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CI90447 - 7471B

Mercury	ND	0.033	mg/kg wet							
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LCS

Mercury	24.4	3.60	mg/kg wet	27.30		90	80-120			
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LCS Dup

Mercury	23.3	3.74	mg/kg wet	27.30		85	80-120	5	20	
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Reference

Mercury	0.978	0.174	mg/kg wet	1000		0.1	0-200			
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93021 - 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	0.0050	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							
1-Chlorohexane	ND	0.0050	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0500	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0500	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet							
Acetone	ND	0.0500	mg/kg wet							
Benzene	ND	0.0050	mg/kg wet							
Bromobenzene	ND	0.0050	mg/kg wet							
Bromochloromethane	ND	0.0050	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93021 - 5035

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	0.0050	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	0.0250	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 Acetate	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	0.0445		mg/kg wet	0.05000		89	70-130			
Surrogate: 4-Bromofluorobenzene	0.0440		mg/kg wet	0.05000		88	70-130			
Surrogate: Dibromofluoromethane	0.0459		mg/kg wet	0.05000		92	70-130			
Surrogate: Toluene-d8	0.0467		mg/kg wet	0.05000		93	70-130			

LCS



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93021 - 5035

1,1,1,2-Tetrachloroethane	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
1,1,1-Trichloroethane	0.0551	0.0050	mg/kg wet	0.05000		110	70-130			
1,1,2,2-Tetrachloroethane	0.0427	0.0050	mg/kg wet	0.05000		85	70-130			
1,1,2-Trichloroethane	0.0459	0.0050	mg/kg wet	0.05000		92	70-130			
1,1-Dichloroethane	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			
1,1-Dichloroethene	0.0547	0.0050	mg/kg wet	0.05000		109	70-130			
1,1-Dichloropropene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
1,2,3-Trichlorobenzene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			
1,2,3-Trichloropropane	0.0431	0.0050	mg/kg wet	0.05000		86	70-130			
1,2,4-Trichlorobenzene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
1,2,4-Trimethylbenzene	0.0537	0.0050	mg/kg wet	0.05000		107	70-130			
1,2-Dibromo-3-Chloropropane	0.0390	0.0050	mg/kg wet	0.05000		78	70-130			
1,2-Dibromoethane	0.0466	0.0050	mg/kg wet	0.05000		93	70-130			
1,2-Dichlorobenzene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130			
1,2-Dichloroethane	0.0457	0.0050	mg/kg wet	0.05000		91	70-130			
1,2-Dichloropropane	0.0468	0.0050	mg/kg wet	0.05000		94	70-130			
1,3,5-Trimethylbenzene	0.0530	0.0050	mg/kg wet	0.05000		106	70-130			
1,3-Dichlorobenzene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
1,3-Dichloropropane	0.0474	0.0050	mg/kg wet	0.05000		95	70-130			
1,4-Dichlorobenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
1,4-Dioxane	0.910	0.100	mg/kg wet	1.000		91	70-130			
1-Chlorohexane	0.0550	0.0050	mg/kg wet	0.05000		110	70-130			
2,2-Dichloropropane	0.0554	0.0050	mg/kg wet	0.05000		111	70-130			
2-Butanone	0.234	0.0500	mg/kg wet	0.2500		94	70-130			
2-Chlorotoluene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
2-Hexanone	0.194	0.0500	mg/kg wet	0.2500		78	70-130			
4-Chlorotoluene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			
4-Isopropyltoluene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
4-Methyl-2-Pentanone	0.201	0.0500	mg/kg wet	0.2500		80	70-130			
Acetone	0.200	0.0500	mg/kg wet	0.2500		80	70-130			
Benzene	0.0499	0.0050	mg/kg wet	0.05000		100	70-130			
Bromobenzene	0.0516	0.0050	mg/kg wet	0.05000		103	70-130			
Bromochloromethane	0.0492	0.0050	mg/kg wet	0.05000		98	70-130			
Bromodichloromethane	0.0466	0.0050	mg/kg wet	0.05000		93	70-130			
Bromoform	0.0451	0.0050	mg/kg wet	0.05000		90	70-130			
Bromomethane	0.0491	0.0100	mg/kg wet	0.05000		98	70-130			
Carbon Disulfide	0.0547	0.0050	mg/kg wet	0.05000		109	70-130			
Carbon Tetrachloride	0.0570	0.0050	mg/kg wet	0.05000		114	70-130			
Chlorobenzene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
Chloroethane	0.0443	0.0100	mg/kg wet	0.05000		89	70-130			
Chloroform	0.0489	0.0050	mg/kg wet	0.05000		98	70-130			
Chloromethane	0.0477	0.0100	mg/kg wet	0.05000		95	70-130			
cis-1,2-Dichloroethene	0.0512	0.0050	mg/kg wet	0.05000		102	70-130			
cis-1,3-Dichloropropene	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
Dibromochloromethane	0.0459	0.0050	mg/kg wet	0.05000		92	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93021 - 5035

Dibromomethane	0.0473	0.0050	mg/kg wet	0.05000		95	70-130			
Dichlorodifluoromethane	0.0379	0.0100	mg/kg wet	0.05000		76	70-130			
Diethyl Ether	0.0492	0.0050	mg/kg wet	0.05000		98	70-130			
Di-isopropyl ether	0.0487	0.0050	mg/kg wet	0.05000		97	70-130			
Ethyl tertiary-butyl ether	0.0453	0.0050	mg/kg wet	0.05000		91	70-130			
Ethylbenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Hexachlorobutadiene	0.0556	0.0050	mg/kg wet	0.05000		111	70-130			
Isopropylbenzene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130			
Methyl tert-Butyl Ether	0.0476	0.0050	mg/kg wet	0.05000		95	70-130			
Methylene Chloride	0.0445	0.0250	mg/kg wet	0.05000		89	70-130			
Naphthalene	0.0464	0.0050	mg/kg wet	0.05000		93	70-130			
n-Butylbenzene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
n-Propylbenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
sec-Butylbenzene	0.0522	0.0050	mg/kg wet	0.05000		104	70-130			
Styrene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
tert-Butylbenzene	0.0530	0.0050	mg/kg wet	0.05000		106	70-130			
Tertiary-amyl methyl ether	0.0480	0.0050	mg/kg wet	0.05000		96	70-130			
Tetrachloroethene	0.0554	0.0050	mg/kg wet	0.05000		111	70-130			
Tetrahydrofuran	0.0360	0.0050	mg/kg wet	0.05000		72	70-130			
Toluene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
trans-1,2-Dichloroethene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
trans-1,3-Dichloropropene	0.0431	0.0050	mg/kg wet	0.05000		86	70-130			
Trichloroethene	0.0497	0.0050	mg/kg wet	0.05000		99	70-130			
Trichlorofluoromethane	0.0502	0.0050	mg/kg wet	0.05000		100	70-130			
Vinyl Acetate	0.0391	0.0050	mg/kg wet	0.05000		78	70-130			
Vinyl Chloride	0.0522	0.0100	mg/kg wet	0.05000		104	70-130			
Xylene O	0.0501	0.0050	mg/kg wet	0.05000		100	70-130			
Xylene P,M	0.111	0.0100	mg/kg wet	0.1000		111	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0410		mg/kg wet	0.05000		82	70-130			
Surrogate: 4-Bromofluorobenzene	0.0459		mg/kg wet	0.05000		92	70-130			
Surrogate: Dibromofluoromethane	0.0459		mg/kg wet	0.05000		92	70-130			
Surrogate: Toluene-d8	0.0460		mg/kg wet	0.05000		92	70-130			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	2	25	
1,1,1-Trichloroethane	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	6	25	
1,1,2,2-Tetrachloroethane	0.0429	0.0050	mg/kg wet	0.05000		86	70-130	0.5	25	
1,1,2-Trichloroethane	0.0461	0.0050	mg/kg wet	0.05000		92	70-130	0.3	25	
1,1-Dichloroethane	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
1,1-Dichloroethene	0.0530	0.0050	mg/kg wet	0.05000		106	70-130	3	25	
1,1-Dichloropropene	0.0492	0.0050	mg/kg wet	0.05000		98	70-130	5	25	
1,2,3-Trichlorobenzene	0.0492	0.0050	mg/kg wet	0.05000		98	70-130	3	25	
1,2,3-Trichloropropane	0.0426	0.0050	mg/kg wet	0.05000		85	70-130	1	25	
1,2,4-Trichlorobenzene	0.0504	0.0050	mg/kg wet	0.05000		101	70-130	3	25	
1,2,4-Trimethylbenzene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130	4	25	
1,2-Dibromo-3-Chloropropane	0.0384	0.0050	mg/kg wet	0.05000		77	70-130	2	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93021 - 5035

1,2-Dibromoethane	0.0470	0.0050	mg/kg wet	0.05000		94	70-130	0.8	25	
1,2-Dichlorobenzene	0.0493	0.0050	mg/kg wet	0.05000		99	70-130	2	25	
1,2-Dichloroethane	0.0442	0.0050	mg/kg wet	0.05000		88	70-130	3	25	
1,2-Dichloropropane	0.0459	0.0050	mg/kg wet	0.05000		92	70-130	2	25	
1,3,5-Trimethylbenzene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	5	25	
1,3-Dichlorobenzene	0.0493	0.0050	mg/kg wet	0.05000		99	70-130	3	25	
1,3-Dichloropropane	0.0477	0.0050	mg/kg wet	0.05000		95	70-130	0.7	25	
1,4-Dichlorobenzene	0.0501	0.0050	mg/kg wet	0.05000		100	70-130	5	25	
1,4-Dioxane	0.893	0.100	mg/kg wet	1.000		89	70-130	2	20	
1-Chlorohexane	0.0530	0.0050	mg/kg wet	0.05000		106	70-130	4	25	
2,2-Dichloropropane	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	6	25	
2-Butanone	0.232	0.0500	mg/kg wet	0.2500		93	70-130	0.6	25	
2-Chlorotoluene	0.0490	0.0050	mg/kg wet	0.05000		98	70-130	5	25	
2-Hexanone	0.200	0.0500	mg/kg wet	0.2500		80	70-130	3	25	
4-Chlorotoluene	0.0489	0.0050	mg/kg wet	0.05000		98	70-130	4	25	
4-Isopropyltoluene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130	4	25	
4-Methyl-2-Pentanone	0.204	0.0500	mg/kg wet	0.2500		81	70-130	1	25	
Acetone	0.198	0.0500	mg/kg wet	0.2500		79	70-130	0.9	25	
Benzene	0.0477	0.0050	mg/kg wet	0.05000		95	70-130	4	25	
Bromobenzene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	2	25	
Bromochloromethane	0.0487	0.0050	mg/kg wet	0.05000		97	70-130	1	25	
Bromodichloromethane	0.0450	0.0050	mg/kg wet	0.05000		90	70-130	3	25	
Bromoform	0.0449	0.0050	mg/kg wet	0.05000		90	70-130	0.4	25	
Bromomethane	0.0463	0.0100	mg/kg wet	0.05000		93	70-130	6	25	
Carbon Disulfide	0.0523	0.0050	mg/kg wet	0.05000		105	70-130	4	25	
Carbon Tetrachloride	0.0535	0.0050	mg/kg wet	0.05000		107	70-130	6	25	
Chlorobenzene	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
Chloroethane	0.0421	0.0100	mg/kg wet	0.05000		84	70-130	5	25	
Chloroform	0.0475	0.0050	mg/kg wet	0.05000		95	70-130	3	25	
Chloromethane	0.0450	0.0100	mg/kg wet	0.05000		90	70-130	6	25	
cis-1,2-Dichloroethene	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	3	25	
cis-1,3-Dichloropropene	0.0492	0.0050	mg/kg wet	0.05000		98	70-130	2	25	
Dibromochloromethane	0.0456	0.0050	mg/kg wet	0.05000		91	70-130	0.7	25	
Dibromomethane	0.0454	0.0050	mg/kg wet	0.05000		91	70-130	4	25	
Dichlorodifluoromethane	0.0359	0.0100	mg/kg wet	0.05000		72	70-130	5	25	
Diethyl Ether	0.0494	0.0050	mg/kg wet	0.05000		99	70-130	0.3	25	
Di-isopropyl ether	0.0482	0.0050	mg/kg wet	0.05000		96	70-130	1	25	
Ethyl tertiary-butyl ether	0.0457	0.0050	mg/kg wet	0.05000		91	70-130	0.8	25	
Ethylbenzene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130	3	25	
Hexachlorobutadiene	0.0533	0.0050	mg/kg wet	0.05000		107	70-130	4	25	
Isopropylbenzene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130	3	25	
Methyl tert-Butyl Ether	0.0475	0.0050	mg/kg wet	0.05000		95	70-130	0.2	25	
Methylene Chloride	0.0436	0.0250	mg/kg wet	0.05000		87	70-130	2	25	
Naphthalene	0.0462	0.0050	mg/kg wet	0.05000		92	70-130	0.4	25	
n-Butylbenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	5	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93021 - 5035

n-Propylbenzene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130	4	25	
sec-Butylbenzene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	4	25	
Styrene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130	1	25	
tert-Butylbenzene	0.0512	0.0050	mg/kg wet	0.05000		102	70-130	3	25	
Tertiary-amyl methyl ether	0.0480	0.0050	mg/kg wet	0.05000		96	70-130	0.04	25	
Tetrachloroethene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	5	25	
Tetrahydrofuran	0.0385	0.0050	mg/kg wet	0.05000		77	70-130	7	25	
Toluene	0.0490	0.0050	mg/kg wet	0.05000		98	70-130	5	25	
trans-1,2-Dichloroethene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130	3	25	
trans-1,3-Dichloropropene	0.0426	0.0050	mg/kg wet	0.05000		85	70-130	1	25	
Trichloroethene	0.0476	0.0050	mg/kg wet	0.05000		95	70-130	4	25	
Trichlorofluoromethane	0.0465	0.0050	mg/kg wet	0.05000		93	70-130	8	25	
Vinyl Acetate	0.0393	0.0050	mg/kg wet	0.05000		79	70-130	0.5	25	
Vinyl Chloride	0.0492	0.0100	mg/kg wet	0.05000		98	70-130	6	25	
Xylene O	0.0490	0.0050	mg/kg wet	0.05000		98	70-130	2	25	
Xylene P,M	0.108	0.0100	mg/kg wet	0.1000		108	70-130	3	25	
Surrogate: 1,2-Dichloroethane-d4	0.0399		mg/kg wet	0.05000		80	70-130			
Surrogate: 4-Bromofluorobenzene	0.0457		mg/kg wet	0.05000		91	70-130			
Surrogate: Dibromofluoromethane	0.0455		mg/kg wet	0.05000		91	70-130			
Surrogate: Toluene-d8	0.0469		mg/kg wet	0.05000		94	70-130			

8082A Polychlorinated Biphenyls (PCB)

Batch CH93007 - 3540C

Blank										
Aroclor 1016	ND	0.02	mg/kg wet							
Aroclor 1016 [2C]	ND	0.02	mg/kg wet							
Aroclor 1221	ND	0.02	mg/kg wet							
Aroclor 1221 [2C]	ND	0.02	mg/kg wet							
Aroclor 1232	ND	0.02	mg/kg wet							
Aroclor 1232 [2C]	ND	0.02	mg/kg wet							
Aroclor 1242	ND	0.02	mg/kg wet							
Aroclor 1242 [2C]	ND	0.02	mg/kg wet							
Aroclor 1248	ND	0.02	mg/kg wet							
Aroclor 1248 [2C]	ND	0.02	mg/kg wet							
Aroclor 1254	ND	0.02	mg/kg wet							
Aroclor 1254 [2C]	ND	0.02	mg/kg wet							
Aroclor 1260	ND	0.02	mg/kg wet							
Aroclor 1260 [2C]	ND	0.02	mg/kg wet							
Aroclor 1262	ND	0.02	mg/kg wet							
Aroclor 1262 [2C]	ND	0.02	mg/kg wet							
Aroclor 1268	ND	0.02	mg/kg wet							
Aroclor 1268 [2C]	ND	0.02	mg/kg wet							
Surrogate: Decachlorobiphenyl	0.0222		mg/kg wet	0.02500		89	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0217		mg/kg wet	0.02500		87	30-150			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082A Polychlorinated Biphenyls (PCB)

Batch CH93007 - 3540C

Surrogate: Tetrachloro-m-xylene	0.0190		mg/kg wet	0.02500		76	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0194		mg/kg wet	0.02500		78	30-150			

LCS

Aroclor 1016	0.4	0.02	mg/kg wet	0.5000		86	40-140			
Aroclor 1016 [2C]	0.4	0.02	mg/kg wet	0.5000		85	40-140			
Aroclor 1260	0.4	0.02	mg/kg wet	0.5000		82	40-140			
Aroclor 1260 [2C]	0.4	0.02	mg/kg wet	0.5000		81	40-140			

Surrogate: Decachlorobiphenyl	0.0203		mg/kg wet	0.02500		81	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0199		mg/kg wet	0.02500		79	30-150			
Surrogate: Tetrachloro-m-xylene	0.0175		mg/kg wet	0.02500		70	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0170		mg/kg wet	0.02500		68	30-150			

LCS Dup

Aroclor 1016	0.4	0.02	mg/kg wet	0.5000		85	40-140	0.4	30	
Aroclor 1016 [2C]	0.4	0.02	mg/kg wet	0.5000		85	40-140	0.7	30	
Aroclor 1260	0.4	0.02	mg/kg wet	0.5000		82	40-140	0.1	30	
Aroclor 1260 [2C]	0.4	0.02	mg/kg wet	0.5000		79	40-140	2	30	

Surrogate: Decachlorobiphenyl	0.0207		mg/kg wet	0.02500		83	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0203		mg/kg wet	0.02500		81	30-150			
Surrogate: Tetrachloro-m-xylene	0.0177		mg/kg wet	0.02500		71	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0172		mg/kg wet	0.02500		69	30-150			

8100M Total Petroleum Hydrocarbons

Batch CH93012 - 3546

Blank

Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							
Hexadecane (C16)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							
Octacosane (C28)	ND	0.2	mg/kg wet							
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							
Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons	ND	37.5	mg/kg wet							
Triacotane (C30)	ND	0.2	mg/kg wet							

Surrogate: O-Terphenyl	4.66		mg/kg wet	5.000		93	40-140			
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LCS

Decane (C10)	2.0	0.2	mg/kg wet	2.500		81	40-140			
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CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8100M Total Petroleum Hydrocarbons

Batch CH93012 - 3546

Docosane (C22)	2.5	0.2	mg/kg wet	2.500		102	40-140			
Dodecane (C12)	2.2	0.2	mg/kg wet	2.500		87	40-140			
Eicosane (C20)	2.5	0.2	mg/kg wet	2.500		101	40-140			
Hexacosane (C26)	2.4	0.2	mg/kg wet	2.500		98	40-140			
Hexadecane (C16)	2.4	0.2	mg/kg wet	2.500		97	40-140			
Nonadecane (C19)	2.6	0.2	mg/kg wet	2.500		106	40-140			
Nonane (C9)	1.8	0.2	mg/kg wet	2.500		74	30-140			
Octacosane (C28)	2.4	0.2	mg/kg wet	2.500		96	40-140			
Octadecane (C18)	2.5	0.2	mg/kg wet	2.500		101	40-140			
Tetracosane (C24)	2.5	0.2	mg/kg wet	2.500		100	40-140			
Tetradecane (C14)	2.3	0.2	mg/kg wet	2.500		92	40-140			
Total Petroleum Hydrocarbons	32.4	37.5	mg/kg wet	35.00		93	40-140			
Triacotane (C30)	2.3	0.2	mg/kg wet	2.500		91	40-140			

Surrogate: O-Terphenyl

4.98 mg/kg wet 5.000 100 40-140

LCS Dup

Decane (C10)	1.8	0.2	mg/kg wet	2.500		71	40-140	14	25	
Docosane (C22)	2.2	0.2	mg/kg wet	2.500		88	40-140	14	25	
Dodecane (C12)	1.9	0.2	mg/kg wet	2.500		77	40-140	12	25	
Eicosane (C20)	2.2	0.2	mg/kg wet	2.500		87	40-140	15	25	
Hexacosane (C26)	2.1	0.2	mg/kg wet	2.500		85	40-140	14	25	
Hexadecane (C16)	2.1	0.2	mg/kg wet	2.500		84	40-140	14	25	
Nonadecane (C19)	2.3	0.2	mg/kg wet	2.500		92	40-140	14	25	
Nonane (C9)	1.6	0.2	mg/kg wet	2.500		64	30-140	14	25	
Octacosane (C28)	2.1	0.2	mg/kg wet	2.500		83	40-140	14	25	
Octadecane (C18)	2.2	0.2	mg/kg wet	2.500		88	40-140	14	25	
Tetracosane (C24)	2.2	0.2	mg/kg wet	2.500		87	40-140	14	25	
Tetradecane (C14)	2.0	0.2	mg/kg wet	2.500		81	40-140	13	25	
Total Petroleum Hydrocarbons	28.2	37.5	mg/kg wet	35.00		81	40-140	14	25	
Triacotane (C30)	2.0	0.2	mg/kg wet	2.500		80	40-140	13	25	

Surrogate: O-Terphenyl

4.30 mg/kg wet 5.000 86 40-140

8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

Blank

1,1-Biphenyl	ND	0.100	mg/kg wet							
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							
2,3,4,6-Tetrachlorophenol	ND	1.67	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							



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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

2,4-Dimethylphenol	ND	0.333	mg/kg wet
2,4-Dinitrophenol	ND	1.67	mg/kg wet
2,4-Dinitrotoluene	ND	0.167	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-Nitroaniline	ND	0.333	mg/kg wet
2-Nitrophenol	ND	0.333	mg/kg wet
3,3'-Dichlorobenzidine	ND	0.167	mg/kg wet
3+4-Methylphenol	ND	0.667	mg/kg wet
3-Nitroaniline	ND	0.333	mg/kg wet
4,6-Dinitro-2-Methylphenol	ND	1.67	mg/kg wet
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet
4-Chloro-3-Methylphenol	ND	0.333	mg/kg wet
4-Chloroaniline	ND	0.667	mg/kg wet
4-Chloro-phenyl-phenyl ether	ND	0.333	mg/kg wet
4-Nitroaniline	ND	0.333	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	0.667	mg/kg wet
Anthracene	ND	0.333	mg/kg wet
Azobenzene	ND	0.333	mg/kg wet
Benzo(a)anthracene	ND	0.167	mg/kg wet
Benzo(a)pyrene	ND	0.067	mg/kg wet
Benzo(b)fluoranthene	ND	0.167	mg/kg wet
Benzo(g,h,i)perylene	ND	0.100	mg/kg wet
Benzo(k)fluoranthene	ND	0.167	mg/kg wet
Benzoic Acid	ND	1.67	mg/kg wet
Benzyl Alcohol	ND	0.333	mg/kg wet
bis(2-Chloroethoxy)methane	ND	0.333	mg/kg wet
bis(2-Chloroethyl)ether	ND	0.100	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
Carbazole	ND	0.333	mg/kg wet
Chrysene	ND	0.067	mg/kg wet
Dibenzo(a,h)Anthracene	ND	0.067	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



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
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8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

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	0.067	mg/kg wet							
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachlorocyclopentadiene	ND	1.67	mg/kg wet							
Hexachloroethane	ND	0.333	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.167	mg/kg wet							
Isophorone	ND	0.333	mg/kg wet							
Naphthalene	ND	0.083	mg/kg wet							
Nitrobenzene	ND	0.333	mg/kg wet							
N-Nitrosodimethylamine	ND	0.333	mg/kg wet							
N-Nitroso-Di-n-Propylamine	ND	0.333	mg/kg wet							
N-nitrosodiphenylamine	ND	0.333	mg/kg wet							
Pentachlorophenol	ND	0.333	mg/kg wet							
Phenanthrene	ND	0.333	mg/kg wet							
Phenol	ND	0.333	mg/kg wet							
Pyrene	ND	0.333	mg/kg wet							
Pyridine	ND	1.67	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	1.99		mg/kg wet	3.333		60	30-130			
Surrogate: 2,4,6-Tribromophenol	3.55		mg/kg wet	5.000		71	30-130			
Surrogate: 2-Chlorophenol-d4	3.17		mg/kg wet	5.000		63	30-130			
Surrogate: 2-Fluorobiphenyl	2.27		mg/kg wet	3.333		68	30-130			
Surrogate: 2-Fluorophenol	2.98		mg/kg wet	5.000		60	30-130			
Surrogate: Nitrobenzene-d5	2.08		mg/kg wet	3.333		62	30-130			
Surrogate: Phenol-d6	2.90		mg/kg wet	5.000		58	30-130			
Surrogate: p-Terphenyl-d14	2.89		mg/kg wet	3.333		87	30-130			

LCS

1,1-Biphenyl	2.18	0.100	mg/kg wet	3.333		66	40-140			
1,2,4-Trichlorobenzene	2.21	0.333	mg/kg wet	3.333		66	40-140			
1,2-Dichlorobenzene	1.98	0.333	mg/kg wet	3.333		59	40-140			
1,3-Dichlorobenzene	1.88	0.333	mg/kg wet	3.333		56	40-140			
1,4-Dichlorobenzene	1.87	0.333	mg/kg wet	3.333		56	40-140			
2,3,4,6-Tetrachlorophenol	2.95	1.67	mg/kg wet	3.333		88	30-130			
2,4,5-Trichlorophenol	2.86	0.333	mg/kg wet	3.333		86	30-130			
2,4,6-Trichlorophenol	2.56	0.333	mg/kg wet	3.333		77	30-130			
2,4-Dichlorophenol	2.43	0.333	mg/kg wet	3.333		73	30-130			
2,4-Dimethylphenol	2.10	0.333	mg/kg wet	3.333		63	30-130			
2,4-Dinitrophenol	2.79	1.67	mg/kg wet	3.333		84	30-130			
2,4-Dinitrotoluene	2.76	0.167	mg/kg wet	3.333		83	40-140			
2,6-Dinitrotoluene	2.78	0.333	mg/kg wet	3.333		83	40-140			
2-Chloronaphthalene	2.16	0.333	mg/kg wet	3.333		65	40-140			
2-Chlorophenol	1.90	0.333	mg/kg wet	3.333		57	30-130			
2-Methylnaphthalene	2.24	0.333	mg/kg wet	3.333		67	40-140			
2-Methylphenol	1.93	0.333	mg/kg wet	3.333		58	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

2-Nitroaniline	1.88	0.333	mg/kg wet	3.333		56	40-140			
2-Nitrophenol	1.99	0.333	mg/kg wet	3.333		60	30-130			
3,3'-Dichlorobenzidine	2.86	0.167	mg/kg wet	3.333		86	40-140			
3+4-Methylphenol	4.34	0.667	mg/kg wet	6.667		65	30-130			
3-Nitroaniline	2.31	0.333	mg/kg wet	3.333		69	40-140			
4,6-Dinitro-2-Methylphenol	2.83	1.67	mg/kg wet	3.333		85	30-130			
4-Bromophenyl-phenylether	3.15	0.333	mg/kg wet	3.333		95	40-140			
4-Chloro-3-Methylphenol	2.59	0.333	mg/kg wet	3.333		78	30-130			
4-Chloroaniline	1.66	0.667	mg/kg wet	3.333		50	40-140			
4-Chloro-phenyl-phenyl ether	2.85	0.333	mg/kg wet	3.333		85	40-140			
4-Nitroaniline	2.39	0.333	mg/kg wet	3.333		72	40-140			
4-Nitrophenol	1.96	1.67	mg/kg wet	3.333		59	30-130			
Acenaphthene	2.36	0.333	mg/kg wet	3.333		71	40-140			
Acenaphthylene	2.08	0.333	mg/kg wet	3.333		63	40-140			
Acetophenone	1.73	0.667	mg/kg wet	3.333		52	40-140			
Aniline	1.29	0.667	mg/kg wet	3.333		39	40-140			B-
Anthracene	2.67	0.333	mg/kg wet	3.333		80	40-140			
Azobenzene	2.04	0.333	mg/kg wet	3.333		61	40-140			
Benzo(a)anthracene	2.87	0.167	mg/kg wet	3.333		86	40-140			
Benzo(a)pyrene	2.64	0.067	mg/kg wet	3.333		79	40-140			
Benzo(b)fluoranthene	2.63	0.167	mg/kg wet	3.333		79	40-140			
Benzo(g,h,i)perylene	2.80	0.100	mg/kg wet	3.333		84	40-140			
Benzo(k)fluoranthene	2.68	0.167	mg/kg wet	3.333		80	40-140			
Benzoic Acid	2.35	1.67	mg/kg wet	3.333		70	40-140			
Benzyl Alcohol	1.46	0.333	mg/kg wet	3.333		44	40-140			
bis(2-Chloroethoxy)methane	1.76	0.333	mg/kg wet	3.333		53	40-140			
bis(2-Chloroethyl)ether	1.73	0.100	mg/kg wet	3.333		52	40-140			
bis(2-chloroisopropyl)Ether	1.77	0.333	mg/kg wet	3.333		53	40-140			
bis(2-Ethylhexyl)phthalate	2.94	0.333	mg/kg wet	3.333		88	40-140			
Butylbenzylphthalate	2.90	0.333	mg/kg wet	3.333		87	40-140			
Carbazole	2.74	0.333	mg/kg wet	3.333		82	40-140			
Chrysene	2.72	0.067	mg/kg wet	3.333		82	40-140			
Dibenzo(a,h)Anthracene	2.72	0.067	mg/kg wet	3.333		82	40-140			
Dibenzofuran	2.46	0.333	mg/kg wet	3.333		74	40-140			
Diethylphthalate	2.81	0.333	mg/kg wet	3.333		84	40-140			
Dimethylphthalate	2.82	0.333	mg/kg wet	3.333		85	40-140			
Di-n-butylphthalate	3.15	0.333	mg/kg wet	3.333		94	40-140			
Di-n-octylphthalate	2.92	0.333	mg/kg wet	3.333		88	40-140			
Fluoranthene	3.02	0.333	mg/kg wet	3.333		91	40-140			
Fluorene	2.63	0.333	mg/kg wet	3.333		79	40-140			
Hexachlorobenzene	3.17	0.067	mg/kg wet	3.333		95	40-140			
Hexachlorobutadiene	2.21	0.333	mg/kg wet	3.333		66	40-140			
Hexachlorocyclopentadiene	1.28	1.67	mg/kg wet	3.333		38	40-140			B-
Hexachloroethane	1.63	0.333	mg/kg wet	3.333		49	40-140			
Indeno(1,2,3-cd)Pyrene	2.70	0.167	mg/kg wet	3.333		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
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8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

Isophorone	1.54	0.333	mg/kg wet	3.333		46	40-140			
Naphthalene	2.00	0.083	mg/kg wet	3.333		60	40-140			
Nitrobenzene	1.60	0.333	mg/kg wet	3.333		48	40-140			
N-Nitrosodimethylamine	1.64	0.333	mg/kg wet	3.333		49	40-140			
N-Nitroso-Di-n-Propylamine	1.64	0.333	mg/kg wet	3.333		49	40-140			
N-nitrosodiphenylamine	2.79	0.333	mg/kg wet	3.333		84	40-140			
Pentachlorophenol	3.18	0.333	mg/kg wet	3.333		95	30-130			
Phenanthrene	2.74	0.333	mg/kg wet	3.333		82	40-140			
Phenol	1.80	0.333	mg/kg wet	3.333		54	30-130			
Pyrene	2.81	0.333	mg/kg wet	3.333		84	40-140			
Pyridine	1.61	1.67	mg/kg wet	3.333		48	40-140			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	1.81		mg/kg wet	3.333		54	30-130			
<i>Surrogate: 2,4,6-Tribromophenol</i>	4.62		mg/kg wet	5.000		92	30-130			
<i>Surrogate: 2-Chlorophenol-d4</i>	2.95		mg/kg wet	5.000		59	30-130			
<i>Surrogate: 2-Fluorobiphenyl</i>	2.29		mg/kg wet	3.333		69	30-130			
<i>Surrogate: 2-Fluorophenol</i>	2.90		mg/kg wet	5.000		58	30-130			
<i>Surrogate: Nitrobenzene-d5</i>	1.78		mg/kg wet	3.333		53	30-130			
<i>Surrogate: Phenol-d6</i>	2.80		mg/kg wet	5.000		56	30-130			
<i>Surrogate: p-Terphenyl-d14</i>	2.92		mg/kg wet	3.333		88	30-130			

LCS Dup

1,1-Biphenyl	2.16	0.100	mg/kg wet	3.333		65	40-140	1	30	
1,2,4-Trichlorobenzene	2.24	0.333	mg/kg wet	3.333		67	40-140	1	30	
1,2-Dichlorobenzene	2.00	0.333	mg/kg wet	3.333		60	40-140	1	30	
1,3-Dichlorobenzene	1.92	0.333	mg/kg wet	3.333		57	40-140	2	30	
1,4-Dichlorobenzene	1.87	0.333	mg/kg wet	3.333		56	40-140	0.03	30	
2,3,4,6-Tetrachlorophenol	2.88	1.67	mg/kg wet	3.333		86	30-130	2	30	
2,4,5-Trichlorophenol	2.77	0.333	mg/kg wet	3.333		83	30-130	3	30	
2,4,6-Trichlorophenol	2.51	0.333	mg/kg wet	3.333		75	30-130	2	30	
2,4-Dichlorophenol	2.39	0.333	mg/kg wet	3.333		72	30-130	1	30	
2,4-Dimethylphenol	2.07	0.333	mg/kg wet	3.333		62	30-130	1	30	
2,4-Dinitrophenol	2.70	1.67	mg/kg wet	3.333		81	30-130	3	30	
2,4-Dinitrotoluene	2.71	0.167	mg/kg wet	3.333		81	40-140	2	30	
2,6-Dinitrotoluene	2.79	0.333	mg/kg wet	3.333		84	40-140	0.2	30	
2-Chloronaphthalene	2.11	0.333	mg/kg wet	3.333		63	40-140	3	30	
2-Chlorophenol	1.98	0.333	mg/kg wet	3.333		59	30-130	4	30	
2-Methylnaphthalene	2.21	0.333	mg/kg wet	3.333		66	40-140	1	30	
2-Methylphenol	1.93	0.333	mg/kg wet	3.333		58	30-130	0.009	30	
2-Nitroaniline	1.87	0.333	mg/kg wet	3.333		56	40-140	0.2	30	
2-Nitrophenol	1.92	0.333	mg/kg wet	3.333		58	30-130	3	30	
3,3'-Dichlorobenzidine	2.72	0.167	mg/kg wet	3.333		82	40-140	5	30	
3+4-Methylphenol	4.39	0.667	mg/kg wet	6.667		66	30-130	1	30	
3-Nitroaniline	2.30	0.333	mg/kg wet	3.333		69	40-140	0.3	30	
4,6-Dinitro-2-Methylphenol	2.75	1.67	mg/kg wet	3.333		83	30-130	3	30	
4-Bromophenyl-phenylether	3.06	0.333	mg/kg wet	3.333		92	40-140	3	30	
4-Chloro-3-Methylphenol	2.54	0.333	mg/kg wet	3.333		76	30-130	2	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

4-Chloroaniline	1.65	0.667	mg/kg wet	3.333		49	40-140	0.9	30	
4-Chloro-phenyl-phenyl ether	2.71	0.333	mg/kg wet	3.333		81	40-140	5	30	
4-Nitroaniline	2.37	0.333	mg/kg wet	3.333		71	40-140	1	30	
4-Nitrophenol	1.83	1.67	mg/kg wet	3.333		55	30-130	7	30	
Acenaphthene	2.34	0.333	mg/kg wet	3.333		70	40-140	0.7	30	
Acenaphthylene	2.08	0.333	mg/kg wet	3.333		62	40-140	0.2	30	
Acetophenone	1.77	0.667	mg/kg wet	3.333		53	40-140	2	30	
Aniline	1.30	0.667	mg/kg wet	3.333		39	40-140	0.5	30	B-
Anthracene	2.63	0.333	mg/kg wet	3.333		79	40-140	1	30	
Azobenzene	2.01	0.333	mg/kg wet	3.333		60	40-140	2	30	
Benzo(a)anthracene	2.74	0.167	mg/kg wet	3.333		82	40-140	5	30	
Benzo(a)pyrene	2.57	0.067	mg/kg wet	3.333		77	40-140	3	30	
Benzo(b)fluoranthene	2.50	0.167	mg/kg wet	3.333		75	40-140	5	30	
Benzo(g,h,i)perylene	2.82	0.100	mg/kg wet	3.333		85	40-140	0.8	30	
Benzo(k)fluoranthene	2.71	0.167	mg/kg wet	3.333		81	40-140	1	30	
Benzoic Acid	2.31	1.67	mg/kg wet	3.333		69	40-140	2	30	
Benzyl Alcohol	1.49	0.333	mg/kg wet	3.333		45	40-140	2	30	
bis(2-Chloroethoxy)methane	1.80	0.333	mg/kg wet	3.333		54	40-140	2	30	
bis(2-Chloroethyl)ether	1.79	0.100	mg/kg wet	3.333		54	40-140	4	30	
bis(2-chloroisopropyl)Ether	1.83	0.333	mg/kg wet	3.333		55	40-140	3	30	
bis(2-Ethylhexyl)phthalate	2.70	0.333	mg/kg wet	3.333		81	40-140	8	30	
Butylbenzylphthalate	2.65	0.333	mg/kg wet	3.333		79	40-140	9	30	
Carbazole	2.64	0.333	mg/kg wet	3.333		79	40-140	4	30	
Chrysene	2.68	0.067	mg/kg wet	3.333		81	40-140	1	30	
Dibenzo(a,h)Anthracene	2.77	0.067	mg/kg wet	3.333		83	40-140	2	30	
Dibenzofuran	2.47	0.333	mg/kg wet	3.333		74	40-140	0.1	30	
Diethylphthalate	2.82	0.333	mg/kg wet	3.333		84	40-140	0.2	30	
Dimethylphthalate	2.81	0.333	mg/kg wet	3.333		84	40-140	0.3	30	
Di-n-butylphthalate	2.89	0.333	mg/kg wet	3.333		87	40-140	9	30	
Di-n-octylphthalate	2.72	0.333	mg/kg wet	3.333		82	40-140	7	30	
Fluoranthene	2.85	0.333	mg/kg wet	3.333		85	40-140	6	30	
Fluorene	2.64	0.333	mg/kg wet	3.333		79	40-140	0.2	30	
Hexachlorobenzene	3.07	0.067	mg/kg wet	3.333		92	40-140	3	30	
Hexachlorobutadiene	2.12	0.333	mg/kg wet	3.333		64	40-140	4	30	
Hexachlorocyclopentadiene	1.28	1.67	mg/kg wet	3.333		38	40-140	0.03	30	B-
Hexachloroethane	1.63	0.333	mg/kg wet	3.333		49	40-140	0.3	30	
Indeno(1,2,3-cd)Pyrene	2.76	0.167	mg/kg wet	3.333		83	40-140	2	30	
Isophorone	1.53	0.333	mg/kg wet	3.333		46	40-140	0.4	30	
Naphthalene	2.00	0.083	mg/kg wet	3.333		60	40-140	0.1	30	
Nitrobenzene	1.60	0.333	mg/kg wet	3.333		48	40-140	0.05	30	
N-Nitrosodimethylamine	1.27	0.333	mg/kg wet	3.333		38	40-140	26	30	B-
N-Nitroso-Di-n-Propylamine	1.71	0.333	mg/kg wet	3.333		51	40-140	4	30	
N-nitrosodiphenylamine	2.78	0.333	mg/kg wet	3.333		83	40-140	0.2	30	
Pentachlorophenol	3.13	0.333	mg/kg wet	3.333		94	30-130	2	30	
Phenanthrene	2.63	0.333	mg/kg wet	3.333		79	40-140	4	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

Phenol	1.80	0.333	mg/kg wet	3.333		54	30-130	0.3	30	
Pyrene	2.67	0.333	mg/kg wet	3.333		80	40-140	5	30	
Pyridine	1.31	1.67	mg/kg wet	3.333		39	40-140	21	30	B-
Surrogate: 1,2-Dichlorobenzene-d4	1.79		mg/kg wet	3.333		54	30-130			
Surrogate: 2,4,6-Tribromophenol	4.32		mg/kg wet	5.000		86	30-130			
Surrogate: 2-Chlorophenol-d4	2.91		mg/kg wet	5.000		58	30-130			
Surrogate: 2-Fluorobiphenyl	2.22		mg/kg wet	3.333		66	30-130			
Surrogate: 2-Fluorophenol	3.12		mg/kg wet	5.000		62	30-130			
Surrogate: Nitrobenzene-d5	1.72		mg/kg wet	3.333		52	30-130			
Surrogate: Phenol-d6	2.75		mg/kg wet	5.000		55	30-130			
Surrogate: p-Terphenyl-d14	2.76		mg/kg wet	3.333		83	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

Notes and Definitions

- U Analyte included in the analysis, but not detected
- Q Calibration required quadratic regression (Q).
- D Diluted.
- CD+ Continuing Calibration %Diff/Drift is above control limit (CD+).
- CD- Continuing Calibration %Diff/Drift is below control limit (CD-).
- 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
- RL Reporting Limit
- EDL Estimated Detection Limit
- MF Membrane Filtration
- MPN Most Probably Number
- TNTC Too numerous to Count
- CFU Colony Forming Units



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0974

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

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.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 19H0974
 Date Received: 8/29/2019
 Project Due Date: 9/6/2019
 Days for Project: 5 Day

Shipped/Delivered Via: ESS Courier

- 1. Air bill manifest present? No
Air No.: NA
- 2. Were custody seals present? No
- 3. Is radiation count <100 CPM? Yes
- 4. Is a Cooler Present? Yes
Temp: 1.9 Iced with: Ice
- 5. Was COC signed and dated by client? Yes

- 6. Does COC match bottles? Yes
- 7. Is COC complete and correct? Yes
- 8. Were samples received intact? Yes
- 9. Were labs informed about short holds & rushes? Yes / No / NA
- 10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes / No
 ESS Sample IDs: _____
 Analysis: _____
 TAT: _____

- 12. Were VOAs received? Yes / No
 - a. Air bubbles in aqueous VOAs? Yes / No
 - b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes / No
 a. If metals preserved upon receipt: Date: _____ Time: _____ By: _____
 b. Low Level VOA vials frozen: Date: 8/29/19 Time: 1701 By: du

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / No
 a. Was there a need to contact the client? Yes / No
 Who was contacted? _____ Date: _____ Time: _____ By: _____

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
01	382919	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
01	382922	Yes	NA	Yes	VOA Vial - Other	Other	
01	382923	Yes	NA	Yes	VOA Vial - Other	Other	
01	382925	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
02	382918	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
02	382920	Yes	NA	Yes	VOA Vial - Other	Other	
02	382921	Yes	NA	Yes	VOA Vial - Other	Other	
02	382924	Yes	NA	Yes	8 oz. Jar - Unpres	NP	

2nd Review

- Were all containers scanned into storage/lab? Initials: GA
- Are barcode labels on correct containers? Yes / No
- Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA
- Are all Hex Chrome stickers attached? Yes / No / NA
- Are all QC stickers attached? Yes / No / NA
- Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: [Signature] Date & Time: 8/29/19 1636
 Reviewed By: [Signature] Date & Time: 8/29/19 1701
 Delivered

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 19H0974

By: 

Date Received: 8/29/19 1701

ESS Laboratory

Division of Thielsch Engineering, Inc.
 185 Frances Avenue, Cranston RI 02910
 Tel. (401) 461-7181 Fax (401) 461-4486
 www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time 5 Days
 Regulatory State RI

Is this project for any of the following?
 CT RCP MA MCP RGP

Project # NBC IDA-4 and IIA-5

Address 701 George Washington Hwy

City Lincoln

State RI

FAX Number 401.333.2382

Zip Code 02865

Email Address j.mclaughlin@obate-inc.com

ESS Lab # 1910074

Reporting Limits RDEM RSD/EC/DEC

Electronic Deliverables Data Checker Excel

Other (Please Specify →)

Analysis VOCs SVOCs TH PCBs R-3 Methyl

Sample ID

Sample Matrix

Sample Type

Collection Time

Collection Date

8/29/19 8:00

8/29/19 8:20

Grub

Grub

B-6 0-2'

B-6 2-4'

Vial

AG AG AG AG

7 10 10 10

9/10 1 1 1 1

3 1 1 1

Number of Containers per Sample:

Sampled by: Scott Nee

Comments: Please specify "Other" preservative and containers types in this space

Laboratory Use Only

Cooler Present: Drop-off

Seals Intact: Pickup

Cooler Temperature: 1.9 °C I.C.F.R.C

Received by: (Signature, Date & Time) R.C. Adams 8/29/19 15:18

Relinquished by: (Signature, Date & Time) Scott Nee 8/29/19 15:18

Received by: (Signature, Date & Time)

Relinquished by: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished By: (Signature, Date & Time)

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Received By: (Signature, Date & Time)

Relinquished By: (Signature, Date & Time)



CERTIFICATE OF ANALYSIS

Joe McLoughlin
Beta Engineering
701 George Washington Hwy 2nd FL
Lincoln, RI 02865

RE: NBC III (N/A)
ESS Laboratory Work Order Number: 19H0896

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 12:40 pm, Sep 10, 2019

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 TNI and relative state standards, 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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

SAMPLE RECEIPT

The following samples were received on August 28, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Low Level VOA vials were frozen by ESS Laboratory on 8/28/19 at 15:11.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
19H0896-01	B-4 0-2ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D
19H0896-02	B-4 2-4ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D
19H0896-03	B-4 4-6ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D
19H0896-04	B-4 6-10ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

PROJECT NARRATIVE

5035/8260B Volatile Organic Compounds / Low Level

- C9H0615-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).
Bromomethane (40% @ 30%)
- C9H0632-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).
Chloromethane (32% @ 30%)
- CH92956-BSD1 Blank Spike recovery is above upper control limit (B+).
Bromomethane (138% @ 70-130%)
- CH93024-BS1 Blank Spike recovery is below lower control limit (B-).
Chloromethane (68% @ 70-130%), Dichlorodifluoromethane (68% @ 70-130%)

8100M Total Petroleum Hydrocarbons

- 19H0896-01 Surrogate recovery(ies) diluted below the MRL (SD).
O-Terphenyl (% @ 40-140%)
- 19H0896-02 Surrogate recovery(ies) diluted below the MRL (SD).
O-Terphenyl (% @ 40-140%)
- CH92855-BSD1 Relative percent difference for duplicate is outside of criteria (D+).
Decane (C10) (26% @ 25%), Nonane (C9) (27% @ 25%)

8270D Semi-Volatile Organic Compounds

- 19H0896-02 Internal Standard(s) outside of criteria due to matrix (UCM/coelution is present) (IM).
Perylene-d12 (48% @ 50-200%)
- 19H0896-03 Internal Standard(s) outside of criteria due to matrix (UCM/coelution is present) (IM).
Perylene-d12 (48% @ 50-200%)
- 19H0896-04 Internal Standard(s) outside of criteria due to matrix (UCM/coelution is present) (IM).
Perylene-d12 (47% @ 50-200%)
- C9H0589-CCV1 Calibration required quadratic regression (Q).
2,4-Dinitrophenol (101% @ 80-120%), 4,6-Dinitro-2-Methylphenol (109% @ 80-120%), Benzoic Acid (102% @ 80-120%), Pentachlorophenol (117% @ 80-120%)
- C9H0589-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).
Hexachlorocyclopentadiene (28% @ 20%)
- C9H0626-CCV1 Calibration required quadratic regression (Q).
2,4-Dinitrophenol (106% @ 80-120%), 4,6-Dinitro-2-Methylphenol (104% @ 80-120%), Benzoic Acid (102% @ 80-120%)
- C9H0626-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).
2-Methylnaphthalene (23% @ 20%)
- C9H0626-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).
Aniline (23% @ 20%), Hexachlorocyclopentadiene (27% @ 20%), Isophorone (21% @ 20%)
- C9I0030-CCV1 Calibration required quadratic regression (Q).
2,4-Dinitrophenol (106% @ 80-120%), 4,6-Dinitro-2-Methylphenol (86% @ 80-120%), Benzoic Acid (100% @ 80-120%), Pentachlorophenol (106% @ 80-120%)
- C9I0030-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).
2-Nitroaniline (32% @ 20%), Hexachlorocyclopentadiene (24% @ 20%)



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

[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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

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
- 8015C - 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
- MADEP 18-2.1 - 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
- 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 0-2ft
Date Sampled: 08/28/19 08:30
Percent Solids: 93

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (3.93)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359
Arsenic	ND (1.97)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359
Beryllium	0.33 (0.09)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359
Cadmium	ND (0.39)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359
Chromium	9.53 (0.79)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359
Copper	10.4 (1.97)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359
Lead	14.1 (3.93)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359
Mercury	0.023 (0.022)		7471B		1	MKS	09/04/19 11:39	0.95	40	CI90360
Nickel	8.15 (1.97)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359
Selenium	ND (3.93)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359
Silver	ND (0.39)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359
Thallium	ND (0.39)		6020A		1	NAR	09/05/19 14:18	2.73	100	CI90359
Zinc	24.5 (1.97)		6010C		1	KJK	09/04/19 11:02	2.73	100	CI90359



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 0-2ft
Date Sampled: 08/28/19 08:30
Percent Solids: 93
Initial Volume: 8.1
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,1,1-Trichloroethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,1,2,2-Tetrachloroethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,1,2-Trichloroethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,1-Dichloroethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,1-Dichloroethene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,1-Dichloropropene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,2,3-Trichlorobenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,2,3-Trichloropropane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,2,4-Trichlorobenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,2,4-Trimethylbenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,2-Dibromo-3-Chloropropane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,2-Dibromoethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,2-Dichlorobenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,2-Dichloroethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,2-Dichloropropane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,3,5-Trimethylbenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,3-Dichlorobenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,3-Dichloropropane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,4-Dichlorobenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1,4-Dioxane	ND (0.0663)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
1-Chlorohexane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
2,2-Dichloropropane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
2-Butanone	ND (0.0331)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
2-Chlorotoluene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
2-Hexanone	ND (0.0331)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
4-Chlorotoluene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
4-Isopropyltoluene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
4-Methyl-2-Pentanone	ND (0.0331)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Acetone	ND (0.0331)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Benzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Bromobenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 0-2ft
Date Sampled: 08/28/19 08:30
Percent Solids: 93
Initial Volume: 8.1
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Bromodichloromethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Bromoform	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Bromomethane	ND (0.0066)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Carbon Disulfide	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Carbon Tetrachloride	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Chlorobenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Chloroethane	ND (0.0066)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Chloroform	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Chloromethane	ND (0.0066)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
cis-1,2-Dichloroethene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
cis-1,3-Dichloropropene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Dibromochloromethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Dibromomethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Dichlorodifluoromethane	ND (0.0066)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Diethyl Ether	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Di-isopropyl ether	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Ethyl tertiary-butyl ether	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Ethylbenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Hexachlorobutadiene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Isopropylbenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Methyl tert-Butyl Ether	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Methylene Chloride	ND (0.0166)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Naphthalene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
n-Butylbenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
n-Propylbenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
sec-Butylbenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Styrene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
tert-Butylbenzene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Tertiary-amyl methyl ether	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Tetrachloroethene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Tetrahydrofuran	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 0-2ft
Date Sampled: 08/28/19 08:30
Percent Solids: 93
Initial Volume: 8.1
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
trans-1,2-Dichloroethene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
trans-1,3-Dichloropropene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Trichloroethene	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Trichlorofluoromethane	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Vinyl Acetate	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Vinyl Chloride	ND (0.0066)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Xylene O	ND (0.0033)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Xylene P,M	ND (0.0066)		8260B Low		1	08/30/19 2:07	C9H0615	CH92956
Xylenes (Total)	ND (0.00663)		8260B Low		1	08/30/19 2:07		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>113 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>80 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>108 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>109 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 0-2ft
Date Sampled: 08/28/19 08:30
Percent Solids: 93
Initial Volume: 19.2
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 8/28/19 16:13

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	08/29/19 14:50		CH92803
Aroclor 1221	ND (0.06)		8082A		1	08/29/19 14:50		CH92803
Aroclor 1232	ND (0.06)		8082A		1	08/29/19 14:50		CH92803
Aroclor 1242	ND (0.06)		8082A		1	08/29/19 14:50		CH92803
Aroclor 1248	ND (0.06)		8082A		1	08/29/19 14:50		CH92803
Aroclor 1254	ND (0.06)		8082A		1	08/29/19 14:50		CH92803
Aroclor 1260	ND (0.06)		8082A		1	08/29/19 14:50		CH92803
Aroclor 1262	ND (0.06)		8082A		1	08/29/19 14:50		CH92803
Aroclor 1268	ND (0.06)		8082A		1	08/29/19 14:50		CH92803

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	49 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	52 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	62 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	65 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 0-2ft
Date Sampled: 08/28/19 08:30
Percent Solids: 93
Initial Volume: 20.1
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/28/19 18:30

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	886 (802)		8100M		20	08/30/19 2:09	C9H0605	CH92855
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		<i>%</i>	<i>SD</i>	<i>40-140</i>				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 0-2ft
Date Sampled: 08/28/19 08:30
Percent Solids: 93
Initial Volume: 14.3
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
1,2,4-Trichlorobenzene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
1,2-Dichlorobenzene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
1,3-Dichlorobenzene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
1,4-Dichlorobenzene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2,3,4,6-Tetrachlorophenol	ND (3.76)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2,4,5-Trichlorophenol	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2,4,6-Trichlorophenol	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2,4-Dichlorophenol	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2,4-Dimethylphenol	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2,4-Dinitrophenol	ND (3.76)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2,4-Dinitrotoluene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2,6-Dinitrotoluene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2-Chloronaphthalene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2-Chlorophenol	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2-Methylnaphthalene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2-Methylphenol	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2-Nitroaniline	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
2-Nitrophenol	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
3,3'-Dichlorobenzidine	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
3+4-Methylphenol	ND (1.50)		8270D		1	09/04/19 23:44	C9I0030	CH92856
3-Nitroaniline	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
4,6-Dinitro-2-Methylphenol	ND (3.76)		8270D		1	09/04/19 23:44	C9I0030	CH92856
4-Bromophenyl-phenylether	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
4-Chloro-3-Methylphenol	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
4-Chloroaniline	ND (1.50)		8270D		1	09/04/19 23:44	C9I0030	CH92856
4-Chloro-phenyl-phenyl ether	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
4-Nitroaniline	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
4-Nitrophenol	ND (3.76)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Acenaphthene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Acenaphthylene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Acetophenone	ND (1.50)		8270D		1	09/04/19 23:44	C9I0030	CH92856



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 0-2ft
Date Sampled: 08/28/19 08:30
Percent Solids: 93
Initial Volume: 14.3
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (1.50)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Anthracene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Azobenzene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Benzo(a)anthracene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Benzo(a)pyrene	ND (0.376)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Benzo(b)fluoranthene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Benzo(g,h,i)perylene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Benzo(k)fluoranthene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Benzoic Acid	ND (3.76)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Benzyl Alcohol	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
bis(2-Chloroethoxy)methane	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
bis(2-Chloroethyl)ether	ND (0.376)		8270D		1	09/04/19 23:44	C9I0030	CH92856
bis(2-chloroisopropyl)Ether	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
bis(2-Ethylhexyl)phthalate	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Butylbenzylphthalate	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Carbazole	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Chrysene	ND (0.376)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Dibenzo(a,h)Anthracene	ND (0.376)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Dibenzofuran	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Diethylphthalate	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Dimethylphthalate	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Di-n-butylphthalate	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Di-n-octylphthalate	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Fluoranthene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Fluorene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Hexachlorobenzene	ND (0.376)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Hexachlorobutadiene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Hexachlorocyclopentadiene	ND (3.76)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Hexachloroethane	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Indeno(1,2,3-cd)Pyrene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Isophorone	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Naphthalene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 0-2ft
Date Sampled: 08/28/19 08:30
Percent Solids: 93
Initial Volume: 14.3
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
N-Nitrosodimethylamine	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
N-Nitroso-Di-n-Propylamine	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
N-nitrosodiphenylamine	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Pentachlorophenol	ND (3.76)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Phenanthrene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Phenol	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Pyrene	ND (0.750)		8270D		1	09/04/19 23:44	C9I0030	CH92856
Pyridine	ND (3.76)		8270D		1	09/04/19 23:44	C9I0030	CH92856

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	66 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	84 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	78 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	66 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	69 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	61 %		30-130
<i>Surrogate: Phenol-d6</i>	74 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	82 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 2-4ft
Date Sampled: 08/28/19 08:45
Percent Solids: 90

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (5.19)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359
Arsenic	5.74 (2.59)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359
Beryllium	0.27 (0.11)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359
Cadmium	ND (0.52)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359
Chromium	12.8 (1.04)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359
Copper	22.2 (2.59)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359
Lead	53.2 (5.19)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359
Mercury	0.105 (0.021)		7471B		1	MKS	09/04/19 11:41	1.06	40	CI90360
Nickel	11.5 (2.59)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359
Selenium	ND (5.19)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359
Silver	ND (0.52)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359
Thallium	ND (0.52)		6020A		1	NAR	09/05/19 14:23	2.13	100	CI90359
Zinc	43.9 (2.59)		6010C		1	KJK	09/04/19 11:08	2.13	100	CI90359



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 2-4ft
Date Sampled: 08/28/19 08:45
Percent Solids: 90
Initial Volume: 7.3
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,1,1-Trichloroethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,1,2,2-Tetrachloroethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,1,2-Trichloroethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,1-Dichloroethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,1-Dichloroethene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,1-Dichloropropene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,2,3-Trichlorobenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,2,3-Trichloropropane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,2,4-Trichlorobenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,2,4-Trimethylbenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,2-Dibromo-3-Chloropropane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,2-Dibromoethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,2-Dichlorobenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,2-Dichloroethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,2-Dichloropropane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,3,5-Trimethylbenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,3-Dichlorobenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,3-Dichloropropane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,4-Dichlorobenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1,4-Dioxane	ND (0.0757)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
1-Chlorohexane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
2,2-Dichloropropane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
2-Butanone	ND (0.0379)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
2-Chlorotoluene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
2-Hexanone	ND (0.0379)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
4-Chlorotoluene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
4-Isopropyltoluene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
4-Methyl-2-Pentanone	ND (0.0379)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Acetone	ND (0.0379)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Benzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Bromobenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 2-4ft
Date Sampled: 08/28/19 08:45
Percent Solids: 90
Initial Volume: 7.3
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Bromodichloromethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Bromoform	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Bromomethane	ND (0.0076)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Carbon Disulfide	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Carbon Tetrachloride	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Chlorobenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Chloroethane	ND (0.0076)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Chloroform	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Chloromethane	ND (0.0076)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
cis-1,2-Dichloroethene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
cis-1,3-Dichloropropene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Dibromochloromethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Dibromomethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Dichlorodifluoromethane	ND (0.0076)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Diethyl Ether	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Di-isopropyl ether	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Ethyl tertiary-butyl ether	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Ethylbenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Hexachlorobutadiene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Isopropylbenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Methyl tert-Butyl Ether	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Methylene Chloride	ND (0.0189)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Naphthalene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
n-Butylbenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
n-Propylbenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
sec-Butylbenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Styrene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
tert-Butylbenzene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Tertiary-amyl methyl ether	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Tetrachloroethene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Tetrahydrofuran	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 2-4ft
Date Sampled: 08/28/19 08:45
Percent Solids: 90
Initial Volume: 7.3
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
trans-1,2-Dichloroethene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
trans-1,3-Dichloropropene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Trichloroethene	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Trichlorofluoromethane	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Vinyl Acetate	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Vinyl Chloride	ND (0.0076)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Xylene O	ND (0.0038)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Xylene P,M	ND (0.0076)		8260B Low		1	08/30/19 2:33	C9H0615	CH92956
Xylenes (Total)	ND (0.00757)		8260B Low		1	08/30/19 2:33		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>117 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>79 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>111 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>110 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 2-4ft
Date Sampled: 08/28/19 08:45
Percent Solids: 90
Initial Volume: 20.2
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 8/28/19 16:13

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.05)		8082A		1	08/29/19 15:09		CH92803
Aroclor 1221	ND (0.05)		8082A		1	08/29/19 15:09		CH92803
Aroclor 1232	ND (0.05)		8082A		1	08/29/19 15:09		CH92803
Aroclor 1242	ND (0.05)		8082A		1	08/29/19 15:09		CH92803
Aroclor 1248	ND (0.05)		8082A		1	08/29/19 15:09		CH92803
Aroclor 1254	ND (0.05)		8082A		1	08/29/19 15:09		CH92803
Aroclor 1260	ND (0.05)		8082A		1	08/29/19 15:09		CH92803
Aroclor 1262	ND (0.05)		8082A		1	08/29/19 15:09		CH92803
Aroclor 1268	ND (0.05)		8082A		1	08/29/19 15:09		CH92803

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	33 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	35 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	39 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	42 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 2-4ft
Date Sampled: 08/28/19 08:45
Percent Solids: 90
Initial Volume: 19.6
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/28/19 18:30

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	1370 (846)		8100M		20	08/30/19 2:45	C9H0605	CH92855
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		<i>%</i>	<i>SD</i>	<i>40-140</i>				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 2-4ft
Date Sampled: 08/28/19 08:45
Percent Solids: 90
Initial Volume: 15.4
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
1,2,4-Trichlorobenzene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
1,2-Dichlorobenzene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
1,3-Dichlorobenzene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
1,4-Dichlorobenzene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2,3,4,6-Tetrachlorophenol	ND (3.60)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2,4,5-Trichlorophenol	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2,4,6-Trichlorophenol	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2,4-Dichlorophenol	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2,4-Dimethylphenol	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2,4-Dinitrophenol	ND (3.60)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2,4-Dinitrotoluene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2,6-Dinitrotoluene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2-Chloronaphthalene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2-Chlorophenol	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2-Methylnaphthalene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2-Methylphenol	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2-Nitroaniline	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
2-Nitrophenol	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
3,3'-Dichlorobenzidine	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
3+4-Methylphenol	ND (1.44)		8270D		1	09/05/19 0:12	C9I0030	CH92856
3-Nitroaniline	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
4,6-Dinitro-2-Methylphenol	ND (3.60)		8270D		1	09/05/19 0:12	C9I0030	CH92856
4-Bromophenyl-phenylether	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
4-Chloro-3-Methylphenol	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
4-Chloroaniline	ND (1.44)		8270D		1	09/05/19 0:12	C9I0030	CH92856
4-Chloro-phenyl-phenyl ether	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
4-Nitroaniline	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
4-Nitrophenol	ND (3.60)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Acenaphthene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Acenaphthylene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Acetophenone	ND (1.44)		8270D		1	09/05/19 0:12	C9I0030	CH92856



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 2-4ft
Date Sampled: 08/28/19 08:45
Percent Solids: 90
Initial Volume: 15.4
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (1.44)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Anthracene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Azobenzene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Benzo(a)anthracene	0.800 (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Benzo(a)pyrene	0.665 (0.360)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Benzo(b)fluoranthene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Benzo(g,h,i)perylene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Benzo(k)fluoranthene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Benzoic Acid	ND (3.60)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Benzyl Alcohol	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
bis(2-Chloroethoxy)methane	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
bis(2-Chloroethyl)ether	ND (0.360)		8270D		1	09/05/19 0:12	C9I0030	CH92856
bis(2-chloroisopropyl)Ether	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
bis(2-Ethylhexyl)phthalate	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Butylbenzylphthalate	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Carbazole	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Chrysene	0.815 (0.360)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Dibenzo(a,h)Anthracene	ND (0.360)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Dibenzofuran	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Diethylphthalate	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Dimethylphthalate	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Di-n-butylphthalate	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Di-n-octylphthalate	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Fluoranthene	1.80 (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Fluorene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Hexachlorobenzene	ND (0.360)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Hexachlorobutadiene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Hexachlorocyclopentadiene	ND (3.60)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Hexachloroethane	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Indeno(1,2,3-cd)Pyrene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Isophorone	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Naphthalene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 2-4ft
Date Sampled: 08/28/19 08:45
Percent Solids: 90
Initial Volume: 15.4
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
N-Nitrosodimethylamine	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
N-Nitroso-Di-n-Propylamine	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
N-nitrosodiphenylamine	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Pentachlorophenol	ND (3.60)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Phenanthrene	1.73 (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Phenol	ND (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Pyrene	1.82 (0.717)		8270D		1	09/05/19 0:12	C9I0030	CH92856
Pyridine	ND (3.60)		8270D		1	09/05/19 0:12	C9I0030	CH92856

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	71 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	88 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	79 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	74 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	89 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	65 %		30-130
<i>Surrogate: Phenol-d6</i>	74 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	95 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 4-6ft
Date Sampled: 08/28/19 09:10
Percent Solids: 84

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-03
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (1.79)		6010C		1	KJK	09/04/19 11:22	6.62	100	CI90359
Arsenic	5.60 (1.79)		6010C		2	KJK	09/05/19 12:25	6.62	100	CI90359
Beryllium	0.31 (0.04)		6010C		1	KJK	09/04/19 11:22	6.62	100	CI90359
Cadmium	ND (0.18)		6010C		1	KJK	09/04/19 11:22	6.62	100	CI90359
Chromium	12.1 (0.36)		6010C		1	KJK	09/04/19 11:22	6.62	100	CI90359
Copper	24.7 (0.90)		6010C		1	KJK	09/04/19 11:22	6.62	100	CI90359
Lead	85.4 (1.79)		6010C		1	KJK	09/04/19 11:22	6.62	100	CI90359
Mercury	0.250 (0.083)		7471B		10	MKS	09/04/19 12:56	2.83	40	CI90360
Nickel	10.7 (0.90)		6010C		1	KJK	09/04/19 11:22	6.62	100	CI90359
Selenium	ND (0.18)		6020A		1	NAR	09/05/19 14:28	6.62	100	CI90359
Silver	ND (0.36)		6010C		2	KJK	09/05/19 12:25	6.62	100	CI90359
Thallium	ND (0.18)		6020A		1	NAR	09/05/19 14:28	6.62	100	CI90359
Zinc	66.8 (0.90)		6010C		1	KJK	09/04/19 11:22	6.62	100	CI90359



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 4-6ft
Date Sampled: 08/28/19 09:10
Percent Solids: 84
Initial Volume: 6.6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,1,1-Trichloroethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,1,2,2-Tetrachloroethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,1,2-Trichloroethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,1-Dichloroethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,1-Dichloroethene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,1-Dichloropropene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,2,3-Trichlorobenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,2,3-Trichloropropane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,2,4-Trichlorobenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,2,4-Trimethylbenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,2-Dibromo-3-Chloropropane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,2-Dibromoethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,2-Dichlorobenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,2-Dichloroethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,2-Dichloropropane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,3,5-Trimethylbenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,3-Dichlorobenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,3-Dichloropropane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,4-Dichlorobenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1,4-Dioxane	ND (0.0898)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
1-Chlorohexane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
2,2-Dichloropropane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
2-Butanone	ND (0.0449)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
2-Chlorotoluene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
2-Hexanone	ND (0.0449)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
4-Chlorotoluene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
4-Isopropyltoluene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
4-Methyl-2-Pentanone	ND (0.0449)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Acetone	ND (0.0449)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Benzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Bromobenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 4-6ft
Date Sampled: 08/28/19 09:10
Percent Solids: 84
Initial Volume: 6.6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Bromodichloromethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Bromoform	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Bromomethane	ND (0.0090)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Carbon Disulfide	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Carbon Tetrachloride	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Chlorobenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Chloroethane	ND (0.0090)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Chloroform	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Chloromethane	ND (0.0090)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
cis-1,2-Dichloroethene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
cis-1,3-Dichloropropene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Dibromochloromethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Dibromomethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Dichlorodifluoromethane	ND (0.0090)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Diethyl Ether	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Di-isopropyl ether	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Ethyl tertiary-butyl ether	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Ethylbenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Hexachlorobutadiene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Isopropylbenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Methyl tert-Butyl Ether	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Methylene Chloride	ND (0.0225)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Naphthalene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
n-Butylbenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
n-Propylbenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
sec-Butylbenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Styrene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
tert-Butylbenzene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Tertiary-amyl methyl ether	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Tetrachloroethene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Tetrahydrofuran	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 4-6ft
Date Sampled: 08/28/19 09:10
Percent Solids: 84
Initial Volume: 6.6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
trans-1,2-Dichloroethene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
trans-1,3-Dichloropropene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Trichloroethene	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Trichlorofluoromethane	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Vinyl Acetate	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Vinyl Chloride	ND (0.0090)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Xylene O	ND (0.0045)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Xylene P,M	ND (0.0090)		8260B Low		1	08/30/19 2:59	C9H0615	CH92956
Xylenes (Total)	ND (0.00898)		8260B Low		1	08/30/19 2:59		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>110 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>86 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>104 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>108 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 4-6ft
Date Sampled: 08/28/19 09:10
Percent Solids: 84
Initial Volume: 19.3
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 8/28/19 16:13

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	08/29/19 15:29		CH92803
Aroclor 1221	ND (0.06)		8082A		1	08/29/19 15:29		CH92803
Aroclor 1232	ND (0.06)		8082A		1	08/29/19 15:29		CH92803
Aroclor 1242	ND (0.06)		8082A		1	08/29/19 15:29		CH92803
Aroclor 1248	ND (0.06)		8082A		1	08/29/19 15:29		CH92803
Aroclor 1254	ND (0.06)		8082A		1	08/29/19 15:29		CH92803
Aroclor 1260	ND (0.06)		8082A		1	08/29/19 15:29		CH92803
Aroclor 1262	ND (0.06)		8082A		1	08/29/19 15:29		CH92803
Aroclor 1268	ND (0.06)		8082A		1	08/29/19 15:29		CH92803

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	47 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	50 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	58 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	62 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 4-6ft
Date Sampled: 08/28/19 09:10
Percent Solids: 84
Initial Volume: 19.5
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/28/19 18:30

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	744 (456)		8100M		10	08/30/19 3:21	C9H0605	CH92855
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		66 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 4-6ft
Date Sampled: 08/28/19 09:10
Percent Solids: 84
Initial Volume: 15.7
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
1,2,4-Trichlorobenzene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
1,2-Dichlorobenzene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
1,3-Dichlorobenzene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
1,4-Dichlorobenzene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2,3,4,6-Tetrachlorophenol	ND (3.78)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2,4,5-Trichlorophenol	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2,4,6-Trichlorophenol	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2,4-Dichlorophenol	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2,4-Dimethylphenol	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2,4-Dinitrophenol	ND (3.78)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2,4-Dinitrotoluene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2,6-Dinitrotoluene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2-Chloronaphthalene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2-Chlorophenol	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2-Methylnaphthalene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2-Methylphenol	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2-Nitroaniline	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
2-Nitrophenol	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
3,3'-Dichlorobenzidine	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
3+4-Methylphenol	ND (1.51)		8270D		1	09/05/19 0:40	C9I0030	CH92856
3-Nitroaniline	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
4,6-Dinitro-2-Methylphenol	ND (3.78)		8270D		1	09/05/19 0:40	C9I0030	CH92856
4-Bromophenyl-phenylether	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
4-Chloro-3-Methylphenol	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
4-Chloroaniline	ND (1.51)		8270D		1	09/05/19 0:40	C9I0030	CH92856
4-Chloro-phenyl-phenyl ether	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
4-Nitroaniline	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
4-Nitrophenol	ND (3.78)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Acenaphthene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Acenaphthylene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Acetophenone	ND (1.51)		8270D		1	09/05/19 0:40	C9I0030	CH92856



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 4-6ft
Date Sampled: 08/28/19 09:10
Percent Solids: 84
Initial Volume: 15.7
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (1.51)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Anthracene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Azobenzene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Benzo(a)anthracene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Benzo(a)pyrene	ND (0.378)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Benzo(b)fluoranthene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Benzo(g,h,i)perylene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Benzo(k)fluoranthene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Benzoic Acid	ND (3.78)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Benzyl Alcohol	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
bis(2-Chloroethoxy)methane	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
bis(2-Chloroethyl)ether	ND (0.378)		8270D		1	09/05/19 0:40	C9I0030	CH92856
bis(2-chloroisopropyl)Ether	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
bis(2-Ethylhexyl)phthalate	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Butylbenzylphthalate	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Carbazole	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Chrysene	0.398 (0.378)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Dibenzo(a,h)Anthracene	ND (0.378)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Dibenzofuran	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Diethylphthalate	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Dimethylphthalate	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Di-n-butylphthalate	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Di-n-octylphthalate	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Fluoranthene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Fluorene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Hexachlorobenzene	ND (0.378)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Hexachlorobutadiene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Hexachlorocyclopentadiene	ND (3.78)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Hexachloroethane	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Indeno(1,2,3-cd)Pyrene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Isophorone	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Naphthalene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-4 4-6ft
 Date Sampled: 08/28/19 09:10
 Percent Solids: 84
 Initial Volume: 15.7
 Final Volume: 1
 Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
 ESS Laboratory Sample ID: 19H0896-03
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: TJ
 Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
N-Nitrosodimethylamine	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
N-Nitroso-Di-n-Propylamine	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
N-nitrosodiphenylamine	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Pentachlorophenol	ND (3.78)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Phenanthrene	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Phenol	ND (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Pyrene	0.859 (0.754)		8270D		1	09/05/19 0:40	C9I0030	CH92856
Pyridine	ND (3.78)		8270D		1	09/05/19 0:40	C9I0030	CH92856

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	70 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	77 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	83 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	66 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	73 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	59 %		30-130
<i>Surrogate: Phenol-d6</i>	79 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	90 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 6-10ft
Date Sampled: 08/28/19 09:30
Percent Solids: 92

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-04
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (4.06)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359
Arsenic	7.69 (2.03)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359
Beryllium	0.28 (0.09)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359
Cadmium	ND (0.41)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359
Chromium	15.6 (0.81)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359
Copper	17.7 (2.03)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359
Lead	60.8 (4.06)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359
Mercury	0.158 (0.019)		7471B		1	MKS	09/04/19 11:46	1.13	40	CI90360
Nickel	12.1 (2.03)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359
Selenium	ND (4.06)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359
Silver	ND (0.41)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359
Thallium	ND (0.41)		6020A		1	NAR	09/09/19 19:05	2.67	100	CI90359
Zinc	54.8 (2.03)		6010C		1	KJK	09/04/19 11:27	2.67	100	CI90359



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 6-10ft
Date Sampled: 08/28/19 09:30
Percent Solids: 92
Initial Volume: 9.7
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,1,1-Trichloroethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,1,2,2-Tetrachloroethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,1,2-Trichloroethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,1-Dichloroethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,1-Dichloroethene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,1-Dichloropropene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,2,3-Trichlorobenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,2,3-Trichloropropane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,2,4-Trichlorobenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,2,4-Trimethylbenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,2-Dibromo-3-Chloropropane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,2-Dibromoethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,2-Dichlorobenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,2-Dichloroethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,2-Dichloropropane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,3,5-Trimethylbenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,3-Dichlorobenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,3-Dichloropropane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,4-Dichlorobenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1,4-Dioxane	ND (0.0559)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
1-Chlorohexane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
2,2-Dichloropropane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
2-Butanone	ND (0.0280)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
2-Chlorotoluene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
2-Hexanone	ND (0.0280)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
4-Chlorotoluene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
4-Isopropyltoluene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
4-Methyl-2-Pentanone	ND (0.0280)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Acetone	ND (0.0280)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Benzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Bromobenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 6-10ft
Date Sampled: 08/28/19 09:30
Percent Solids: 92
Initial Volume: 9.7
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Bromodichloromethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Bromoform	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Bromomethane	ND (0.0056)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Carbon Disulfide	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Carbon Tetrachloride	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Chlorobenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Chloroethane	ND (0.0056)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Chloroform	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Chloromethane	ND (0.0056)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
cis-1,2-Dichloroethene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
cis-1,3-Dichloropropene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Dibromochloromethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Dibromomethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Dichlorodifluoromethane	ND (0.0056)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Diethyl Ether	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Di-isopropyl ether	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Ethyl tertiary-butyl ether	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Ethylbenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Hexachlorobutadiene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Isopropylbenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Methyl tert-Butyl Ether	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Methylene Chloride	ND (0.0140)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Naphthalene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
n-Butylbenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
n-Propylbenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
sec-Butylbenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Styrene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
tert-Butylbenzene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Tertiary-amyl methyl ether	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Tetrachloroethene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Tetrahydrofuran	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 6-10ft
Date Sampled: 08/28/19 09:30
Percent Solids: 92
Initial Volume: 9.7
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
trans-1,2-Dichloroethene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
trans-1,3-Dichloropropene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Trichloroethene	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Trichlorofluoromethane	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Vinyl Acetate	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Vinyl Chloride	ND (0.0056)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Xylene O	ND (0.0028)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Xylene P,M	ND (0.0056)		8260B Low		1	08/30/19 13:58	C9H0632	CH93024
Xylenes (Total)	ND (0.00559)		8260B Low		1	08/30/19 13:58		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>106 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>82 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>99 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>109 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 6-10ft
Date Sampled: 08/28/19 09:30
Percent Solids: 92
Initial Volume: 19.4
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 8/28/19 16:13

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	08/29/19 15:48		CH92803
Aroclor 1221	ND (0.06)		8082A		1	08/29/19 15:48		CH92803
Aroclor 1232	ND (0.06)		8082A		1	08/29/19 15:48		CH92803
Aroclor 1242	ND (0.06)		8082A		1	08/29/19 15:48		CH92803
Aroclor 1248	ND (0.06)		8082A		1	08/29/19 15:48		CH92803
Aroclor 1254	ND (0.06)		8082A		1	08/29/19 15:48		CH92803
Aroclor 1260	ND (0.06)		8082A		1	08/29/19 15:48		CH92803
Aroclor 1262	ND (0.06)		8082A		1	08/29/19 15:48		CH92803
Aroclor 1268	ND (0.06)		8082A		1	08/29/19 15:48		CH92803

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	48 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	51 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	60 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	64 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 6-10ft
Date Sampled: 08/28/19 09:30
Percent Solids: 92
Initial Volume: 20.9
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/28/19 18:30

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	543 (389)		8100M		10	08/30/19 3:57	C9H0605	CH92855
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		71 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 6-10ft
Date Sampled: 08/28/19 09:30
Percent Solids: 92
Initial Volume: 15.1
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
1,2,4-Trichlorobenzene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
1,2-Dichlorobenzene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
1,3-Dichlorobenzene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
1,4-Dichlorobenzene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2,3,4,6-Tetrachlorophenol	ND (3.60)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2,4,5-Trichlorophenol	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2,4,6-Trichlorophenol	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2,4-Dichlorophenol	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2,4-Dimethylphenol	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2,4-Dinitrophenol	ND (3.60)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2,4-Dinitrotoluene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2,6-Dinitrotoluene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2-Chloronaphthalene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2-Chlorophenol	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2-Methylnaphthalene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2-Methylphenol	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2-Nitroaniline	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
2-Nitrophenol	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
3,3'-Dichlorobenzidine	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
3+4-Methylphenol	ND (1.44)		8270D		1	09/05/19 1:09	C9I0030	CH92856
3-Nitroaniline	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
4,6-Dinitro-2-Methylphenol	ND (3.60)		8270D		1	09/05/19 1:09	C9I0030	CH92856
4-Bromophenyl-phenylether	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
4-Chloro-3-Methylphenol	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
4-Chloroaniline	ND (1.44)		8270D		1	09/05/19 1:09	C9I0030	CH92856
4-Chloro-phenyl-phenyl ether	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
4-Nitroaniline	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
4-Nitrophenol	ND (3.60)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Acenaphthene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Acenaphthylene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Acetophenone	ND (1.44)		8270D		1	09/05/19 1:09	C9I0030	CH92856



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 6-10ft
Date Sampled: 08/28/19 09:30
Percent Solids: 92
Initial Volume: 15.1
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (1.44)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Anthracene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Azobenzene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Benzo(a)anthracene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Benzo(a)pyrene	ND (0.360)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Benzo(b)fluoranthene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Benzo(g,h,i)perylene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Benzo(k)fluoranthene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Benzoic Acid	ND (3.60)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Benzyl Alcohol	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
bis(2-Chloroethoxy)methane	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
bis(2-Chloroethyl)ether	ND (0.360)		8270D		1	09/05/19 1:09	C9I0030	CH92856
bis(2-chloroisopropyl)Ether	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
bis(2-Ethylhexyl)phthalate	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Butylbenzylphthalate	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Carbazole	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Chrysene	ND (0.360)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Dibenzo(a,h)Anthracene	ND (0.360)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Dibenzofuran	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Diethylphthalate	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Dimethylphthalate	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Di-n-butylphthalate	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Di-n-octylphthalate	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Fluoranthene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Fluorene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Hexachlorobenzene	ND (0.360)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Hexachlorobutadiene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Hexachlorocyclopentadiene	ND (3.60)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Hexachloroethane	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Indeno(1,2,3-cd)Pyrene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Isophorone	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Naphthalene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-4 6-10ft
Date Sampled: 08/28/19 09:30
Percent Solids: 92
Initial Volume: 15.1
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0896
ESS Laboratory Sample ID: 19H0896-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/28/19 18:45

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
N-Nitrosodimethylamine	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
N-Nitroso-Di-n-Propylamine	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
N-nitrosodiphenylamine	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Pentachlorophenol	ND (3.60)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Phenanthrene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Phenol	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Pyrene	ND (0.718)		8270D		1	09/05/19 1:09	C9I0030	CH92856
Pyridine	ND (3.60)		8270D		1	09/05/19 1:09	C9I0030	CH92856

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	65 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	75 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	74 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	61 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	62 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	53 %		30-130
<i>Surrogate: Phenol-d6</i>	69 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	78 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch C190359 - 3050B

Blank

Antimony	ND	5.00	mg/kg wet
Arsenic	ND	2.50	mg/kg wet
Beryllium	ND	0.11	mg/kg wet
Cadmium	ND	0.50	mg/kg wet
Chromium	ND	1.00	mg/kg wet
Copper	ND	2.50	mg/kg wet
Lead	ND	5.00	mg/kg wet
Nickel	ND	2.50	mg/kg wet
Selenium	ND	5.00	mg/kg wet
Silver	ND	0.50	mg/kg wet
Zinc	ND	2.50	mg/kg wet

Blank

Selenium	ND	0.50	mg/kg wet
Thallium	ND	0.50	mg/kg wet

LCS

Antimony	42.5	17.2	mg/kg wet	42.40	100	80-120
Arsenic	112	8.62	mg/kg wet	128.0	88	80-120
Beryllium	204	0.38	mg/kg wet	217.0	94	80-120
Cadmium	86.3	1.72	mg/kg wet	99.00	87	80-120
Chromium	108	3.45	mg/kg wet	116.0	93	80-120
Copper	88.0	8.62	mg/kg wet	89.60	98	80-120
Lead	258	17.2	mg/kg wet	277.0	93	80-120
Nickel	104	8.62	mg/kg wet	107.0	97	80-120
Selenium	207	17.2	mg/kg wet	242.0	86	80-120
Silver	57.8	1.72	mg/kg wet	64.30	90	80-120
Zinc	483	8.62	mg/kg wet	561.0	86	80-120

LCS

Selenium	205	8.62	mg/kg wet	242.0	85	80-120
Thallium	161	8.62	mg/kg wet	183.0	88	80-120

LCS Dup

Antimony	45.7	18.2	mg/kg wet	42.40	108	80-120	7	20
Arsenic	112	9.09	mg/kg wet	128.0	87	80-120	0.7	20
Beryllium	203	0.40	mg/kg wet	217.0	94	80-120	0.6	20
Cadmium	89.2	1.82	mg/kg wet	99.00	90	80-120	3	20
Chromium	110	3.64	mg/kg wet	116.0	95	80-120	2	20
Copper	89.2	9.09	mg/kg wet	89.60	100	80-120	1	20
Lead	268	18.2	mg/kg wet	277.0	97	80-120	4	20
Nickel	106	9.09	mg/kg wet	107.0	99	80-120	2	20
Selenium	213	18.2	mg/kg wet	242.0	88	80-120	3	20
Silver	59.4	1.82	mg/kg wet	64.30	92	80-120	3	20
Zinc	491	9.09	mg/kg wet	561.0	88	80-120	2	20

LCS Dup

Selenium	233	9.09	mg/kg wet	242.0	96	80-120	13	30
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CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CI90359 - 3050B

Thallium	180	9.09	mg/kg wet	183.0		98	80-120	11	30	
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Batch CI90360 - 7471B

Blank

Mercury	ND	0.033	mg/kg wet							
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LCS

Mercury	22.3	3.54	mg/kg wet	27.30		82	80-120			
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LCS Dup

Mercury	23.3	3.30	mg/kg wet	27.30		85	80-120	4	20	
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92956 - 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	0.0050	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							
1-Chlorohexane	ND	0.0050	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0500	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0500	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet							
Acetone	ND	0.0500	mg/kg wet							
Benzene	ND	0.0050	mg/kg wet							
Bromobenzene	ND	0.0050	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92956 - 5035

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	0.0050	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	0.0250	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 Acetate	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	0.0507		mg/kg wet	0.05000		101	70-130			
Surrogate: 4-Bromofluorobenzene	0.0445		mg/kg wet	0.05000		89	70-130			
Surrogate: Dibromofluoromethane	0.0480		mg/kg wet	0.05000		96	70-130			
Surrogate: Toluene-d8	0.0517		mg/kg wet	0.05000		103	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92956 - 5035

LCS

1,1,1,2-Tetrachloroethane	0.0504	0.0050	mg/kg wet	0.05000		101	70-130			
1,1,1-Trichloroethane	0.0512	0.0050	mg/kg wet	0.05000		102	70-130			
1,1,2,2-Tetrachloroethane	0.0500	0.0050	mg/kg wet	0.05000		100	70-130			
1,1,2-Trichloroethane	0.0475	0.0050	mg/kg wet	0.05000		95	70-130			
1,1-Dichloroethane	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
1,1-Dichloroethene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
1,1-Dichloropropene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
1,2,3-Trichlorobenzene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130			
1,2,3-Trichloropropane	0.0483	0.0050	mg/kg wet	0.05000		97	70-130			
1,2,4-Trichlorobenzene	0.0574	0.0050	mg/kg wet	0.05000		115	70-130			
1,2,4-Trimethylbenzene	0.0555	0.0050	mg/kg wet	0.05000		111	70-130			
1,2-Dibromo-3-Chloropropane	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			
1,2-Dibromoethane	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
1,2-Dichlorobenzene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
1,2-Dichloroethane	0.0475	0.0050	mg/kg wet	0.05000		95	70-130			
1,2-Dichloropropane	0.0477	0.0050	mg/kg wet	0.05000		95	70-130			
1,3,5-Trimethylbenzene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
1,3-Dichlorobenzene	0.0507	0.0050	mg/kg wet	0.05000		101	70-130			
1,3-Dichloropropane	0.0500	0.0050	mg/kg wet	0.05000		100	70-130			
1,4-Dichlorobenzene	0.0497	0.0050	mg/kg wet	0.05000		99	70-130			
1,4-Dioxane	0.949	0.100	mg/kg wet	1.000		95	70-130			
1-Chlorohexane	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			
2,2-Dichloropropane	0.0522	0.0050	mg/kg wet	0.05000		104	70-130			
2-Butanone	0.245	0.0500	mg/kg wet	0.2500		98	70-130			
2-Chlorotoluene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130			
2-Hexanone	0.264	0.0500	mg/kg wet	0.2500		106	70-130			
4-Chlorotoluene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
4-Isopropyltoluene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130			
4-Methyl-2-Pentanone	0.255	0.0500	mg/kg wet	0.2500		102	70-130			
Acetone	0.235	0.0500	mg/kg wet	0.2500		94	70-130			
Benzene	0.0484	0.0050	mg/kg wet	0.05000		97	70-130			
Bromobenzene	0.0516	0.0050	mg/kg wet	0.05000		103	70-130			
Bromochloromethane	0.0500	0.0050	mg/kg wet	0.05000		100	70-130			
Bromodichloromethane	0.0483	0.0050	mg/kg wet	0.05000		97	70-130			
Bromoform	0.0448	0.0050	mg/kg wet	0.05000		90	70-130			
Bromomethane	0.0646	0.0100	mg/kg wet	0.05000		129	70-130			
Carbon Disulfide	0.0571	0.0050	mg/kg wet	0.05000		114	70-130			
Carbon Tetrachloride	0.0504	0.0050	mg/kg wet	0.05000		101	70-130			
Chlorobenzene	0.0489	0.0050	mg/kg wet	0.05000		98	70-130			
Chloroethane	0.0422	0.0100	mg/kg wet	0.05000		84	70-130			
Chloroform	0.0483	0.0050	mg/kg wet	0.05000		97	70-130			
Chloromethane	0.0394	0.0100	mg/kg wet	0.05000		79	70-130			
cis-1,2-Dichloroethene	0.0494	0.0050	mg/kg wet	0.05000		99	70-130			
cis-1,3-Dichloropropene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92956 - 5035

Dibromochloromethane	0.0511	0.0050	mg/kg wet	0.05000		102	70-130			
Dibromomethane	0.0488	0.0050	mg/kg wet	0.05000		98	70-130			
Dichlorodifluoromethane	0.0380	0.0100	mg/kg wet	0.05000		76	70-130			
Diethyl Ether	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
Di-isopropyl ether	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
Ethyl tertiary-butyl ether	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
Ethylbenzene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
Hexachlorobutadiene	0.0523	0.0050	mg/kg wet	0.05000		105	70-130			
Isopropylbenzene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
Methyl tert-Butyl Ether	0.0545	0.0050	mg/kg wet	0.05000		109	70-130			
Methylene Chloride	0.0520	0.0250	mg/kg wet	0.05000		104	70-130			
Naphthalene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
n-Butylbenzene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130			
n-Propylbenzene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
sec-Butylbenzene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130			
Styrene	0.0493	0.0050	mg/kg wet	0.05000		99	70-130			
tert-Butylbenzene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
Tertiary-amyl methyl ether	0.0553	0.0050	mg/kg wet	0.05000		111	70-130			
Tetrachloroethene	0.0490	0.0050	mg/kg wet	0.05000		98	70-130			
Tetrahydrofuran	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
Toluene	0.0487	0.0050	mg/kg wet	0.05000		97	70-130			
trans-1,2-Dichloroethene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
trans-1,3-Dichloropropene	0.0461	0.0050	mg/kg wet	0.05000		92	70-130			
Trichloroethene	0.0483	0.0050	mg/kg wet	0.05000		97	70-130			
Trichlorofluoromethane	0.0476	0.0050	mg/kg wet	0.05000		95	70-130			
Vinyl Acetate	0.0507	0.0050	mg/kg wet	0.05000		101	70-130			
Vinyl Chloride	0.0424	0.0100	mg/kg wet	0.05000		85	70-130			
Xylene O	0.0540	0.0050	mg/kg wet	0.05000		108	70-130			
Xylene P,M	0.109	0.0100	mg/kg wet	0.1000		109	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0468		mg/kg wet	0.05000		94	70-130			
Surrogate: 4-Bromofluorobenzene	0.0507		mg/kg wet	0.05000		101	70-130			
Surrogate: Dibromofluoromethane	0.0471		mg/kg wet	0.05000		94	70-130			
Surrogate: Toluene-d8	0.0501		mg/kg wet	0.05000		100	70-130			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0537	0.0050	mg/kg wet	0.05000		107	70-130	6	25	
1,1,1-Trichloroethane	0.0552	0.0050	mg/kg wet	0.05000		110	70-130	8	25	
1,1,2,2-Tetrachloroethane	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	3	25	
1,1,2-Trichloroethane	0.0488	0.0050	mg/kg wet	0.05000		98	70-130	3	25	
1,1-Dichloroethane	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	7	25	
1,1-Dichloroethene	0.0598	0.0050	mg/kg wet	0.05000		120	70-130	9	25	
1,1-Dichloropropene	0.0563	0.0050	mg/kg wet	0.05000		113	70-130	9	25	
1,2,3-Trichlorobenzene	0.0584	0.0050	mg/kg wet	0.05000		117	70-130	6	25	
1,2,3-Trichloropropane	0.0503	0.0050	mg/kg wet	0.05000		101	70-130	4	25	
1,2,4-Trichlorobenzene	0.0599	0.0050	mg/kg wet	0.05000		120	70-130	4	25	
1,2,4-Trimethylbenzene	0.0590	0.0050	mg/kg wet	0.05000		118	70-130	6	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92956 - 5035

1,2-Dibromo-3-Chloropropane	0.0520	0.0050	mg/kg wet	0.05000		104	70-130	3	25	
1,2-Dibromoethane	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	6	25	
1,2-Dichlorobenzene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	4	25	
1,2-Dichloroethane	0.0491	0.0050	mg/kg wet	0.05000		98	70-130	3	25	
1,2-Dichloropropane	0.0497	0.0050	mg/kg wet	0.05000		99	70-130	4	25	
1,3,5-Trimethylbenzene	0.0573	0.0050	mg/kg wet	0.05000		115	70-130	7	25	
1,3-Dichlorobenzene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130	5	25	
1,3-Dichloropropane	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	5	25	
1,4-Dichlorobenzene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130	5	25	
1,4-Dioxane	1.08	0.100	mg/kg wet	1.000		108	70-130	13	20	
1-Chlorohexane	0.0569	0.0050	mg/kg wet	0.05000		114	70-130	12	25	
2,2-Dichloropropane	0.0572	0.0050	mg/kg wet	0.05000		114	70-130	9	25	
2-Butanone	0.264	0.0500	mg/kg wet	0.2500		106	70-130	7	25	
2-Chlorotoluene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	6	25	
2-Hexanone	0.285	0.0500	mg/kg wet	0.2500		114	70-130	7	25	
4-Chlorotoluene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	6	25	
4-Isopropyltoluene	0.0561	0.0050	mg/kg wet	0.05000		112	70-130	7	25	
4-Methyl-2-Pentanone	0.269	0.0500	mg/kg wet	0.2500		107	70-130	5	25	
Acetone	0.256	0.0500	mg/kg wet	0.2500		103	70-130	9	25	
Benzene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130	6	25	
Bromobenzene	0.0537	0.0050	mg/kg wet	0.05000		107	70-130	4	25	
Bromochloromethane	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	4	25	
Bromodichloromethane	0.0510	0.0050	mg/kg wet	0.05000		102	70-130	5	25	
Bromoform	0.0473	0.0050	mg/kg wet	0.05000		95	70-130	5	25	
Bromomethane	0.0691	0.0100	mg/kg wet	0.05000		138	70-130	7	25	B+
Carbon Disulfide	0.0627	0.0050	mg/kg wet	0.05000		125	70-130	9	25	
Carbon Tetrachloride	0.0547	0.0050	mg/kg wet	0.05000		109	70-130	8	25	
Chlorobenzene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130	7	25	
Chloroethane	0.0454	0.0100	mg/kg wet	0.05000		91	70-130	7	25	
Chloroform	0.0510	0.0050	mg/kg wet	0.05000		102	70-130	6	25	
Chloromethane	0.0413	0.0100	mg/kg wet	0.05000		83	70-130	5	25	
cis-1,2-Dichloroethene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130	8	25	
cis-1,3-Dichloropropene	0.0559	0.0050	mg/kg wet	0.05000		112	70-130	6	25	
Dibromochloromethane	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	5	25	
Dibromomethane	0.0510	0.0050	mg/kg wet	0.05000		102	70-130	4	25	
Dichlorodifluoromethane	0.0415	0.0100	mg/kg wet	0.05000		83	70-130	9	25	
Diethyl Ether	0.0558	0.0050	mg/kg wet	0.05000		112	70-130	4	25	
Di-isopropyl ether	0.0560	0.0050	mg/kg wet	0.05000		112	70-130	5	25	
Ethyl tertiary-butyl ether	0.0569	0.0050	mg/kg wet	0.05000		114	70-130	9	25	
Ethylbenzene	0.0582	0.0050	mg/kg wet	0.05000		116	70-130	8	25	
Hexachlorobutadiene	0.0567	0.0050	mg/kg wet	0.05000		113	70-130	8	25	
Isopropylbenzene	0.0584	0.0050	mg/kg wet	0.05000		117	70-130	8	25	
Methyl tert-Butyl Ether	0.0578	0.0050	mg/kg wet	0.05000		116	70-130	6	25	
Methylene Chloride	0.0552	0.0250	mg/kg wet	0.05000		110	70-130	6	25	
Naphthalene	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	7	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH92956 - 5035

n-Butylbenzene	0.0597	0.0050	mg/kg wet	0.05000		119	70-130	8	25	
n-Propylbenzene	0.0579	0.0050	mg/kg wet	0.05000		116	70-130	8	25	
sec-Butylbenzene	0.0566	0.0050	mg/kg wet	0.05000		113	70-130	8	25	
Styrene	0.0530	0.0050	mg/kg wet	0.05000		106	70-130	7	25	
tert-Butylbenzene	0.0587	0.0050	mg/kg wet	0.05000		117	70-130	9	25	
Tertiary-amyl methyl ether	0.0602	0.0050	mg/kg wet	0.05000		120	70-130	8	25	
Tetrachloroethene	0.0537	0.0050	mg/kg wet	0.05000		107	70-130	9	25	
Tetrahydrofuran	0.0546	0.0050	mg/kg wet	0.05000		109	70-130	8	25	
Toluene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130	7	25	
trans-1,2-Dichloroethene	0.0582	0.0050	mg/kg wet	0.05000		116	70-130	8	25	
trans-1,3-Dichloropropene	0.0478	0.0050	mg/kg wet	0.05000		96	70-130	4	25	
Trichloroethene	0.0517	0.0050	mg/kg wet	0.05000		103	70-130	7	25	
Trichlorofluoromethane	0.0516	0.0050	mg/kg wet	0.05000		103	70-130	8	25	
Vinyl Acetate	0.0535	0.0050	mg/kg wet	0.05000		107	70-130	5	25	
Vinyl Chloride	0.0468	0.0100	mg/kg wet	0.05000		94	70-130	10	25	
Xylene O	0.0583	0.0050	mg/kg wet	0.05000		117	70-130	8	25	
Xylene P,M	0.119	0.0100	mg/kg wet	0.1000		119	70-130	9	25	
Surrogate: 1,2-Dichloroethane-d4	0.0459		mg/kg wet	0.05000		92	70-130			
Surrogate: 4-Bromofluorobenzene	0.0508		mg/kg wet	0.05000		102	70-130			
Surrogate: Dibromofluoromethane	0.0470		mg/kg wet	0.05000		94	70-130			
Surrogate: Toluene-d8	0.0502		mg/kg wet	0.05000		100	70-130			

Batch CH93024 - 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	0.0050	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							
1-Chlorohexane	ND	0.0050	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 5035

2,2-Dichloropropane	ND	0.0050	mg/kg wet
2-Butanone	ND	0.0500	mg/kg wet
2-Chlorotoluene	ND	0.0050	mg/kg wet
2-Hexanone	ND	0.0500	mg/kg wet
4-Chlorotoluene	ND	0.0050	mg/kg wet
4-Isopropyltoluene	ND	0.0050	mg/kg wet
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet
Acetone	ND	0.0500	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	0.0050	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	0.0250	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



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
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 5035

Trichloroethene	ND	0.0050	mg/kg wet							
Trichlorofluoromethane	ND	0.0050	mg/kg wet							
Vinyl Acetate	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	0.0526		mg/kg wet	0.05000		105	70-130			
Surrogate: 4-Bromofluorobenzene	0.0440		mg/kg wet	0.05000		88	70-130			
Surrogate: Dibromofluoromethane	0.0501		mg/kg wet	0.05000		100	70-130			
Surrogate: Toluene-d8	0.0527		mg/kg wet	0.05000		105	70-130			

LCS

1,1,1,2-Tetrachloroethane	0.0499	0.0050	mg/kg wet	0.05000		100	70-130			
1,1,1-Trichloroethane	0.0490	0.0050	mg/kg wet	0.05000		98	70-130			
1,1,2,2-Tetrachloroethane	0.0445	0.0050	mg/kg wet	0.05000		89	70-130			
1,1,2-Trichloroethane	0.0463	0.0050	mg/kg wet	0.05000		93	70-130			
1,1-Dichloroethane	0.0481	0.0050	mg/kg wet	0.05000		96	70-130			
1,1-Dichloroethene	0.0477	0.0050	mg/kg wet	0.05000		95	70-130			
1,1-Dichloropropene	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
1,2,3-Trichlorobenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
1,2,3-Trichloropropane	0.0426	0.0050	mg/kg wet	0.05000		85	70-130			
1,2,4-Trichlorobenzene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
1,2,4-Trimethylbenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130			
1,2-Dibromo-3-Chloropropane	0.0401	0.0050	mg/kg wet	0.05000		80	70-130			
1,2-Dibromoethane	0.0481	0.0050	mg/kg wet	0.05000		96	70-130			
1,2-Dichlorobenzene	0.0487	0.0050	mg/kg wet	0.05000		97	70-130			
1,2-Dichloroethane	0.0486	0.0050	mg/kg wet	0.05000		97	70-130			
1,2-Dichloropropane	0.0458	0.0050	mg/kg wet	0.05000		92	70-130			
1,3,5-Trimethylbenzene	0.0487	0.0050	mg/kg wet	0.05000		97	70-130			
1,3-Dichlorobenzene	0.0476	0.0050	mg/kg wet	0.05000		95	70-130			
1,3-Dichloropropane	0.0484	0.0050	mg/kg wet	0.05000		97	70-130			
1,4-Dichlorobenzene	0.0472	0.0050	mg/kg wet	0.05000		94	70-130			
1,4-Dioxane	0.719	0.100	mg/kg wet	1.000		72	70-130			
1-Chlorohexane	0.0447	0.0050	mg/kg wet	0.05000		89	70-130			
2,2-Dichloropropane	0.0516	0.0050	mg/kg wet	0.05000		103	70-130			
2-Butanone	0.214	0.0500	mg/kg wet	0.2500		85	70-130			
2-Chlorotoluene	0.0476	0.0050	mg/kg wet	0.05000		95	70-130			
2-Hexanone	0.207	0.0500	mg/kg wet	0.2500		83	70-130			
4-Chlorotoluene	0.0483	0.0050	mg/kg wet	0.05000		97	70-130			
4-Isopropyltoluene	0.0471	0.0050	mg/kg wet	0.05000		94	70-130			
4-Methyl-2-Pentanone	0.215	0.0500	mg/kg wet	0.2500		86	70-130			
Acetone	0.181	0.0500	mg/kg wet	0.2500		72	70-130			
Benzene	0.0455	0.0050	mg/kg wet	0.05000		91	70-130			
Bromobenzene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130			
Bromochloromethane	0.0505	0.0050	mg/kg wet	0.05000		101	70-130			
Bromodichloromethane	0.0498	0.0050	mg/kg wet	0.05000		100	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 5035

Bromoform	0.0443	0.0050	mg/kg wet	0.05000		89	70-130			
Bromomethane	0.0633	0.0100	mg/kg wet	0.05000		127	70-130			
Carbon Disulfide	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
Carbon Tetrachloride	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
Chlorobenzene	0.0461	0.0050	mg/kg wet	0.05000		92	70-130			
Chloroethane	0.0391	0.0100	mg/kg wet	0.05000		78	70-130			
Chloroform	0.0473	0.0050	mg/kg wet	0.05000		95	70-130			
Chloromethane	0.0338	0.0100	mg/kg wet	0.05000		68	70-130			B-
cis-1,2-Dichloroethene	0.0482	0.0050	mg/kg wet	0.05000		96	70-130			
cis-1,3-Dichloropropene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
Dibromochloromethane	0.0514	0.0050	mg/kg wet	0.05000		103	70-130			
Dibromomethane	0.0486	0.0050	mg/kg wet	0.05000		97	70-130			
Dichlorodifluoromethane	0.0341	0.0100	mg/kg wet	0.05000		68	70-130			B-
Diethyl Ether	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
Di-isopropyl ether	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Ethyl tertiary-butyl ether	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
Ethylbenzene	0.0483	0.0050	mg/kg wet	0.05000		97	70-130			
Hexachlorobutadiene	0.0468	0.0050	mg/kg wet	0.05000		94	70-130			
Isopropylbenzene	0.0485	0.0050	mg/kg wet	0.05000		97	70-130			
Methyl tert-Butyl Ether	0.0548	0.0050	mg/kg wet	0.05000		110	70-130			
Methylene Chloride	0.0522	0.0250	mg/kg wet	0.05000		104	70-130			
Naphthalene	0.0445	0.0050	mg/kg wet	0.05000		89	70-130			
n-Butylbenzene	0.0489	0.0050	mg/kg wet	0.05000		98	70-130			
n-Propylbenzene	0.0479	0.0050	mg/kg wet	0.05000		96	70-130			
sec-Butylbenzene	0.0462	0.0050	mg/kg wet	0.05000		92	70-130			
Styrene	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
tert-Butylbenzene	0.0483	0.0050	mg/kg wet	0.05000		97	70-130			
Tertiary-amyl methyl ether	0.0568	0.0050	mg/kg wet	0.05000		114	70-130			
Tetrachloroethene	0.0433	0.0050	mg/kg wet	0.05000		87	70-130			
Tetrahydrofuran	0.0391	0.0050	mg/kg wet	0.05000		78	70-130			
Toluene	0.0461	0.0050	mg/kg wet	0.05000		92	70-130			
trans-1,2-Dichloroethene	0.0490	0.0050	mg/kg wet	0.05000		98	70-130			
trans-1,3-Dichloropropene	0.0469	0.0050	mg/kg wet	0.05000		94	70-130			
Trichloroethene	0.0449	0.0050	mg/kg wet	0.05000		90	70-130			
Trichlorofluoromethane	0.0421	0.0050	mg/kg wet	0.05000		84	70-130			
Vinyl Acetate	0.0474	0.0050	mg/kg wet	0.05000		95	70-130			
Vinyl Chloride	0.0393	0.0100	mg/kg wet	0.05000		79	70-130			
Xylene O	0.0496	0.0050	mg/kg wet	0.05000		99	70-130			
Xylene P,M	0.0995	0.0100	mg/kg wet	0.1000		99	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0479		mg/kg wet	0.05000		96	70-130			
Surrogate: 4-Bromofluorobenzene	0.0501		mg/kg wet	0.05000		100	70-130			
Surrogate: Dibromofluoromethane	0.0493		mg/kg wet	0.05000		99	70-130			
Surrogate: Toluene-d8	0.0497		mg/kg wet	0.05000		99	70-130			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	3	25	
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CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 5035

1,1,1-Trichloroethane	0.0503	0.0050	mg/kg wet	0.05000		101	70-130	3	25	
1,1,2,2-Tetrachloroethane	0.0478	0.0050	mg/kg wet	0.05000		96	70-130	7	25	
1,1,2-Trichloroethane	0.0479	0.0050	mg/kg wet	0.05000		96	70-130	4	25	
1,1-Dichloroethane	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	4	25	
1,1-Dichloroethene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	7	25	
1,1-Dichloropropene	0.0495	0.0050	mg/kg wet	0.05000		99	70-130	6	25	
1,2,3-Trichlorobenzene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	5	25	
1,2,3-Trichloropropane	0.0463	0.0050	mg/kg wet	0.05000		93	70-130	8	25	
1,2,4-Trichlorobenzene	0.0565	0.0050	mg/kg wet	0.05000		113	70-130	5	25	
1,2,4-Trimethylbenzene	0.0541	0.0050	mg/kg wet	0.05000		108	70-130	5	25	
1,2-Dibromo-3-Chloropropane	0.0462	0.0050	mg/kg wet	0.05000		92	70-130	14	25	
1,2-Dibromoethane	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	5	25	
1,2-Dichlorobenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	5	25	
1,2-Dichloroethane	0.0494	0.0050	mg/kg wet	0.05000		99	70-130	2	25	
1,2-Dichloropropane	0.0483	0.0050	mg/kg wet	0.05000		97	70-130	5	25	
1,3,5-Trimethylbenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	5	25	
1,3-Dichlorobenzene	0.0497	0.0050	mg/kg wet	0.05000		99	70-130	4	25	
1,3-Dichloropropane	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	3	25	
1,4-Dichlorobenzene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	7	25	
1,4-Dioxane	0.848	0.100	mg/kg wet	1.000		85	70-130	17	20	
1-Chlorohexane	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	8	25	
2,2-Dichloropropane	0.0526	0.0050	mg/kg wet	0.05000		105	70-130	2	25	
2-Butanone	0.232	0.0500	mg/kg wet	0.2500		93	70-130	8	25	
2-Chlorotoluene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130	5	25	
2-Hexanone	0.236	0.0500	mg/kg wet	0.2500		95	70-130	13	25	
4-Chlorotoluene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	6	25	
4-Isopropyltoluene	0.0499	0.0050	mg/kg wet	0.05000		100	70-130	6	25	
4-Methyl-2-Pentanone	0.240	0.0500	mg/kg wet	0.2500		96	70-130	11	25	
Acetone	0.212	0.0500	mg/kg wet	0.2500		85	70-130	16	25	
Benzene	0.0479	0.0050	mg/kg wet	0.05000		96	70-130	5	25	
Bromobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	3	25	
Bromochloromethane	0.0517	0.0050	mg/kg wet	0.05000		103	70-130	2	25	
Bromodichloromethane	0.0507	0.0050	mg/kg wet	0.05000		101	70-130	2	25	
Bromoform	0.0464	0.0050	mg/kg wet	0.05000		93	70-130	5	25	
Bromomethane	0.0645	0.0100	mg/kg wet	0.05000		129	70-130	2	25	
Carbon Disulfide	0.0552	0.0050	mg/kg wet	0.05000		110	70-130	7	25	
Carbon Tetrachloride	0.0494	0.0050	mg/kg wet	0.05000		99	70-130	6	25	
Chlorobenzene	0.0482	0.0050	mg/kg wet	0.05000		96	70-130	4	25	
Chloroethane	0.0409	0.0100	mg/kg wet	0.05000		82	70-130	5	25	
Chloroform	0.0488	0.0050	mg/kg wet	0.05000		98	70-130	3	25	
Chloromethane	0.0359	0.0100	mg/kg wet	0.05000		72	70-130	6	25	
cis-1,2-Dichloroethene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	5	25	
cis-1,3-Dichloropropene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130	2	25	
Dibromochloromethane	0.0530	0.0050	mg/kg wet	0.05000		106	70-130	3	25	
Dibromomethane	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	4	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 5035

Dichlorodifluoromethane	0.0365	0.0100	mg/kg wet	0.05000		73	70-130	7	25	
Diethyl Ether	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	4	25	
Di-isopropyl ether	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	3	25	
Ethyl tertiary-butyl ether	0.0565	0.0050	mg/kg wet	0.05000		113	70-130	5	25	
Ethylbenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	6	25	
Hexachlorobutadiene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	7	25	
Isopropylbenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	6	25	
Methyl tert-Butyl Ether	0.0574	0.0050	mg/kg wet	0.05000		115	70-130	5	25	
Methylene Chloride	0.0545	0.0250	mg/kg wet	0.05000		109	70-130	4	25	
Naphthalene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	12	25	
n-Butylbenzene	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	7	25	
n-Propylbenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	6	25	
sec-Butylbenzene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130	7	25	
Styrene	0.0490	0.0050	mg/kg wet	0.05000		98	70-130	5	25	
tert-Butylbenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	7	25	
Tertiary-amyl methyl ether	0.0608	0.0050	mg/kg wet	0.05000		122	70-130	7	25	
Tetrachloroethene	0.0456	0.0050	mg/kg wet	0.05000		91	70-130	5	25	
Tetrahydrofuran	0.0434	0.0050	mg/kg wet	0.05000		87	70-130	10	25	
Toluene	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	5	25	
trans-1,2-Dichloroethene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130	7	25	
trans-1,3-Dichloropropene	0.0489	0.0050	mg/kg wet	0.05000		98	70-130	4	25	
Trichloroethene	0.0471	0.0050	mg/kg wet	0.05000		94	70-130	5	25	
Trichlorofluoromethane	0.0449	0.0050	mg/kg wet	0.05000		90	70-130	6	25	
Vinyl Acetate	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	7	25	
Vinyl Chloride	0.0425	0.0100	mg/kg wet	0.05000		85	70-130	8	25	
Xylene O	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	6	25	
Xylene P,M	0.105	0.0100	mg/kg wet	0.1000		105	70-130	6	25	
Surrogate: 1,2-Dichloroethane-d4	0.0466		mg/kg wet	0.05000		93	70-130			
Surrogate: 4-Bromofluorobenzene	0.0497		mg/kg wet	0.05000		99	70-130			
Surrogate: Dibromofluoromethane	0.0478		mg/kg wet	0.05000		96	70-130			
Surrogate: Toluene-d8	0.0485		mg/kg wet	0.05000		97	70-130			

8082A Polychlorinated Biphenyls (PCB)

Batch CH92803 - 3540C

Blank										
Aroclor 1016	ND	0.05	mg/kg wet							
Aroclor 1016 [2C]	ND	0.05	mg/kg wet							
Aroclor 1221	ND	0.05	mg/kg wet							
Aroclor 1221 [2C]	ND	0.05	mg/kg wet							
Aroclor 1232	ND	0.05	mg/kg wet							
Aroclor 1232 [2C]	ND	0.05	mg/kg wet							
Aroclor 1242	ND	0.05	mg/kg wet							
Aroclor 1242 [2C]	ND	0.05	mg/kg wet							
Aroclor 1248	ND	0.05	mg/kg wet							
Aroclor 1248 [2C]	ND	0.05	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

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8082A Polychlorinated Biphenyls (PCB)

Batch CH92803 - 3540C

Aroclor 1254	ND	0.05	mg/kg wet							
Aroclor 1254 [2C]	ND	0.05	mg/kg wet							
Aroclor 1260	ND	0.05	mg/kg wet							
Aroclor 1260 [2C]	ND	0.05	mg/kg wet							
Aroclor 1262	ND	0.05	mg/kg wet							
Aroclor 1262 [2C]	ND	0.05	mg/kg wet							
Aroclor 1268	ND	0.05	mg/kg wet							
Aroclor 1268 [2C]	ND	0.05	mg/kg wet							

Surrogate: Decachlorobiphenyl	0.0211		mg/kg wet	0.02500		85	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0211		mg/kg wet	0.02500		85	30-150			
Surrogate: Tetrachloro-m-xylene	0.0172		mg/kg wet	0.02500		69	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0178		mg/kg wet	0.02500		71	30-150			

LCS

Aroclor 1016	0.5	0.05	mg/kg wet	0.5000		90	40-140			
Aroclor 1016 [2C]	0.5	0.05	mg/kg wet	0.5000		94	40-140			
Aroclor 1260	0.4	0.05	mg/kg wet	0.5000		88	40-140			
Aroclor 1260 [2C]	0.4	0.05	mg/kg wet	0.5000		89	40-140			

Surrogate: Decachlorobiphenyl	0.0219		mg/kg wet	0.02500		88	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0218		mg/kg wet	0.02500		87	30-150			
Surrogate: Tetrachloro-m-xylene	0.0183		mg/kg wet	0.02500		73	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0179		mg/kg wet	0.02500		72	30-150			

LCS Dup

Aroclor 1016	0.4	0.05	mg/kg wet	0.5000		89	40-140	1	30	
Aroclor 1016 [2C]	0.5	0.05	mg/kg wet	0.5000		94	40-140	0.3	30	
Aroclor 1260	0.4	0.05	mg/kg wet	0.5000		90	40-140	2	30	
Aroclor 1260 [2C]	0.5	0.05	mg/kg wet	0.5000		93	40-140	4	30	

Surrogate: Decachlorobiphenyl	0.0221		mg/kg wet	0.02500		88	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0219		mg/kg wet	0.02500		88	30-150			
Surrogate: Tetrachloro-m-xylene	0.0180		mg/kg wet	0.02500		72	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0178		mg/kg wet	0.02500		71	30-150			

8100M Total Petroleum Hydrocarbons

Batch CH92855 - 3546

Blank

Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							
Hexadecane (C16)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							



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8100M Total Petroleum Hydrocarbons

Batch CH92855 - 3546

Octacosane (C28)	ND	0.2	mg/kg wet							
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							
Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons	ND	37.5	mg/kg wet							
Triacontane (C30)	ND	0.2	mg/kg wet							

<i>Surrogate: O-Terphenyl</i>	4.56		mg/kg wet	5.000		91	40-140			
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LCS

Decane (C10)	2.0	0.2	mg/kg wet	2.500		81	40-140			
Docosane (C22)	2.4	0.2	mg/kg wet	2.500		96	40-140			
Dodecane (C12)	2.2	0.2	mg/kg wet	2.500		86	40-140			
Eicosane (C20)	2.4	0.2	mg/kg wet	2.500		95	40-140			
Hexacosane (C26)	2.3	0.2	mg/kg wet	2.500		93	40-140			
Hexadecane (C16)	2.3	0.2	mg/kg wet	2.500		91	40-140			
Nonadecane (C19)	2.5	0.2	mg/kg wet	2.500		101	40-140			
Nonane (C9)	1.7	0.2	mg/kg wet	2.500		68	30-140			
Octacosane (C28)	2.3	0.2	mg/kg wet	2.500		92	40-140			
Octadecane (C18)	2.4	0.2	mg/kg wet	2.500		94	40-140			
Tetracosane (C24)	2.4	0.2	mg/kg wet	2.500		95	40-140			
Tetradecane (C14)	2.2	0.2	mg/kg wet	2.500		89	40-140			
Total Petroleum Hydrocarbons	31.1	37.5	mg/kg wet	35.00		89	40-140			
Triacontane (C30)	2.2	0.2	mg/kg wet	2.500		89	40-140			

<i>Surrogate: O-Terphenyl</i>	4.60		mg/kg wet	5.000		92	40-140			
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LCS Dup

Decane (C10)	2.6	0.2	mg/kg wet	2.500		104	40-140	26	25	D+
Docosane (C22)	3.0	0.2	mg/kg wet	2.500		119	40-140	21	25	
Dodecane (C12)	2.8	0.2	mg/kg wet	2.500		110	40-140	24	25	
Eicosane (C20)	3.0	0.2	mg/kg wet	2.500		118	40-140	21	25	
Hexacosane (C26)	2.9	0.2	mg/kg wet	2.500		115	40-140	21	25	
Hexadecane (C16)	2.9	0.2	mg/kg wet	2.500		116	40-140	24	25	
Nonadecane (C19)	3.1	0.2	mg/kg wet	2.500		124	40-140	21	25	
Nonane (C9)	2.2	0.2	mg/kg wet	2.500		89	30-140	27	25	D+
Octacosane (C28)	2.9	0.2	mg/kg wet	2.500		114	40-140	21	25	
Octadecane (C18)	2.9	0.2	mg/kg wet	2.500		117	40-140	22	25	
Tetracosane (C24)	2.9	0.2	mg/kg wet	2.500		118	40-140	21	25	
Tetradecane (C14)	2.9	0.2	mg/kg wet	2.500		114	40-140	25	25	
Total Petroleum Hydrocarbons	39.1	37.5	mg/kg wet	35.00		112	40-140	23	25	
Triacontane (C30)	2.8	0.2	mg/kg wet	2.500		111	40-140	21	25	

<i>Surrogate: O-Terphenyl</i>	5.62		mg/kg wet	5.000		112	40-140			
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8270D Semi-Volatile Organic Compounds

Batch CH92856 - 3546



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH92856 - 3546

Blank

1,1-Biphenyl	ND	0.333	mg/kg wet							
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							
2,3,4,6-Tetrachlorophenol	ND	1.67	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-Nitroaniline	ND	0.333	mg/kg wet							
2-Nitrophenol	ND	0.333	mg/kg wet							
3,3'-Dichlorobenzidine	ND	0.333	mg/kg wet							
3+4-Methylphenol	ND	0.667	mg/kg wet							
3-Nitroaniline	ND	0.333	mg/kg wet							
4,6-Dinitro-2-Methylphenol	ND	1.67	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet							
4-Chloro-3-Methylphenol	ND	0.333	mg/kg wet							
4-Chloroaniline	ND	0.667	mg/kg wet							
4-Chloro-phenyl-phenyl ether	ND	0.333	mg/kg wet							
4-Nitroaniline	ND	0.333	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	0.667	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							
Benzoic Acid	ND	1.67	mg/kg wet							
Benzyl Alcohol	ND	0.333	mg/kg wet							
bis(2-Chloroethoxy)methane	ND	0.333	mg/kg wet							
bis(2-Chloroethyl)ether	ND	0.167	mg/kg wet							



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8270D Semi-Volatile Organic Compounds

Batch CH92856 - 3546

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							
Carbazole	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	0.167	mg/kg wet							
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachlorocyclopentadiene	ND	1.67	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							
N-Nitroso-Di-n-Propylamine	ND	0.333	mg/kg wet							
N-nitrosodiphenylamine	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							
Pyridine	ND	1.67	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	2.61		mg/kg wet	3.333		78	30-130			
Surrogate: 2,4,6-Tribromophenol	3.62		mg/kg wet	5.000		72	30-130			
Surrogate: 2-Chlorophenol-d4	4.29		mg/kg wet	5.000		86	30-130			
Surrogate: 2-Fluorobiphenyl	2.91		mg/kg wet	3.333		87	30-130			
Surrogate: 2-Fluorophenol	4.48		mg/kg wet	5.000		90	30-130			
Surrogate: Nitrobenzene-d5	2.92		mg/kg wet	3.333		88	30-130			
Surrogate: Phenol-d6	4.39		mg/kg wet	5.000		88	30-130			
Surrogate: p-Terphenyl-d14	2.91		mg/kg wet	3.333		87	30-130			

LCS

1,1-Biphenyl	2.34	0.333	mg/kg wet	3.333		70	40-140			
1,2,4-Trichlorobenzene	2.49	0.333	mg/kg wet	3.333		75	40-140			
1,2-Dichlorobenzene	2.57	0.333	mg/kg wet	3.333		77	40-140			
1,3-Dichlorobenzene	2.44	0.333	mg/kg wet	3.333		73	40-140			
1,4-Dichlorobenzene	2.40	0.333	mg/kg wet	3.333		72	40-140			
2,3,4,6-Tetrachlorophenol	2.52	1.67	mg/kg wet	3.333		76	30-130			
2,4,5-Trichlorophenol	2.59	0.333	mg/kg wet	3.333		78	30-130			



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8270D Semi-Volatile Organic Compounds

Batch CH92856 - 3546

2,4,6-Trichlorophenol	2.37	0.333	mg/kg wet	3.333		71	30-130			
2,4-Dichlorophenol	2.44	0.333	mg/kg wet	3.333		73	30-130			
2,4-Dimethylphenol	2.39	0.333	mg/kg wet	3.333		72	30-130			
2,4-Dinitrophenol	2.62	1.67	mg/kg wet	3.333		79	30-130			
2,4-Dinitrotoluene	2.68	0.333	mg/kg wet	3.333		81	40-140			
2,6-Dinitrotoluene	2.78	0.333	mg/kg wet	3.333		83	40-140			
2-Chloronaphthalene	2.37	0.333	mg/kg wet	3.333		71	40-140			
2-Chlorophenol	2.53	0.333	mg/kg wet	3.333		76	30-130			
2-Methylnaphthalene	2.36	0.333	mg/kg wet	3.333		71	40-140			
2-Methylphenol	2.51	0.333	mg/kg wet	3.333		75	30-130			
2-Nitroaniline	2.63	0.333	mg/kg wet	3.333		79	40-140			
2-Nitrophenol	2.31	0.333	mg/kg wet	3.333		69	30-130			
3,3'-Dichlorobenzidine	2.65	0.333	mg/kg wet	3.333		80	40-140			
3+4-Methylphenol	5.48	0.667	mg/kg wet	6.667		82	30-130			
3-Nitroaniline	2.44	0.333	mg/kg wet	3.333		73	40-140			
4,6-Dinitro-2-Methylphenol	2.86	1.67	mg/kg wet	3.333		86	30-130			
4-Bromophenyl-phenylether	2.92	0.333	mg/kg wet	3.333		88	40-140			
4-Chloro-3-Methylphenol	2.61	0.333	mg/kg wet	3.333		78	30-130			
4-Chloroaniline	1.74	0.667	mg/kg wet	3.333		52	40-140			
4-Chloro-phenyl-phenyl ether	2.71	0.333	mg/kg wet	3.333		81	40-140			
4-Nitroaniline	2.51	0.333	mg/kg wet	3.333		75	40-140			
4-Nitrophenol	2.74	1.67	mg/kg wet	3.333		82	30-130			
Acenaphthene	2.41	0.333	mg/kg wet	3.333		72	40-140			
Acenaphthylene	2.14	0.333	mg/kg wet	3.333		64	40-140			
Acetophenone	2.39	0.667	mg/kg wet	3.333		72	40-140			
Aniline	1.92	0.667	mg/kg wet	3.333		58	40-140			
Anthracene	2.74	0.333	mg/kg wet	3.333		82	40-140			
Azobenzene	2.77	0.333	mg/kg wet	3.333		83	40-140			
Benzo(a)anthracene	2.85	0.333	mg/kg wet	3.333		85	40-140			
Benzo(a)pyrene	2.76	0.167	mg/kg wet	3.333		83	40-140			
Benzo(b)fluoranthene	2.60	0.333	mg/kg wet	3.333		78	40-140			
Benzo(g,h,i)perylene	2.82	0.333	mg/kg wet	3.333		85	40-140			
Benzo(k)fluoranthene	3.16	0.333	mg/kg wet	3.333		95	40-140			
Benzoic Acid	2.40	1.67	mg/kg wet	3.333		72	40-140			
Benzyl Alcohol	2.24	0.333	mg/kg wet	3.333		67	40-140			
bis(2-Chloroethoxy)methane	2.44	0.333	mg/kg wet	3.333		73	40-140			
bis(2-Chloroethyl)ether	2.64	0.167	mg/kg wet	3.333		79	40-140			
bis(2-chloroisopropyl)Ether	2.39	0.333	mg/kg wet	3.333		72	40-140			
bis(2-Ethylhexyl)phthalate	3.05	0.333	mg/kg wet	3.333		91	40-140			
Butylbenzylphthalate	3.01	0.333	mg/kg wet	3.333		90	40-140			
Carbazole	2.78	0.333	mg/kg wet	3.333		83	40-140			
Chrysene	2.84	0.167	mg/kg wet	3.333		85	40-140			
Dibenzo(a,h)Anthracene	2.85	0.167	mg/kg wet	3.333		86	40-140			
Dibenzofuran	2.44	0.333	mg/kg wet	3.333		73	40-140			
Diethylphthalate	2.86	0.333	mg/kg wet	3.333		86	40-140			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH92856 - 3546

Dimethylphthalate	2.80	0.333	mg/kg wet	3.333		84	40-140			
Di-n-butylphthalate	3.00	0.333	mg/kg wet	3.333		90	40-140			
Di-n-octylphthalate	3.10	0.333	mg/kg wet	3.333		93	40-140			
Fluoranthene	2.81	0.333	mg/kg wet	3.333		84	40-140			
Fluorene	2.65	0.333	mg/kg wet	3.333		79	40-140			
Hexachlorobenzene	2.80	0.167	mg/kg wet	3.333		84	40-140			
Hexachlorobutadiene	2.37	0.333	mg/kg wet	3.333		71	40-140			
Hexachlorocyclopentadiene	1.43	1.67	mg/kg wet	3.333		43	40-140			
Hexachloroethane	2.24	0.333	mg/kg wet	3.333		67	40-140			
Indeno(1,2,3-cd)Pyrene	2.83	0.333	mg/kg wet	3.333		85	40-140			
Isophorone	2.04	0.333	mg/kg wet	3.333		61	40-140			
Naphthalene	2.48	0.333	mg/kg wet	3.333		74	40-140			
Nitrobenzene	2.38	0.333	mg/kg wet	3.333		71	40-140			
N-Nitrosodimethylamine	2.43	0.333	mg/kg wet	3.333		73	40-140			
N-Nitroso-Di-n-Propylamine	2.51	0.333	mg/kg wet	3.333		75	40-140			
N-nitrosodiphenylamine	2.87	0.333	mg/kg wet	3.333		86	40-140			
Pentachlorophenol	2.77	1.67	mg/kg wet	3.333		83	30-130			
Phenanthrene	2.64	0.333	mg/kg wet	3.333		79	40-140			
Phenol	2.64	0.333	mg/kg wet	3.333		79	30-130			
Pyrene	2.79	0.333	mg/kg wet	3.333		84	40-140			
Pyridine	2.11	1.67	mg/kg wet	3.333		63	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	2.23		mg/kg wet	3.333		67	30-130			
Surrogate: 2,4,6-Tribromophenol	3.80		mg/kg wet	5.000		76	30-130			
Surrogate: 2-Chlorophenol-d4	3.71		mg/kg wet	5.000		74	30-130			
Surrogate: 2-Fluorobiphenyl	2.34		mg/kg wet	3.333		70	30-130			
Surrogate: 2-Fluorophenol	3.87		mg/kg wet	5.000		77	30-130			
Surrogate: Nitrobenzene-d5	2.54		mg/kg wet	3.333		76	30-130			
Surrogate: Phenol-d6	3.89		mg/kg wet	5.000		78	30-130			
Surrogate: p-Terphenyl-d14	2.74		mg/kg wet	3.333		82	30-130			

LCS Dup

1,1-Biphenyl	2.31	0.333	mg/kg wet	3.333		69	40-140	2	30	
1,2,4-Trichlorobenzene	2.53	0.333	mg/kg wet	3.333		76	40-140	1	30	
1,2-Dichlorobenzene	2.46	0.333	mg/kg wet	3.333		74	40-140	4	30	
1,3-Dichlorobenzene	2.41	0.333	mg/kg wet	3.333		72	40-140	1	30	
1,4-Dichlorobenzene	2.36	0.333	mg/kg wet	3.333		71	40-140	1	30	
2,3,4,6-Tetrachlorophenol	2.65	1.67	mg/kg wet	3.333		79	30-130	5	30	
2,4,5-Trichlorophenol	2.65	0.333	mg/kg wet	3.333		79	30-130	2	30	
2,4,6-Trichlorophenol	2.40	0.333	mg/kg wet	3.333		72	30-130	1	30	
2,4-Dichlorophenol	2.50	0.333	mg/kg wet	3.333		75	30-130	2	30	
2,4-Dimethylphenol	2.29	0.333	mg/kg wet	3.333		69	30-130	4	30	
2,4-Dinitrophenol	2.70	1.67	mg/kg wet	3.333		81	30-130	3	30	
2,4-Dinitrotoluene	2.79	0.333	mg/kg wet	3.333		84	40-140	4	30	
2,6-Dinitrotoluene	2.88	0.333	mg/kg wet	3.333		87	40-140	4	30	
2-Chloronaphthalene	2.23	0.333	mg/kg wet	3.333		67	40-140	6	30	
2-Chlorophenol	2.51	0.333	mg/kg wet	3.333		75	30-130	0.7	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH92856 - 3546

2-Methylnaphthalene	2.41	0.333	mg/kg wet	3.333		72	40-140	2	30	
2-Methylphenol	2.33	0.333	mg/kg wet	3.333		70	30-130	7	30	
2-Nitroaniline	2.22	0.333	mg/kg wet	3.333		67	40-140	17	30	
2-Nitrophenol	2.26	0.333	mg/kg wet	3.333		68	30-130	2	30	
3,3'-Dichlorobenzidine	2.73	0.333	mg/kg wet	3.333		82	40-140	3	30	
3+4-Methylphenol	5.06	0.667	mg/kg wet	6.667		76	30-130	8	30	
3-Nitroaniline	2.51	0.333	mg/kg wet	3.333		75	40-140	3	30	
4,6-Dinitro-2-Methylphenol	2.94	1.67	mg/kg wet	3.333		88	30-130	3	30	
4-Bromophenyl-phenylether	3.04	0.333	mg/kg wet	3.333		91	40-140	4	30	
4-Chloro-3-Methylphenol	2.51	0.333	mg/kg wet	3.333		75	30-130	4	30	
4-Chloroaniline	1.76	0.667	mg/kg wet	3.333		53	40-140	0.8	30	
4-Chloro-phenyl-phenyl ether	2.79	0.333	mg/kg wet	3.333		84	40-140	3	30	
4-Nitroaniline	2.65	0.333	mg/kg wet	3.333		80	40-140	5	30	
4-Nitrophenol	2.69	1.67	mg/kg wet	3.333		81	30-130	2	30	
Acenaphthene	2.42	0.333	mg/kg wet	3.333		73	40-140	0.5	30	
Acenaphthylene	2.16	0.333	mg/kg wet	3.333		65	40-140	0.9	30	
Acetophenone	2.20	0.667	mg/kg wet	3.333		66	40-140	8	30	
Aniline	1.86	0.667	mg/kg wet	3.333		56	40-140	3	30	
Anthracene	2.75	0.333	mg/kg wet	3.333		83	40-140	0.4	30	
Azobenzene	2.70	0.333	mg/kg wet	3.333		81	40-140	3	30	
Benzo(a)anthracene	2.87	0.333	mg/kg wet	3.333		86	40-140	1	30	
Benzo(a)pyrene	2.74	0.167	mg/kg wet	3.333		82	40-140	0.8	30	
Benzo(b)fluoranthene	2.56	0.333	mg/kg wet	3.333		77	40-140	2	30	
Benzo(g,h,i)perylene	2.87	0.333	mg/kg wet	3.333		86	40-140	2	30	
Benzo(k)fluoranthene	3.12	0.333	mg/kg wet	3.333		94	40-140	1	30	
Benzoic Acid	2.35	1.67	mg/kg wet	3.333		71	40-140	2	30	
Benzyl Alcohol	1.95	0.333	mg/kg wet	3.333		59	40-140	14	30	
bis(2-Chloroethoxy)methane	2.27	0.333	mg/kg wet	3.333		68	40-140	7	30	
bis(2-Chloroethyl)ether	2.57	0.167	mg/kg wet	3.333		77	40-140	3	30	
bis(2-chloroisopropyl)Ether	2.23	0.333	mg/kg wet	3.333		67	40-140	7	30	
bis(2-Ethylhexyl)phthalate	2.98	0.333	mg/kg wet	3.333		90	40-140	2	30	
Butylbenzylphthalate	2.86	0.333	mg/kg wet	3.333		86	40-140	5	30	
Carbazole	2.81	0.333	mg/kg wet	3.333		84	40-140	1	30	
Chrysene	2.85	0.167	mg/kg wet	3.333		85	40-140	0.2	30	
Dibenzo(a,h)Anthracene	2.89	0.167	mg/kg wet	3.333		87	40-140	1	30	
Dibenzofuran	2.50	0.333	mg/kg wet	3.333		75	40-140	3	30	
Diethylphthalate	3.02	0.333	mg/kg wet	3.333		91	40-140	5	30	
Dimethylphthalate	2.91	0.333	mg/kg wet	3.333		87	40-140	4	30	
Di-n-butylphthalate	2.97	0.333	mg/kg wet	3.333		89	40-140	1	30	
Di-n-octylphthalate	2.92	0.333	mg/kg wet	3.333		88	40-140	6	30	
Fluoranthene	2.85	0.333	mg/kg wet	3.333		86	40-140	1	30	
Fluorene	2.70	0.333	mg/kg wet	3.333		81	40-140	2	30	
Hexachlorobenzene	2.86	0.167	mg/kg wet	3.333		86	40-140	2	30	
Hexachlorobutadiene	2.43	0.333	mg/kg wet	3.333		73	40-140	3	30	
Hexachlorocyclopentadiene	1.48	1.67	mg/kg wet	3.333		44	40-140	4	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH92856 - 3546

Hexachloroethane	2.09	0.333	mg/kg wet	3.333		63	40-140	7	30	
Indeno(1,2,3-cd)Pyrene	2.86	0.333	mg/kg wet	3.333		86	40-140	1	30	
Isophorone	1.87	0.333	mg/kg wet	3.333		56	40-140	8	30	
Naphthalene	2.40	0.333	mg/kg wet	3.333		72	40-140	3	30	
Nitrobenzene	2.13	0.333	mg/kg wet	3.333		64	40-140	11	30	
N-Nitrosodimethylamine	2.43	0.333	mg/kg wet	3.333		73	40-140	0.3	30	
N-Nitroso-Di-n-Propylamine	2.23	0.333	mg/kg wet	3.333		67	40-140	12	30	
N-nitrosodiphenylamine	2.88	0.333	mg/kg wet	3.333		86	40-140	0.3	30	
Pentachlorophenol	2.90	1.67	mg/kg wet	3.333		87	30-130	5	30	
Phenanthrene	2.76	0.333	mg/kg wet	3.333		83	40-140	4	30	
Phenol	2.60	0.333	mg/kg wet	3.333		78	30-130	1	30	
Pyrene	2.80	0.333	mg/kg wet	3.333		84	40-140	0.1	30	
Pyridine	2.17	1.67	mg/kg wet	3.333		65	40-140	3	30	
Surrogate: 1,2-Dichlorobenzene-d4	2.16		mg/kg wet	3.333		65	30-130			
Surrogate: 2,4,6-Tribromophenol	3.90		mg/kg wet	5.000		78	30-130			
Surrogate: 2-Chlorophenol-d4	3.72		mg/kg wet	5.000		74	30-130			
Surrogate: 2-Fluorobiphenyl	2.32		mg/kg wet	3.333		70	30-130			
Surrogate: 2-Fluorophenol	3.84		mg/kg wet	5.000		77	30-130			
Surrogate: Nitrobenzene-d5	2.29		mg/kg wet	3.333		69	30-130			
Surrogate: Phenol-d6	3.84		mg/kg wet	5.000		77	30-130			
Surrogate: p-Terphenyl-d14	2.78		mg/kg wet	3.333		83	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

Notes and Definitions

- U Analyte included in the analysis, but not detected
- SD Surrogate recovery(ies) diluted below the MRL (SD).
- Q Calibration required quadratic regression (Q).
- IM Internal Standard(s) outside of criteria due to matrix (UCM/coelution is present) (IM).
- D+ Relative percent difference for duplicate is outside of criteria (D+).
- D Diluted.
- CD+ Continuing Calibration %Diff/Drift is above control limit (CD+).
- CD- Continuing Calibration %Diff/Drift is below control limit (CD-).
- B+ Blank Spike recovery is above upper control limit (B+).
- 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
- RL Reporting Limit
- EDL Estimated Detection Limit
- MF Membrane Filtration
- MPN Most Probably Number
- TNTC Too numerous to Count
- CFU Colony Forming Units



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0896

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

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.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 19H0896

Date Received: 8/28/2019

Project Due Date: 9/5/2019

Days for Project: 5 Day

Shipped/Delivered Via: Client

- 1. Air bill manifest present? No
- Air No.: NA
- 2. Were custody seals present? No
- 3. Is radiation count <100 CPM? Yes
- 4. Is a Cooler Present? Yes
- Temp: 3.1 Iced with: Ice
- 5. Was COC signed and dated by client? Yes

- 6. Does COC match bottles? Yes
- 7. Is COC complete and correct? Yes
- 8. Were samples received intact? Yes
- 9. Were labs informed about short holds & rushes? Yes / No / NA
- 10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes No

ESS Sample IDs: _____

Analysis: _____

TAT: _____

12. Were VOAs received? Yes No

a. Air bubbles in aqueous VOAs? Yes / No / NA

b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes / No

a. If metals preserved upon receipt: Date: 8/28

b. Low Level VOA vials frozen: Date: 8/28

Time: _____ By: _____

Time: 1511 By: [Signature]

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes No

a. Was there a need to contact the client? Yes No

Who was contacted? _____ Date: _____ Time: _____ By: _____

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
01	382274	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
01	382281	Yes	NA	Yes	VOA Vial - Other	Other	
01	382282	Yes	NA	Yes	VOA Vial - Other	Other	
01	382286	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
02	382273	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
02	382279	Yes	NA	Yes	VOA Vial - Other	Other	
02	382280	Yes	NA	Yes	VOA Vial - Other	Other	
02	382285	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
03	382272	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
03	382277	Yes	NA	Yes	VOA Vial - Other	Other	
03	382278	Yes	NA	Yes	VOA Vial - Other	Other	
03	382284	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
04	382271	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
04	382275	Yes	NA	Yes	VOA Vial - Other	Other	
04	382276	Yes	NA	Yes	VOA Vial - Other	Other	
04	382283	Yes	NA	Yes	8 oz. Jar - Unpres	NP	

2nd Review

Were all containers scanned into storage/lab?

Are barcode labels on correct containers?

Are all Flashpoint stickers attached/container ID # circled?

Are all Hex Chrome stickers attached?

Initials [Signature]

Yes / No

Yes / No / NA

Yes / No / NA

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 19H0896

Date Received: 8/28/2019

Are all QC stickers attached?

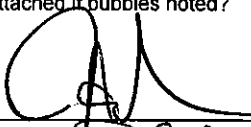
Yes / No / NA

Are VOA stickers attached if bubbles noted?

Yes / No / NA

Completed

By:



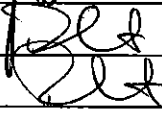
Date & Time:

8/28/19

1505

Reviewed

By:



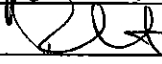
Date & Time:

8/28/19

1511

Delivered

By:



8/28/19

1511

ESS Laboratory

Division of Thielsch Engineering, Inc.
 185 Frances Avenue, Cranston RI 02910
 Tel. (401) 461-7181 Fax (401) 461-4486
 www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time: 5 Days
 Regulatory State: RI
 Is this project for any of the following?
 CT RCP MA MCP RGP
 Project # NBC
 Project Name PA-4 and PA-5
 Address Washington Hwy
 Zip Code 02885
 PO #
 State RI
 City Litch
 FAX Number
 Email Address mcoughlin@birk-inc.com

ESS Lab # 19110896
 Reporting Limits RIBM RIS DEL / ICD EC

Electronic Deliverables Data Checker Excel
 Other (Please Specify --)

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Analysis																
						VOCs	SVOCs	FBs	TFH	PH3	Meths											
1	8/28/19	8:30	Grab	Soil	B-4 0-2'	X	X	X	X	X												
2		8:45			B-4 2-4'	X	X	X	X	X												
3		9:10			B-4 4-6'	X	X	X	X	X												
4		9:30	Comp		B-4 6-10'	X	X	X	X	X												

Container Type	AC-Air Cassette	AG-Amber Glass	B-BOD Bottle	C-Cubittainer	J-Jar	O-Other	P-Poly	S-Sterile	V-Vial								
Container Volume:	1-100 mL	2-2.5 gal	3-250 mL	4-300 mL	5-500 mL	6-1L	7-VOA	8-2 oz	9-4 oz	10-8 oz	11-Other*						
Preservation Code:	1-Non Preserved	2-HCl	3-H2SO4	4-HNO3	5-NaOH	6-Methanol	7-Na2SO3	8-ZnAcAc, NaOH	9-NH4Cl	10-DI H2O	11-Other*						
Number of Containers per Sample:										V	A6	7	10	6	1	3	1

Sampled by: Scott Mc
 Comments: Please specify "Other" preservative and containers types in this space

Laboratory Use Only

Cooler Present: Drop Off Pickup
 Seals Intact:

Cooler Temperature: 12.3°C

Relinquished by: (Signature, Date & Time) [Signature] 8/28/19 13:51
 Received By: (Signature, Date & Time)

Relinquished by: (Signature, Date & Time) [Signature] 8/28/19 1:51
 Received By: (Signature, Date & Time)



CERTIFICATE OF ANALYSIS

Joe McLoughlin
Beta Engineering
701 George Washington Hwy 2nd FL
Lincoln, RI 02865

RE: NBC III (N/A)
ESS Laboratory Work Order Number: 19I0088

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 2:32 pm, Sep 13, 2019

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 TNI and relative state standards, 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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

SAMPLE RECEIPT

The following samples were received on September 05, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Low Level VOA vials were frozen by ESS Laboratory on 9/5/19 at 18:25.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
19I0088-01	B-8 0-2ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D
19I0088-02	B-8 2-4ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

PROJECT NARRATIVE

8270D Semi-Volatile Organic Compounds

- C9I0114-CCV1 Calibration required quadratic regression (O).
2,4-Dinitrophenol (91% @ 80-120%), 4,6-Dinitro-2-Methylphenol (101% @ 80-120%), Benzoic Acid (82% @ 80-120%), Di-n-octylphthalate (113% @ 80-120%), Pentachlorophenol (104% @ 80-120%)
- C9I0114-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).
2-Nitroaniline (25% @ 20%)
- C9I0144-CCV1 Calibration required quadratic regression (O).
2,4-Dinitrophenol (89% @ 80-120%), 4,6-Dinitro-2-Methylphenol (95% @ 80-120%), Benzoic Acid (78% @ 80-120%), Di-n-octylphthalate (112% @ 80-120%), Pentachlorophenol (101% @ 80-120%)
- C9I0144-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).
2-Nitroaniline (24% @ 20%), Benzoic Acid (22% @ 20%)

Total Metals

- CI90963-BSD3 Blank Spike recovery is below lower control limit (B-).
Antimony (33% @ 40-160%), Silver (40% @ 80-120%)
- CI90963-BSD3 Relative percent difference for duplicate is outside of criteria (D+).
Silver (76% @ 20%)
- CI90964-BSD1 Relative percent difference for duplicate is outside of criteria (D+).
Mercury (163% @ 20%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

- [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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

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
- 8015C - 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
- MADEP 18-2.1 - 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
- 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 0-2ft
Date Sampled: 09/03/19 10:15
Percent Solids: 94

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (3.69)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963
Arsenic	9.94 (1.85)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963
Beryllium	0.25 (0.08)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963
Cadmium	ND (0.37)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963
Chromium	7.00 (0.74)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963
Copper	6.78 (1.85)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963
Lead	5.41 (3.69)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963
Mercury	ND (0.027)		7471B		1	MKS	09/11/19 9:55	0.78	40	CI90964
Nickel	9.00 (1.85)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963
Selenium	ND (3.69)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963
Silver	ND (0.37)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963
Thallium	ND (0.37)		6020A		1	KJK	09/11/19 18:02	2.88	100	CI90963
Zinc	24.6 (1.85)		6010C		1	KJK	09/10/19 16:22	2.88	100	CI90963



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 0-2ft
Date Sampled: 09/03/19 10:15
Percent Solids: 94
Initial Volume: 6.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,1,1-Trichloroethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,1,2,2-Tetrachloroethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,1,2-Trichloroethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,1-Dichloroethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,1-Dichloroethene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,1-Dichloropropene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,2,3-Trichlorobenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,2,3-Trichloropropane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,2,4-Trichlorobenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,2,4-Trimethylbenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,2-Dibromo-3-Chloropropane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,2-Dibromoethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,2-Dichlorobenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,2-Dichloroethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,2-Dichloropropane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,3,5-Trimethylbenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,3-Dichlorobenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,3-Dichloropropane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,4-Dichlorobenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1,4-Dioxane	ND (0.0818)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
1-Chlorohexane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
2,2-Dichloropropane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
2-Butanone	ND (0.0409)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
2-Chlorotoluene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
2-Hexanone	ND (0.0409)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
4-Chlorotoluene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
4-Isopropyltoluene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
4-Methyl-2-Pentanone	ND (0.0409)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Acetone	ND (0.0409)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Benzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Bromobenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-8 0-2ft
 Date Sampled: 09/03/19 10:15
 Percent Solids: 94
 Initial Volume: 6.5
 Final Volume: 10
 Extraction Method: 5035

ESS Laboratory Work Order: 19I0088
 ESS Laboratory Sample ID: 19I0088-01
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Bromodichloromethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Bromoform	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Bromomethane	ND (0.0082)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Carbon Disulfide	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Carbon Tetrachloride	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Chlorobenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Chloroethane	ND (0.0082)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Chloroform	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Chloromethane	ND (0.0082)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
cis-1,2-Dichloroethene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
cis-1,3-Dichloropropene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Dibromochloromethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Dibromomethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Dichlorodifluoromethane	ND (0.0082)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Diethyl Ether	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Di-isopropyl ether	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Ethyl tertiary-butyl ether	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Ethylbenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Hexachlorobutadiene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Isopropylbenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Methyl tert-Butyl Ether	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Methylene Chloride	ND (0.0205)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Naphthalene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
n-Butylbenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
n-Propylbenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
sec-Butylbenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Styrene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
tert-Butylbenzene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Tertiary-amyl methyl ether	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Tetrachloroethene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Tetrahydrofuran	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 0-2ft
Date Sampled: 09/03/19 10:15
Percent Solids: 94
Initial Volume: 6.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
trans-1,2-Dichloroethene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
trans-1,3-Dichloropropene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Trichloroethene	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Trichlorofluoromethane	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Vinyl Acetate	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Vinyl Chloride	ND (0.0082)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Xylene O	ND (0.0041)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Xylene P,M	ND (0.0082)		8260B Low		1	09/06/19 15:51	C9I0092	CI90623
Xylenes (Total)	ND (0.00818)		8260B Low		1	09/06/19 15:51		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>93 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>86 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>98 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>91 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 0-2ft
Date Sampled: 09/03/19 10:15
Percent Solids: 94
Initial Volume: 20.7
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/6/19 16:20

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.05)		8082A		1	09/09/19 17:16		CI90605
Aroclor 1221	ND (0.05)		8082A		1	09/09/19 17:16		CI90605
Aroclor 1232	ND (0.05)		8082A		1	09/09/19 17:16		CI90605
Aroclor 1242	ND (0.05)		8082A		1	09/09/19 17:16		CI90605
Aroclor 1248	ND (0.05)		8082A		1	09/09/19 17:16		CI90605
Aroclor 1254	ND (0.05)		8082A		1	09/09/19 17:16		CI90605
Aroclor 1260	ND (0.05)		8082A		1	09/09/19 17:16		CI90605
Aroclor 1262	ND (0.05)		8082A		1	09/09/19 17:16		CI90605
Aroclor 1268	ND (0.05)		8082A		1	09/09/19 17:16		CI90605

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	89 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	92 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	73 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	72 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 0-2ft
Date Sampled: 09/03/19 10:15
Percent Solids: 94
Initial Volume: 19.1
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 9/6/19 11:15

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	ND (41.8)		8100M		1	09/06/19 18:43	C910094	CI90615
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		85 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 0-2ft
Date Sampled: 09/03/19 10:15
Percent Solids: 94
Initial Volume: 14.8
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/6/19 18:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
1,2,4-Trichlorobenzene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
1,2-Dichlorobenzene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
1,3-Dichlorobenzene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
1,4-Dichlorobenzene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2,3,4,6-Tetrachlorophenol	ND (1.80)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2,4,5-Trichlorophenol	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2,4,6-Trichlorophenol	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2,4-Dichlorophenol	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2,4-Dimethylphenol	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2,4-Dinitrophenol	ND (1.80)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2,4-Dinitrotoluene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2,6-Dinitrotoluene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2-Chloronaphthalene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2-Chlorophenol	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2-Methylnaphthalene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2-Methylphenol	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2-Nitroaniline	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
2-Nitrophenol	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
3,3'-Dichlorobenzidine	ND (0.719)		8270D		1	09/11/19 1:12	C9I0144	CI90648
3+4-Methylphenol	ND (0.719)		8270D		1	09/11/19 1:12	C9I0144	CI90648
3-Nitroaniline	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
4,6-Dinitro-2-Methylphenol	ND (1.80)		8270D		1	09/11/19 1:12	C9I0144	CI90648
4-Bromophenyl-phenylether	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
4-Chloro-3-Methylphenol	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
4-Chloroaniline	ND (0.719)		8270D		1	09/11/19 1:12	C9I0144	CI90648
4-Chloro-phenyl-phenyl ether	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
4-Nitroaniline	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
4-Nitrophenol	ND (1.80)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Acenaphthene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Acenaphthylene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Acetophenone	ND (0.719)		8270D		1	09/11/19 1:12	C9I0144	CI90648



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 0-2ft
Date Sampled: 09/03/19 10:15
Percent Solids: 94
Initial Volume: 14.8
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/6/19 18:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.719)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Anthracene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Azobenzene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Benzo(a)anthracene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Benzo(a)pyrene	ND (0.180)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Benzo(b)fluoranthene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Benzo(g,h,i)perylene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Benzo(k)fluoranthene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Benzoic Acid	ND (1.80)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Benzyl Alcohol	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
bis(2-Chloroethoxy)methane	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
bis(2-Chloroethyl)ether	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
bis(2-chloroisopropyl)Ether	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
bis(2-Ethylhexyl)phthalate	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Butylbenzylphthalate	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Carbazole	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Chrysene	ND (0.180)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Dibenzo(a,h)Anthracene	ND (0.180)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Dibenzofuran	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Diethylphthalate	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Dimethylphthalate	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Di-n-butylphthalate	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Di-n-octylphthalate	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Fluoranthene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Fluorene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Hexachlorobenzene	ND (0.180)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Hexachlorobutadiene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Hexachlorocyclopentadiene	ND (1.80)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Hexachloroethane	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Indeno(1,2,3-cd)Pyrene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Isophorone	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Naphthalene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 0-2ft
Date Sampled: 09/03/19 10:15
Percent Solids: 94
Initial Volume: 14.8
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/6/19 18:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
N-Nitrosodimethylamine	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
N-Nitroso-Di-n-Propylamine	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
N-nitrosodiphenylamine	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Pentachlorophenol	ND (1.80)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Phenanthrene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Phenol	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Pyrene	ND (0.359)		8270D		1	09/11/19 1:12	C9I0144	CI90648
Pyridine	ND (1.80)		8270D		1	09/11/19 1:12	C9I0144	CI90648

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	71 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	88 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	76 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	70 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	75 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	72 %		30-130
<i>Surrogate: Phenol-d6</i>	74 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	76 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 2-4ft
Date Sampled: 09/03/19 10:30
Percent Solids: 95

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (3.93)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963
Arsenic	6.88 (1.96)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963
Beryllium	0.21 (0.09)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963
Cadmium	ND (0.39)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963
Chromium	7.48 (0.79)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963
Copper	5.93 (1.96)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963
Lead	5.02 (3.93)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963
Mercury	ND (0.031)		7471B		1	MKS	09/11/19 9:57	0.68	40	CI90964
Nickel	8.62 (1.96)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963
Selenium	ND (3.93)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963
Silver	ND (0.39)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963
Thallium	ND (0.39)		6020A		1	KJK	09/11/19 18:07	2.67	100	CI90963
Zinc	27.1 (1.96)		6010C		1	KJK	09/10/19 16:37	2.67	100	CI90963



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 2-4ft
Date Sampled: 09/03/19 10:30
Percent Solids: 95
Initial Volume: 6.6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,1,1-Trichloroethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,1,2,2-Tetrachloroethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,1,2-Trichloroethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,1-Dichloroethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,1-Dichloroethene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,1-Dichloropropene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,2,3-Trichlorobenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,2,3-Trichloropropane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,2,4-Trichlorobenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,2,4-Trimethylbenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,2-Dibromo-3-Chloropropane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,2-Dibromoethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,2-Dichlorobenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,2-Dichloroethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,2-Dichloropropane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,3,5-Trimethylbenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,3-Dichlorobenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,3-Dichloropropane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,4-Dichlorobenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1,4-Dioxane	ND (0.0795)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
1-Chlorohexane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
2,2-Dichloropropane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
2-Butanone	ND (0.0397)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
2-Chlorotoluene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
2-Hexanone	ND (0.0397)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
4-Chlorotoluene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
4-Isopropyltoluene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
4-Methyl-2-Pentanone	ND (0.0397)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Acetone	ND (0.0397)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Benzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Bromobenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 2-4ft
Date Sampled: 09/03/19 10:30
Percent Solids: 95
Initial Volume: 6.6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Bromodichloromethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Bromoform	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Bromomethane	ND (0.0079)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Carbon Disulfide	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Carbon Tetrachloride	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Chlorobenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Chloroethane	ND (0.0079)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Chloroform	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Chloromethane	ND (0.0079)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
cis-1,2-Dichloroethene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
cis-1,3-Dichloropropene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Dibromochloromethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Dibromomethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Dichlorodifluoromethane	ND (0.0079)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Diethyl Ether	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Di-isopropyl ether	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Ethyl tertiary-butyl ether	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Ethylbenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Hexachlorobutadiene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Isopropylbenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Methyl tert-Butyl Ether	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Methylene Chloride	ND (0.0199)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Naphthalene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
n-Butylbenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
n-Propylbenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
sec-Butylbenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Styrene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
tert-Butylbenzene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Tertiary-amyl methyl ether	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Tetrachloroethene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Tetrahydrofuran	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 2-4ft
Date Sampled: 09/03/19 10:30
Percent Solids: 95
Initial Volume: 6.6
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
trans-1,2-Dichloroethene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
trans-1,3-Dichloropropene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Trichloroethene	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Trichlorofluoromethane	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Vinyl Acetate	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Vinyl Chloride	ND (0.0079)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Xylene O	ND (0.0040)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Xylene P,M	ND (0.0079)		8260B Low		1	09/06/19 16:16	C9I0092	CI90623
Xylenes (Total)	ND (0.00795)		8260B Low		1	09/06/19 16:16		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>92 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>87 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>97 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>91 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 2-4ft
Date Sampled: 09/03/19 10:30
Percent Solids: 95
Initial Volume: 20.4
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/6/19 16:20

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.05)		8082A		1	09/09/19 17:35		CI90605
Aroclor 1221	ND (0.05)		8082A		1	09/09/19 17:35		CI90605
Aroclor 1232	ND (0.05)		8082A		1	09/09/19 17:35		CI90605
Aroclor 1242	ND (0.05)		8082A		1	09/09/19 17:35		CI90605
Aroclor 1248	ND (0.05)		8082A		1	09/09/19 17:35		CI90605
Aroclor 1254	ND (0.05)		8082A		1	09/09/19 17:35		CI90605
Aroclor 1260	ND (0.05)		8082A		1	09/09/19 17:35		CI90605
Aroclor 1262	ND (0.05)		8082A		1	09/09/19 17:35		CI90605
Aroclor 1268	ND (0.05)		8082A		1	09/09/19 17:35		CI90605

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	91 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	94 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	75 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	74 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 2-4ft
Date Sampled: 09/03/19 10:30
Percent Solids: 95
Initial Volume: 20.3
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 9/6/19 11:15

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	ND (38.8)		8100M		1	09/06/19 19:15	C910094	CI90615
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		85 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 2-4ft
Date Sampled: 09/03/19 10:30
Percent Solids: 95
Initial Volume: 14.4
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/6/19 18:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
1,2,4-Trichlorobenzene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
1,2-Dichlorobenzene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
1,3-Dichlorobenzene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
1,4-Dichlorobenzene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2,3,4,6-Tetrachlorophenol	ND (1.83)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2,4,5-Trichlorophenol	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2,4,6-Trichlorophenol	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2,4-Dichlorophenol	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2,4-Dimethylphenol	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2,4-Dinitrophenol	ND (1.83)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2,4-Dinitrotoluene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2,6-Dinitrotoluene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2-Chloronaphthalene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2-Chlorophenol	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2-Methylnaphthalene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2-Methylphenol	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2-Nitroaniline	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
2-Nitrophenol	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
3,3'-Dichlorobenzidine	ND (0.729)		8270D		1	09/11/19 1:38	C9I0144	CI90648
3+4-Methylphenol	ND (0.729)		8270D		1	09/11/19 1:38	C9I0144	CI90648
3-Nitroaniline	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
4,6-Dinitro-2-Methylphenol	ND (1.83)		8270D		1	09/11/19 1:38	C9I0144	CI90648
4-Bromophenyl-phenylether	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
4-Chloro-3-Methylphenol	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
4-Chloroaniline	ND (0.729)		8270D		1	09/11/19 1:38	C9I0144	CI90648
4-Chloro-phenyl-phenyl ether	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
4-Nitroaniline	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
4-Nitrophenol	ND (1.83)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Acenaphthene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Acenaphthylene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Acetophenone	ND (0.729)		8270D		1	09/11/19 1:38	C9I0144	CI90648



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 2-4ft
Date Sampled: 09/03/19 10:30
Percent Solids: 95
Initial Volume: 14.4
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/6/19 18:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.729)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Anthracene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Azobenzene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Benzo(a)anthracene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Benzo(a)pyrene	ND (0.183)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Benzo(b)fluoranthene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Benzo(g,h,i)perylene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Benzo(k)fluoranthene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Benzoic Acid	ND (1.83)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Benzyl Alcohol	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
bis(2-Chloroethoxy)methane	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
bis(2-Chloroethyl)ether	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
bis(2-chloroisopropyl)Ether	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
bis(2-Ethylhexyl)phthalate	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Butylbenzylphthalate	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Carbazole	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Chrysene	ND (0.183)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Dibenzo(a,h)Anthracene	ND (0.183)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Dibenzofuran	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Diethylphthalate	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Dimethylphthalate	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Di-n-butylphthalate	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Di-n-octylphthalate	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Fluoranthene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Fluorene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Hexachlorobenzene	ND (0.183)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Hexachlorobutadiene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Hexachlorocyclopentadiene	ND (1.83)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Hexachloroethane	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Indeno(1,2,3-cd)Pyrene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Isophorone	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Naphthalene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 2-4ft
Date Sampled: 09/03/19 10:30
Percent Solids: 95
Initial Volume: 14.4
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0088
ESS Laboratory Sample ID: 19I0088-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/6/19 18:35

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
N-Nitrosodimethylamine	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
N-Nitroso-Di-n-Propylamine	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
N-nitrosodiphenylamine	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Pentachlorophenol	ND (1.83)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Phenanthrene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Phenol	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Pyrene	ND (0.364)		8270D		1	09/11/19 1:38	C9I0144	CI90648
Pyridine	ND (1.83)		8270D		1	09/11/19 1:38	C9I0144	CI90648

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	78 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	96 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	84 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	77 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	83 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	82 %		30-130
<i>Surrogate: Phenol-d6</i>	83 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	83 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch C190963 - 3050B

Blank

Antimony	ND	5.00	mg/kg wet
Arsenic	ND	2.50	mg/kg wet
Beryllium	ND	0.11	mg/kg wet
Cadmium	ND	0.50	mg/kg wet
Chromium	ND	1.00	mg/kg wet
Copper	ND	2.50	mg/kg wet
Lead	ND	5.00	mg/kg wet
Nickel	ND	2.50	mg/kg wet
Selenium	ND	5.00	mg/kg wet
Silver	ND	0.50	mg/kg wet
Thallium	ND	0.50	mg/kg wet
Zinc	ND	2.50	mg/kg wet

LCS

Arsenic	137	8.62	mg/kg wet	128.0	107	80-120
Beryllium	205	0.38	mg/kg wet	217.0	94	80-120
Cadmium	83.4	1.72	mg/kg wet	99.00	84	80-120
Chromium	107	3.45	mg/kg wet	116.0	92	80-120
Copper	83.7	8.62	mg/kg wet	89.60	93	80-120
Lead	277	17.2	mg/kg wet	277.0	100	80-120
Nickel	105	8.62	mg/kg wet	107.0	98	80-120
Selenium	236	17.2	mg/kg wet	242.0	98	80-120
Thallium	193	8.62	mg/kg wet	183.0	105	80-120
Zinc	533	8.62	mg/kg wet	561.0	95	80-120

LCS

Zinc	ND	8.93	mg/kg wet	127.0	0	80-120
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LCS

Antimony	52.6	17.5	mg/kg wet	42.40	124	40-160
Silver	60.0	1.75	mg/kg wet	64.30	93	80-120
Zinc	ND	8.77	mg/kg wet	561.0	0	80-120

LCS Dup

Arsenic	139	9.26	mg/kg wet	128.0	108	80-120	1	20
Beryllium	216	0.41	mg/kg wet	217.0	100	80-120	5	20
Cadmium	85.6	1.85	mg/kg wet	99.00	86	80-120	3	20
Chromium	111	3.70	mg/kg wet	116.0	96	80-120	4	20
Copper	88.0	9.26	mg/kg wet	89.60	98	80-120	5	20
Lead	279	18.5	mg/kg wet	277.0	101	80-120	0.7	20
Nickel	109	9.26	mg/kg wet	107.0	102	80-120	4	20
Selenium	238	18.5	mg/kg wet	242.0	99	80-120	0.8	20
Thallium	203	9.26	mg/kg wet	183.0	111	80-120	5	30
Zinc	549	9.26	mg/kg wet	561.0	98	80-120	3	20

LCS Dup

Zinc	ND	8.62	mg/kg wet	127.0	0	80-120		20
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LCS Dup



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CI90963 - 3050B

Antimony	43.7	15.2	mg/kg wet	133.0		33	40-160	19	20	B-
Silver	26.8	1.52	mg/kg wet	66.30		40	80-120	76	20	B-, D+
Zinc	ND	7.58	mg/kg wet	127.0		0	80-120		20	

Batch CI90964 - 7471B

Blank

Mercury	ND	0.033	mg/kg wet							
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LCS

Mercury	23.9	2.64	mg/kg wet	27.30		88	80-120			
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LCS Dup

Mercury	2.46	0.291	mg/kg wet	3.120		79	67-121	163	20	D+
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5035/8260B Volatile Organic Compounds / Low Level

Batch CI90623 - 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	0.0050	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							
1-Chlorohexane	ND	0.0050	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0500	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0500	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet							
Acetone	ND	0.0500	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C190623 - 5035

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	0.0050	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	0.0250	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 Acetate	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	0.0425		mg/kg wet	0.05000		85	70-130			
Surrogate: 4-Bromofluorobenzene	0.0432		mg/kg wet	0.05000		86	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C190623 - 5035

Surrogate: Dibromofluoromethane	0.0460		mg/kg wet	0.05000		92	70-130			
Surrogate: Toluene-d8	0.0455		mg/kg wet	0.05000		91	70-130			

LCS

1,1,1,2-Tetrachloroethane	0.0536	0.0050	mg/kg wet	0.05000		107	70-130			
1,1,1-Trichloroethane	0.0552	0.0050	mg/kg wet	0.05000		110	70-130			
1,1,2,2-Tetrachloroethane	0.0441	0.0050	mg/kg wet	0.05000		88	70-130			
1,1,2-Trichloroethane	0.0492	0.0050	mg/kg wet	0.05000		98	70-130			
1,1-Dichloroethane	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
1,1-Dichloroethene	0.0556	0.0050	mg/kg wet	0.05000		111	70-130			
1,1-Dichloropropene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
1,2,3-Trichlorobenzene	0.0494	0.0050	mg/kg wet	0.05000		99	70-130			
1,2,3-Trichloropropane	0.0443	0.0050	mg/kg wet	0.05000		89	70-130			
1,2,4-Trichlorobenzene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
1,2,4-Trimethylbenzene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130			
1,2-Dibromo-3-Chloropropane	0.0405	0.0050	mg/kg wet	0.05000		81	70-130			
1,2-Dibromoethane	0.0466	0.0050	mg/kg wet	0.05000		93	70-130			
1,2-Dichlorobenzene	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
1,2-Dichloroethane	0.0473	0.0050	mg/kg wet	0.05000		95	70-130			
1,2-Dichloropropane	0.0493	0.0050	mg/kg wet	0.05000		99	70-130			
1,3,5-Trimethylbenzene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130			
1,3-Dichlorobenzene	0.0495	0.0050	mg/kg wet	0.05000		99	70-130			
1,3-Dichloropropane	0.0481	0.0050	mg/kg wet	0.05000		96	70-130			
1,4-Dichlorobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
1,4-Dioxane	0.966	0.100	mg/kg wet	1.000		97	70-130			
1-Chlorohexane	0.0526	0.0050	mg/kg wet	0.05000		105	70-130			
2,2-Dichloropropane	0.0565	0.0050	mg/kg wet	0.05000		113	70-130			
2-Butanone	0.260	0.0500	mg/kg wet	0.2500		104	70-130			
2-Chlorotoluene	0.0492	0.0050	mg/kg wet	0.05000		98	70-130			
2-Hexanone	0.215	0.0500	mg/kg wet	0.2500		86	70-130			
4-Chlorotoluene	0.0489	0.0050	mg/kg wet	0.05000		98	70-130			
4-Isopropyltoluene	0.0517	0.0050	mg/kg wet	0.05000		103	70-130			
4-Methyl-2-Pentanone	0.223	0.0500	mg/kg wet	0.2500		89	70-130			
Acetone	0.257	0.0500	mg/kg wet	0.2500		103	70-130			
Benzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Bromobenzene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
Bromochloromethane	0.0530	0.0050	mg/kg wet	0.05000		106	70-130			
Bromodichloromethane	0.0487	0.0050	mg/kg wet	0.05000		97	70-130			
Bromoform	0.0458	0.0050	mg/kg wet	0.05000		92	70-130			
Bromomethane	0.0480	0.0100	mg/kg wet	0.05000		96	70-130			
Carbon Disulfide	0.0570	0.0050	mg/kg wet	0.05000		114	70-130			
Carbon Tetrachloride	0.0573	0.0050	mg/kg wet	0.05000		115	70-130			
Chlorobenzene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130			
Chloroethane	0.0459	0.0100	mg/kg wet	0.05000		92	70-130			
Chloroform	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C190623 - 5035

Chloromethane	0.0465	0.0100	mg/kg wet	0.05000		93	70-130			
cis-1,2-Dichloroethene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130			
cis-1,3-Dichloropropene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130			
Dibromochloromethane	0.0471	0.0050	mg/kg wet	0.05000		94	70-130			
Dibromomethane	0.0488	0.0050	mg/kg wet	0.05000		98	70-130			
Dichlorodifluoromethane	0.0355	0.0100	mg/kg wet	0.05000		71	70-130			
Diethyl Ether	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
Di-isopropyl ether	0.0523	0.0050	mg/kg wet	0.05000		105	70-130			
Ethyl tertiary-butyl ether	0.0473	0.0050	mg/kg wet	0.05000		95	70-130			
Ethylbenzene	0.0501	0.0050	mg/kg wet	0.05000		100	70-130			
Hexachlorobutadiene	0.0539	0.0050	mg/kg wet	0.05000		108	70-130			
Isopropylbenzene	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
Methyl tert-Butyl Ether	0.0497	0.0050	mg/kg wet	0.05000		99	70-130			
Methylene Chloride	0.0479	0.0250	mg/kg wet	0.05000		96	70-130			
Naphthalene	0.0454	0.0050	mg/kg wet	0.05000		91	70-130			
n-Butylbenzene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
n-Propylbenzene	0.0501	0.0050	mg/kg wet	0.05000		100	70-130			
sec-Butylbenzene	0.0497	0.0050	mg/kg wet	0.05000		99	70-130			
Styrene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130			
tert-Butylbenzene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130			
Tertiary-amyl methyl ether	0.0495	0.0050	mg/kg wet	0.05000		99	70-130			
Tetrachloroethene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
Tetrahydrofuran	0.0405	0.0050	mg/kg wet	0.05000		81	70-130			
Toluene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
trans-1,2-Dichloroethene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130			
trans-1,3-Dichloropropene	0.0457	0.0050	mg/kg wet	0.05000		91	70-130			
Trichloroethene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
Trichlorofluoromethane	0.0496	0.0050	mg/kg wet	0.05000		99	70-130			
Vinyl Acetate	0.0419	0.0050	mg/kg wet	0.05000		84	70-130			
Vinyl Chloride	0.0508	0.0100	mg/kg wet	0.05000		102	70-130			
Xylene O	0.0491	0.0050	mg/kg wet	0.05000		98	70-130			
Xylene P,M	0.108	0.0100	mg/kg wet	0.1000		108	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0410		mg/kg wet	0.05000		82	70-130			
Surrogate: 4-Bromofluorobenzene	0.0456		mg/kg wet	0.05000		91	70-130			
Surrogate: Dibromofluoromethane	0.0472		mg/kg wet	0.05000		94	70-130			
Surrogate: Toluene-d8	0.0447		mg/kg wet	0.05000		89	70-130			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	0.8	25	
1,1,1-Trichloroethane	0.0560	0.0050	mg/kg wet	0.05000		112	70-130	2	25	
1,1,2,2-Tetrachloroethane	0.0443	0.0050	mg/kg wet	0.05000		89	70-130	0.5	25	
1,1,2-Trichloroethane	0.0507	0.0050	mg/kg wet	0.05000		101	70-130	3	25	
1,1-Dichloroethane	0.0543	0.0050	mg/kg wet	0.05000		109	70-130	3	25	
1,1-Dichloroethene	0.0574	0.0050	mg/kg wet	0.05000		115	70-130	3	25	
1,1-Dichloropropene	0.0541	0.0050	mg/kg wet	0.05000		108	70-130	2	25	
1,2,3-Trichlorobenzene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130	0.3	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C190623 - 5035

1,2,3-Trichloropropane	0.0448	0.0050	mg/kg wet	0.05000		90	70-130	1	25	
1,2,4-Trichlorobenzene	0.0509	0.0050	mg/kg wet	0.05000		102	70-130	0.2	25	
1,2,4-Trimethylbenzene	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	2	25	
1,2-Dibromo-3-Chloropropane	0.0393	0.0050	mg/kg wet	0.05000		79	70-130	3	25	
1,2-Dibromoethane	0.0477	0.0050	mg/kg wet	0.05000		95	70-130	2	25	
1,2-Dichlorobenzene	0.0507	0.0050	mg/kg wet	0.05000		101	70-130	0.8	25	
1,2-Dichloroethane	0.0470	0.0050	mg/kg wet	0.05000		94	70-130	0.6	25	
1,2-Dichloropropane	0.0502	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
1,3,5-Trimethylbenzene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130	3	25	
1,3-Dichlorobenzene	0.0509	0.0050	mg/kg wet	0.05000		102	70-130	3	25	
1,3-Dichloropropane	0.0490	0.0050	mg/kg wet	0.05000		98	70-130	2	25	
1,4-Dichlorobenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	0.2	25	
1,4-Dioxane	1.01	0.100	mg/kg wet	1.000		101	70-130	5	20	
1-Chlorohexane	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	5	25	
2,2-Dichloropropane	0.0571	0.0050	mg/kg wet	0.05000		114	70-130	1	25	
2-Butanone	0.256	0.0500	mg/kg wet	0.2500		102	70-130	2	25	
2-Chlorotoluene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
2-Hexanone	0.214	0.0500	mg/kg wet	0.2500		86	70-130	0.2	25	
4-Chlorotoluene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
4-Isopropyltoluene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130	0.5	25	
4-Methyl-2-Pentanone	0.228	0.0500	mg/kg wet	0.2500		91	70-130	2	25	
Acetone	0.220	0.0500	mg/kg wet	0.2500		88	70-130	16	25	
Benzene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130	2	25	
Bromobenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	0.6	25	
Bromochloromethane	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	0.3	25	
Bromodichloromethane	0.0490	0.0050	mg/kg wet	0.05000		98	70-130	0.6	25	
Bromoform	0.0475	0.0050	mg/kg wet	0.05000		95	70-130	4	25	
Bromomethane	0.0481	0.0100	mg/kg wet	0.05000		96	70-130	0.2	25	
Carbon Disulfide	0.0590	0.0050	mg/kg wet	0.05000		118	70-130	3	25	
Carbon Tetrachloride	0.0585	0.0050	mg/kg wet	0.05000		117	70-130	2	25	
Chlorobenzene	0.0516	0.0050	mg/kg wet	0.05000		103	70-130	3	25	
Chloroethane	0.0468	0.0100	mg/kg wet	0.05000		94	70-130	2	25	
Chloroform	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	1	25	
Chloromethane	0.0479	0.0100	mg/kg wet	0.05000		96	70-130	3	25	
cis-1,2-Dichloroethene	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	1	25	
cis-1,3-Dichloropropene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	1	25	
Dibromochloromethane	0.0473	0.0050	mg/kg wet	0.05000		95	70-130	0.4	25	
Dibromomethane	0.0489	0.0050	mg/kg wet	0.05000		98	70-130	0.3	25	
Dichlorodifluoromethane	0.0355	0.0100	mg/kg wet	0.05000		71	70-130	0.06	25	
Diethyl Ether	0.0539	0.0050	mg/kg wet	0.05000		108	70-130	0.6	25	
Di-isopropyl ether	0.0533	0.0050	mg/kg wet	0.05000		107	70-130	2	25	
Ethyl tertiary-butyl ether	0.0482	0.0050	mg/kg wet	0.05000		96	70-130	2	25	
Ethylbenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130	5	25	
Hexachlorobutadiene	0.0533	0.0050	mg/kg wet	0.05000		107	70-130	1	25	
Isopropylbenzene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130	4	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C190623 - 5035

Methyl tert-Butyl Ether	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	2	25	
Methylene Chloride	0.0495	0.0250	mg/kg wet	0.05000		99	70-130	3	25	
Naphthalene	0.0463	0.0050	mg/kg wet	0.05000		93	70-130	2	25	
n-Butylbenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130	2	25	
n-Propylbenzene	0.0516	0.0050	mg/kg wet	0.05000		103	70-130	3	25	
sec-Butylbenzene	0.0509	0.0050	mg/kg wet	0.05000		102	70-130	2	25	
Styrene	0.0533	0.0050	mg/kg wet	0.05000		107	70-130	4	25	
tert-Butylbenzene	0.0526	0.0050	mg/kg wet	0.05000		105	70-130	4	25	
Tertiary-amyl methyl ether	0.0499	0.0050	mg/kg wet	0.05000		100	70-130	0.8	25	
Tetrachloroethene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	2	25	
Tetrahydrofuran	0.0425	0.0050	mg/kg wet	0.05000		85	70-130	5	25	
Toluene	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	1	25	
trans-1,2-Dichloroethene	0.0567	0.0050	mg/kg wet	0.05000		113	70-130	3	25	
trans-1,3-Dichloropropene	0.0466	0.0050	mg/kg wet	0.05000		93	70-130	2	25	
Trichloroethene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130	2	25	
Trichlorofluoromethane	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	2	25	
Vinyl Acetate	0.0429	0.0050	mg/kg wet	0.05000		86	70-130	3	25	
Vinyl Chloride	0.0516	0.0100	mg/kg wet	0.05000		103	70-130	1	25	
Xylene O	0.0508	0.0050	mg/kg wet	0.05000		102	70-130	3	25	
Xylene P,M	0.113	0.0100	mg/kg wet	0.1000		113	70-130	4	25	
Surrogate: 1,2-Dichloroethane-d4	0.0404		mg/kg wet	0.05000		81	70-130			
Surrogate: 4-Bromofluorobenzene	0.0453		mg/kg wet	0.05000		91	70-130			
Surrogate: Dibromofluoromethane	0.0463		mg/kg wet	0.05000		93	70-130			
Surrogate: Toluene-d8	0.0449		mg/kg wet	0.05000		90	70-130			

8082A Polychlorinated Biphenyls (PCB)

Batch C190605 - 3540C

Blank										
Aroclor 1016	ND	0.02	mg/kg wet							
Aroclor 1016 [2C]	ND	0.02	mg/kg wet							
Aroclor 1221	ND	0.02	mg/kg wet							
Aroclor 1221 [2C]	ND	0.02	mg/kg wet							
Aroclor 1232	ND	0.02	mg/kg wet							
Aroclor 1232 [2C]	ND	0.02	mg/kg wet							
Aroclor 1242	ND	0.02	mg/kg wet							
Aroclor 1242 [2C]	ND	0.02	mg/kg wet							
Aroclor 1248	ND	0.02	mg/kg wet							
Aroclor 1248 [2C]	ND	0.02	mg/kg wet							
Aroclor 1254	ND	0.02	mg/kg wet							
Aroclor 1254 [2C]	ND	0.02	mg/kg wet							
Aroclor 1260	ND	0.02	mg/kg wet							
Aroclor 1260 [2C]	ND	0.02	mg/kg wet							
Aroclor 1262	ND	0.02	mg/kg wet							
Aroclor 1262 [2C]	ND	0.02	mg/kg wet							
Aroclor 1268	ND	0.02	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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ESS Laboratory Work Order: 19I0088

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082A Polychlorinated Biphenyls (PCB)

Batch C190605 - 3540C

Aroclor 1268 [2C]	ND	0.02	mg/kg wet							
Surrogate: Decachlorobiphenyl	0.0223		mg/kg wet	0.02500		89	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0226		mg/kg wet	0.02500		90	30-150			
Surrogate: Tetrachloro-m-xylene	0.0182		mg/kg wet	0.02500		73	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0179		mg/kg wet	0.02500		72	30-150			

LCS

Aroclor 1016	0.5	0.05	mg/kg wet	0.5000		98	40-140			
Aroclor 1016 [2C]	0.5	0.05	mg/kg wet	0.5000		96	40-140			
Aroclor 1260	0.5	0.05	mg/kg wet	0.5000		92	40-140			
Aroclor 1260 [2C]	0.4	0.05	mg/kg wet	0.5000		85	40-140			
Surrogate: Decachlorobiphenyl	0.0224		mg/kg wet	0.02500		89	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0226		mg/kg wet	0.02500		90	30-150			
Surrogate: Tetrachloro-m-xylene	0.0189		mg/kg wet	0.02500		76	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0172		mg/kg wet	0.02500		69	30-150			

LCS Dup

Aroclor 1016	0.4	0.05	mg/kg wet	0.5000		89	40-140	10	30	
Aroclor 1016 [2C]	0.4	0.05	mg/kg wet	0.5000		88	40-140	9	30	
Aroclor 1260	0.4	0.05	mg/kg wet	0.5000		86	40-140	7	30	
Aroclor 1260 [2C]	0.4	0.05	mg/kg wet	0.5000		82	40-140	4	30	
Surrogate: Decachlorobiphenyl	0.0212		mg/kg wet	0.02500		85	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0213		mg/kg wet	0.02500		85	30-150			
Surrogate: Tetrachloro-m-xylene	0.0168		mg/kg wet	0.02500		67	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0153		mg/kg wet	0.02500		61	30-150			

8100M Total Petroleum Hydrocarbons

Batch C190615 - 3546

Blank

Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							
Hexadecane (C16)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							
Octacosane (C28)	ND	0.2	mg/kg wet							
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							
Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons	ND	37.5	mg/kg wet							
Triacontane (C30)	ND	0.2	mg/kg wet							

Surrogate: O-Terphenyl 4.61 mg/kg wet 5.000 92 40-140



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8100M Total Petroleum Hydrocarbons

Batch C190615 - 3546

LCS

Decane (C10)	1.8	0.2	mg/kg wet	2.500		74	40-140			
Docosane (C22)	2.3	0.2	mg/kg wet	2.500		94	40-140			
Dodecane (C12)	2.0	0.2	mg/kg wet	2.500		79	40-140			
Eicosane (C20)	2.3	0.2	mg/kg wet	2.500		92	40-140			
Hexacosane (C26)	2.3	0.2	mg/kg wet	2.500		93	40-140			
Hexadecane (C16)	2.2	0.2	mg/kg wet	2.500		87	40-140			
Nonadecane (C19)	2.4	0.2	mg/kg wet	2.500		96	40-140			
Nonane (C9)	1.6	0.2	mg/kg wet	2.500		66	30-140			
Octacosane (C28)	2.3	0.2	mg/kg wet	2.500		94	40-140			
Octadecane (C18)	2.3	0.2	mg/kg wet	2.500		92	40-140			
Tetracosane (C24)	2.3	0.2	mg/kg wet	2.500		93	40-140			
Tetradecane (C14)	2.1	0.2	mg/kg wet	2.500		84	40-140			
Total Petroleum Hydrocarbons	31.0	37.5	mg/kg wet	35.00		88	40-140			
Triacontane (C30)	2.3	0.2	mg/kg wet	2.500		94	40-140			

<i>Surrogate: O-Terphenyl</i>	<i>4.81</i>		mg/kg wet	<i>5.000</i>		<i>96</i>	<i>40-140</i>			
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LCS Dup

Decane (C10)	1.9	0.2	mg/kg wet	2.500		75	40-140	1	25	
Docosane (C22)	2.3	0.2	mg/kg wet	2.500		92	40-140	2	25	
Dodecane (C12)	2.0	0.2	mg/kg wet	2.500		81	40-140	2	25	
Eicosane (C20)	2.3	0.2	mg/kg wet	2.500		91	40-140	1	25	
Hexacosane (C26)	2.3	0.2	mg/kg wet	2.500		92	40-140	1	25	
Hexadecane (C16)	2.2	0.2	mg/kg wet	2.500		88	40-140	1	25	
Nonadecane (C19)	2.4	0.2	mg/kg wet	2.500		95	40-140	1	25	
Nonane (C9)	1.7	0.2	mg/kg wet	2.500		67	30-140	1	25	
Octacosane (C28)	2.3	0.2	mg/kg wet	2.500		92	40-140	1	25	
Octadecane (C18)	2.3	0.2	mg/kg wet	2.500		91	40-140	1	25	
Tetracosane (C24)	2.3	0.2	mg/kg wet	2.500		92	40-140	1	25	
Tetradecane (C14)	2.1	0.2	mg/kg wet	2.500		84	40-140	0.7	25	
Total Petroleum Hydrocarbons	30.8	37.5	mg/kg wet	35.00		88	40-140	0.6	25	
Triacontane (C30)	2.3	0.2	mg/kg wet	2.500		93	40-140	1	25	

<i>Surrogate: O-Terphenyl</i>	<i>4.66</i>		mg/kg wet	<i>5.000</i>		<i>93</i>	<i>40-140</i>			
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8270D Semi-Volatile Organic Compounds

Batch C190648 - 3546

Blank

1,1-Biphenyl	ND	0.333	mg/kg wet							
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							
2,3,4,6-Tetrachlorophenol	ND	1.67	mg/kg wet							
2,4,5-Trichlorophenol	ND	0.333	mg/kg wet							



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
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8270D Semi-Volatile Organic Compounds

Batch C190648 - 3546

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	0.167	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-Nitroaniline	ND	0.333	mg/kg wet
2-Nitrophenol	ND	0.333	mg/kg wet
3,3'-Dichlorobenzidine	ND	0.167	mg/kg wet
3+4-Methylphenol	ND	0.667	mg/kg wet
3-Nitroaniline	ND	0.333	mg/kg wet
4,6-Dinitro-2-Methylphenol	ND	1.67	mg/kg wet
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet
4-Chloro-3-Methylphenol	ND	0.333	mg/kg wet
4-Chloroaniline	ND	0.667	mg/kg wet
4-Chloro-phenyl-phenyl ether	ND	0.333	mg/kg wet
4-Nitroaniline	ND	0.333	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	0.667	mg/kg wet
Anthracene	ND	0.333	mg/kg wet
Azobenzene	ND	0.333	mg/kg wet
Benzo(a)anthracene	ND	0.167	mg/kg wet
Benzo(a)pyrene	ND	0.167	mg/kg wet
Benzo(b)fluoranthene	ND	0.167	mg/kg wet
Benzo(g,h,i)perylene	ND	0.167	mg/kg wet
Benzo(k)fluoranthene	ND	0.167	mg/kg wet
Benzoic Acid	ND	1.67	mg/kg wet
Benzyl Alcohol	ND	0.333	mg/kg wet
bis(2-Chloroethoxy)methane	ND	0.333	mg/kg wet
bis(2-Chloroethyl)ether	ND	0.100	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
Carbazole	ND	0.333	mg/kg wet
Chrysene	ND	0.083	mg/kg wet
Dibenzo(a,h)Anthracene	ND	0.083	mg/kg wet
Dibenzofuran	ND	0.333	mg/kg wet
Diethylphthalate	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
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8270D Semi-Volatile Organic Compounds

Batch C190648 - 3546

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	0.083	mg/kg wet							
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachlorocyclopentadiene	ND	1.67	mg/kg wet							
Hexachloroethane	ND	0.333	mg/kg wet							
Indeno(1,2,3-cd)Pyrene	ND	0.167	mg/kg wet							
Isophorone	ND	0.333	mg/kg wet							
Naphthalene	ND	0.167	mg/kg wet							
Nitrobenzene	ND	0.333	mg/kg wet							
N-Nitrosodimethylamine	ND	0.333	mg/kg wet							
N-Nitroso-Di-n-Propylamine	ND	0.333	mg/kg wet							
N-nitrosodiphenylamine	ND	0.333	mg/kg wet							
Pentachlorophenol	ND	0.667	mg/kg wet							
Phenanthrene	ND	0.333	mg/kg wet							
Phenol	ND	0.333	mg/kg wet							
Pyrene	ND	0.333	mg/kg wet							
Pyridine	ND	1.67	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	2.22		mg/kg wet	3.333		67	30-130			
Surrogate: 2,4,6-Tribromophenol	4.26		mg/kg wet	5.000		85	30-130			
Surrogate: 2-Chlorophenol-d4	3.56		mg/kg wet	5.000		71	30-130			
Surrogate: 2-Fluorobiphenyl	2.19		mg/kg wet	3.333		66	30-130			
Surrogate: 2-Fluorophenol	3.62		mg/kg wet	5.000		72	30-130			
Surrogate: Nitrobenzene-d5	2.24		mg/kg wet	3.333		67	30-130			
Surrogate: Phenol-d6	3.46		mg/kg wet	5.000		69	30-130			
Surrogate: p-Terphenyl-d14	2.53		mg/kg wet	3.333		76	30-130			

LCS

1,1-Biphenyl	2.19	0.333	mg/kg wet	3.333		66	40-140			
1,2,4-Trichlorobenzene	2.17	0.333	mg/kg wet	3.333		65	40-140			
1,2-Dichlorobenzene	2.00	0.333	mg/kg wet	3.333		60	40-140			
1,3-Dichlorobenzene	1.98	0.333	mg/kg wet	3.333		59	40-140			
1,4-Dichlorobenzene	1.96	0.333	mg/kg wet	3.333		59	40-140			
2,3,4,6-Tetrachlorophenol	2.54	1.67	mg/kg wet	3.333		76	30-130			
2,4,5-Trichlorophenol	2.58	0.333	mg/kg wet	3.333		77	30-130			
2,4,6-Trichlorophenol	2.50	0.333	mg/kg wet	3.333		75	30-130			
2,4-Dichlorophenol	2.47	0.333	mg/kg wet	3.333		74	30-130			
2,4-Dimethylphenol	2.34	0.333	mg/kg wet	3.333		70	30-130			
2,4-Dinitrophenol	2.59	1.67	mg/kg wet	3.333		78	30-130			
2,4-Dinitrotoluene	2.73	0.167	mg/kg wet	3.333		82	40-140			
2,6-Dinitrotoluene	2.52	0.333	mg/kg wet	3.333		76	40-140			
2-Chloronaphthalene	2.14	0.333	mg/kg wet	3.333		64	40-140			
2-Chlorophenol	2.10	0.333	mg/kg wet	3.333		63	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
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8270D Semi-Volatile Organic Compounds

Batch C190648 - 3546

2-Methylnaphthalene	2.13	0.333	mg/kg wet	3.333		64	40-140			
2-Methylphenol	2.20	0.333	mg/kg wet	3.333		66	30-130			
2-Nitroaniline	1.97	0.333	mg/kg wet	3.333		59	40-140			
2-Nitrophenol	2.17	0.333	mg/kg wet	3.333		65	30-130			
3,3'-Dichlorobenzidine	2.30	0.167	mg/kg wet	3.333		69	40-140			
3+4-Methylphenol	4.28	0.667	mg/kg wet	6.667		64	30-130			
3-Nitroaniline	2.32	0.333	mg/kg wet	3.333		70	40-140			
4,6-Dinitro-2-Methylphenol	2.68	1.67	mg/kg wet	3.333		81	30-130			
4-Bromophenyl-phenylether	2.68	0.333	mg/kg wet	3.333		80	40-140			
4-Chloro-3-Methylphenol	2.61	0.333	mg/kg wet	3.333		78	30-130			
4-Chloroaniline	1.63	0.667	mg/kg wet	3.333		49	40-140			
4-Chloro-phenyl-phenyl ether	2.60	0.333	mg/kg wet	3.333		78	40-140			
4-Nitroaniline	2.27	0.333	mg/kg wet	3.333		68	40-140			
4-Nitrophenol	2.50	1.67	mg/kg wet	3.333		75	30-130			
Acenaphthene	2.26	0.333	mg/kg wet	3.333		68	40-140			
Acenaphthylene	2.12	0.333	mg/kg wet	3.333		64	40-140			
Acetophenone	1.98	0.667	mg/kg wet	3.333		59	40-140			
Aniline	1.53	0.667	mg/kg wet	3.333		46	40-140			
Anthracene	2.56	0.333	mg/kg wet	3.333		77	40-140			
Azobenzene	2.32	0.333	mg/kg wet	3.333		70	40-140			
Benzo(a)anthracene	2.74	0.167	mg/kg wet	3.333		82	40-140			
Benzo(a)pyrene	2.34	0.167	mg/kg wet	3.333		70	40-140			
Benzo(b)fluoranthene	2.38	0.167	mg/kg wet	3.333		71	40-140			
Benzo(g,h,i)perylene	2.48	0.167	mg/kg wet	3.333		74	40-140			
Benzo(k)fluoranthene	2.37	0.167	mg/kg wet	3.333		71	40-140			
Benzoic Acid	2.17	1.67	mg/kg wet	3.333		65	40-140			
Benzyl Alcohol	2.02	0.333	mg/kg wet	3.333		61	40-140			
bis(2-Chloroethoxy)methane	2.13	0.333	mg/kg wet	3.333		64	40-140			
bis(2-Chloroethyl)ether	2.00	0.100	mg/kg wet	3.333		60	40-140			
bis(2-chloroisopropyl)Ether	1.97	0.333	mg/kg wet	3.333		59	40-140			
bis(2-Ethylhexyl)phthalate	2.59	0.333	mg/kg wet	3.333		78	40-140			
Butylbenzylphthalate	2.52	0.333	mg/kg wet	3.333		76	40-140			
Carbazole	2.64	0.333	mg/kg wet	3.333		79	40-140			
Chrysene	2.43	0.083	mg/kg wet	3.333		73	40-140			
Dibenzo(a,h)Anthracene	2.52	0.083	mg/kg wet	3.333		76	40-140			
Dibenzofuran	2.33	0.333	mg/kg wet	3.333		70	40-140			
Diethylphthalate	2.83	0.333	mg/kg wet	3.333		85	40-140			
Dimethylphthalate	2.69	0.333	mg/kg wet	3.333		81	40-140			
Di-n-butylphthalate	2.86	0.333	mg/kg wet	3.333		86	40-140			
Di-n-octylphthalate	2.57	0.333	mg/kg wet	3.333		77	40-140			
Fluoranthene	2.81	0.333	mg/kg wet	3.333		84	40-140			
Fluorene	2.52	0.333	mg/kg wet	3.333		76	40-140			
Hexachlorobenzene	2.65	0.083	mg/kg wet	3.333		80	40-140			
Hexachlorobutadiene	2.20	0.333	mg/kg wet	3.333		66	40-140			
Hexachlorocyclopentadiene	1.38	1.67	mg/kg wet	3.333		41	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
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8270D Semi-Volatile Organic Compounds

Batch C190648 - 3546

Hexachloroethane	1.86	0.333	mg/kg wet	3.333		56	40-140			
Indeno(1,2,3-cd)Pyrene	2.53	0.167	mg/kg wet	3.333		76	40-140			
Isophorone	1.93	0.333	mg/kg wet	3.333		58	40-140			
Naphthalene	2.15	0.167	mg/kg wet	3.333		64	40-140			
Nitrobenzene	2.08	0.333	mg/kg wet	3.333		63	40-140			
N-Nitrosodimethylamine	1.86	0.333	mg/kg wet	3.333		56	40-140			
N-Nitroso-Di-n-Propylamine	2.17	0.333	mg/kg wet	3.333		65	40-140			
N-nitrosodiphenylamine	2.62	0.333	mg/kg wet	3.333		79	40-140			
Pentachlorophenol	2.75	0.667	mg/kg wet	3.333		82	30-130			
Phenanthrene	2.41	0.333	mg/kg wet	3.333		72	40-140			
Phenol	2.35	0.333	mg/kg wet	3.333		71	30-130			
Pyrene	2.42	0.333	mg/kg wet	3.333		73	40-140			
Pyridine	1.77	1.67	mg/kg wet	3.333		53	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	2.05		mg/kg wet	3.333		61	30-130			
Surrogate: 2,4,6-Tribromophenol	4.41		mg/kg wet	5.000		88	30-130			
Surrogate: 2-Chlorophenol-d4	3.48		mg/kg wet	5.000		70	30-130			
Surrogate: 2-Fluorobiphenyl	2.36		mg/kg wet	3.333		71	30-130			
Surrogate: 2-Fluorophenol	3.54		mg/kg wet	5.000		71	30-130			
Surrogate: Nitrobenzene-d5	2.38		mg/kg wet	3.333		71	30-130			
Surrogate: Phenol-d6	3.55		mg/kg wet	5.000		71	30-130			
Surrogate: p-Terphenyl-d14	2.76		mg/kg wet	3.333		83	30-130			

LCS Dup

1,1-Biphenyl	2.22	0.333	mg/kg wet	3.333		67	40-140	1	30	
1,2,4-Trichlorobenzene	2.10	0.333	mg/kg wet	3.333		63	40-140	4	30	
1,2-Dichlorobenzene	1.91	0.333	mg/kg wet	3.333		57	40-140	5	30	
1,3-Dichlorobenzene	1.84	0.333	mg/kg wet	3.333		55	40-140	7	30	
1,4-Dichlorobenzene	1.82	0.333	mg/kg wet	3.333		55	40-140	7	30	
2,3,4,6-Tetrachlorophenol	2.62	1.67	mg/kg wet	3.333		79	30-130	3	30	
2,4,5-Trichlorophenol	2.67	0.333	mg/kg wet	3.333		80	30-130	3	30	
2,4,6-Trichlorophenol	2.58	0.333	mg/kg wet	3.333		77	30-130	3	30	
2,4-Dichlorophenol	2.57	0.333	mg/kg wet	3.333		77	30-130	4	30	
2,4-Dimethylphenol	2.45	0.333	mg/kg wet	3.333		74	30-130	5	30	
2,4-Dinitrophenol	2.89	1.67	mg/kg wet	3.333		87	30-130	11	30	
2,4-Dinitrotoluene	2.95	0.167	mg/kg wet	3.333		89	40-140	8	30	
2,6-Dinitrotoluene	2.62	0.333	mg/kg wet	3.333		78	40-140	4	30	
2-Chloronaphthalene	2.18	0.333	mg/kg wet	3.333		65	40-140	2	30	
2-Chlorophenol	2.10	0.333	mg/kg wet	3.333		63	30-130	0.1	30	
2-Methylnaphthalene	2.22	0.333	mg/kg wet	3.333		67	40-140	4	30	
2-Methylphenol	2.32	0.333	mg/kg wet	3.333		70	30-130	5	30	
2-Nitroaniline	2.15	0.333	mg/kg wet	3.333		65	40-140	9	30	
2-Nitrophenol	2.13	0.333	mg/kg wet	3.333		64	30-130	2	30	
3,3'-Dichlorobenzidine	2.50	0.167	mg/kg wet	3.333		75	40-140	8	30	
3+4-Methylphenol	4.53	0.667	mg/kg wet	6.667		68	30-130	6	30	
3-Nitroaniline	2.48	0.333	mg/kg wet	3.333		74	40-140	6	30	
4,6-Dinitro-2-Methylphenol	2.97	1.67	mg/kg wet	3.333		89	30-130	10	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch C190648 - 3546

4-Bromophenyl-phenylether	2.86	0.333	mg/kg wet	3.333		86	40-140	7	30	
4-Chloro-3-Methylphenol	2.83	0.333	mg/kg wet	3.333		85	30-130	8	30	
4-Chloroaniline	1.76	0.667	mg/kg wet	3.333		53	40-140	8	30	
4-Chloro-phenyl-phenyl ether	2.66	0.333	mg/kg wet	3.333		80	40-140	2	30	
4-Nitroaniline	2.54	0.333	mg/kg wet	3.333		76	40-140	11	30	
4-Nitrophenol	2.68	1.67	mg/kg wet	3.333		80	30-130	7	30	
Acenaphthene	2.33	0.333	mg/kg wet	3.333		70	40-140	3	30	
Acenaphthylene	2.17	0.333	mg/kg wet	3.333		65	40-140	2	30	
Acetophenone	2.01	0.667	mg/kg wet	3.333		60	40-140	2	30	
Aniline	1.62	0.667	mg/kg wet	3.333		48	40-140	5	30	
Anthracene	2.76	0.333	mg/kg wet	3.333		83	40-140	7	30	
Azobenzene	2.43	0.333	mg/kg wet	3.333		73	40-140	5	30	
Benzo(a)anthracene	2.93	0.167	mg/kg wet	3.333		88	40-140	6	30	
Benzo(a)pyrene	2.44	0.167	mg/kg wet	3.333		73	40-140	4	30	
Benzo(b)fluoranthene	2.52	0.167	mg/kg wet	3.333		76	40-140	6	30	
Benzo(g,h,i)perylene	2.63	0.167	mg/kg wet	3.333		79	40-140	6	30	
Benzo(k)fluoranthene	2.52	0.167	mg/kg wet	3.333		76	40-140	6	30	
Benzoic Acid	2.41	1.67	mg/kg wet	3.333		72	40-140	11	30	
Benzyl Alcohol	2.11	0.333	mg/kg wet	3.333		63	40-140	4	30	
bis(2-Chloroethoxy)methane	2.15	0.333	mg/kg wet	3.333		65	40-140	1	30	
bis(2-Chloroethyl)ether	1.92	0.100	mg/kg wet	3.333		58	40-140	4	30	
bis(2-chloroisopropyl)Ether	1.94	0.333	mg/kg wet	3.333		58	40-140	2	30	
bis(2-Ethylhexyl)phthalate	2.77	0.333	mg/kg wet	3.333		83	40-140	7	30	
Butylbenzylphthalate	2.74	0.333	mg/kg wet	3.333		82	40-140	8	30	
Carbazole	2.86	0.333	mg/kg wet	3.333		86	40-140	8	30	
Chrysene	2.54	0.083	mg/kg wet	3.333		76	40-140	4	30	
Dibenzo(a,h)Anthracene	2.66	0.083	mg/kg wet	3.333		80	40-140	5	30	
Dibenzofuran	2.36	0.333	mg/kg wet	3.333		71	40-140	2	30	
Diethylphthalate	3.01	0.333	mg/kg wet	3.333		90	40-140	6	30	
Dimethylphthalate	2.80	0.333	mg/kg wet	3.333		84	40-140	4	30	
Di-n-butylphthalate	3.09	0.333	mg/kg wet	3.333		93	40-140	8	30	
Di-n-octylphthalate	2.70	0.333	mg/kg wet	3.333		81	40-140	5	30	
Fluoranthene	3.03	0.333	mg/kg wet	3.333		91	40-140	7	30	
Fluorene	2.62	0.333	mg/kg wet	3.333		79	40-140	4	30	
Hexachlorobenzene	2.81	0.083	mg/kg wet	3.333		84	40-140	6	30	
Hexachlorobutadiene	2.09	0.333	mg/kg wet	3.333		63	40-140	5	30	
Hexachlorocyclopentadiene	1.33	1.67	mg/kg wet	3.333		40	40-140	4	30	
Hexachloroethane	1.80	0.333	mg/kg wet	3.333		54	40-140	3	30	
Indeno(1,2,3-cd)Pyrene	2.70	0.167	mg/kg wet	3.333		81	40-140	6	30	
Isophorone	2.00	0.333	mg/kg wet	3.333		60	40-140	3	30	
Naphthalene	2.11	0.167	mg/kg wet	3.333		63	40-140	2	30	
Nitrobenzene	2.06	0.333	mg/kg wet	3.333		62	40-140	1	30	
N-Nitrosodimethylamine	1.71	0.333	mg/kg wet	3.333		51	40-140	8	30	
N-Nitroso-Di-n-Propylamine	2.31	0.333	mg/kg wet	3.333		69	40-140	6	30	
N-nitrosodiphenylamine	2.75	0.333	mg/kg wet	3.333		82	40-140	5	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch C190648 - 3546

Pentachlorophenol	2.86	0.667	mg/kg wet	3.333		86	30-130	4	30	
Phenanthrene	2.57	0.333	mg/kg wet	3.333		77	40-140	6	30	
Phenol	2.42	0.333	mg/kg wet	3.333		72	30-130	3	30	
Pyrene	2.62	0.333	mg/kg wet	3.333		79	40-140	8	30	
Pyridine	1.63	1.67	mg/kg wet	3.333		49	40-140	8	30	
Surrogate: 1,2-Dichlorobenzene-d4	1.90		mg/kg wet	3.333		57	30-130			
Surrogate: 2,4,6-Tribromophenol	4.39		mg/kg wet	5.000		88	30-130			
Surrogate: 2-Chlorophenol-d4	3.37		mg/kg wet	5.000		67	30-130			
Surrogate: 2-Fluorobiphenyl	2.36		mg/kg wet	3.333		71	30-130			
Surrogate: 2-Fluorophenol	3.36		mg/kg wet	5.000		67	30-130			
Surrogate: Nitrobenzene-d5	2.22		mg/kg wet	3.333		67	30-130			
Surrogate: Phenol-d6	3.56		mg/kg wet	5.000		71	30-130			
Surrogate: p-Terphenyl-d14	2.85		mg/kg wet	3.333		86	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

Notes and Definitions

- 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.
- CD- Continuing Calibration %Diff/Drift is below control limit (CD-).
- 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
- RL Reporting Limit
- EDL Estimated Detection Limit
- MF Membrane Filtration
- MPN Most Probably Number
- TNTC Too numerous to Count
- CFU Colony Forming Units



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0088

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

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.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML
 Shipped/Delivered Via: ESS Courier

ESS Project ID: 1910088
 Date Received: 9/5/2019
 Project Due Date: 9/12/2019
 Days for Project: 5 Day

- 1. Air bill manifest present? No
 Air No.: NA
- 2. Were custody seals present? No
- 3. Is radiation count <100 CPM? Yes
- 4. Is a Cooler Present? Yes
 Temp: 0.3 Iced with: Ice
- 5. Was COC signed and dated by client? Yes

- 6. Does COC match bottles? Yes
- 7. Is COC complete and correct? Yes
- 8. Were samples received intact? Yes
- 9. Were labs informed about short holds & rushes? Yes / No / NA
- 10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes No
 ESS Sample IDs: _____
 Analysis: _____
 TAT: _____

12. Were VOAs received? Yes / No
 a. Air bubbles in aqueous VOAs? Yes / No
 b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes / No
 a. If metals preserved upon receipt: Date: 9/5/19 Time: _____ By: _____
 b. Low Level VOA vials frozen: Date: 1825 Time: _____ By: jm

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / No
 a. Was there a need to contact the client? Yes / No
 Who was contacted? _____ Date: _____ Time: _____ By: _____

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
01	384638	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
01	384640	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
01	384643	Yes	NA	Yes	VOA Vial - Other	Other	
01	384644	Yes	NA	Yes	VOA Vial - Other	Other	
02	384637	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
02	384639	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
02	384641	Yes	NA	Yes	VOA Vial - Other	Other	
02	384642	Yes	NA	Yes	VOA Vial - Other	Other	

2nd Review

Were all containers scanned into storage/lab? Initials [Signature]
 Are barcode labels on correct containers? Yes / No
 Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA
 Are all Hex Chrome stickers attached? Yes / No / NA
 Are all QC stickers attached? Yes / No / NA
 Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: [Signature] Date & Time: 9/5/19 1806
 Reviewed By: [Signature] Date & Time: 9/5/19 1825

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 19I0088

Date Received: 9/5/2019

Delivered
By:

[Signature]

9/5/19

1825

ESS Laboratory

Division of Thielsch Engineering, Inc.
 185 Frances Avenue, Cranston RI 02910
 Tel. (401) 461-7181 Fax (401) 461-4486
 www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time: 5 Days
 Regulatory State: RI
 Is this project for any of the following?:
 CT RCP MA MCP RGP
 Project # NBC IIIA-4 and IIIA-5
 Address 201 George Washington Hwy
 City Providence
 State RI
 Zip Code 02865
 Email Address jmcloagh@bcrp-inc.com
 Project Name IIIA-4 and IIIA-5
 PO #

ESS Lab # 19I0088

Reporting Limits RIDEM R03 Dec 1 2006

Electronic Deliverables Data Checker Excel

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Analysis
1	9/3/19	10:15	Grb	Sc11	B-8 02'	VOCs X TPH X PCBs X PP-13 Metals X
2	9/3/19	10:30	Grb	Sc11	B-8 2-4'	VOCs X TPH X PCBs X PP-13 Metals X

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial
 Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other
 Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAcAc, NaOH 9-NH4Cl 10-DI H2O 11-Other
 Number of Containers per Sample: 3

Sampled by: Scot Mc
 Comments: 20X Rule as per client jjs 9/6/19
 Laboratory Use Only
 Cooler Present: Drop Off
 Seals Intact:
 Cooler Temperature: 0.3°C
 Relinquished by: (Signature, Date & Time) [Signature] 9/5/19 10:00
 Relinquished By: (Signature, Date & Time) [Signature] 9/5/19 15:54
 Relinquished By: (Signature, Date & Time) [Signature] 9/5/19 15:54
 Relinquished By: (Signature, Date & Time) [Signature] 9/5/19 15:54

ESS Laboratory

Division of Thielsch Engineering, Inc.
 185 Frances Avenue, Cranston RI 02910
 Tel. (401) 461-7181 Fax (401) 461-4486
 www.esslaboratory.com

CHAIN OF CUSTODY

ESS Lab # **19I0088**

Reporting Limits **RIDEM Res Ber 1/1/06**

Turn Time **5** Days
 Regulatory State **RI**
 Is this project for any of the following?:
 CT RCP MA MCP RGP

Electronic Deliverables Data Checker Excel
 Other (Please Specify →)

Project # **NBC IIIA-4 and IIIA-5**
 Address **201 George Washington Hwy**
 City **Providence** State **RI** Zip Code **02565**
 Email Address **jmcloagh@bcra-ri.com**
 PO #

Company Name **Bate Group**
 Contact Person **Joe McLoughlin**
 Telephone Number **401-332-2382**
 Project Name **VOCs SVOCs TPH PCBs PP-13 Metals**

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	VOCs	SVOCs	TPH	PCBs	PP-13 Metals
1	9/3/19	10:15	Grb	Soil	B-8 02'	X	X	X	X	X
2	9/3/19	10:30	Grb	Soil	B-8 2-4'	X	X	X	X	X

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitaliner J-Jar O-Other P-Poly S-Sterile V-Vial
 Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other
 Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAcAc, NaOH 9-NH4Cl 10-DI H2O 11-Other

Number of Containers per Sample: **3**
 Sampled by: **Scott Mc**
 Comments: **Please specify "Other" preservative and containers types in this space**

Laboratory Use Only
 Cooler Present:
 Seals Intact:
 Cooler Temperature: **0.3°C**
 Relinquished by: **Scott Mc** 9/5/19 10:00
 Relinquished By: (Signature, Date & Time)
 Received By: (Signature, Date & Time) **9/5/19 15:54**
 Relinquished By: (Signature, Date & Time)
 Received By: (Signature, Date & Time) **9/5/19 15:54**



CERTIFICATE OF ANALYSIS

Joe McLoughlin
Beta Engineering
701 George Washington Hwy 2nd FL
Lincoln, RI 02865

RE: NBC III (N/A)
ESS Laboratory Work Order Number: 19I0654

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 5:10 pm, Sep 27, 2019

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 TNI and relative state standards, 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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

SAMPLE RECEIPT

The following samples were received on September 20, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Low Level VOA vials were frozen by ESS Laboratory on 9/20/2019 at 14:42.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
19I0654-01	B-6A 0-2ft	Soil	6010C, 7471B, 8082A, 8100M, 8260B Low, 8270D
19I0654-02	B-6A 2-9ft	Soil	6010C, 7471B, 8082A, 8100M, 8260B Low, 8270D
19I0654-03	B-6A 4-6ft	Soil	6010C, 7471B, 8082A, 8100M, 8260B Low, 8270D
19I0654-04	B-6A 6-10ft	Soil	6010C, 7471B, 8082A, 8100M, 8260B Low, 8270D



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

PROJECT NARRATIVE

8270D Semi-Volatile Organic Compounds

- C9I0387-CCV1 **Calibration required quadratic regression (O).**
2,4-Dinitrophenol (94% @ 80-120%), 4,6-Dinitro-2-Methylphenol (91% @ 80-120%), Benzoic Acid (94% @ 80-120%), Di-n-octylphthalate (104% @ 80-120%), Pentachlorophenol (83% @ 80-120%)
- C9I0387-CCV1 **Continuing Calibration %Diff/Drift is below control limit (CD-).**
Hexachlorocyclopentadiene (25% @ 20%), N-Nitrosodimethylamine (26% @ 20%)
- C9I0440-CCV1 **Calibration required quadratic regression (O).**
2,4-Dinitrophenol (67% @ 80-120%), 4,6-Dinitro-2-Methylphenol (83% @ 80-120%), Pentachlorophenol (75% @ 80-120%)
- C9I0440-CCV1 **Continuing Calibration %Diff/Drift is above control limit (CD+).**
Di-n-octylphthalate (30% @ 20%), Phenol (24% @ 20%)
- C9I0440-CCV1 **Continuing Calibration %Diff/Drift is below control limit (CD-).**
2,4-Dinitrophenol (33% @ 20%), 4-Nitrophenol (34% @ 20%), Benzoic Acid (25% @ 20%), Hexachlorocyclopentadiene (25% @ 20%), N-Nitrosodimethylamine (22% @ 20%), Pentachlorophenol (25% @ 20%)
- CI92028-BS1 **Blank Spike recovery is below lower control limit (B-).**
Aniline (37% @ 40-140%)
- CI92028-BSD1 **Relative percent difference for duplicate is outside of criteria (D+).**
4-Chloroaniline (38% @ 30%), Aniline (32% @ 30%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

- [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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

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
- 8015C - 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
- MADEP 18-2.1 - 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
- 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 0-2ft
Date Sampled: 09/18/19 08:00
Percent Solids: 93

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (4.33)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Arsenic	ND (2.16)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Beryllium	0.29 (0.10)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Cadmium	ND (0.43)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Chromium	4.25 (0.87)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Copper	6.00 (2.16)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Lead	5.87 (4.33)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Mercury	ND (0.029)		7471B		1	MKS	09/24/19 13:50	0.73	40	CI92367
Nickel	5.96 (2.16)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Selenium	ND (4.33)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Silver	ND (0.43)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Thallium	ND (4.33)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366
Zinc	33.5 (2.16)		6010C		1	KJK	09/24/19 23:29	2.49	100	CI92366



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 0-2ft
Date Sampled: 09/18/19 08:00
Percent Solids: 93
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,1,1-Trichloroethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,1,2,2-Tetrachloroethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,1,2-Trichloroethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,1-Dichloroethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,1-Dichloroethene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,1-Dichloropropene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,2,3-Trichlorobenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,2,3-Trichloropropane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,2,4-Trichlorobenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,2,4-Trimethylbenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,2-Dibromo-3-Chloropropane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,2-Dibromoethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,2-Dichlorobenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,2-Dichloroethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,2-Dichloropropane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,3,5-Trimethylbenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,3-Dichlorobenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,3-Dichloropropane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,4-Dichlorobenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1,4-Dioxane	ND (0.0719)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
1-Chlorohexane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
2,2-Dichloropropane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
2-Butanone	ND (0.0359)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
2-Chlorotoluene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
2-Hexanone	ND (0.0359)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
4-Chlorotoluene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
4-Isopropyltoluene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
4-Methyl-2-Pentanone	ND (0.0359)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Acetone	ND (0.0359)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Benzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Bromobenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 0-2ft
Date Sampled: 09/18/19 08:00
Percent Solids: 93
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Bromodichloromethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Bromoform	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Bromomethane	ND (0.0072)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Carbon Disulfide	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Carbon Tetrachloride	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Chlorobenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Chloroethane	ND (0.0072)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Chloroform	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Chloromethane	ND (0.0072)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
cis-1,2-Dichloroethene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
cis-1,3-Dichloropropene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Dibromochloromethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Dibromomethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Dichlorodifluoromethane	ND (0.0072)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Diethyl Ether	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Di-isopropyl ether	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Ethyl tertiary-butyl ether	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Ethylbenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Hexachlorobutadiene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Isopropylbenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Methyl tert-Butyl Ether	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Methylene Chloride	ND (0.0180)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Naphthalene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
n-Butylbenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
n-Propylbenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
sec-Butylbenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Styrene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
tert-Butylbenzene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Tertiary-amyl methyl ether	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Tetrachloroethene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Tetrahydrofuran	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 0-2ft
Date Sampled: 09/18/19 08:00
Percent Solids: 93
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
trans-1,2-Dichloroethene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
trans-1,3-Dichloropropene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Trichloroethene	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Trichlorofluoromethane	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Vinyl Acetate	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Vinyl Chloride	ND (0.0072)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Xylene O	ND (0.0036)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Xylene P,M	ND (0.0072)		8260B Low		1	09/20/19 19:40	C9I0371	CI92012
Xylenes (Total)	ND (0.00719)		8260B Low		1	09/20/19 19:40		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>119 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>101 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>104 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>97 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 0-2ft
Date Sampled: 09/18/19 08:00
Percent Solids: 93
Initial Volume: 19.4
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/20/19 19:50

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	09/23/19 15:06		CI92045
Aroclor 1221	ND (0.06)		8082A		1	09/23/19 15:06		CI92045
Aroclor 1232	ND (0.06)		8082A		1	09/23/19 15:06		CI92045
Aroclor 1242	ND (0.06)		8082A		1	09/23/19 15:06		CI92045
Aroclor 1248	ND (0.06)		8082A		1	09/23/19 15:06		CI92045
Aroclor 1254	ND (0.06)		8082A		1	09/23/19 15:06		CI92045
Aroclor 1260	ND (0.06)		8082A		1	09/23/19 15:06		CI92045
Aroclor 1262	ND (0.06)		8082A		1	09/23/19 15:06		CI92045
Aroclor 1268	ND (0.06)		8082A		1	09/23/19 15:06		CI92045

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	72 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	83 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	70 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	88 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 0-2ft
Date Sampled: 09/18/19 08:00
Percent Solids: 93
Initial Volume: 19.5
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 9/20/19 20:15

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	ND (41.5)		8100M		1	09/25/19 5:56	C910398	CI92046
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		96 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 0-2ft
Date Sampled: 09/18/19 08:00
Percent Solids: 93
Initial Volume: 14.3
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
1,2,4-Trichlorobenzene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
1,2-Dichlorobenzene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
1,3-Dichlorobenzene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
1,4-Dichlorobenzene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2,3,4,6-Tetrachlorophenol	ND (1.89)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2,4,5-Trichlorophenol	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2,4,6-Trichlorophenol	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2,4-Dichlorophenol	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2,4-Dimethylphenol	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2,4-Dinitrophenol	ND (1.89)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2,4-Dinitrotoluene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2,6-Dinitrotoluene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2-Chloronaphthalene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2-Chlorophenol	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2-Methylnaphthalene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2-Methylphenol	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2-Nitroaniline	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
2-Nitrophenol	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
3,3'-Dichlorobenzidine	ND (0.754)		8270D		1	09/26/19 0:24	C9I0440	CI92028
3+4-Methylphenol	ND (0.754)		8270D		1	09/26/19 0:24	C9I0440	CI92028
3-Nitroaniline	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
4,6-Dinitro-2-Methylphenol	ND (1.89)		8270D		1	09/26/19 0:24	C9I0440	CI92028
4-Bromophenyl-phenylether	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
4-Chloro-3-Methylphenol	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
4-Chloroaniline	ND (0.754)		8270D		1	09/26/19 0:24	C9I0440	CI92028
4-Chloro-phenyl-phenyl ether	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
4-Nitroaniline	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
4-Nitrophenol	ND (1.89)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Acenaphthene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Acenaphthylene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Acetophenone	ND (0.754)		8270D		1	09/26/19 0:24	C9I0440	CI92028



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 0-2ft
Date Sampled: 09/18/19 08:00
Percent Solids: 93
Initial Volume: 14.3
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.754)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Anthracene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Azobenzene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Benzo(a)anthracene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Benzo(a)pyrene	ND (0.189)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Benzo(b)fluoranthene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Benzo(g,h,i)perylene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Benzo(k)fluoranthene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Benzoic Acid	ND (1.89)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Benzyl Alcohol	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
bis(2-Chloroethoxy)methane	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
bis(2-Chloroethyl)ether	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
bis(2-chloroisopropyl)Ether	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
bis(2-Ethylhexyl)phthalate	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Butylbenzylphthalate	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Carbazole	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Chrysene	ND (0.189)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Dibenzo(a,h)Anthracene	ND (0.189)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Dibenzofuran	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Diethylphthalate	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Dimethylphthalate	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Di-n-butylphthalate	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Di-n-octylphthalate	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Fluoranthene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Fluorene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Hexachlorobenzene	ND (0.189)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Hexachlorobutadiene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Hexachlorocyclopentadiene	ND (1.89)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Hexachloroethane	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Indeno(1,2,3-cd)Pyrene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Isophorone	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Naphthalene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 0-2ft
Date Sampled: 09/18/19 08:00
Percent Solids: 93
Initial Volume: 14.3
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
N-Nitrosodimethylamine	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
N-Nitroso-Di-n-Propylamine	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
N-nitrosodiphenylamine	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Pentachlorophenol	ND (1.89)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Phenanthrene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Phenol	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Pyrene	ND (0.376)		8270D		1	09/26/19 0:24	C9I0440	CI92028
Pyridine	ND (1.89)		8270D		1	09/26/19 0:24	C9I0440	CI92028

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>75 %</i>		<i>30-130</i>
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>79 %</i>		<i>30-130</i>
<i>Surrogate: 2-Chlorophenol-d4</i>	<i>88 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>69 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorophenol</i>	<i>89 %</i>		<i>30-130</i>
<i>Surrogate: Nitrobenzene-d5</i>	<i>87 %</i>		<i>30-130</i>
<i>Surrogate: Phenol-d6</i>	<i>95 %</i>		<i>30-130</i>
<i>Surrogate: p-Terphenyl-d14</i>	<i>95 %</i>		<i>30-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 2-9ft
Date Sampled: 09/18/19 08:15
Percent Solids: 92

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (5.20)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Arsenic	ND (2.60)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Beryllium	0.33 (0.11)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Cadmium	ND (0.52)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Chromium	7.43 (1.04)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Copper	8.64 (2.60)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Lead	7.03 (5.20)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Mercury	ND (0.033)		7471B		1	MKS	09/24/19 13:52	0.66	40	CI92367
Nickel	8.49 (2.60)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Selenium	ND (5.20)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Silver	ND (0.52)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Thallium	ND (5.20)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366
Zinc	37.2 (2.60)		6010C		1	KJK	09/24/19 23:34	2.1	100	CI92366



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 2-9ft
Date Sampled: 09/18/19 08:15
Percent Solids: 92
Initial Volume: 5.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,1,1-Trichloroethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,1,2,2-Tetrachloroethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,1,2-Trichloroethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,1-Dichloroethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,1-Dichloroethene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,1-Dichloropropene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,2,3-Trichlorobenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,2,3-Trichloropropane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,2,4-Trichlorobenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,2,4-Trimethylbenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,2-Dibromo-3-Chloropropane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,2-Dibromoethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,2-Dichlorobenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,2-Dichloroethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,2-Dichloropropane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,3,5-Trimethylbenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,3-Dichlorobenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,3-Dichloropropane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,4-Dichlorobenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1,4-Dioxane	ND (0.0925)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
1-Chlorohexane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
2,2-Dichloropropane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
2-Butanone	ND (0.0462)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
2-Chlorotoluene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
2-Hexanone	ND (0.0462)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
4-Chlorotoluene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
4-Isopropyltoluene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
4-Methyl-2-Pentanone	ND (0.0462)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Acetone	ND (0.0462)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Benzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Bromobenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 2-9ft
Date Sampled: 09/18/19 08:15
Percent Solids: 92
Initial Volume: 5.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Bromodichloromethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Bromoform	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Bromomethane	ND (0.0092)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Carbon Disulfide	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Carbon Tetrachloride	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Chlorobenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Chloroethane	ND (0.0092)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Chloroform	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Chloromethane	ND (0.0092)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
cis-1,2-Dichloroethene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
cis-1,3-Dichloropropene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Dibromochloromethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Dibromomethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Dichlorodifluoromethane	ND (0.0092)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Diethyl Ether	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Di-isopropyl ether	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Ethyl tertiary-butyl ether	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Ethylbenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Hexachlorobutadiene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Isopropylbenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Methyl tert-Butyl Ether	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Methylene Chloride	ND (0.0231)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Naphthalene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
n-Butylbenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
n-Propylbenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
sec-Butylbenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Styrene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
tert-Butylbenzene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Tertiary-amyl methyl ether	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Tetrachloroethene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Tetrahydrofuran	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 2-9ft
Date Sampled: 09/18/19 08:15
Percent Solids: 92
Initial Volume: 5.9
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
trans-1,2-Dichloroethene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
trans-1,3-Dichloropropene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Trichloroethene	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Trichlorofluoromethane	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Vinyl Acetate	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Vinyl Chloride	ND (0.0092)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Xylene O	ND (0.0046)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Xylene P,M	ND (0.0092)		8260B Low		1	09/20/19 20:06	C9I0371	CI92012
Xylenes (Total)	ND (0.00925)		8260B Low		1	09/20/19 20:06		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>118 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>99 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>105 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>98 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 2-9ft
Date Sampled: 09/18/19 08:15
Percent Solids: 92
Initial Volume: 20.7
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/20/19 19:50

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.05)		8082A		1	09/23/19 15:25		CI92045
Aroclor 1221	ND (0.05)		8082A		1	09/23/19 15:25		CI92045
Aroclor 1232	ND (0.05)		8082A		1	09/23/19 15:25		CI92045
Aroclor 1242	ND (0.05)		8082A		1	09/23/19 15:25		CI92045
Aroclor 1248	ND (0.05)		8082A		1	09/23/19 15:25		CI92045
Aroclor 1254	ND (0.05)		8082A		1	09/23/19 15:25		CI92045
Aroclor 1260	ND (0.05)		8082A		1	09/23/19 15:25		CI92045
Aroclor 1262	ND (0.05)		8082A		1	09/23/19 15:25		CI92045
Aroclor 1268	ND (0.05)		8082A		1	09/23/19 15:25		CI92045

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	69 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	81 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	67 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	83 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 2-9ft
Date Sampled: 09/18/19 08:15
Percent Solids: 92
Initial Volume: 20.5
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 9/20/19 20:15

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	310 (79.9)		8100M		2	09/25/19 8:03	C910398	CI92046
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		86 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 2-9ft
Date Sampled: 09/18/19 08:15
Percent Solids: 92
Initial Volume: 15.4
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
1,2,4-Trichlorobenzene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
1,2-Dichlorobenzene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
1,3-Dichlorobenzene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
1,4-Dichlorobenzene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2,3,4,6-Tetrachlorophenol	ND (1.78)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2,4,5-Trichlorophenol	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2,4,6-Trichlorophenol	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2,4-Dichlorophenol	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2,4-Dimethylphenol	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2,4-Dinitrophenol	ND (1.78)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2,4-Dinitrotoluene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2,6-Dinitrotoluene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2-Chloronaphthalene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2-Chlorophenol	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2-Methylnaphthalene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2-Methylphenol	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2-Nitroaniline	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
2-Nitrophenol	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
3,3'-Dichlorobenzidine	ND (0.709)		8270D		1	09/26/19 0:50	C9I0440	CI92028
3+4-Methylphenol	ND (0.709)		8270D		1	09/26/19 0:50	C9I0440	CI92028
3-Nitroaniline	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
4,6-Dinitro-2-Methylphenol	ND (1.78)		8270D		1	09/26/19 0:50	C9I0440	CI92028
4-Bromophenyl-phenylether	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
4-Chloro-3-Methylphenol	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
4-Chloroaniline	ND (0.709)		8270D		1	09/26/19 0:50	C9I0440	CI92028
4-Chloro-phenyl-phenyl ether	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
4-Nitroaniline	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
4-Nitrophenol	ND (1.78)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Acenaphthene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Acenaphthylene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Acetophenone	ND (0.709)		8270D		1	09/26/19 0:50	C9I0440	CI92028



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 2-9ft
Date Sampled: 09/18/19 08:15
Percent Solids: 92
Initial Volume: 15.4
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.709)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Anthracene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Azobenzene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Benzo(a)anthracene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Benzo(a)pyrene	ND (0.178)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Benzo(b)fluoranthene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Benzo(g,h,i)perylene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Benzo(k)fluoranthene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Benzoic Acid	ND (1.78)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Benzyl Alcohol	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
bis(2-Chloroethoxy)methane	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
bis(2-Chloroethyl)ether	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
bis(2-chloroisopropyl)Ether	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
bis(2-Ethylhexyl)phthalate	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Butylbenzylphthalate	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Carbazole	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Chrysene	ND (0.178)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Dibenzo(a,h)Anthracene	ND (0.178)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Dibenzofuran	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Diethylphthalate	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Dimethylphthalate	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Di-n-butylphthalate	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Di-n-octylphthalate	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Fluoranthene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Fluorene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Hexachlorobenzene	ND (0.178)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Hexachlorobutadiene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Hexachlorocyclopentadiene	ND (1.78)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Hexachloroethane	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Indeno(1,2,3-cd)Pyrene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Isophorone	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Naphthalene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 2-9ft
Date Sampled: 09/18/19 08:15
Percent Solids: 92
Initial Volume: 15.4
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
N-Nitrosodimethylamine	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
N-Nitroso-Di-n-Propylamine	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
N-nitrosodiphenylamine	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Pentachlorophenol	ND (1.78)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Phenanthrene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Phenol	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Pyrene	ND (0.354)		8270D		1	09/26/19 0:50	C9I0440	CI92028
Pyridine	ND (1.78)		8270D		1	09/26/19 0:50	C9I0440	CI92028

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>80 %</i>		<i>30-130</i>
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>73 %</i>		<i>30-130</i>
<i>Surrogate: 2-Chlorophenol-d4</i>	<i>95 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>74 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorophenol</i>	<i>95 %</i>		<i>30-130</i>
<i>Surrogate: Nitrobenzene-d5</i>	<i>88 %</i>		<i>30-130</i>
<i>Surrogate: Phenol-d6</i>	<i>97 %</i>		<i>30-130</i>
<i>Surrogate: p-Terphenyl-d14</i>	<i>95 %</i>		<i>30-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 4-6ft
Date Sampled: 09/18/19 08:30
Percent Solids: 93

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-03
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (4.56)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Arsenic	5.11 (2.28)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Beryllium	0.25 (0.10)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Cadmium	ND (0.46)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Chromium	6.59 (0.91)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Copper	10.6 (2.28)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Lead	20.7 (4.56)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Mercury	0.040 (0.027)		7471B		1	MKS	09/24/19 13:54	0.78	40	CI92367
Nickel	8.41 (2.28)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Selenium	ND (4.56)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Silver	ND (0.46)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Thallium	ND (4.56)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366
Zinc	29.9 (2.28)		6010C		1	KJK	09/24/19 23:38	2.35	100	CI92366



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 4-6ft
Date Sampled: 09/18/19 08:30
Percent Solids: 93
Initial Volume: 6.7
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,1,1-Trichloroethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,1,2,2-Tetrachloroethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,1,2-Trichloroethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,1-Dichloroethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,1-Dichloroethene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,1-Dichloropropene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,2,3-Trichlorobenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,2,3-Trichloropropane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,2,4-Trichlorobenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,2,4-Trimethylbenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,2-Dibromo-3-Chloropropane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,2-Dibromoethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,2-Dichlorobenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,2-Dichloroethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,2-Dichloropropane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,3,5-Trimethylbenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,3-Dichlorobenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,3-Dichloropropane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,4-Dichlorobenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1,4-Dioxane	ND (0.0799)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
1-Chlorohexane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
2,2-Dichloropropane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
2-Butanone	ND (0.0400)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
2-Chlorotoluene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
2-Hexanone	ND (0.0400)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
4-Chlorotoluene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
4-Isopropyltoluene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
4-Methyl-2-Pentanone	ND (0.0400)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Acetone	ND (0.0400)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Benzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Bromobenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 4-6ft
Date Sampled: 09/18/19 08:30
Percent Solids: 93
Initial Volume: 6.7
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Bromodichloromethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Bromoform	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Bromomethane	ND (0.0080)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Carbon Disulfide	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Carbon Tetrachloride	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Chlorobenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Chloroethane	ND (0.0080)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Chloroform	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Chloromethane	ND (0.0080)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
cis-1,2-Dichloroethene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
cis-1,3-Dichloropropene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Dibromochloromethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Dibromomethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Dichlorodifluoromethane	ND (0.0080)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Diethyl Ether	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Di-isopropyl ether	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Ethyl tertiary-butyl ether	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Ethylbenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Hexachlorobutadiene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Isopropylbenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Methyl tert-Butyl Ether	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Methylene Chloride	ND (0.0200)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Naphthalene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
n-Butylbenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
n-Propylbenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
sec-Butylbenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Styrene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
tert-Butylbenzene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Tertiary-amyl methyl ether	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Tetrachloroethene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Tetrahydrofuran	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 4-6ft
Date Sampled: 09/18/19 08:30
Percent Solids: 93
Initial Volume: 6.7
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
trans-1,2-Dichloroethene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
trans-1,3-Dichloropropene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Trichloroethene	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Trichlorofluoromethane	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Vinyl Acetate	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Vinyl Chloride	ND (0.0080)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Xylene O	ND (0.0040)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Xylene P,M	ND (0.0080)		8260B Low		1	09/20/19 20:31	C9I0371	CI92012
Xylenes (Total)	ND (0.00799)		8260B Low		1	09/20/19 20:31		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>120 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>101 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>105 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>98 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 4-6ft
Date Sampled: 09/18/19 08:30
Percent Solids: 93
Initial Volume: 19.5
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/20/19 19:50

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.05)		8082A		1	09/24/19 15:11		CI92045
Aroclor 1221	ND (0.05)		8082A		1	09/24/19 15:11		CI92045
Aroclor 1232	ND (0.05)		8082A		1	09/24/19 15:11		CI92045
Aroclor 1242	ND (0.05)		8082A		1	09/24/19 15:11		CI92045
Aroclor 1248	ND (0.05)		8082A		1	09/24/19 15:11		CI92045
Aroclor 1254	ND (0.05)		8082A		1	09/24/19 15:11		CI92045
Aroclor 1260	ND (0.05)		8082A		1	09/24/19 15:11		CI92045
Aroclor 1262	ND (0.05)		8082A		1	09/24/19 15:11		CI92045
Aroclor 1268 [2C]	ND (0.05)		8082A		1	09/24/19 15:11		CI92045

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	72 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	84 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	80 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	94 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 4-6ft
Date Sampled: 09/18/19 08:30
Percent Solids: 93
Initial Volume: 19.8
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 9/20/19 20:15

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	ND (40.6)		8100M		1	09/25/19 6:27	C910398	CI92046
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		<i>98 %</i>		<i>40-140</i>				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 4-6ft
Date Sampled: 09/18/19 08:30
Percent Solids: 93
Initial Volume: 14.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
1,2,4-Trichlorobenzene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
1,2-Dichlorobenzene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
1,3-Dichlorobenzene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
1,4-Dichlorobenzene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2,3,4,6-Tetrachlorophenol	ND (1.89)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2,4,5-Trichlorophenol	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2,4,6-Trichlorophenol	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2,4-Dichlorophenol	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2,4-Dimethylphenol	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2,4-Dinitrophenol	ND (1.89)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2,4-Dinitrotoluene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2,6-Dinitrotoluene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2-Chloronaphthalene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2-Chlorophenol	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2-Methylnaphthalene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2-Methylphenol	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2-Nitroaniline	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
2-Nitrophenol	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
3,3'-Dichlorobenzidine	ND (0.754)		8270D		1	09/26/19 1:16	C9I0440	CI92028
3+4-Methylphenol	ND (0.754)		8270D		1	09/26/19 1:16	C9I0440	CI92028
3-Nitroaniline	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
4,6-Dinitro-2-Methylphenol	ND (1.89)		8270D		1	09/26/19 1:16	C9I0440	CI92028
4-Bromophenyl-phenylether	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
4-Chloro-3-Methylphenol	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
4-Chloroaniline	ND (0.754)		8270D		1	09/26/19 1:16	C9I0440	CI92028
4-Chloro-phenyl-phenyl ether	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
4-Nitroaniline	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
4-Nitrophenol	ND (1.89)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Acenaphthene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Acenaphthylene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Acetophenone	ND (0.754)		8270D		1	09/26/19 1:16	C9I0440	CI92028



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 4-6ft
Date Sampled: 09/18/19 08:30
Percent Solids: 93
Initial Volume: 14.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.754)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Anthracene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Azobenzene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Benzo(a)anthracene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Benzo(a)pyrene	ND (0.189)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Benzo(b)fluoranthene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Benzo(g,h,i)perylene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Benzo(k)fluoranthene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Benzoic Acid	ND (1.89)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Benzyl Alcohol	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
bis(2-Chloroethoxy)methane	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
bis(2-Chloroethyl)ether	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
bis(2-chloroisopropyl)Ether	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
bis(2-Ethylhexyl)phthalate	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Butylbenzylphthalate	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Carbazole	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Chrysene	ND (0.189)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Dibenzo(a,h)Anthracene	ND (0.189)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Dibenzofuran	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Diethylphthalate	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Dimethylphthalate	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Di-n-butylphthalate	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Di-n-octylphthalate	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Fluoranthene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Fluorene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Hexachlorobenzene	ND (0.189)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Hexachlorobutadiene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Hexachlorocyclopentadiene	ND (1.89)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Hexachloroethane	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Indeno(1,2,3-cd)Pyrene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Isophorone	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Naphthalene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 4-6ft
Date Sampled: 09/18/19 08:30
Percent Solids: 93
Initial Volume: 14.2
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
N-Nitrosodimethylamine	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
N-Nitroso-Di-n-Propylamine	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
N-nitrosodiphenylamine	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Pentachlorophenol	ND (1.89)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Phenanthrene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Phenol	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Pyrene	ND (0.377)		8270D		1	09/26/19 1:16	C9I0440	CI92028
Pyridine	ND (1.89)		8270D		1	09/26/19 1:16	C9I0440	CI92028

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>82 %</i>		<i>30-130</i>
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>74 %</i>		<i>30-130</i>
<i>Surrogate: 2-Chlorophenol-d4</i>	<i>95 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>76 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorophenol</i>	<i>98 %</i>		<i>30-130</i>
<i>Surrogate: Nitrobenzene-d5</i>	<i>93 %</i>		<i>30-130</i>
<i>Surrogate: Phenol-d6</i>	<i>99 %</i>		<i>30-130</i>
<i>Surrogate: p-Terphenyl-d14</i>	<i>94 %</i>		<i>30-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 6-10ft
Date Sampled: 09/18/19 11:45
Percent Solids: 88

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-04
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (4.16)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Arsenic	3.49 (2.08)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Beryllium	0.23 (0.09)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Cadmium	ND (0.42)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Chromium	7.88 (0.83)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Copper	18.8 (2.08)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Lead	35.7 (4.16)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Mercury	0.223 (0.027)		7471B		1	MKS	09/24/19 13:56	0.82	40	CI92367
Nickel	9.14 (2.08)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Selenium	ND (4.16)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Silver	ND (0.42)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Thallium	ND (4.16)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366
Zinc	31.3 (2.08)		6010C		1	KJK	09/24/19 23:42	2.73	100	CI92366



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 6-10ft
Date Sampled: 09/18/19 11:45
Percent Solids: 88
Initial Volume: 7.4
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,1,1-Trichloroethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,1,2,2-Tetrachloroethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,1,2-Trichloroethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,1-Dichloroethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,1-Dichloroethene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,1-Dichloropropene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,2,3-Trichlorobenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,2,3-Trichloropropane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,2,4-Trichlorobenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,2,4-Trimethylbenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,2-Dibromo-3-Chloropropane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,2-Dibromoethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,2-Dichlorobenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,2-Dichloroethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,2-Dichloropropane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,3,5-Trimethylbenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,3-Dichlorobenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,3-Dichloropropane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,4-Dichlorobenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1,4-Dioxane	ND (0.0768)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
1-Chlorohexane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
2,2-Dichloropropane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
2-Butanone	ND (0.0384)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
2-Chlorotoluene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
2-Hexanone	ND (0.0384)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
4-Chlorotoluene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
4-Isopropyltoluene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
4-Methyl-2-Pentanone	ND (0.0384)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Acetone	ND (0.0384)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Benzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Bromobenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 6-10ft
Date Sampled: 09/18/19 11:45
Percent Solids: 88
Initial Volume: 7.4
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Bromodichloromethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Bromoform	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Bromomethane	ND (0.0077)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Carbon Disulfide	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Carbon Tetrachloride	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Chlorobenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Chloroethane	ND (0.0077)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Chloroform	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Chloromethane	ND (0.0077)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
cis-1,2-Dichloroethene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
cis-1,3-Dichloropropene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Dibromochloromethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Dibromomethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Dichlorodifluoromethane	ND (0.0077)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Diethyl Ether	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Di-isopropyl ether	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Ethyl tertiary-butyl ether	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Ethylbenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Hexachlorobutadiene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Isopropylbenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Methyl tert-Butyl Ether	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Methylene Chloride	ND (0.0192)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Naphthalene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
n-Butylbenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
n-Propylbenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
sec-Butylbenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Styrene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
tert-Butylbenzene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Tertiary-amyl methyl ether	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Tetrachloroethene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Tetrahydrofuran	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 6-10ft
Date Sampled: 09/18/19 11:45
Percent Solids: 88
Initial Volume: 7.4
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
trans-1,2-Dichloroethene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
trans-1,3-Dichloropropene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Trichloroethene	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Trichlorofluoromethane	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Vinyl Acetate	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Vinyl Chloride	ND (0.0077)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Xylene O	ND (0.0038)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Xylene P,M	ND (0.0077)		8260B Low		1	09/23/19 14:31	C9I0405	CI92335
Xylenes (Total)	ND (0.00768)		8260B Low		1	09/23/19 14:31		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>111 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>89 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>102 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>106 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 6-10ft
Date Sampled: 09/18/19 11:45
Percent Solids: 88
Initial Volume: 19.3
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/20/19 19:50

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	09/23/19 16:03		CI92045
Aroclor 1221	ND (0.06)		8082A		1	09/23/19 16:03		CI92045
Aroclor 1232	ND (0.06)		8082A		1	09/23/19 16:03		CI92045
Aroclor 1242	ND (0.06)		8082A		1	09/23/19 16:03		CI92045
Aroclor 1248	ND (0.06)		8082A		1	09/23/19 16:03		CI92045
Aroclor 1254	ND (0.06)		8082A		1	09/23/19 16:03		CI92045
Aroclor 1260 [2C]	0.2 (0.06)		8082A		1	09/23/19 16:03		CI92045
Aroclor 1262	ND (0.06)		8082A		1	09/23/19 16:03		CI92045
Aroclor 1268	ND (0.06)		8082A		1	09/23/19 16:03		CI92045

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	65 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	81 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	60 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	85 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 6-10ft
Date Sampled: 09/18/19 11:45
Percent Solids: 88
Initial Volume: 19.3
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 9/20/19 20:15

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	60.3 (44.2)		8100M		1	09/25/19 6:59	C910398	CI92046
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		87 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 6-10ft
Date Sampled: 09/18/19 11:45
Percent Solids: 88
Initial Volume: 15.5
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
1,2,4-Trichlorobenzene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
1,2-Dichlorobenzene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
1,3-Dichlorobenzene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
1,4-Dichlorobenzene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2,3,4,6-Tetrachlorophenol	ND (1.84)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2,4,5-Trichlorophenol	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2,4,6-Trichlorophenol	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2,4-Dichlorophenol	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2,4-Dimethylphenol	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2,4-Dinitrophenol	ND (1.84)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2,4-Dinitrotoluene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2,6-Dinitrotoluene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2-Chloronaphthalene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2-Chlorophenol	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2-Methylnaphthalene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2-Methylphenol	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2-Nitroaniline	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
2-Nitrophenol	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
3,3'-Dichlorobenzidine	ND (0.734)		8270D		1	09/26/19 1:42	C9I0440	CI92028
3+4-Methylphenol	ND (0.734)		8270D		1	09/26/19 1:42	C9I0440	CI92028
3-Nitroaniline	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
4,6-Dinitro-2-Methylphenol	ND (1.84)		8270D		1	09/26/19 1:42	C9I0440	CI92028
4-Bromophenyl-phenylether	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
4-Chloro-3-Methylphenol	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
4-Chloroaniline	ND (0.734)		8270D		1	09/26/19 1:42	C9I0440	CI92028
4-Chloro-phenyl-phenyl ether	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
4-Nitroaniline	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
4-Nitrophenol	ND (1.84)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Acenaphthene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Acenaphthylene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Acetophenone	ND (0.734)		8270D		1	09/26/19 1:42	C9I0440	CI92028



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-6A 6-10ft
Date Sampled: 09/18/19 11:45
Percent Solids: 88
Initial Volume: 15.5
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
ESS Laboratory Sample ID: 19I0654-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.734)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Anthracene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Azobenzene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Benzo(a)anthracene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Benzo(a)pyrene	0.261 (0.184)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Benzo(b)fluoranthene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Benzo(g,h,i)perylene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Benzo(k)fluoranthene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Benzoic Acid	ND (1.84)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Benzyl Alcohol	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
bis(2-Chloroethoxy)methane	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
bis(2-Chloroethyl)ether	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
bis(2-chloroisopropyl)Ether	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
bis(2-Ethylhexyl)phthalate	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Butylbenzylphthalate	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Carbazole	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Chrysene	0.262 (0.184)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Dibenzo(a,h)Anthracene	ND (0.184)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Dibenzofuran	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Diethylphthalate	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Dimethylphthalate	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Di-n-butylphthalate	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Di-n-octylphthalate	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Fluoranthene	0.395 (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Fluorene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Hexachlorobenzene	ND (0.184)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Hexachlorobutadiene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Hexachlorocyclopentadiene	ND (1.84)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Hexachloroethane	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Indeno(1,2,3-cd)Pyrene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Isophorone	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Naphthalene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-6A 6-10ft
 Date Sampled: 09/18/19 11:45
 Percent Solids: 88
 Initial Volume: 15.5
 Final Volume: 0.5
 Extraction Method: 3546

ESS Laboratory Work Order: 19I0654
 ESS Laboratory Sample ID: 19I0654-04
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: TJ
 Prepared: 9/20/19 20:26

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
N-Nitrosodimethylamine	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
N-Nitroso-Di-n-Propylamine	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
N-nitrosodiphenylamine	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Pentachlorophenol	ND (1.84)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Phenanthrene	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Phenol	ND (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Pyrene	0.482 (0.366)		8270D		1	09/26/19 1:42	C9I0440	CI92028
Pyridine	ND (1.84)		8270D		1	09/26/19 1:42	C9I0440	CI92028

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	76 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	60 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	86 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	71 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	90 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	85 %		30-130
<i>Surrogate: Phenol-d6</i>	89 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	82 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CI92366 - 3050B

Blank

Antimony	ND	5.00	mg/kg wet
Arsenic	ND	2.50	mg/kg wet
Beryllium	ND	0.11	mg/kg wet
Cadmium	ND	0.50	mg/kg wet
Chromium	ND	1.00	mg/kg wet
Copper	ND	2.50	mg/kg wet
Lead	ND	5.00	mg/kg wet
Nickel	ND	2.50	mg/kg wet
Selenium	ND	5.00	mg/kg wet
Silver	ND	0.50	mg/kg wet
Thallium	ND	5.00	mg/kg wet
Zinc	ND	2.50	mg/kg wet

LCS

Antimony	35.1	12.7	mg/kg wet	42.40	83	80-120
Arsenic	127	6.33	mg/kg wet	128.0	99	80-120
Beryllium	202	0.28	mg/kg wet	217.0	93	80-120
Cadmium	85.1	1.27	mg/kg wet	99.00	86	80-120
Chromium	114	2.53	mg/kg wet	116.0	98	80-120
Copper	88.6	6.33	mg/kg wet	89.60	99	80-120
Lead	269	12.7	mg/kg wet	277.0	97	80-120
Nickel	106	6.33	mg/kg wet	107.0	99	80-120
Selenium	241	12.7	mg/kg wet	242.0	99	80-120
Silver	62.0	1.27	mg/kg wet	64.30	96	80-120
Thallium	171	12.7	mg/kg wet	183.0	94	80-120
Zinc	540	6.33	mg/kg wet	561.0	96	80-120

LCS Dup

Antimony	36.1	12.7	mg/kg wet	42.40	85	80-120	3	20
Arsenic	129	6.33	mg/kg wet	128.0	101	80-120	2	20
Beryllium	205	0.28	mg/kg wet	217.0	95	80-120	2	20
Cadmium	86.4	1.27	mg/kg wet	99.00	87	80-120	2	20
Chromium	117	2.53	mg/kg wet	116.0	101	80-120	3	20
Copper	90.8	6.33	mg/kg wet	89.60	101	80-120	2	20
Lead	273	12.7	mg/kg wet	277.0	99	80-120	1	20
Nickel	108	6.33	mg/kg wet	107.0	101	80-120	2	20
Selenium	249	12.7	mg/kg wet	242.0	103	80-120	3	20
Silver	62.7	1.27	mg/kg wet	64.30	97	80-120	1	20
Thallium	172	12.7	mg/kg wet	183.0	94	80-120	0.3	20
Zinc	548	6.33	mg/kg wet	561.0	98	80-120	1	20

Batch CI92367 - 7471B

Blank

Mercury	ND	0.033	mg/kg wet
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LCS

Mercury	2.77	0.305	mg/kg wet	3.120	89	80-120
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CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CI92367 - 7471B

LCS Dup

Mercury	2.78	0.264	mg/kg wet	3.120		89	80-120	0.6	20	
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5035/8260B Volatile Organic Compounds / Low Level

Batch CI92012 - 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	0.0050	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
1-Chlorohexane	ND	0.0050	mg/kg wet
2,2-Dichloropropane	ND	0.0050	mg/kg wet
2-Butanone	ND	0.0500	mg/kg wet
2-Chlorotoluene	ND	0.0050	mg/kg wet
2-Hexanone	ND	0.0500	mg/kg wet
4-Chlorotoluene	ND	0.0050	mg/kg wet
4-Isopropyltoluene	ND	0.0050	mg/kg wet
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet
Acetone	ND	0.0500	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



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C192012 - 5035

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	0.0050	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	0.0250	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 Acetate	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	0.0524		mg/kg wet	0.05000		105	70-130			
Surrogate: 4-Bromofluorobenzene	0.0503		mg/kg wet	0.05000		101	70-130			
Surrogate: Dibromofluoromethane	0.0492		mg/kg wet	0.05000		98	70-130			
Surrogate: Toluene-d8	0.0496		mg/kg wet	0.05000		99	70-130			

LCS

1,1,1,2-Tetrachloroethane	0.0518	0.0050	mg/kg wet	0.05000		104	70-130			
1,1,1-Trichloroethane	0.0571	0.0050	mg/kg wet	0.05000		114	70-130			
1,1,2,2-Tetrachloroethane	0.0505	0.0050	mg/kg wet	0.05000		101	70-130			
1,1,2-Trichloroethane	0.0499	0.0050	mg/kg wet	0.05000		100	70-130			
1,1-Dichloroethane	0.0562	0.0050	mg/kg wet	0.05000		112	70-130			
1,1-Dichloroethene	0.0565	0.0050	mg/kg wet	0.05000		113	70-130			



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
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5035/8260B Volatile Organic Compounds / Low Level

Batch C192012 - 5035

1,1-Dichloropropene	0.0556	0.0050	mg/kg wet	0.05000		111	70-130			
1,2,3-Trichlorobenzene	0.0493	0.0050	mg/kg wet	0.05000		99	70-130			
1,2,3-Trichloropropane	0.0481	0.0050	mg/kg wet	0.05000		96	70-130			
1,2,4-Trichlorobenzene	0.0507	0.0050	mg/kg wet	0.05000		101	70-130			
1,2,4-Trimethylbenzene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130			
1,2-Dibromo-3-Chloropropane	0.0488	0.0050	mg/kg wet	0.05000		98	70-130			
1,2-Dibromoethane	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
1,2-Dichlorobenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130			
1,2-Dichloroethane	0.0551	0.0050	mg/kg wet	0.05000		110	70-130			
1,2-Dichloropropane	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
1,3,5-Trimethylbenzene	0.0545	0.0050	mg/kg wet	0.05000		109	70-130			
1,3-Dichlorobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
1,3-Dichloropropane	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
1,4-Dichlorobenzene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
1,4-Dioxane	0.951	0.100	mg/kg wet	1.000		95	70-130			
1-Chlorohexane	0.0523	0.0050	mg/kg wet	0.05000		105	70-130			
2,2-Dichloropropane	0.0559	0.0050	mg/kg wet	0.05000		112	70-130			
2-Butanone	0.268	0.0500	mg/kg wet	0.2500		107	70-130			
2-Chlorotoluene	0.0536	0.0050	mg/kg wet	0.05000		107	70-130			
2-Hexanone	0.250	0.0500	mg/kg wet	0.2500		100	70-130			
4-Chlorotoluene	0.0543	0.0050	mg/kg wet	0.05000		109	70-130			
4-Isopropyltoluene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
4-Methyl-2-Pentanone	0.254	0.0500	mg/kg wet	0.2500		102	70-130			
Acetone	0.243	0.0500	mg/kg wet	0.2500		97	70-130			
Benzene	0.0529	0.0050	mg/kg wet	0.05000		106	70-130			
Bromobenzene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130			
Bromochloromethane	0.0520	0.0050	mg/kg wet	0.05000		104	70-130			
Bromodichloromethane	0.0537	0.0050	mg/kg wet	0.05000		107	70-130			
Bromoform	0.0480	0.0050	mg/kg wet	0.05000		96	70-130			
Bromomethane	0.0426	0.0100	mg/kg wet	0.05000		85	70-130			
Carbon Disulfide	0.0562	0.0050	mg/kg wet	0.05000		112	70-130			
Carbon Tetrachloride	0.0546	0.0050	mg/kg wet	0.05000		109	70-130			
Chlorobenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130			
Chloroethane	0.0467	0.0100	mg/kg wet	0.05000		93	70-130			
Chloroform	0.0542	0.0050	mg/kg wet	0.05000		108	70-130			
Chloromethane	0.0452	0.0100	mg/kg wet	0.05000		90	70-130			
cis-1,2-Dichloroethene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130			
cis-1,3-Dichloropropene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
Dibromochloromethane	0.0528	0.0050	mg/kg wet	0.05000		106	70-130			
Dibromomethane	0.0537	0.0050	mg/kg wet	0.05000		107	70-130			
Dichlorodifluoromethane	0.0431	0.0100	mg/kg wet	0.05000		86	70-130			
Diethyl Ether	0.0541	0.0050	mg/kg wet	0.05000		108	70-130			
Di-isopropyl ether	0.0549	0.0050	mg/kg wet	0.05000		110	70-130			
Ethyl tertiary-butyl ether	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
Ethylbenzene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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ESS Laboratory Work Order: 19I0654

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C192012 - 5035

Hexachlorobutadiene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130			
Isopropylbenzene	0.0546	0.0050	mg/kg wet	0.05000		109	70-130			
Methyl tert-Butyl Ether	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Methylene Chloride	0.0509	0.0250	mg/kg wet	0.05000		102	70-130			
Naphthalene	0.0484	0.0050	mg/kg wet	0.05000		97	70-130			
n-Butylbenzene	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
n-Propylbenzene	0.0548	0.0050	mg/kg wet	0.05000		110	70-130			
sec-Butylbenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
Styrene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130			
tert-Butylbenzene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130			
Tertiary-amyl methyl ether	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
Tetrachloroethene	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
Tetrahydrofuran	0.0476	0.0050	mg/kg wet	0.05000		95	70-130			
Toluene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
trans-1,2-Dichloroethene	0.0557	0.0050	mg/kg wet	0.05000		111	70-130			
trans-1,3-Dichloropropene	0.0507	0.0050	mg/kg wet	0.05000		101	70-130			
Trichloroethene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
Trichlorofluoromethane	0.0549	0.0050	mg/kg wet	0.05000		110	70-130			
Vinyl Acetate	0.0504	0.0050	mg/kg wet	0.05000		101	70-130			
Vinyl Chloride	0.0486	0.0100	mg/kg wet	0.05000		97	70-130			
Xylene O	0.0533	0.0050	mg/kg wet	0.05000		107	70-130			
Xylene P,M	0.107	0.0100	mg/kg wet	0.1000		107	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0511		mg/kg wet	0.05000		102	70-130			
Surrogate: 4-Bromofluorobenzene	0.0499		mg/kg wet	0.05000		100	70-130			
Surrogate: Dibromofluoromethane	0.0497		mg/kg wet	0.05000		99	70-130			
Surrogate: Toluene-d8	0.0501		mg/kg wet	0.05000		100	70-130			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	4	25	
1,1,1-Trichloroethane	0.0577	0.0050	mg/kg wet	0.05000		115	70-130	1	25	
1,1,2,2-Tetrachloroethane	0.0470	0.0050	mg/kg wet	0.05000		94	70-130	7	25	
1,1,2-Trichloroethane	0.0491	0.0050	mg/kg wet	0.05000		98	70-130	1	25	
1,1-Dichloroethane	0.0566	0.0050	mg/kg wet	0.05000		113	70-130	0.7	25	
1,1-Dichloroethene	0.0563	0.0050	mg/kg wet	0.05000		113	70-130	0.2	25	
1,1-Dichloropropene	0.0559	0.0050	mg/kg wet	0.05000		112	70-130	0.6	25	
1,2,3-Trichlorobenzene	0.0488	0.0050	mg/kg wet	0.05000		98	70-130	1	25	
1,2,3-Trichloropropane	0.0453	0.0050	mg/kg wet	0.05000		91	70-130	6	25	
1,2,4-Trichlorobenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	1	25	
1,2,4-Trimethylbenzene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130	0.1	25	
1,2-Dibromo-3-Chloropropane	0.0426	0.0050	mg/kg wet	0.05000		85	70-130	13	25	
1,2-Dibromoethane	0.0482	0.0050	mg/kg wet	0.05000		96	70-130	7	25	
1,2-Dichlorobenzene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	1	25	
1,2-Dichloroethane	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	3	25	
1,2-Dichloropropane	0.0510	0.0050	mg/kg wet	0.05000		102	70-130	2	25	
1,3,5-Trimethylbenzene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130	0.6	25	
1,3-Dichlorobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	0.04	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C192012 - 5035

1,3-Dichloropropane	0.0504	0.0050	mg/kg wet	0.05000		101	70-130	6	25	
1,4-Dichlorobenzene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130	0.8	25	
1,4-Dioxane	0.832	0.100	mg/kg wet	1.000		83	70-130	13	20	
1-Chlorohexane	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	2	25	
2,2-Dichloropropane	0.0576	0.0050	mg/kg wet	0.05000		115	70-130	3	25	
2-Butanone	0.266	0.0500	mg/kg wet	0.2500		106	70-130	0.7	25	
2-Chlorotoluene	0.0529	0.0050	mg/kg wet	0.05000		106	70-130	1	25	
2-Hexanone	0.227	0.0500	mg/kg wet	0.2500		91	70-130	10	25	
4-Chlorotoluene	0.0541	0.0050	mg/kg wet	0.05000		108	70-130	0.4	25	
4-Isopropyltoluene	0.0536	0.0050	mg/kg wet	0.05000		107	70-130	0.3	25	
4-Methyl-2-Pentanone	0.239	0.0500	mg/kg wet	0.2500		96	70-130	6	25	
Acetone	0.253	0.0500	mg/kg wet	0.2500		101	70-130	4	25	
Benzene	0.0523	0.0050	mg/kg wet	0.05000		105	70-130	1	25	
Bromobenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	2	25	
Bromochloromethane	0.0499	0.0050	mg/kg wet	0.05000		100	70-130	4	25	
Bromodichloromethane	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	2	25	
Bromoform	0.0444	0.0050	mg/kg wet	0.05000		89	70-130	8	25	
Bromomethane	0.0427	0.0100	mg/kg wet	0.05000		85	70-130	0.3	25	
Carbon Disulfide	0.0568	0.0050	mg/kg wet	0.05000		114	70-130	1	25	
Carbon Tetrachloride	0.0548	0.0050	mg/kg wet	0.05000		110	70-130	0.3	25	
Chlorobenzene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
Chloroethane	0.0467	0.0100	mg/kg wet	0.05000		93	70-130	0.09	25	
Chloroform	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	0.8	25	
Chloromethane	0.0455	0.0100	mg/kg wet	0.05000		91	70-130	0.7	25	
cis-1,2-Dichloroethene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130	1	25	
cis-1,3-Dichloropropene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130	0.7	25	
Dibromochloromethane	0.0502	0.0050	mg/kg wet	0.05000		100	70-130	5	25	
Dibromomethane	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	5	25	
Dichlorodifluoromethane	0.0435	0.0100	mg/kg wet	0.05000		87	70-130	0.9	25	
Diethyl Ether	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	4	25	
Di-isopropyl ether	0.0540	0.0050	mg/kg wet	0.05000		108	70-130	2	25	
Ethyl tertiary-butyl ether	0.0489	0.0050	mg/kg wet	0.05000		98	70-130	3	25	
Ethylbenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130	2	25	
Hexachlorobutadiene	0.0533	0.0050	mg/kg wet	0.05000		107	70-130	2	25	
Isopropylbenzene	0.0543	0.0050	mg/kg wet	0.05000		109	70-130	0.6	25	
Methyl tert-Butyl Ether	0.0503	0.0050	mg/kg wet	0.05000		101	70-130	4	25	
Methylene Chloride	0.0512	0.0250	mg/kg wet	0.05000		102	70-130	0.5	25	
Naphthalene	0.0453	0.0050	mg/kg wet	0.05000		91	70-130	6	25	
n-Butylbenzene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	2	25	
n-Propylbenzene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	0.4	25	
sec-Butylbenzene	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	0.2	25	
Styrene	0.0516	0.0050	mg/kg wet	0.05000		103	70-130	3	25	
tert-Butylbenzene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	0.8	25	
Tertiary-amyl methyl ether	0.0495	0.0050	mg/kg wet	0.05000		99	70-130	3	25	
Tetrachloroethene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	2	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C192012 - 5035

Tetrahydrofuran	0.0427	0.0050	mg/kg wet	0.05000		85	70-130	11	25	
Toluene	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	1	25	
trans-1,2-Dichloroethene	0.0556	0.0050	mg/kg wet	0.05000		111	70-130	0.1	25	
trans-1,3-Dichloropropene	0.0499	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
Trichloroethene	0.0530	0.0050	mg/kg wet	0.05000		106	70-130	0.6	25	
Trichlorofluoromethane	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	0.3	25	
Vinyl Acetate	0.0480	0.0050	mg/kg wet	0.05000		96	70-130	5	25	
Vinyl Chloride	0.0493	0.0100	mg/kg wet	0.05000		99	70-130	1	25	
Xylene O	0.0521	0.0050	mg/kg wet	0.05000		104	70-130	2	25	
Xylene P,M	0.104	0.0100	mg/kg wet	0.1000		104	70-130	2	25	
Surrogate: 1,2-Dichloroethane-d4	0.0512		mg/kg wet	0.05000		102	70-130			
Surrogate: 4-Bromofluorobenzene	0.0494		mg/kg wet	0.05000		99	70-130			
Surrogate: Dibromofluoromethane	0.0503		mg/kg wet	0.05000		101	70-130			
Surrogate: Toluene-d8	0.0492		mg/kg wet	0.05000		98	70-130			

Batch C192335 - 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	0.0050	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							
1-Chlorohexane	ND	0.0050	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0500	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0500	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C192335 - 5035

Acetone	ND	0.0500	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	0.0050	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	0.0250	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 Acetate	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	0.0522		mg/kg wet	0.05000		104	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C192335 - 5035

Surrogate: 4-Bromofluorobenzene	0.0500		mg/kg wet	0.05000		100	70-130			
Surrogate: Dibromofluoromethane	0.0488		mg/kg wet	0.05000		98	70-130			
Surrogate: Toluene-d8	0.0498		mg/kg wet	0.05000		100	70-130			

LCS

1,1,1,2-Tetrachloroethane	0.0495	0.0050	mg/kg wet	0.05000		99	70-130			
1,1,1-Trichloroethane	0.0565	0.0050	mg/kg wet	0.05000		113	70-130			
1,1,2,2-Tetrachloroethane	0.0468	0.0050	mg/kg wet	0.05000		94	70-130			
1,1,2-Trichloroethane	0.0481	0.0050	mg/kg wet	0.05000		96	70-130			
1,1-Dichloroethane	0.0552	0.0050	mg/kg wet	0.05000		110	70-130			
1,1-Dichloroethene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130			
1,1-Dichloropropene	0.0542	0.0050	mg/kg wet	0.05000		108	70-130			
1,2,3-Trichlorobenzene	0.0474	0.0050	mg/kg wet	0.05000		95	70-130			
1,2,3-Trichloropropane	0.0446	0.0050	mg/kg wet	0.05000		89	70-130			
1,2,4-Trichlorobenzene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130			
1,2,4-Trimethylbenzene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
1,2-Dibromo-3-Chloropropane	0.0427	0.0050	mg/kg wet	0.05000		85	70-130			
1,2-Dibromoethane	0.0485	0.0050	mg/kg wet	0.05000		97	70-130			
1,2-Dichlorobenzene	0.0492	0.0050	mg/kg wet	0.05000		98	70-130			
1,2-Dichloroethane	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
1,2-Dichloropropane	0.0496	0.0050	mg/kg wet	0.05000		99	70-130			
1,3,5-Trimethylbenzene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130			
1,3-Dichlorobenzene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130			
1,3-Dichloropropane	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
1,4-Dichlorobenzene	0.0499	0.0050	mg/kg wet	0.05000		100	70-130			
1,4-Dioxane	0.862	0.100	mg/kg wet	1.000		86	70-130			
1-Chlorohexane	0.0496	0.0050	mg/kg wet	0.05000		99	70-130			
2,2-Dichloropropane	0.0555	0.0050	mg/kg wet	0.05000		111	70-130			
2-Butanone	0.253	0.0500	mg/kg wet	0.2500		101	70-130			
2-Chlorotoluene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
2-Hexanone	0.221	0.0500	mg/kg wet	0.2500		89	70-130			
4-Chlorotoluene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
4-Isopropyltoluene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
4-Methyl-2-Pentanone	0.234	0.0500	mg/kg wet	0.2500		94	70-130			
Acetone	0.220	0.0500	mg/kg wet	0.2500		88	70-130			
Benzene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
Bromobenzene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
Bromochloromethane	0.0499	0.0050	mg/kg wet	0.05000		100	70-130			
Bromodichloromethane	0.0522	0.0050	mg/kg wet	0.05000		104	70-130			
Bromoform	0.0452	0.0050	mg/kg wet	0.05000		90	70-130			
Bromomethane	0.0418	0.0100	mg/kg wet	0.05000		84	70-130			
Carbon Disulfide	0.0543	0.0050	mg/kg wet	0.05000		109	70-130			
Carbon Tetrachloride	0.0544	0.0050	mg/kg wet	0.05000		109	70-130			
Chlorobenzene	0.0489	0.0050	mg/kg wet	0.05000		98	70-130			
Chloroethane	0.0451	0.0100	mg/kg wet	0.05000		90	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C192335 - 5035

Chloroform	0.0531	0.0050	mg/kg wet	0.05000		106	70-130			
Chloromethane	0.0443	0.0100	mg/kg wet	0.05000		89	70-130			
cis-1,2-Dichloroethene	0.0512	0.0050	mg/kg wet	0.05000		102	70-130			
cis-1,3-Dichloropropene	0.0508	0.0050	mg/kg wet	0.05000		102	70-130			
Dibromochloromethane	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
Dibromomethane	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			
Dichlorodifluoromethane	0.0420	0.0100	mg/kg wet	0.05000		84	70-130			
Diethyl Ether	0.0509	0.0050	mg/kg wet	0.05000		102	70-130			
Di-isopropyl ether	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Ethyl tertiary-butyl ether	0.0479	0.0050	mg/kg wet	0.05000		96	70-130			
Ethylbenzene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130			
Hexachlorobutadiene	0.0522	0.0050	mg/kg wet	0.05000		104	70-130			
Isopropylbenzene	0.0525	0.0050	mg/kg wet	0.05000		105	70-130			
Methyl tert-Butyl Ether	0.0498	0.0050	mg/kg wet	0.05000		100	70-130			
Methylene Chloride	0.0550	0.0250	mg/kg wet	0.05000		110	70-130			
Naphthalene	0.0448	0.0050	mg/kg wet	0.05000		90	70-130			
n-Butylbenzene	0.0526	0.0050	mg/kg wet	0.05000		105	70-130			
n-Propylbenzene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130			
sec-Butylbenzene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
Styrene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			
tert-Butylbenzene	0.0527	0.0050	mg/kg wet	0.05000		105	70-130			
Tertiary-amyl methyl ether	0.0486	0.0050	mg/kg wet	0.05000		97	70-130			
Tetrachloroethene	0.0509	0.0050	mg/kg wet	0.05000		102	70-130			
Tetrahydrofuran	0.0414	0.0050	mg/kg wet	0.05000		83	70-130			
Toluene	0.0506	0.0050	mg/kg wet	0.05000		101	70-130			
trans-1,2-Dichloroethene	0.0537	0.0050	mg/kg wet	0.05000		107	70-130			
trans-1,3-Dichloropropene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130			
Trichloroethene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130			
Trichlorofluoromethane	0.0541	0.0050	mg/kg wet	0.05000		108	70-130			
Vinyl Acetate	0.0478	0.0050	mg/kg wet	0.05000		96	70-130			
Vinyl Chloride	0.0478	0.0100	mg/kg wet	0.05000		96	70-130			
Xylene O	0.0511	0.0050	mg/kg wet	0.05000		102	70-130			
Xylene P,M	0.102	0.0100	mg/kg wet	0.1000		102	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0516		mg/kg wet	0.05000		103	70-130			
Surrogate: 4-Bromofluorobenzene	0.0495		mg/kg wet	0.05000		99	70-130			
Surrogate: Dibromofluoromethane	0.0505		mg/kg wet	0.05000		101	70-130			
Surrogate: Toluene-d8	0.0497		mg/kg wet	0.05000		99	70-130			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0490	0.0050	mg/kg wet	0.05000		98	70-130	1	25	
1,1,1-Trichloroethane	0.0549	0.0050	mg/kg wet	0.05000		110	70-130	3	25	
1,1,2,2-Tetrachloroethane	0.0460	0.0050	mg/kg wet	0.05000		92	70-130	2	25	
1,1,2-Trichloroethane	0.0467	0.0050	mg/kg wet	0.05000		93	70-130	3	25	
1,1-Dichloroethane	0.0541	0.0050	mg/kg wet	0.05000		108	70-130	2	25	
1,1-Dichloroethene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130	2	25	
1,1-Dichloropropene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130	1	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C192335 - 5035

1,2,3-Trichlorobenzene	0.0477	0.0050	mg/kg wet	0.05000		95	70-130	0.8	25	
1,2,3-Trichloropropane	0.0441	0.0050	mg/kg wet	0.05000		88	70-130	1	25	
1,2,4-Trichlorobenzene	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	0.4	25	
1,2,4-Trimethylbenzene	0.0532	0.0050	mg/kg wet	0.05000		106	70-130	0.4	25	
1,2-Dibromo-3-Chloropropane	0.0434	0.0050	mg/kg wet	0.05000		87	70-130	2	25	
1,2-Dibromoethane	0.0477	0.0050	mg/kg wet	0.05000		95	70-130	2	25	
1,2-Dichlorobenzene	0.0492	0.0050	mg/kg wet	0.05000		98	70-130	0.04	25	
1,2-Dichloroethane	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	4	25	
1,2-Dichloropropane	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	2	25	
1,3,5-Trimethylbenzene	0.0523	0.0050	mg/kg wet	0.05000		105	70-130	0.1	25	
1,3-Dichlorobenzene	0.0493	0.0050	mg/kg wet	0.05000		99	70-130	1	25	
1,3-Dichloropropane	0.0501	0.0050	mg/kg wet	0.05000		100	70-130	0.4	25	
1,4-Dichlorobenzene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	0.2	25	
1,4-Dioxane	0.827	0.100	mg/kg wet	1.000		83	70-130	4	20	
1-Chlorohexane	0.0496	0.0050	mg/kg wet	0.05000		99	70-130	0.04	25	
2,2-Dichloropropane	0.0535	0.0050	mg/kg wet	0.05000		107	70-130	4	25	
2-Butanone	0.242	0.0500	mg/kg wet	0.2500		97	70-130	4	25	
2-Chlorotoluene	0.0518	0.0050	mg/kg wet	0.05000		104	70-130	1	25	
2-Hexanone	0.218	0.0500	mg/kg wet	0.2500		87	70-130	1	25	
4-Chlorotoluene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130	0.9	25	
4-Isopropyltoluene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	0.04	25	
4-Methyl-2-Pentanone	0.227	0.0500	mg/kg wet	0.2500		91	70-130	3	25	
Acetone	0.212	0.0500	mg/kg wet	0.2500		85	70-130	3	25	
Benzene	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
Bromobenzene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	0.8	25	
Bromochloromethane	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	3	25	
Bromodichloromethane	0.0508	0.0050	mg/kg wet	0.05000		102	70-130	3	25	
Bromoform	0.0449	0.0050	mg/kg wet	0.05000		90	70-130	0.6	25	
Bromomethane	0.0414	0.0100	mg/kg wet	0.05000		83	70-130	1	25	
Carbon Disulfide	0.0533	0.0050	mg/kg wet	0.05000		107	70-130	2	25	
Carbon Tetrachloride	0.0526	0.0050	mg/kg wet	0.05000		105	70-130	3	25	
Chlorobenzene	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	1	25	
Chloroethane	0.0446	0.0100	mg/kg wet	0.05000		89	70-130	1	25	
Chloroform	0.0515	0.0050	mg/kg wet	0.05000		103	70-130	3	25	
Chloromethane	0.0440	0.0100	mg/kg wet	0.05000		88	70-130	0.8	25	
cis-1,2-Dichloroethene	0.0504	0.0050	mg/kg wet	0.05000		101	70-130	2	25	
cis-1,3-Dichloropropene	0.0492	0.0050	mg/kg wet	0.05000		98	70-130	3	25	
Dibromochloromethane	0.0501	0.0050	mg/kg wet	0.05000		100	70-130	0.5	25	
Dibromomethane	0.0493	0.0050	mg/kg wet	0.05000		99	70-130	3	25	
Dichlorodifluoromethane	0.0410	0.0100	mg/kg wet	0.05000		82	70-130	2	25	
Diethyl Ether	0.0501	0.0050	mg/kg wet	0.05000		100	70-130	2	25	
Di-isopropyl ether	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	3	25	
Ethyl tertiary-butyl ether	0.0464	0.0050	mg/kg wet	0.05000		93	70-130	3	25	
Ethylbenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	0.4	25	
Hexachlorobutadiene	0.0520	0.0050	mg/kg wet	0.05000		104	70-130	0.3	25	



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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CI92335 - 5035

Isopropylbenzene	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	0.5	25	
Methyl tert-Butyl Ether	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	3	25	
Methylene Chloride	0.0535	0.0250	mg/kg wet	0.05000		107	70-130	3	25	
Naphthalene	0.0452	0.0050	mg/kg wet	0.05000		90	70-130	1	25	
n-Butylbenzene	0.0523	0.0050	mg/kg wet	0.05000		105	70-130	0.6	25	
n-Propylbenzene	0.0531	0.0050	mg/kg wet	0.05000		106	70-130	0	25	
sec-Butylbenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	0.2	25	
Styrene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	1	25	
tert-Butylbenzene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130	0.5	25	
Tertiary-amyl methyl ether	0.0473	0.0050	mg/kg wet	0.05000		95	70-130	3	25	
Tetrachloroethene	0.0512	0.0050	mg/kg wet	0.05000		102	70-130	0.6	25	
Tetrahydrofuran	0.0404	0.0050	mg/kg wet	0.05000		81	70-130	2	25	
Toluene	0.0494	0.0050	mg/kg wet	0.05000		99	70-130	2	25	
trans-1,2-Dichloroethene	0.0534	0.0050	mg/kg wet	0.05000		107	70-130	0.6	25	
trans-1,3-Dichloropropene	0.0477	0.0050	mg/kg wet	0.05000		95	70-130	4	25	
Trichloroethene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130	3	25	
Trichlorofluoromethane	0.0529	0.0050	mg/kg wet	0.05000		106	70-130	2	25	
Vinyl Acetate	0.0463	0.0050	mg/kg wet	0.05000		93	70-130	3	25	
Vinyl Chloride	0.0469	0.0100	mg/kg wet	0.05000		94	70-130	2	25	
Xylene O	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	1	25	
Xylene P,M	0.102	0.0100	mg/kg wet	0.1000		102	70-130	0.4	25	
Surrogate: 1,2-Dichloroethane-d4	0.0503		mg/kg wet	0.05000		101	70-130			
Surrogate: 4-Bromofluorobenzene	0.0496		mg/kg wet	0.05000		99	70-130			
Surrogate: Dibromofluoromethane	0.0490		mg/kg wet	0.05000		98	70-130			
Surrogate: Toluene-d8	0.0499		mg/kg wet	0.05000		100	70-130			

8082A Polychlorinated Biphenyls (PCB)

Batch CI92045 - 3540C

Blank										
Aroclor 1016	ND	0.02	mg/kg wet							
Aroclor 1016 [2C]	ND	0.02	mg/kg wet							
Aroclor 1221	ND	0.02	mg/kg wet							
Aroclor 1221 [2C]	ND	0.02	mg/kg wet							
Aroclor 1232	ND	0.02	mg/kg wet							
Aroclor 1232 [2C]	ND	0.02	mg/kg wet							
Aroclor 1242	ND	0.02	mg/kg wet							
Aroclor 1242 [2C]	ND	0.02	mg/kg wet							
Aroclor 1248	ND	0.02	mg/kg wet							
Aroclor 1248 [2C]	ND	0.02	mg/kg wet							
Aroclor 1254	ND	0.02	mg/kg wet							
Aroclor 1254 [2C]	ND	0.02	mg/kg wet							
Aroclor 1260	ND	0.02	mg/kg wet							
Aroclor 1260 [2C]	ND	0.02	mg/kg wet							
Aroclor 1262	ND	0.02	mg/kg wet							
Aroclor 1262 [2C]	ND	0.02	mg/kg wet							



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8082A Polychlorinated Biphenyls (PCB)

Batch C192045 - 3540C

Aroclor 1268	ND	0.02	mg/kg wet							
Aroclor 1268 [2C]	ND	0.02	mg/kg wet							
Surrogate: Decachlorobiphenyl	0.0193		mg/kg wet	0.02500		77	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0210		mg/kg wet	0.02500		84	30-150			
Surrogate: Tetrachloro-m-xylene	0.0123		mg/kg wet	0.02500		49	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0177		mg/kg wet	0.02500		71	30-150			

LCS

Aroclor 1016	0.3	0.05	mg/kg wet	0.5000		67	40-140			
Aroclor 1016 [2C]	0.4	0.05	mg/kg wet	0.5000		79	40-140			
Aroclor 1260	0.4	0.05	mg/kg wet	0.5000		80	40-140			
Aroclor 1260 [2C]	0.4	0.05	mg/kg wet	0.5000		81	40-140			
Surrogate: Decachlorobiphenyl	0.0195		mg/kg wet	0.02500		78	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0211		mg/kg wet	0.02500		84	30-150			
Surrogate: Tetrachloro-m-xylene	0.0150		mg/kg wet	0.02500		60	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0180		mg/kg wet	0.02500		72	30-150			

LCS Dup

Aroclor 1016	0.3	0.05	mg/kg wet	0.5000		70	40-140	4	30	
Aroclor 1016 [2C]	0.4	0.05	mg/kg wet	0.5000		83	40-140	5	30	
Aroclor 1260	0.4	0.05	mg/kg wet	0.5000		80	40-140	0.3	30	
Aroclor 1260 [2C]	0.4	0.05	mg/kg wet	0.5000		82	40-140	0.5	30	
Surrogate: Decachlorobiphenyl	0.0193		mg/kg wet	0.02500		77	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0208		mg/kg wet	0.02500		83	30-150			
Surrogate: Tetrachloro-m-xylene	0.0156		mg/kg wet	0.02500		62	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0187		mg/kg wet	0.02500		75	30-150			

8100M Total Petroleum Hydrocarbons

Batch C192046 - 3546

Blank

Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							
Hexadecane (C16)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							
Octacosane (C28)	ND	0.2	mg/kg wet							
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							
Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons	ND	37.5	mg/kg wet							
Triacotane (C30)	ND	0.2	mg/kg wet							



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8100M Total Petroleum Hydrocarbons

Batch CI92046 - 3546

<i>Surrogate: O-Terphenyl</i>	4.97		mg/kg wet	5.000		99	40-140			
LCS										
Decane (C10)	2.1	0.2	mg/kg wet	2.500		84	40-140			
Docosane (C22)	2.4	0.2	mg/kg wet	2.500		97	40-140			
Dodecane (C12)	2.3	0.2	mg/kg wet	2.500		90	40-140			
Eicosane (C20)	2.4	0.2	mg/kg wet	2.500		95	40-140			
Hexacosane (C26)	2.4	0.2	mg/kg wet	2.500		97	40-140			
Hexadecane (C16)	2.3	0.2	mg/kg wet	2.500		93	40-140			
Nonadecane (C19)	2.5	0.2	mg/kg wet	2.500		100	40-140			
Nonane (C9)	1.9	0.2	mg/kg wet	2.500		75	30-140			
Octacosane (C28)	2.5	0.2	mg/kg wet	2.500		98	40-140			
Octadecane (C18)	2.4	0.2	mg/kg wet	2.500		96	40-140			
Tetracosane (C24)	2.4	0.2	mg/kg wet	2.500		97	40-140			
Tetradecane (C14)	2.3	0.2	mg/kg wet	2.500		93	40-140			
Total Petroleum Hydrocarbons	32.8	37.5	mg/kg wet	35.00		94	40-140			
Triacontane (C30)	2.5	0.2	mg/kg wet	2.500		99	40-140			

<i>Surrogate: O-Terphenyl</i>	4.71		mg/kg wet	5.000		94	40-140			
LCS Dup										
Decane (C10)	2.2	0.2	mg/kg wet	2.500		87	40-140	4	25	
Docosane (C22)	2.6	0.2	mg/kg wet	2.500		102	40-140	5	25	
Dodecane (C12)	2.4	0.2	mg/kg wet	2.500		94	40-140	4	25	
Eicosane (C20)	2.5	0.2	mg/kg wet	2.500		100	40-140	5	25	
Hexacosane (C26)	2.6	0.2	mg/kg wet	2.500		102	40-140	5	25	
Hexadecane (C16)	2.4	0.2	mg/kg wet	2.500		98	40-140	5	25	
Nonadecane (C19)	2.6	0.2	mg/kg wet	2.500		105	40-140	4	25	
Nonane (C9)	1.9	0.2	mg/kg wet	2.500		78	30-140	3	25	
Octacosane (C28)	2.6	0.2	mg/kg wet	2.500		103	40-140	5	25	
Octadecane (C18)	2.5	0.2	mg/kg wet	2.500		100	40-140	5	25	
Tetracosane (C24)	2.6	0.2	mg/kg wet	2.500		102	40-140	5	25	
Tetradecane (C14)	2.4	0.2	mg/kg wet	2.500		97	40-140	4	25	
Total Petroleum Hydrocarbons	34.3	37.5	mg/kg wet	35.00		98	40-140	5	25	
Triacontane (C30)	2.6	0.2	mg/kg wet	2.500		103	40-140	5	25	

<i>Surrogate: O-Terphenyl</i>	4.92		mg/kg wet	5.000		98	40-140			
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8270D Semi-Volatile Organic Compounds

Batch CI92028 - 3546

Blank										
1,1-Biphenyl	ND	0.333	mg/kg wet							
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							



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8270D Semi-Volatile Organic Compounds

Batch C192028 - 3546

2,3,4,6-Tetrachlorophenol	ND	1.67	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-Nitroaniline	ND	0.333	mg/kg wet
2-Nitrophenol	ND	0.333	mg/kg wet
3,3'-Dichlorobenzidine	ND	0.333	mg/kg wet
3+4-Methylphenol	ND	0.667	mg/kg wet
3-Nitroaniline	ND	0.333	mg/kg wet
4,6-Dinitro-2-Methylphenol	ND	1.67	mg/kg wet
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet
4-Chloro-3-Methylphenol	ND	0.333	mg/kg wet
4-Chloroaniline	ND	0.667	mg/kg wet
4-Chloro-phenyl-phenyl ether	ND	0.333	mg/kg wet
4-Nitroaniline	ND	0.333	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	0.667	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
Benzoic Acid	ND	1.67	mg/kg wet
Benzyl Alcohol	ND	0.333	mg/kg wet
bis(2-Chloroethoxy)methane	ND	0.333	mg/kg wet
bis(2-Chloroethyl)ether	ND	0.167	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
Carbazole	ND	0.333	mg/kg wet
Chrysene	ND	0.167	mg/kg wet
Dibenzo(a,h)Anthracene	ND	0.167	mg/kg wet



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8270D Semi-Volatile Organic Compounds

Batch C192028 - 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	0.167	mg/kg wet							
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachlorocyclopentadiene	ND	1.67	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							
N-Nitroso-Di-n-Propylamine	ND	0.333	mg/kg wet							
N-nitrosodiphenylamine	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							
Pyridine	ND	1.67	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	2.32		mg/kg wet	3.333		70	30-130			
Surrogate: 2,4,6-Tribromophenol	4.21		mg/kg wet	5.000		84	30-130			
Surrogate: 2-Chlorophenol-d4	3.71		mg/kg wet	5.000		74	30-130			
Surrogate: 2-Fluorobiphenyl	2.19		mg/kg wet	3.333		66	30-130			
Surrogate: 2-Fluorophenol	3.63		mg/kg wet	5.000		73	30-130			
Surrogate: Nitrobenzene-d5	2.43		mg/kg wet	3.333		73	30-130			
Surrogate: Phenol-d6	3.62		mg/kg wet	5.000		72	30-130			
Surrogate: p-Terphenyl-d14	3.08		mg/kg wet	3.333		92	30-130			

LCS

1,1-Biphenyl	2.08	0.333	mg/kg wet	3.333		62	40-140			
1,2,4-Trichlorobenzene	1.98	0.333	mg/kg wet	3.333		60	40-140			
1,2-Dichlorobenzene	1.93	0.333	mg/kg wet	3.333		58	40-140			
1,3-Dichlorobenzene	1.83	0.333	mg/kg wet	3.333		55	40-140			
1,4-Dichlorobenzene	1.87	0.333	mg/kg wet	3.333		56	40-140			
2,3,4,6-Tetrachlorophenol	2.41	1.67	mg/kg wet	3.333		72	30-130			
2,4,5-Trichlorophenol	2.47	0.333	mg/kg wet	3.333		74	30-130			
2,4,6-Trichlorophenol	2.44	0.333	mg/kg wet	3.333		73	30-130			
2,4-Dichlorophenol	2.22	0.333	mg/kg wet	3.333		67	30-130			
2,4-Dimethylphenol	2.14	0.333	mg/kg wet	3.333		64	30-130			
2,4-Dinitrophenol	2.60	1.67	mg/kg wet	3.333		78	30-130			
2,4-Dinitrotoluene	2.89	0.333	mg/kg wet	3.333		87	40-140			
2,6-Dinitrotoluene	2.57	0.333	mg/kg wet	3.333		77	40-140			



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8270D Semi-Volatile Organic Compounds

Batch C192028 - 3546

2-Chloronaphthalene	2.07	0.333	mg/kg wet	3.333		62	40-140			
2-Chlorophenol	1.98	0.333	mg/kg wet	3.333		59	30-130			
2-Methylnaphthalene	1.96	0.333	mg/kg wet	3.333		59	40-140			
2-Methylphenol	1.92	0.333	mg/kg wet	3.333		58	30-130			
2-Nitroaniline	1.93	0.333	mg/kg wet	3.333		58	40-140			
2-Nitrophenol	1.97	0.333	mg/kg wet	3.333		59	30-130			
3,3'-Dichlorobenzidine	2.40	0.667	mg/kg wet	3.333		72	40-140			
3+4-Methylphenol	4.04	0.667	mg/kg wet	6.667		61	30-130			
3-Nitroaniline	2.32	0.333	mg/kg wet	3.333		70	40-140			
4,6-Dinitro-2-Methylphenol	2.89	1.67	mg/kg wet	3.333		87	30-130			
4-Bromophenyl-phenylether	2.68	0.333	mg/kg wet	3.333		80	40-140			
4-Chloro-3-Methylphenol	2.54	0.333	mg/kg wet	3.333		76	30-130			
4-Chloroaniline	1.50	0.667	mg/kg wet	3.333		45	40-140			
4-Chloro-phenyl-phenyl ether	2.52	0.333	mg/kg wet	3.333		75	40-140			
4-Nitroaniline	2.43	0.333	mg/kg wet	3.333		73	40-140			
4-Nitrophenol	2.39	1.67	mg/kg wet	3.333		72	30-130			
Acenaphthene	2.14	0.333	mg/kg wet	3.333		64	40-140			
Acenaphthylene	2.17	0.333	mg/kg wet	3.333		65	40-140			
Acetophenone	1.86	0.667	mg/kg wet	3.333		56	40-140			
Aniline	1.24	0.667	mg/kg wet	3.333		37	40-140			B-
Anthracene	2.72	0.333	mg/kg wet	3.333		82	40-140			
Azobenzene	2.34	0.333	mg/kg wet	3.333		70	40-140			
Benzo(a)anthracene	3.07	0.333	mg/kg wet	3.333		92	40-140			
Benzo(a)pyrene	2.60	0.167	mg/kg wet	3.333		78	40-140			
Benzo(b)fluoranthene	2.98	0.333	mg/kg wet	3.333		89	40-140			
Benzo(g,h,i)perylene	2.91	0.333	mg/kg wet	3.333		87	40-140			
Benzo(k)fluoranthene	2.40	0.333	mg/kg wet	3.333		72	40-140			
Benzoic Acid	2.34	1.67	mg/kg wet	3.333		70	40-140			
Benzyl Alcohol	1.75	0.333	mg/kg wet	3.333		52	40-140			
bis(2-Chloroethoxy)methane	1.94	0.333	mg/kg wet	3.333		58	40-140			
bis(2-Chloroethyl)ether	1.98	0.333	mg/kg wet	3.333		60	40-140			
bis(2-chloroisopropyl)Ether	2.00	0.333	mg/kg wet	3.333		60	40-140			
bis(2-Ethylhexyl)phthalate	2.82	0.333	mg/kg wet	3.333		85	40-140			
Butylbenzylphthalate	2.88	0.333	mg/kg wet	3.333		86	40-140			
Carbazole	2.82	0.333	mg/kg wet	3.333		85	40-140			
Chrysene	2.69	0.167	mg/kg wet	3.333		81	40-140			
Dibenzo(a,h)Anthracene	3.02	0.167	mg/kg wet	3.333		91	40-140			
Dibenzofuran	2.21	0.333	mg/kg wet	3.333		66	40-140			
Diethylphthalate	2.87	0.333	mg/kg wet	3.333		86	40-140			
Dimethylphthalate	2.63	0.333	mg/kg wet	3.333		79	40-140			
Di-n-butylphthalate	3.11	0.333	mg/kg wet	3.333		93	40-140			
Di-n-octylphthalate	2.70	0.333	mg/kg wet	3.333		81	40-140			
Fluoranthene	2.96	0.333	mg/kg wet	3.333		89	40-140			
Fluorene	2.54	0.333	mg/kg wet	3.333		76	40-140			
Hexachlorobenzene	2.75	0.167	mg/kg wet	3.333		82	40-140			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch C192028 - 3546

Hexachlorobutadiene	2.03	0.333	mg/kg wet	3.333		61	40-140			
Hexachlorocyclopentadiene	1.38	1.67	mg/kg wet	3.333		41	40-140			
Hexachloroethane	1.86	0.333	mg/kg wet	3.333		56	40-140			
Indeno(1,2,3-cd)Pyrene	3.03	0.333	mg/kg wet	3.333		91	40-140			
Isophorone	1.87	0.333	mg/kg wet	3.333		56	40-140			
Naphthalene	1.96	0.333	mg/kg wet	3.333		59	40-140			
Nitrobenzene	1.95	0.333	mg/kg wet	3.333		59	40-140			
N-Nitrosodimethylamine	1.33	0.333	mg/kg wet	3.333		40	40-140			
N-Nitroso-Di-n-Propylamine	1.92	0.333	mg/kg wet	3.333		58	40-140			
N-nitrosodiphenylamine	2.61	0.333	mg/kg wet	3.333		78	40-140			
Pentachlorophenol	2.64	1.67	mg/kg wet	3.333		79	30-130			
Phenanthrene	2.58	0.333	mg/kg wet	3.333		77	40-140			
Phenol	2.06	0.333	mg/kg wet	3.333		62	30-130			
Pyrene	2.75	0.333	mg/kg wet	3.333		83	40-140			
Pyridine	1.49	1.67	mg/kg wet	3.333		45	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	1.98		mg/kg wet	3.333		59	30-130			
Surrogate: 2,4,6-Tribromophenol	4.42		mg/kg wet	5.000		88	30-130			
Surrogate: 2-Chlorophenol-d4	3.21		mg/kg wet	5.000		64	30-130			
Surrogate: 2-Fluorobiphenyl	2.23		mg/kg wet	3.333		67	30-130			
Surrogate: 2-Fluorophenol	3.18		mg/kg wet	5.000		64	30-130			
Surrogate: Nitrobenzene-d5	2.15		mg/kg wet	3.333		64	30-130			
Surrogate: Phenol-d6	3.15		mg/kg wet	5.000		63	30-130			
Surrogate: p-Terphenyl-d14	3.04		mg/kg wet	3.333		91	30-130			

LCS Dup

1,1-Biphenyl	2.43	0.333	mg/kg wet	3.333		73	40-140	16	30	
1,2,4-Trichlorobenzene	2.33	0.333	mg/kg wet	3.333		70	40-140	16	30	
1,2-Dichlorobenzene	2.31	0.333	mg/kg wet	3.333		69	40-140	18	30	
1,3-Dichlorobenzene	2.18	0.333	mg/kg wet	3.333		65	40-140	17	30	
1,4-Dichlorobenzene	2.26	0.333	mg/kg wet	3.333		68	40-140	19	30	
2,3,4,6-Tetrachlorophenol	2.77	1.67	mg/kg wet	3.333		83	30-130	14	30	
2,4,5-Trichlorophenol	2.87	0.333	mg/kg wet	3.333		86	30-130	15	30	
2,4,6-Trichlorophenol	2.81	0.333	mg/kg wet	3.333		84	30-130	14	30	
2,4-Dichlorophenol	2.63	0.333	mg/kg wet	3.333		79	30-130	17	30	
2,4-Dimethylphenol	2.53	0.333	mg/kg wet	3.333		76	30-130	16	30	
2,4-Dinitrophenol	2.94	1.67	mg/kg wet	3.333		88	30-130	12	30	
2,4-Dinitrotoluene	3.36	0.333	mg/kg wet	3.333		101	40-140	15	30	
2,6-Dinitrotoluene	2.92	0.333	mg/kg wet	3.333		88	40-140	13	30	
2-Chloronaphthalene	2.43	0.333	mg/kg wet	3.333		73	40-140	16	30	
2-Chlorophenol	2.44	0.333	mg/kg wet	3.333		73	30-130	21	30	
2-Methylnaphthalene	2.35	0.333	mg/kg wet	3.333		71	40-140	18	30	
2-Methylphenol	2.44	0.333	mg/kg wet	3.333		73	30-130	24	30	
2-Nitroaniline	2.24	0.333	mg/kg wet	3.333		67	40-140	15	30	
2-Nitrophenol	2.34	0.333	mg/kg wet	3.333		70	30-130	17	30	
3,3'-Dichlorobenzidine	2.75	0.667	mg/kg wet	3.333		82	40-140	13	30	
3+4-Methylphenol	5.02	0.667	mg/kg wet	6.667		75	30-130	22	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch C192028 - 3546

3-Nitroaniline	2.82	0.333	mg/kg wet	3.333		85	40-140	19	30	
4,6-Dinitro-2-Methylphenol	3.08	1.67	mg/kg wet	3.333		92	30-130	6	30	
4-Bromophenyl-phenylether	2.98	0.333	mg/kg wet	3.333		90	40-140	11	30	
4-Chloro-3-Methylphenol	2.93	0.333	mg/kg wet	3.333		88	30-130	14	30	
4-Chloroaniline	2.19	0.667	mg/kg wet	3.333		66	40-140	38	30	D+
4-Chloro-phenyl-phenyl ether	2.86	0.333	mg/kg wet	3.333		86	40-140	13	30	
4-Nitroaniline	2.72	0.333	mg/kg wet	3.333		82	40-140	11	30	
4-Nitrophenol	2.67	1.67	mg/kg wet	3.333		80	30-130	11	30	
Acenaphthene	2.50	0.333	mg/kg wet	3.333		75	40-140	15	30	
Acenaphthylene	2.51	0.333	mg/kg wet	3.333		75	40-140	15	30	
Acetophenone	2.31	0.667	mg/kg wet	3.333		69	40-140	21	30	
Aniline	1.71	0.667	mg/kg wet	3.333		51	40-140	32	30	D+
Anthracene	3.07	0.333	mg/kg wet	3.333		92	40-140	12	30	
Azobenzene	2.64	0.333	mg/kg wet	3.333		79	40-140	12	30	
Benzo(a)anthracene	3.37	0.333	mg/kg wet	3.333		101	40-140	10	30	
Benzo(a)pyrene	2.85	0.167	mg/kg wet	3.333		85	40-140	9	30	
Benzo(b)fluoranthene	2.88	0.333	mg/kg wet	3.333		86	40-140	3	30	
Benzo(g,h,i)perylene	3.10	0.333	mg/kg wet	3.333		93	40-140	6	30	
Benzo(k)fluoranthene	3.07	0.333	mg/kg wet	3.333		92	40-140	24	30	
Benzoic Acid	2.61	1.67	mg/kg wet	3.333		78	40-140	11	30	
Benzyl Alcohol	2.24	0.333	mg/kg wet	3.333		67	40-140	25	30	
bis(2-Chloroethoxy)methane	2.34	0.333	mg/kg wet	3.333		70	40-140	18	30	
bis(2-Chloroethyl)ether	2.51	0.333	mg/kg wet	3.333		75	40-140	23	30	
bis(2-chloroisopropyl)Ether	2.41	0.333	mg/kg wet	3.333		72	40-140	19	30	
bis(2-Ethylhexyl)phthalate	3.22	0.333	mg/kg wet	3.333		97	40-140	13	30	
Butylbenzylphthalate	3.21	0.333	mg/kg wet	3.333		96	40-140	11	30	
Carbazole	3.08	0.333	mg/kg wet	3.333		93	40-140	9	30	
Chrysene	2.94	0.167	mg/kg wet	3.333		88	40-140	9	30	
Dibenzo(a,h)Anthracene	3.21	0.167	mg/kg wet	3.333		96	40-140	6	30	
Dibenzofuran	2.56	0.333	mg/kg wet	3.333		77	40-140	15	30	
Diethylphthalate	3.23	0.333	mg/kg wet	3.333		97	40-140	12	30	
Dimethylphthalate	3.04	0.333	mg/kg wet	3.333		91	40-140	15	30	
Di-n-butylphthalate	3.45	0.333	mg/kg wet	3.333		104	40-140	10	30	
Di-n-octylphthalate	2.99	0.333	mg/kg wet	3.333		90	40-140	10	30	
Fluoranthene	3.22	0.333	mg/kg wet	3.333		97	40-140	8	30	
Fluorene	2.96	0.333	mg/kg wet	3.333		89	40-140	15	30	
Hexachlorobenzene	2.99	0.167	mg/kg wet	3.333		90	40-140	8	30	
Hexachlorobutadiene	2.40	0.333	mg/kg wet	3.333		72	40-140	17	30	
Hexachlorocyclopentadiene	1.63	1.67	mg/kg wet	3.333		49	40-140	17	30	
Hexachloroethane	2.22	0.333	mg/kg wet	3.333		67	40-140	18	30	
Indeno(1,2,3-cd)Pyrene	3.20	0.333	mg/kg wet	3.333		96	40-140	5	30	
Isophorone	2.21	0.333	mg/kg wet	3.333		66	40-140	17	30	
Naphthalene	2.30	0.333	mg/kg wet	3.333		69	40-140	16	30	
Nitrobenzene	2.28	0.333	mg/kg wet	3.333		68	40-140	15	30	
N-Nitrosodimethylamine	1.61	0.333	mg/kg wet	3.333		48	40-140	19	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch C192028 - 3546

N-Nitroso-Di-n-Propylamine	2.34	0.333	mg/kg wet	3.333		70	40-140	20	30	
N-nitrosodiphenylamine	2.84	0.333	mg/kg wet	3.333		85	40-140	8	30	
Pentachlorophenol	2.88	1.67	mg/kg wet	3.333		86	30-130	9	30	
Phenanthrene	2.78	0.333	mg/kg wet	3.333		83	40-140	8	30	
Phenol	2.56	0.333	mg/kg wet	3.333		77	30-130	22	30	
Pyrene	3.06	0.333	mg/kg wet	3.333		92	40-140	11	30	
Pyridine	1.82	1.67	mg/kg wet	3.333		55	40-140	20	30	
Surrogate: 1,2-Dichlorobenzene-d4	2.31		mg/kg wet	3.333		69	30-130			
Surrogate: 2,4,6-Tribromophenol	4.85		mg/kg wet	5.000		97	30-130			
Surrogate: 2-Chlorophenol-d4	3.81		mg/kg wet	5.000		76	30-130			
Surrogate: 2-Fluorobiphenyl	2.49		mg/kg wet	3.333		75	30-130			
Surrogate: 2-Fluorophenol	3.74		mg/kg wet	5.000		75	30-130			
Surrogate: Nitrobenzene-d5	2.49		mg/kg wet	3.333		75	30-130			
Surrogate: Phenol-d6	3.80		mg/kg wet	5.000		76	30-130			
Surrogate: p-Terphenyl-d14	3.31		mg/kg wet	3.333		99	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

Notes and Definitions

- 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.
- CD+ Continuing Calibration %Diff/Drift is above control limit (CD+).
- CD- Continuing Calibration %Diff/Drift is below control limit (CD-).
- 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
- RL Reporting Limit
- EDL Estimated Detection Limit
- MF Membrane Filtration
- MPN Most Probably Number
- TNTC Too numerous to Count
- CFU Colony Forming Units



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0654

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

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.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 1910654

Shipped/Delivered Via: ESS Courier

Date Received: 9/20/2019

Project Due Date: 9/27/2019

Days for Project: 5 Day

1. Air bill manifest present? No
 Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
 Temp: .7 Iced with: Ice
5. Was COC signed and dated by client? Yes

6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. Were labs informed about short holds & rushes? Yes / No / NA
10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes No
 ESS Sample IDs: _____
 Analysis: _____
 TAT: _____

12. Were VOAs received? Yes / No
 a. Air bubbles in aqueous VOAs? Yes / No
 b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes / No
 a. If metals preserved upon receipt: Date: _____ Time: _____ By: _____
 b. Low Level VOA vials frozen: Date: 9/20/19 Time: 1402 By: ML

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes No
 a. Was there a need to contact the client? Yes No
 Who was contacted? _____ Date: _____ Time: _____ By: _____

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
01	390094	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
01	390098	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
01	390105	Yes	NA	Yes	VOA Vial - Other	Other	
01	390106	Yes	NA	Yes	VOA Vial - Other	Other	
02	390093	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
02	390097	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
02	390103	Yes	NA	Yes	VOA Vial - Other	Other	
02	390104	Yes	NA	Yes	VOA Vial - Other	Other	
03	390092	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
03	390096	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
03	390101	Yes	NA	Yes	VOA Vial - Other	Other	
03	390102	Yes	NA	Yes	VOA Vial - Other	Other	
04	390091	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
04	390095	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
04	390099	Yes	NA	Yes	VOA Vial - Other	Other	
04	390100	Yes	NA	Yes	VOA Vial - Other	Other	

2nd Review

Were all containers scanned into storage/lab?

Are barcode labels on correct containers?

Are all Flashpoint stickers attached/container ID # circled?

Are all Hex Chrome stickers attached?

Initials [Signature]
 Yes / No
 Yes / No / NA
 Yes / No / NA

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 1910654

Date Received: 9/20/2019

Are all QC stickers attached?

Yes / No / NA

Are VOA stickers attached if bubbles noted?

Yes / No / NA

Completed

By:

Date & Time:

9/20/19 14:30

Reviewed

By:

Date & Time:

9/20/19 1443

Delivered

By:

9/20/19 1443

ESS Laboratory

Division of Thielsch Engineering, Inc.
 185 Frances Avenue, Cranston RI 02910
 Tel. (401) 461-7181 Fax (401) 461-4486
 www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time: Std Rush: _____
 Regulatory State: RI
 Is this project for any of the following?:
 MA-MCP CT-RCP RGP Remediation

Company Name: Betz Group
 Project #: 6412
 Project Name: NBC IIA-4 and IIA-5
 Contact Person: Joe McLoughlin
 Address: 701 Coors Washington Hwy
 City: Lincoln State: RI
 Zip Code: 02865 PO #: _____
 Telephone Number: 401.333.2282
 FAX Number: _____
 Email Address: jmclooughlin@betz-mc.com

ESS Lab # 1910654
 Reporting Limits: RIDEM R-3 DEC / ICDFC
 Electronic Deliverables: Limit Checker Excel
 Other (Please Specify) → _____

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Analysis														
						VOCs	SVCs	TPH	PCBs	PP13 M+L										
1	9/18/19	8:00	Grds	Soil	B-6A 0-2'	X	X	X	X	X										
2	9/18/19	8:15	|	|	B-6A 2-4'	X	X	X	X	X										
3	9/18/19	8:30	|	|	B-6A 4-6'	X	X	X	X	X										
4	9/18/19	11:45	|	|	B-6A 6-10'	X	X	X	X	X										

Container Type: AG-Amber Glass B-BOD Bottle G-Glass P-Poly S-Sterile V-Vial O-Other
 Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2SO3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other*
 Number of Containers: 3

Laboratory Use Only
 Cooler Present:
 Seals Intact:
 Cooler Temperature: 0.7°C
 Sampled by: Scott Nee
 Comments: Please specify "Other" preservative and containers types in this space
 Relinquished by: (Signature, Date & Time) [Signature] 9/20/19 9:50
 Relinquished By: (Signature, Date & Time) [Signature] 9/20/19 11:42
 Received By: (Signature, Date & Time) [Signature] 9/20/19 14:15
 Relinquished by: (Signature, Date & Time) _____
 Received By: (Signature, Date & Time) _____



CERTIFICATE OF ANALYSIS

Joe McLoughlin
Beta Engineering
701 George Washington Hwy 2nd FL
Lincoln, RI 02865

RE: NBC III (6912)
ESS Laboratory Work Order Number: 19I0291

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 3:19 pm, Sep 18, 2019

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 TNI and relative state standards, 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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

SAMPLE RECEIPT

The following samples were received on September 11, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Low Level VOA vials were frozen by ESS Laboratory on September 11, 2019 at 13:43.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
19I0291-01	B-8 4-6ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D
19I0291-02	B-8 6-10ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

PROJECT NARRATIVE

5035/8260B Volatile Organic Compounds / Low Level

C191217-BS1 **Blank Spike recovery is below lower control limit (B-).**
1,2-Dibromo-3-Chloropropane (66% @ 70-130%), 2-Hexanone (69% @ 70-130%),
Dichlorodifluoromethane (64% @ 70-130%)

CI91217-BSD1 **Blank Spike recovery is below lower control limit (B-).**
Dichlorodifluoromethane (67% @ 70-130%)

8270D Semi-Volatile Organic Compounds

C9I0252-CCV1 **Calibration required quadratic regression (Q).**
2,4-Dinitrophenol (70% @ 80-120%), 4,6-Dinitro-2-Methylphenol (83% @ 80-120%), Benzoic Acid (69%
@ 80-120%), Pentachlorophenol (77% @ 80-120%)

C9I0252-CCV1 **Continuing Calibration %Diff/Drift is below control limit (CD-).**
2,4-Dinitrophenol (30% @ 20%), Benzoic Acid (31% @ 20%), Hexachlorocyclopentadiene (23% @
20%), Pentachlorophenol (23% @ 20%)

CI91213-BS1 **Blank Spike recovery is below lower control limit (B-).**
Hexachlorocyclopentadiene (39% @ 40-140%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

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- [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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

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
- 8015C - 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
- MADEP 18-2.1 - 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
- 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 4-6ft
Date Sampled: 09/10/19 09:15
Percent Solids: 90

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (4.96)		6010C		1	KJK	09/14/19 5:13	2.23	100	CI91302
Arsenic	16.8 (2.48)		6010C		1	KJK	09/14/19 5:13	2.23	100	CI91302
Beryllium	0.33 (0.11)		6010C		1	KJK	09/14/19 5:13	2.23	100	CI91302
Cadmium	ND (0.50)		6010C		1	KJK	09/14/19 5:13	2.23	100	CI91302
Chromium	14.3 (0.99)		6010C		1	KJK	09/14/19 5:13	2.23	100	CI91302
Copper	37.5 (2.48)		6010C		1	KJK	09/16/19 21:24	2.23	100	CI91302
Lead	68.0 (4.96)		6010C		1	KJK	09/14/19 5:13	2.23	100	CI91302
Mercury	0.068 (0.019)		7471B		1	MKS	09/16/19 11:37	1.14	40	CI91323
Nickel	14.6 (2.48)		6010C		1	KJK	09/14/19 5:13	2.23	100	CI91302
Selenium	ND (0.50)		6020A		1	NAR	09/17/19 15:01	2.23	100	CI91302
Silver	ND (0.50)		6010C		1	KJK	09/14/19 5:13	2.23	100	CI91302
Thallium	ND (0.50)		6020A		1	NAR	09/17/19 15:01	2.23	100	CI91302
Zinc	87.9 (2.48)		6010C		1	KJK	09/16/19 21:24	2.23	100	CI91302



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 4-6ft
Date Sampled: 09/10/19 09:15
Percent Solids: 90
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,1,1-Trichloroethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,1,2,2-Tetrachloroethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,1,2-Trichloroethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,1-Dichloroethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,1-Dichloroethene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,1-Dichloropropene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,2,3-Trichlorobenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,2,3-Trichloropropane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,2,4-Trichlorobenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,2,4-Trimethylbenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,2-Dibromo-3-Chloropropane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,2-Dibromoethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,2-Dichlorobenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,2-Dichloroethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,2-Dichloropropane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,3,5-Trimethylbenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,3-Dichlorobenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,3-Dichloropropane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,4-Dichlorobenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1,4-Dioxane	ND (0.0738)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
1-Chlorohexane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
2,2-Dichloropropane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
2-Butanone	ND (0.0369)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
2-Chlorotoluene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
2-Hexanone	ND (0.0369)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
4-Chlorotoluene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
4-Isopropyltoluene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
4-Methyl-2-Pentanone	ND (0.0369)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Acetone	ND (0.0369)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Benzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Bromobenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 4-6ft
Date Sampled: 09/10/19 09:15
Percent Solids: 90
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Bromodichloromethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Bromoform	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Bromomethane	ND (0.0074)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Carbon Disulfide	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Carbon Tetrachloride	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Chlorobenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Chloroethane	ND (0.0074)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Chloroform	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Chloromethane	ND (0.0074)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
cis-1,2-Dichloroethene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
cis-1,3-Dichloropropene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Dibromochloromethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Dibromomethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Dichlorodifluoromethane	ND (0.0074)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Diethyl Ether	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Di-isopropyl ether	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Ethyl tertiary-butyl ether	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Ethylbenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Hexachlorobutadiene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Isopropylbenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Methyl tert-Butyl Ether	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Methylene Chloride	ND (0.0185)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Naphthalene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
n-Butylbenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
n-Propylbenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
sec-Butylbenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Styrene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
tert-Butylbenzene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Tertiary-amyl methyl ether	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Tetrachloroethene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Tetrahydrofuran	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 4-6ft
Date Sampled: 09/10/19 09:15
Percent Solids: 90
Initial Volume: 7.5
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
trans-1,2-Dichloroethene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
trans-1,3-Dichloropropene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Trichloroethene	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Trichlorofluoromethane	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Vinyl Acetate	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Vinyl Chloride	ND (0.0074)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Xylene O	ND (0.0037)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Xylene P,M	ND (0.0074)		8260B Low		1	09/12/19 20:12	C9I0210	CI91217
Xylenes (Total)	ND (0.00738)		8260B Low		1	09/12/19 20:12		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>95 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>93 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>100 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>91 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 4-6ft
Date Sampled: 09/10/19 09:15
Percent Solids: 90
Initial Volume: 19.9
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/12/19 15:50

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	09/16/19 11:35		CI91208
Aroclor 1221	ND (0.06)		8082A		1	09/16/19 11:35		CI91208
Aroclor 1232	ND (0.06)		8082A		1	09/16/19 11:35		CI91208
Aroclor 1242	ND (0.06)		8082A		1	09/16/19 11:35		CI91208
Aroclor 1248	ND (0.06)		8082A		1	09/16/19 11:35		CI91208
Aroclor 1254	ND (0.06)		8082A		1	09/16/19 11:35		CI91208
Aroclor 1260	ND (0.06)		8082A		1	09/16/19 11:35		CI91208
Aroclor 1262	ND (0.06)		8082A		1	09/16/19 11:35		CI91208
Aroclor 1268	ND (0.06)		8082A		1	09/16/19 11:35		CI91208

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	74 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	72 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	64 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	71 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 4-6ft
Date Sampled: 09/10/19 09:15
Percent Solids: 90
Initial Volume: 20.7
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 9/12/19 10:45

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	59.6 (40.1)		8100M		1	09/13/19 19:13	C910178	CI91215
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		79 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 4-6ft
Date Sampled: 09/10/19 09:15
Percent Solids: 90
Initial Volume: 14.3
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/12/19 11:55

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
1,2,4-Trichlorobenzene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
1,2-Dichlorobenzene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
1,3-Dichlorobenzene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
1,4-Dichlorobenzene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2,3,4,6-Tetrachlorophenol	ND (1.94)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2,4,5-Trichlorophenol	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2,4,6-Trichlorophenol	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2,4-Dichlorophenol	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2,4-Dimethylphenol	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2,4-Dinitrophenol	ND (1.94)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2,4-Dinitrotoluene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2,6-Dinitrotoluene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2-Chloronaphthalene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2-Chlorophenol	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2-Methylnaphthalene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2-Methylphenol	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2-Nitroaniline	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
2-Nitrophenol	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
3,3'-Dichlorobenzidine	ND (0.775)		8270D		1	09/14/19 20:33	C9I0252	CI91213
3+4-Methylphenol	ND (0.775)		8270D		1	09/14/19 20:33	C9I0252	CI91213
3-Nitroaniline	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
4,6-Dinitro-2-Methylphenol	ND (1.94)		8270D		1	09/14/19 20:33	C9I0252	CI91213
4-Bromophenyl-phenylether	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
4-Chloro-3-Methylphenol	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
4-Chloroaniline	ND (0.775)		8270D		1	09/14/19 20:33	C9I0252	CI91213
4-Chloro-phenyl-phenyl ether	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
4-Nitroaniline	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
4-Nitrophenol	ND (1.94)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Acenaphthene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Acenaphthylene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Acetophenone	ND (0.775)		8270D		1	09/14/19 20:33	C9I0252	CI91213



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-8 4-6ft
 Date Sampled: 09/10/19 09:15
 Percent Solids: 90
 Initial Volume: 14.3
 Final Volume: 0.5
 Extraction Method: 3546

ESS Laboratory Work Order: 19I0291
 ESS Laboratory Sample ID: 19I0291-01
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: TJ
 Prepared: 9/12/19 11:55

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.775)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Anthracene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Azobenzene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Benzo(a)anthracene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Benzo(a)pyrene	0.385 (0.194)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Benzo(b)fluoranthene	0.481 (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Benzo(g,h,i)perylene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Benzo(k)fluoranthene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Benzoic Acid	ND (1.94)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Benzyl Alcohol	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
bis(2-Chloroethoxy)methane	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
bis(2-Chloroethyl)ether	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
bis(2-chloroisopropyl)Ether	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
bis(2-Ethylhexyl)phthalate	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Butylbenzylphthalate	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Carbazole	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Chrysene	0.453 (0.194)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Dibenzo(a,h)Anthracene	ND (0.194)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Dibenzofuran	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Diethylphthalate	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Dimethylphthalate	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Di-n-butylphthalate	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Di-n-octylphthalate	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Fluoranthene	0.834 (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Fluorene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Hexachlorobenzene	ND (0.194)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Hexachlorobutadiene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Hexachlorocyclopentadiene	ND (1.94)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Hexachloroethane	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Indeno(1,2,3-cd)Pyrene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Isophorone	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Naphthalene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 4-6ft
Date Sampled: 09/10/19 09:15
Percent Solids: 90
Initial Volume: 14.3
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/12/19 11:55

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
N-Nitrosodimethylamine	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
N-Nitroso-Di-n-Propylamine	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
N-nitrosodiphenylamine	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Pentachlorophenol	ND (1.94)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Phenanthrene	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Phenol	ND (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Pyrene	0.825 (0.387)		8270D		1	09/14/19 20:33	C9I0252	CI91213
Pyridine	ND (1.94)		8270D		1	09/14/19 20:33	C9I0252	CI91213

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	67 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	79 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	76 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	68 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	73 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	67 %		30-130
<i>Surrogate: Phenol-d6</i>	79 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	106 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 6-10ft
Date Sampled: 09/10/19 09:45
Percent Solids: 90

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (4.91)		6010C		1	KJK	09/14/19 5:16	2.26	100	CI91302
Arsenic	12.4 (2.45)		6010C		1	KJK	09/14/19 5:16	2.26	100	CI91302
Beryllium	0.35 (0.11)		6010C		1	KJK	09/14/19 5:16	2.26	100	CI91302
Cadmium	ND (0.49)		6010C		1	KJK	09/14/19 5:16	2.26	100	CI91302
Chromium	14.1 (0.98)		6010C		1	KJK	09/14/19 5:16	2.26	100	CI91302
Copper	37.5 (2.45)		6010C		1	KJK	09/16/19 21:27	2.26	100	CI91302
Lead	67.8 (4.91)		6010C		1	KJK	09/14/19 5:16	2.26	100	CI91302
Mercury	0.074 (0.015)		7471B		1	MKS	09/16/19 11:39	1.43	40	CI91323
Nickel	16.3 (2.45)		6010C		1	KJK	09/14/19 5:16	2.26	100	CI91302
Selenium	ND (0.49)		6020A		1	NAR	09/17/19 15:06	2.26	100	CI91302
Silver	ND (0.49)		6010C		1	KJK	09/14/19 5:16	2.26	100	CI91302
Thallium	ND (0.49)		6020A		1	NAR	09/17/19 15:06	2.26	100	CI91302
Zinc	79.3 (2.45)		6010C		1	KJK	09/16/19 21:27	2.26	100	CI91302



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 6-10ft
Date Sampled: 09/10/19 09:45
Percent Solids: 90
Initial Volume: 8
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,1,1-Trichloroethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,1,2,2-Tetrachloroethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,1,2-Trichloroethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,1-Dichloroethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,1-Dichloroethene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,1-Dichloropropene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,2,3-Trichlorobenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,2,3-Trichloropropane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,2,4-Trichlorobenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,2,4-Trimethylbenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,2-Dibromo-3-Chloropropane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,2-Dibromoethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,2-Dichlorobenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,2-Dichloroethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,2-Dichloropropane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,3,5-Trimethylbenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,3-Dichlorobenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,3-Dichloropropane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,4-Dichlorobenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1,4-Dioxane	ND (0.0693)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
1-Chlorohexane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
2,2-Dichloropropane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
2-Butanone	ND (0.0346)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
2-Chlorotoluene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
2-Hexanone	ND (0.0346)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
4-Chlorotoluene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
4-Isopropyltoluene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
4-Methyl-2-Pentanone	ND (0.0346)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Acetone	ND (0.0346)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Benzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Bromobenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 6-10ft
Date Sampled: 09/10/19 09:45
Percent Solids: 90
Initial Volume: 8
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Bromodichloromethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Bromoform	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Bromomethane	ND (0.0069)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Carbon Disulfide	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Carbon Tetrachloride	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Chlorobenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Chloroethane	ND (0.0069)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Chloroform	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Chloromethane	ND (0.0069)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
cis-1,2-Dichloroethene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
cis-1,3-Dichloropropene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Dibromochloromethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Dibromomethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Dichlorodifluoromethane	ND (0.0069)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Diethyl Ether	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Di-isopropyl ether	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Ethyl tertiary-butyl ether	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Ethylbenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Hexachlorobutadiene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Isopropylbenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Methyl tert-Butyl Ether	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Methylene Chloride	ND (0.0173)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Naphthalene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
n-Butylbenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
n-Propylbenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
sec-Butylbenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Styrene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
tert-Butylbenzene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Tertiary-amyl methyl ether	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Tetrachloroethene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Tetrahydrofuran	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 6-10ft
Date Sampled: 09/10/19 09:45
Percent Solids: 90
Initial Volume: 8
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MEK

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
trans-1,2-Dichloroethene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
trans-1,3-Dichloropropene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Trichloroethene	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Trichlorofluoromethane	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Vinyl Acetate	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Vinyl Chloride	ND (0.0069)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Xylene O	ND (0.0035)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Xylene P,M	ND (0.0069)		8260B Low		1	09/12/19 20:37	C9I0210	CI91217
Xylenes (Total)	ND (0.00693)		8260B Low		1	09/12/19 20:37		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>97 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>92 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>103 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>87 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 6-10ft
Date Sampled: 09/10/19 09:45
Percent Solids: 90
Initial Volume: 20.8
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/12/19 15:50

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.05)		8082A		1	09/16/19 11:52		CI91208
Aroclor 1221	ND (0.05)		8082A		1	09/16/19 11:52		CI91208
Aroclor 1232	ND (0.05)		8082A		1	09/16/19 11:52		CI91208
Aroclor 1242	ND (0.05)		8082A		1	09/16/19 11:52		CI91208
Aroclor 1248	ND (0.05)		8082A		1	09/16/19 11:52		CI91208
Aroclor 1254	ND (0.05)		8082A		1	09/16/19 11:52		CI91208
Aroclor 1260	ND (0.05)		8082A		1	09/16/19 11:52		CI91208
Aroclor 1262	0.1 (0.05)		8082A		1	09/16/19 11:52		CI91208
Aroclor 1268	ND (0.05)		8082A		1	09/16/19 11:52		CI91208

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	84 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	78 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	70 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	81 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 6-10ft
Date Sampled: 09/10/19 09:45
Percent Solids: 90
Initial Volume: 20.9
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 9/12/19 10:45

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	68.6 (39.8)		8100M		1	09/13/19 21:02	C910178	CI91215
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		82 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 6-10ft
Date Sampled: 09/10/19 09:45
Percent Solids: 90
Initial Volume: 14
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/12/19 11:55

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
1,2,4-Trichlorobenzene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
1,2-Dichlorobenzene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
1,3-Dichlorobenzene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
1,4-Dichlorobenzene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2,3,4,6-Tetrachlorophenol	ND (1.98)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2,4,5-Trichlorophenol	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2,4,6-Trichlorophenol	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2,4-Dichlorophenol	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2,4-Dimethylphenol	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2,4-Dinitrophenol	ND (1.98)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2,4-Dinitrotoluene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2,6-Dinitrotoluene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2-Chloronaphthalene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2-Chlorophenol	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2-Methylnaphthalene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2-Methylphenol	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2-Nitroaniline	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
2-Nitrophenol	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
3,3'-Dichlorobenzidine	ND (0.792)		8270D		1	09/14/19 22:00	C9I0252	CI91213
3+4-Methylphenol	ND (0.792)		8270D		1	09/14/19 22:00	C9I0252	CI91213
3-Nitroaniline	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
4,6-Dinitro-2-Methylphenol	ND (1.98)		8270D		1	09/14/19 22:00	C9I0252	CI91213
4-Bromophenyl-phenylether	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
4-Chloro-3-Methylphenol	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
4-Chloroaniline	ND (0.792)		8270D		1	09/14/19 22:00	C9I0252	CI91213
4-Chloro-phenyl-phenyl ether	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
4-Nitroaniline	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
4-Nitrophenol	ND (1.98)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Acenaphthene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Acenaphthylene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Acetophenone	ND (0.792)		8270D		1	09/14/19 22:00	C9I0252	CI91213



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-8 6-10ft
Date Sampled: 09/10/19 09:45
Percent Solids: 90
Initial Volume: 14
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19I0291
ESS Laboratory Sample ID: 19I0291-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 9/12/19 11:55

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.792)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Anthracene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Azobenzene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Benzo(a)anthracene	0.473 (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Benzo(a)pyrene	0.559 (0.198)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Benzo(b)fluoranthene	0.625 (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Benzo(g,h,i)perylene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Benzo(k)fluoranthene	0.523 (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Benzoic Acid	ND (1.98)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Benzyl Alcohol	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
bis(2-Chloroethoxy)methane	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
bis(2-Chloroethyl)ether	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
bis(2-chloroisopropyl)Ether	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
bis(2-Ethylhexyl)phthalate	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Butylbenzylphthalate	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Carbazole	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Chrysene	0.616 (0.198)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Dibenzo(a,h)Anthracene	ND (0.198)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Dibenzofuran	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Diethylphthalate	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Dimethylphthalate	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Di-n-butylphthalate	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Di-n-octylphthalate	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Fluoranthene	1.01 (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Fluorene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Hexachlorobenzene	ND (0.198)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Hexachlorobutadiene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Hexachlorocyclopentadiene	ND (1.98)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Hexachloroethane	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Indeno(1,2,3-cd)Pyrene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Isophorone	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Naphthalene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-8 6-10ft
 Date Sampled: 09/10/19 09:45
 Percent Solids: 90
 Initial Volume: 14
 Final Volume: 0.5
 Extraction Method: 3546

ESS Laboratory Work Order: 19I0291
 ESS Laboratory Sample ID: 19I0291-02
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: TJ
 Prepared: 9/12/19 11:55

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
N-Nitrosodimethylamine	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
N-Nitroso-Di-n-Propylamine	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
N-nitrosodiphenylamine	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Pentachlorophenol	ND (1.98)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Phenanthrene	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Phenol	ND (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Pyrene	1.07 (0.396)		8270D		1	09/14/19 22:00	C9I0252	CI91213
Pyridine	ND (1.98)		8270D		1	09/14/19 22:00	C9I0252	CI91213

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	50 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	74 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	60 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	55 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	57 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	51 %		30-130
<i>Surrogate: Phenol-d6</i>	64 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	102 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch C191302 - 3050B

Blank

Antimony	ND	5.00	mg/kg wet
Arsenic	ND	2.50	mg/kg wet
Beryllium	ND	0.11	mg/kg wet
Cadmium	ND	0.50	mg/kg wet
Chromium	ND	1.00	mg/kg wet
Copper	ND	2.50	mg/kg wet
Lead	ND	5.00	mg/kg wet
Nickel	ND	2.50	mg/kg wet
Silver	ND	0.50	mg/kg wet
Zinc	ND	2.50	mg/kg wet

Blank

Selenium	ND	0.50	mg/kg wet
Thallium	ND	0.50	mg/kg wet

LCS

Antimony	39.8	19.6	mg/kg wet	42.40	94	80-120
Arsenic	126	9.80	mg/kg wet	128.0	98	80-120
Beryllium	206	0.43	mg/kg wet	217.0	95	80-120
Cadmium	86.4	1.96	mg/kg wet	99.00	87	80-120
Chromium	111	3.92	mg/kg wet	116.0	95	80-120
Copper	88.4	9.80	mg/kg wet	89.60	99	80-120
Lead	266	19.6	mg/kg wet	277.0	96	80-120
Nickel	111	9.80	mg/kg wet	107.0	104	80-120
Silver	60.2	1.96	mg/kg wet	64.30	94	80-120
Zinc	526	9.80	mg/kg wet	561.0	94	80-120

LCS

Selenium	256	9.80	mg/kg wet	242.0	106	80-120
Thallium	189	9.80	mg/kg wet	183.0	104	80-120

LCS Dup

Antimony	41.0	17.9	mg/kg wet	42.40	97	80-120	3	20
Arsenic	128	8.93	mg/kg wet	128.0	100	80-120	2	20
Beryllium	201	0.39	mg/kg wet	217.0	93	80-120	2	20
Cadmium	85.4	1.79	mg/kg wet	99.00	86	80-120	1	20
Chromium	110	3.57	mg/kg wet	116.0	95	80-120	0.7	20
Copper	89.5	8.93	mg/kg wet	89.60	100	80-120	1	20
Lead	263	17.9	mg/kg wet	277.0	95	80-120	1	20
Nickel	110	8.93	mg/kg wet	107.0	103	80-120	0.8	20
Silver	59.2	1.79	mg/kg wet	64.30	92	80-120	2	20
Zinc	521	8.93	mg/kg wet	561.0	93	80-120	0.9	20

LCS Dup

Selenium	245	8.93	mg/kg wet	242.0	101	80-120	4	30
Thallium	183	8.93	mg/kg wet	183.0	100	80-120	3	30

Reference

Lead	3740	19.2	mg/kg wet	4490	83	83-113
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CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CI91323 - 7471B

Blank

Mercury	ND	0.033	mg/kg wet							
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LCS

Mercury	2.80	0.325	mg/kg wet	3.120		90	80-120			
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LCS Dup

Mercury	2.64	0.296	mg/kg wet	3.120		85	80-120	6	20	
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5035/8260B Volatile Organic Compounds / Low Level

Batch CI91217 - 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	0.0050	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							
1-Chlorohexane	ND	0.0050	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0500	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0500	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet							
Acetone	ND	0.0500	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							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C191217 - 5035

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	0.0050	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	0.0250	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 Acetate	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							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0454</i>		mg/kg wet	<i>0.05000</i>		<i>91</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0437</i>		mg/kg wet	<i>0.05000</i>		<i>87</i>	<i>70-130</i>			
<i>Surrogate: Dibromofluoromethane</i>	<i>0.0496</i>		mg/kg wet	<i>0.05000</i>		<i>99</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0433</i>		mg/kg wet	<i>0.05000</i>		<i>87</i>	<i>70-130</i>			

LCS

1,1,1,2-Tetrachloroethane	0.0495	0.0050	mg/kg wet	0.05000		99	70-130			
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CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C191217 - 5035

1,1,1-Trichloroethane	0.0552	0.0050	mg/kg wet	0.05000		110	70-130			
1,1,2,2-Tetrachloroethane	0.0372	0.0050	mg/kg wet	0.05000		74	70-130			
1,1,2-Trichloroethane	0.0472	0.0050	mg/kg wet	0.05000		94	70-130			
1,1-Dichloroethane	0.0524	0.0050	mg/kg wet	0.05000		105	70-130			
1,1-Dichloroethene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130			
1,1-Dichloropropene	0.0526	0.0050	mg/kg wet	0.05000		105	70-130			
1,2,3-Trichlorobenzene	0.0435	0.0050	mg/kg wet	0.05000		87	70-130			
1,2,3-Trichloropropane	0.0374	0.0050	mg/kg wet	0.05000		75	70-130			
1,2,4-Trichlorobenzene	0.0443	0.0050	mg/kg wet	0.05000		89	70-130			
1,2,4-Trimethylbenzene	0.0463	0.0050	mg/kg wet	0.05000		93	70-130			
1,2-Dibromo-3-Chloropropane	0.0332	0.0050	mg/kg wet	0.05000		66	70-130			B-
1,2-Dibromoethane	0.0415	0.0050	mg/kg wet	0.05000		83	70-130			
1,2-Dichlorobenzene	0.0440	0.0050	mg/kg wet	0.05000		88	70-130			
1,2-Dichloroethane	0.0459	0.0050	mg/kg wet	0.05000		92	70-130			
1,2-Dichloropropane	0.0488	0.0050	mg/kg wet	0.05000		98	70-130			
1,3,5-Trimethylbenzene	0.0461	0.0050	mg/kg wet	0.05000		92	70-130			
1,3-Dichlorobenzene	0.0447	0.0050	mg/kg wet	0.05000		89	70-130			
1,3-Dichloropropane	0.0434	0.0050	mg/kg wet	0.05000		87	70-130			
1,4-Dichlorobenzene	0.0454	0.0050	mg/kg wet	0.05000		91	70-130			
1,4-Dioxane	0.818	0.100	mg/kg wet	1.000		82	70-130			
1-Chlorohexane	0.0478	0.0050	mg/kg wet	0.05000		96	70-130			
2,2-Dichloropropane	0.0553	0.0050	mg/kg wet	0.05000		111	70-130			
2-Butanone	0.237	0.0500	mg/kg wet	0.2500		95	70-130			
2-Chlorotoluene	0.0451	0.0050	mg/kg wet	0.05000		90	70-130			
2-Hexanone	0.174	0.0500	mg/kg wet	0.2500		69	70-130			B-
4-Chlorotoluene	0.0439	0.0050	mg/kg wet	0.05000		88	70-130			
4-Isopropyltoluene	0.0460	0.0050	mg/kg wet	0.05000		92	70-130			
4-Methyl-2-Pentanone	0.201	0.0500	mg/kg wet	0.2500		80	70-130			
Acetone	0.198	0.0500	mg/kg wet	0.2500		79	70-130			
Benzene	0.0510	0.0050	mg/kg wet	0.05000		102	70-130			
Bromobenzene	0.0453	0.0050	mg/kg wet	0.05000		91	70-130			
Bromochloromethane	0.0504	0.0050	mg/kg wet	0.05000		101	70-130			
Bromodichloromethane	0.0476	0.0050	mg/kg wet	0.05000		95	70-130			
Bromoform	0.0410	0.0050	mg/kg wet	0.05000		82	70-130			
Bromomethane	0.0462	0.0100	mg/kg wet	0.05000		92	70-130			
Carbon Disulfide	0.0562	0.0050	mg/kg wet	0.05000		112	70-130			
Carbon Tetrachloride	0.0575	0.0050	mg/kg wet	0.05000		115	70-130			
Chlorobenzene	0.0463	0.0050	mg/kg wet	0.05000		93	70-130			
Chloroethane	0.0448	0.0100	mg/kg wet	0.05000		90	70-130			
Chloroform	0.0503	0.0050	mg/kg wet	0.05000		101	70-130			
Chloromethane	0.0448	0.0100	mg/kg wet	0.05000		90	70-130			
cis-1,2-Dichloroethene	0.0530	0.0050	mg/kg wet	0.05000		106	70-130			
cis-1,3-Dichloropropene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
Dibromochloromethane	0.0423	0.0050	mg/kg wet	0.05000		85	70-130			
Dibromomethane	0.0473	0.0050	mg/kg wet	0.05000		95	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C191217 - 5035

Dichlorodifluoromethane	0.0318	0.0100	mg/kg wet	0.05000	64	70-130				B-
Diethyl Ether	0.0497	0.0050	mg/kg wet	0.05000	99	70-130				
Di-isopropyl ether	0.0508	0.0050	mg/kg wet	0.05000	102	70-130				
Ethyl tertiary-butyl ether	0.0443	0.0050	mg/kg wet	0.05000	89	70-130				
Ethylbenzene	0.0465	0.0050	mg/kg wet	0.05000	93	70-130				
Hexachlorobutadiene	0.0493	0.0050	mg/kg wet	0.05000	99	70-130				
Isopropylbenzene	0.0456	0.0050	mg/kg wet	0.05000	91	70-130				
Methyl tert-Butyl Ether	0.0467	0.0050	mg/kg wet	0.05000	93	70-130				
Methylene Chloride	0.0496	0.0250	mg/kg wet	0.05000	99	70-130				
Naphthalene	0.0379	0.0050	mg/kg wet	0.05000	76	70-130				
n-Butylbenzene	0.0462	0.0050	mg/kg wet	0.05000	92	70-130				
n-Propylbenzene	0.0455	0.0050	mg/kg wet	0.05000	91	70-130				
sec-Butylbenzene	0.0453	0.0050	mg/kg wet	0.05000	91	70-130				
Styrene	0.0467	0.0050	mg/kg wet	0.05000	93	70-130				
tert-Butylbenzene	0.0460	0.0050	mg/kg wet	0.05000	92	70-130				
Tertiary-amyl methyl ether	0.0447	0.0050	mg/kg wet	0.05000	89	70-130				
Tetrachloroethene	0.0500	0.0050	mg/kg wet	0.05000	100	70-130				
Tetrahydrofuran	0.0373	0.0050	mg/kg wet	0.05000	75	70-130				
Toluene	0.0520	0.0050	mg/kg wet	0.05000	104	70-130				
trans-1,2-Dichloroethene	0.0530	0.0050	mg/kg wet	0.05000	106	70-130				
trans-1,3-Dichloropropene	0.0435	0.0050	mg/kg wet	0.05000	87	70-130				
Trichloroethene	0.0497	0.0050	mg/kg wet	0.05000	99	70-130				
Trichlorofluoromethane	0.0491	0.0050	mg/kg wet	0.05000	98	70-130				
Vinyl Acetate	0.0392	0.0050	mg/kg wet	0.05000	78	70-130				
Vinyl Chloride	0.0496	0.0100	mg/kg wet	0.05000	99	70-130				
Xylene O	0.0450	0.0050	mg/kg wet	0.05000	90	70-130				
Xylene P,M	0.0997	0.0100	mg/kg wet	0.1000	100	70-130				
Surrogate: 1,2-Dichloroethane-d4	0.0402		mg/kg wet	0.05000	80	70-130				
Surrogate: 4-Bromofluorobenzene	0.0461		mg/kg wet	0.05000	92	70-130				
Surrogate: Dibromofluoromethane	0.0476		mg/kg wet	0.05000	95	70-130				
Surrogate: Toluene-d8	0.0428		mg/kg wet	0.05000	86	70-130				

LCS Dup

1,1,1,2-Tetrachloroethane	0.0535	0.0050	mg/kg wet	0.05000	107	70-130	8	25		
1,1,1-Trichloroethane	0.0586	0.0050	mg/kg wet	0.05000	117	70-130	6	25		
1,1,2,2-Tetrachloroethane	0.0417	0.0050	mg/kg wet	0.05000	83	70-130	11	25		
1,1,2-Trichloroethane	0.0515	0.0050	mg/kg wet	0.05000	103	70-130	9	25		
1,1-Dichloroethane	0.0563	0.0050	mg/kg wet	0.05000	113	70-130	7	25		
1,1-Dichloroethene	0.0597	0.0050	mg/kg wet	0.05000	119	70-130	8	25		
1,1-Dichloropropene	0.0563	0.0050	mg/kg wet	0.05000	113	70-130	7	25		
1,2,3-Trichlorobenzene	0.0468	0.0050	mg/kg wet	0.05000	94	70-130	7	25		
1,2,3-Trichloropropane	0.0426	0.0050	mg/kg wet	0.05000	85	70-130	13	25		
1,2,4-Trichlorobenzene	0.0481	0.0050	mg/kg wet	0.05000	96	70-130	8	25		
1,2,4-Trimethylbenzene	0.0502	0.0050	mg/kg wet	0.05000	100	70-130	8	25		
1,2-Dibromo-3-Chloropropane	0.0380	0.0050	mg/kg wet	0.05000	76	70-130	14	25		
1,2-Dibromoethane	0.0466	0.0050	mg/kg wet	0.05000	93	70-130	12	25		



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch C191217 - 5035

1,2-Dichlorobenzene	0.0479	0.0050	mg/kg wet	0.05000		96	70-130	8	25	
1,2-Dichloroethane	0.0489	0.0050	mg/kg wet	0.05000		98	70-130	6	25	
1,2-Dichloropropane	0.0530	0.0050	mg/kg wet	0.05000		106	70-130	8	25	
1,3,5-Trimethylbenzene	0.0495	0.0050	mg/kg wet	0.05000		99	70-130	7	25	
1,3-Dichlorobenzene	0.0482	0.0050	mg/kg wet	0.05000		96	70-130	8	25	
1,3-Dichloropropane	0.0481	0.0050	mg/kg wet	0.05000		96	70-130	10	25	
1,4-Dichlorobenzene	0.0492	0.0050	mg/kg wet	0.05000		98	70-130	8	25	
1,4-Dioxane	0.986	0.100	mg/kg wet	1.000		99	70-130	19	20	
1-Chlorohexane	0.0533	0.0050	mg/kg wet	0.05000		107	70-130	11	25	
2,2-Dichloropropane	0.0588	0.0050	mg/kg wet	0.05000		118	70-130	6	25	
2-Butanone	0.269	0.0500	mg/kg wet	0.2500		108	70-130	13	25	
2-Chlorotoluene	0.0473	0.0050	mg/kg wet	0.05000		95	70-130	5	25	
2-Hexanone	0.210	0.0500	mg/kg wet	0.2500		84	70-130	19	25	
4-Chlorotoluene	0.0474	0.0050	mg/kg wet	0.05000		95	70-130	8	25	
4-Isopropyltoluene	0.0494	0.0050	mg/kg wet	0.05000		99	70-130	7	25	
4-Methyl-2-Pentanone	0.236	0.0500	mg/kg wet	0.2500		94	70-130	16	25	
Acetone	0.234	0.0500	mg/kg wet	0.2500		94	70-130	16	25	
Benzene	0.0550	0.0050	mg/kg wet	0.05000		110	70-130	7	25	
Bromobenzene	0.0486	0.0050	mg/kg wet	0.05000		97	70-130	7	25	
Bromochloromethane	0.0555	0.0050	mg/kg wet	0.05000		111	70-130	10	25	
Bromodichloromethane	0.0510	0.0050	mg/kg wet	0.05000		102	70-130	7	25	
Bromoform	0.0460	0.0050	mg/kg wet	0.05000		92	70-130	11	25	
Bromomethane	0.0488	0.0100	mg/kg wet	0.05000		98	70-130	5	25	
Carbon Disulfide	0.0603	0.0050	mg/kg wet	0.05000		121	70-130	7	25	
Carbon Tetrachloride	0.0614	0.0050	mg/kg wet	0.05000		123	70-130	6	25	
Chlorobenzene	0.0504	0.0050	mg/kg wet	0.05000		101	70-130	8	25	
Chloroethane	0.0498	0.0100	mg/kg wet	0.05000		100	70-130	10	25	
Chloroform	0.0537	0.0050	mg/kg wet	0.05000		107	70-130	7	25	
Chloromethane	0.0469	0.0100	mg/kg wet	0.05000		94	70-130	5	25	
cis-1,2-Dichloroethene	0.0570	0.0050	mg/kg wet	0.05000		114	70-130	7	25	
cis-1,3-Dichloropropene	0.0557	0.0050	mg/kg wet	0.05000		111	70-130	8	25	
Dibromochloromethane	0.0466	0.0050	mg/kg wet	0.05000		93	70-130	10	25	
Dibromomethane	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	9	25	
Dichlorodifluoromethane	0.0337	0.0100	mg/kg wet	0.05000		67	70-130	6	25	B-
Diethyl Ether	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	11	25	
Di-isopropyl ether	0.0553	0.0050	mg/kg wet	0.05000		111	70-130	9	25	
Ethyl tertiary-butyl ether	0.0483	0.0050	mg/kg wet	0.05000		97	70-130	9	25	
Ethylbenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	10	25	
Hexachlorobutadiene	0.0521	0.0050	mg/kg wet	0.05000		104	70-130	5	25	
Isopropylbenzene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130	8	25	
Methyl tert-Butyl Ether	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	10	25	
Methylene Chloride	0.0535	0.0250	mg/kg wet	0.05000		107	70-130	8	25	
Naphthalene	0.0434	0.0050	mg/kg wet	0.05000		87	70-130	13	25	
n-Butylbenzene	0.0499	0.0050	mg/kg wet	0.05000		100	70-130	8	25	
n-Propylbenzene	0.0493	0.0050	mg/kg wet	0.05000		99	70-130	8	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CI91217 - 5035

sec-Butylbenzene	0.0486	0.0050	mg/kg wet	0.05000		97	70-130	7	25	
Styrene	0.0515	0.0050	mg/kg wet	0.05000		103	70-130	10	25	
tert-Butylbenzene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130	8	25	
Tertiary-amyl methyl ether	0.0488	0.0050	mg/kg wet	0.05000		98	70-130	9	25	
Tetrachloroethene	0.0545	0.0050	mg/kg wet	0.05000		109	70-130	9	25	
Tetrahydrofuran	0.0445	0.0050	mg/kg wet	0.05000		89	70-130	18	25	
Toluene	0.0561	0.0050	mg/kg wet	0.05000		112	70-130	8	25	
trans-1,2-Dichloroethene	0.0577	0.0050	mg/kg wet	0.05000		115	70-130	8	25	
trans-1,3-Dichloropropene	0.0478	0.0050	mg/kg wet	0.05000		96	70-130	9	25	
Trichloroethene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	8	25	
Trichlorofluoromethane	0.0525	0.0050	mg/kg wet	0.05000		105	70-130	7	25	
Vinyl Acetate	0.0445	0.0050	mg/kg wet	0.05000		89	70-130	13	25	
Vinyl Chloride	0.0519	0.0100	mg/kg wet	0.05000		104	70-130	4	25	
Xylene O	0.0491	0.0050	mg/kg wet	0.05000		98	70-130	9	25	
Xylene P,M	0.110	0.0100	mg/kg wet	0.1000		110	70-130	10	25	
Surrogate: 1,2-Dichloroethane-d4	0.0405		mg/kg wet	0.05000		81	70-130			
Surrogate: 4-Bromofluorobenzene	0.0466		mg/kg wet	0.05000		93	70-130			
Surrogate: Dibromofluoromethane	0.0472		mg/kg wet	0.05000		94	70-130			
Surrogate: Toluene-d8	0.0436		mg/kg wet	0.05000		87	70-130			

8082A Polychlorinated Biphenyls (PCB)

Batch CI91208 - 3540C

Blank										
Aroclor 1016	ND	0.02	mg/kg wet							
Aroclor 1016 [2C]	ND	0.02	mg/kg wet							
Aroclor 1221	ND	0.02	mg/kg wet							
Aroclor 1221 [2C]	ND	0.02	mg/kg wet							
Aroclor 1232	ND	0.02	mg/kg wet							
Aroclor 1232 [2C]	ND	0.02	mg/kg wet							
Aroclor 1242	ND	0.02	mg/kg wet							
Aroclor 1242 [2C]	ND	0.02	mg/kg wet							
Aroclor 1248	ND	0.02	mg/kg wet							
Aroclor 1248 [2C]	ND	0.02	mg/kg wet							
Aroclor 1254	ND	0.02	mg/kg wet							
Aroclor 1254 [2C]	ND	0.02	mg/kg wet							
Aroclor 1260	ND	0.02	mg/kg wet							
Aroclor 1260 [2C]	ND	0.02	mg/kg wet							
Aroclor 1262	ND	0.02	mg/kg wet							
Aroclor 1262 [2C]	ND	0.02	mg/kg wet							
Aroclor 1268	ND	0.02	mg/kg wet							
Aroclor 1268 [2C]	ND	0.02	mg/kg wet							
Surrogate: Decachlorobiphenyl	0.0199		mg/kg wet	0.02500		80	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0246		mg/kg wet	0.02500		99	30-150			
Surrogate: Tetrachloro-m-xylene	0.0175		mg/kg wet	0.02500		70	30-150			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082A Polychlorinated Biphenyls (PCB)

Batch CI91208 - 3540C

Surrogate: Tetrachloro-m-xylene [2C] 0.0221 mg/kg wet 0.02500 88 30-150

LCS

Aroclor 1016	0.5	0.05	mg/kg wet	0.5000	97	40-140
Aroclor 1016 [2C]	0.6	0.05	mg/kg wet	0.5000	115	40-140
Aroclor 1260	0.5	0.05	mg/kg wet	0.5000	105	40-140
Aroclor 1260 [2C]	0.5	0.05	mg/kg wet	0.5000	106	40-140

Surrogate: Decachlorobiphenyl	0.0257		mg/kg wet	0.02500	103	30-150
Surrogate: Decachlorobiphenyl [2C]	0.0257		mg/kg wet	0.02500	103	30-150
Surrogate: Tetrachloro-m-xylene	0.0193		mg/kg wet	0.02500	77	30-150
Surrogate: Tetrachloro-m-xylene [2C]	0.0228		mg/kg wet	0.02500	91	30-150

LCS Dup

Aroclor 1016	0.5	0.05	mg/kg wet	0.5000	99	40-140	2	30
Aroclor 1016 [2C]	0.6	0.05	mg/kg wet	0.5000	118	40-140	3	30
Aroclor 1260	0.6	0.05	mg/kg wet	0.5000	111	40-140	6	30
Aroclor 1260 [2C]	0.6	0.05	mg/kg wet	0.5000	110	40-140	4	30

Surrogate: Decachlorobiphenyl	0.0236		mg/kg wet	0.02500	95	30-150
Surrogate: Decachlorobiphenyl [2C]	0.0262		mg/kg wet	0.02500	105	30-150
Surrogate: Tetrachloro-m-xylene	0.0198		mg/kg wet	0.02500	79	30-150
Surrogate: Tetrachloro-m-xylene [2C]	0.0235		mg/kg wet	0.02500	94	30-150

8100M Total Petroleum Hydrocarbons

Batch CI91215 - 3546

Blank

Decane (C10)	ND	0.2	mg/kg wet
Docosane (C22)	ND	0.2	mg/kg wet
Dodecane (C12)	ND	0.2	mg/kg wet
Eicosane (C20)	ND	0.2	mg/kg wet
Hexacosane (C26)	ND	0.2	mg/kg wet
Hexadecane (C16)	ND	0.2	mg/kg wet
Nonadecane (C19)	ND	0.2	mg/kg wet
Nonane (C9)	ND	0.2	mg/kg wet
Octacosane (C28)	ND	0.2	mg/kg wet
Octadecane (C18)	ND	0.2	mg/kg wet
Tetracosane (C24)	ND	0.2	mg/kg wet
Tetradecane (C14)	ND	0.2	mg/kg wet
Total Petroleum Hydrocarbons	ND	37.5	mg/kg wet
Triacontane (C30)	ND	0.2	mg/kg wet

Surrogate: O-Terphenyl 4.21 mg/kg wet 5.000 84 40-140

LCS

Decane (C10)	1.8	0.2	mg/kg wet	2.500	73	40-140
Docosane (C22)	2.0	0.2	mg/kg wet	2.500	81	40-140



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8100M Total Petroleum Hydrocarbons

Batch CI91215 - 3546

Dodecane (C12)	1.9	0.2	mg/kg wet	2.500		77	40-140			
Eicosane (C20)	2.0	0.2	mg/kg wet	2.500		81	40-140			
Hexacosane (C26)	2.0	0.2	mg/kg wet	2.500		79	40-140			
Hexadecane (C16)	1.9	0.2	mg/kg wet	2.500		78	40-140			
Nonadecane (C19)	2.1	0.2	mg/kg wet	2.500		84	40-140			
Nonane (C9)	1.6	0.2	mg/kg wet	2.500		66	30-140			
Octacosane (C28)	2.0	0.2	mg/kg wet	2.500		79	40-140			
Octadecane (C18)	2.0	0.2	mg/kg wet	2.500		80	40-140			
Tetracosane (C24)	2.0	0.2	mg/kg wet	2.500		80	40-140			
Tetradecane (C14)	1.9	0.2	mg/kg wet	2.500		77	40-140			
Total Petroleum Hydrocarbons	27.2	37.5	mg/kg wet	35.00		78	40-140			
Triacontane (C30)	2.0	0.2	mg/kg wet	2.500		78	40-140			

Surrogate: O-Terphenyl	4.17		mg/kg wet	5.000		83	40-140			
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LCS Dup

Decane (C10)	1.9	0.2	mg/kg wet	2.500		76	40-140	4	25	
Docosane (C22)	2.1	0.2	mg/kg wet	2.500		83	40-140	3	25	
Dodecane (C12)	2.0	0.2	mg/kg wet	2.500		80	40-140	4	25	
Eicosane (C20)	2.1	0.2	mg/kg wet	2.500		82	40-140	1	25	
Hexacosane (C26)	2.0	0.2	mg/kg wet	2.500		81	40-140	3	25	
Hexadecane (C16)	2.0	0.2	mg/kg wet	2.500		80	40-140	3	25	
Nonadecane (C19)	2.1	0.2	mg/kg wet	2.500		86	40-140	2	25	
Nonane (C9)	1.7	0.2	mg/kg wet	2.500		67	30-140	3	25	
Octacosane (C28)	2.0	0.2	mg/kg wet	2.500		81	40-140	3	25	
Octadecane (C18)	2.0	0.2	mg/kg wet	2.500		82	40-140	2	25	
Tetracosane (C24)	2.1	0.2	mg/kg wet	2.500		82	40-140	3	25	
Tetradecane (C14)	2.0	0.2	mg/kg wet	2.500		80	40-140	4	25	
Total Petroleum Hydrocarbons	28.0	37.5	mg/kg wet	35.00		80	40-140	3	25	
Triacontane (C30)	2.0	0.2	mg/kg wet	2.500		81	40-140	3	25	

Surrogate: O-Terphenyl	4.19		mg/kg wet	5.000		84	40-140			
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8270D Semi-Volatile Organic Compounds

Batch CI91213 - 3546

Blank

1,1-Biphenyl	ND	0.333	mg/kg wet							
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							
2,3,4,6-Tetrachlorophenol	ND	1.67	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							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch C191213 - 3546

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-Nitroaniline	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							
3-Nitroaniline	ND	0.333	mg/kg wet							
4,6-Dinitro-2-Methylphenol	ND	1.67	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet							
4-Chloro-3-Methylphenol	ND	0.333	mg/kg wet							
4-Chloroaniline	ND	0.667	mg/kg wet							
4-Chloro-phenyl-phenyl ether	ND	0.333	mg/kg wet							
4-Nitroaniline	ND	0.333	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	0.667	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							
Benzoic Acid	ND	1.67	mg/kg wet							
Benzyl Alcohol	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							
Carbazole	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							



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
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8270D Semi-Volatile Organic Compounds

Batch CI91213 - 3546

Fluoranthene	ND	0.333	mg/kg wet							
Fluorene	ND	0.333	mg/kg wet							
Hexachlorobenzene	ND	0.167	mg/kg wet							
Hexachlorobutadiene	ND	0.333	mg/kg wet							
Hexachlorocyclopentadiene	ND	1.67	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							
N-Nitroso-Di-n-Propylamine	ND	0.333	mg/kg wet							
N-nitrosodiphenylamine	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							
Pyridine	ND	1.67	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	2.34		mg/kg wet	3.333		70	30-130			
Surrogate: 2,4,6-Tribromophenol	4.01		mg/kg wet	5.000		80	30-130			
Surrogate: 2-Chlorophenol-d4	3.88		mg/kg wet	5.000		78	30-130			
Surrogate: 2-Fluorobiphenyl	2.30		mg/kg wet	3.333		69	30-130			
Surrogate: 2-Fluorophenol	3.88		mg/kg wet	5.000		78	30-130			
Surrogate: Nitrobenzene-d5	2.31		mg/kg wet	3.333		69	30-130			
Surrogate: Phenol-d6	4.04		mg/kg wet	5.000		81	30-130			
Surrogate: p-Terphenyl-d14	3.14		mg/kg wet	3.333		94	30-130			

LCS

1,1-Biphenyl	2.01	0.333	mg/kg wet	3.333		60	40-140			
1,2,4-Trichlorobenzene	2.14	0.333	mg/kg wet	3.333		64	40-140			
1,2-Dichlorobenzene	2.26	0.333	mg/kg wet	3.333		68	40-140			
1,3-Dichlorobenzene	2.14	0.333	mg/kg wet	3.333		64	40-140			
1,4-Dichlorobenzene	2.21	0.333	mg/kg wet	3.333		66	40-140			
2,3,4,6-Tetrachlorophenol	2.40	1.67	mg/kg wet	3.333		72	30-130			
2,4,5-Trichlorophenol	2.48	0.333	mg/kg wet	3.333		74	30-130			
2,4,6-Trichlorophenol	2.22	0.333	mg/kg wet	3.333		67	30-130			
2,4-Dichlorophenol	2.34	0.333	mg/kg wet	3.333		70	30-130			
2,4-Dimethylphenol	2.28	0.333	mg/kg wet	3.333		68	30-130			
2,4-Dinitrophenol	2.20	1.67	mg/kg wet	3.333		66	30-130			
2,4-Dinitrotoluene	3.01	0.333	mg/kg wet	3.333		90	40-140			
2,6-Dinitrotoluene	2.59	0.333	mg/kg wet	3.333		78	40-140			
2-Chloronaphthalene	2.07	0.333	mg/kg wet	3.333		62	40-140			
2-Chlorophenol	2.33	0.333	mg/kg wet	3.333		70	30-130			
2-Methylnaphthalene	2.17	0.333	mg/kg wet	3.333		65	40-140			
2-Methylphenol	2.36	0.333	mg/kg wet	3.333		71	30-130			
2-Nitroaniline	2.31	0.333	mg/kg wet	3.333		69	40-140			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CI91213 - 3546

2-Nitrophenol	2.08	0.333	mg/kg wet	3.333		62	30-130			
3,3'-Dichlorobenzidine	2.45	0.667	mg/kg wet	3.333		73	40-140			
3+4-Methylphenol	4.83	0.667	mg/kg wet	6.667		73	30-130			
3-Nitroaniline	2.81	0.333	mg/kg wet	3.333		84	40-140			
4,6-Dinitro-2-Methylphenol	2.78	1.67	mg/kg wet	3.333		83	30-130			
4-Bromophenyl-phenylether	2.55	0.333	mg/kg wet	3.333		76	40-140			
4-Chloro-3-Methylphenol	2.71	0.333	mg/kg wet	3.333		81	30-130			
4-Chloroaniline	1.59	0.667	mg/kg wet	3.333		48	40-140			
4-Chloro-phenyl-phenyl ether	2.56	0.333	mg/kg wet	3.333		77	40-140			
4-Nitroaniline	2.79	0.333	mg/kg wet	3.333		84	40-140			
4-Nitrophenol	2.88	1.67	mg/kg wet	3.333		86	30-130			
Acenaphthene	2.21	0.333	mg/kg wet	3.333		66	40-140			
Acenaphthylene	2.14	0.333	mg/kg wet	3.333		64	40-140			
Acetophenone	2.21	0.667	mg/kg wet	3.333		66	40-140			
Aniline	1.85	0.667	mg/kg wet	3.333		55	40-140			
Anthracene	2.80	0.333	mg/kg wet	3.333		84	40-140			
Azobenzene	2.55	0.333	mg/kg wet	3.333		76	40-140			
Benzo(a)anthracene	2.90	0.333	mg/kg wet	3.333		87	40-140			
Benzo(a)pyrene	2.75	0.167	mg/kg wet	3.333		83	40-140			
Benzo(b)fluoranthene	3.00	0.333	mg/kg wet	3.333		90	40-140			
Benzo(g,h,i)perylene	2.58	0.333	mg/kg wet	3.333		77	40-140			
Benzo(k)fluoranthene	2.90	0.333	mg/kg wet	3.333		87	40-140			
Benzoic Acid	2.21	1.67	mg/kg wet	3.333		66	40-140			
Benzyl Alcohol	2.06	0.333	mg/kg wet	3.333		62	40-140			
bis(2-Chloroethoxy)methane	2.12	0.333	mg/kg wet	3.333		64	40-140			
bis(2-Chloroethyl)ether	2.26	0.333	mg/kg wet	3.333		68	40-140			
bis(2-chloroisopropyl)Ether	2.14	0.333	mg/kg wet	3.333		64	40-140			
bis(2-Ethylhexyl)phthalate	3.13	0.333	mg/kg wet	3.333		94	40-140			
Butylbenzylphthalate	2.98	0.333	mg/kg wet	3.333		89	40-140			
Carbazole	3.02	0.333	mg/kg wet	3.333		90	40-140			
Chrysene	2.82	0.167	mg/kg wet	3.333		85	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	3.02	0.333	mg/kg wet	3.333		91	40-140			
Dimethylphthalate	2.76	0.333	mg/kg wet	3.333		83	40-140			
Di-n-butylphthalate	3.17	0.333	mg/kg wet	3.333		95	40-140			
Di-n-octylphthalate	3.41	0.333	mg/kg wet	3.333		102	40-140			
Fluoranthene	3.10	0.333	mg/kg wet	3.333		93	40-140			
Fluorene	2.66	0.333	mg/kg wet	3.333		80	40-140			
Hexachlorobenzene	2.54	0.167	mg/kg wet	3.333		76	40-140			
Hexachlorobutadiene	2.01	0.333	mg/kg wet	3.333		60	40-140			
Hexachlorocyclopentadiene	1.31	1.67	mg/kg wet	3.333		39	40-140			B-
Hexachloroethane	2.14	0.333	mg/kg wet	3.333		64	40-140			
Indeno(1,2,3-cd)Pyrene	2.65	0.333	mg/kg wet	3.333		80	40-140			
Isophorone	1.89	0.333	mg/kg wet	3.333		57	40-140			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch C191213 - 3546

Naphthalene	2.15	0.333	mg/kg wet	3.333		64	40-140			
Nitrobenzene	2.08	0.333	mg/kg wet	3.333		63	40-140			
N-Nitrosodimethylamine	1.92	0.333	mg/kg wet	3.333		58	40-140			
N-Nitroso-Di-n-Propylamine	2.30	0.333	mg/kg wet	3.333		69	40-140			
N-nitrosodiphenylamine	2.59	0.333	mg/kg wet	3.333		78	40-140			
Pentachlorophenol	2.54	1.67	mg/kg wet	3.333		76	30-130			
Phenanthrene	2.73	0.333	mg/kg wet	3.333		82	40-140			
Phenol	2.61	0.333	mg/kg wet	3.333		78	30-130			
Pyrene	2.72	0.333	mg/kg wet	3.333		82	40-140			
Pyridine	1.91	1.67	mg/kg wet	3.333		57	40-140			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	2.35		mg/kg wet	3.333		71	30-130			
<i>Surrogate: 2,4,6-Tribromophenol</i>	4.37		mg/kg wet	5.000		87	30-130			
<i>Surrogate: 2-Chlorophenol-d4</i>	3.96		mg/kg wet	5.000		79	30-130			
<i>Surrogate: 2-Fluorobiphenyl</i>	2.26		mg/kg wet	3.333		68	30-130			
<i>Surrogate: 2-Fluorophenol</i>	3.90		mg/kg wet	5.000		78	30-130			
<i>Surrogate: Nitrobenzene-d5</i>	2.32		mg/kg wet	3.333		69	30-130			
<i>Surrogate: Phenol-d6</i>	4.04		mg/kg wet	5.000		81	30-130			
<i>Surrogate: p-Terphenyl-d14</i>	2.98		mg/kg wet	3.333		89	30-130			

LCS Dup

1,1-Biphenyl	2.21	0.333	mg/kg wet	3.333		66	40-140	9	30	
1,2,4-Trichlorobenzene	2.24	0.333	mg/kg wet	3.333		67	40-140	4	30	
1,2-Dichlorobenzene	2.30	0.333	mg/kg wet	3.333		69	40-140	2	30	
1,3-Dichlorobenzene	2.17	0.333	mg/kg wet	3.333		65	40-140	1	30	
1,4-Dichlorobenzene	2.23	0.333	mg/kg wet	3.333		67	40-140	0.8	30	
2,3,4,6-Tetrachlorophenol	2.71	1.67	mg/kg wet	3.333		81	30-130	12	30	
2,4,5-Trichlorophenol	2.79	0.333	mg/kg wet	3.333		84	30-130	12	30	
2,4,6-Trichlorophenol	2.46	0.333	mg/kg wet	3.333		74	30-130	10	30	
2,4-Dichlorophenol	2.52	0.333	mg/kg wet	3.333		76	30-130	7	30	
2,4-Dimethylphenol	2.41	0.333	mg/kg wet	3.333		72	30-130	6	30	
2,4-Dinitrophenol	2.51	1.67	mg/kg wet	3.333		75	30-130	13	30	
2,4-Dinitrotoluene	3.37	0.333	mg/kg wet	3.333		101	40-140	11	30	
2,6-Dinitrotoluene	2.90	0.333	mg/kg wet	3.333		87	40-140	11	30	
2-Chloronaphthalene	2.26	0.333	mg/kg wet	3.333		68	40-140	9	30	
2-Chlorophenol	2.43	0.333	mg/kg wet	3.333		73	30-130	4	30	
2-Methylnaphthalene	2.30	0.333	mg/kg wet	3.333		69	40-140	6	30	
2-Methylphenol	2.47	0.333	mg/kg wet	3.333		74	30-130	5	30	
2-Nitroaniline	2.61	0.333	mg/kg wet	3.333		78	40-140	12	30	
2-Nitrophenol	2.19	0.333	mg/kg wet	3.333		66	30-130	5	30	
3,3'-Dichlorobenzidine	2.62	0.667	mg/kg wet	3.333		79	40-140	7	30	
3+4-Methylphenol	5.13	0.667	mg/kg wet	6.667		77	30-130	6	30	
3-Nitroaniline	3.17	0.333	mg/kg wet	3.333		95	40-140	12	30	
4,6-Dinitro-2-Methylphenol	2.99	1.67	mg/kg wet	3.333		90	30-130	7	30	
4-Bromophenyl-phenylether	2.70	0.333	mg/kg wet	3.333		81	40-140	6	30	
4-Chloro-3-Methylphenol	2.98	0.333	mg/kg wet	3.333		89	30-130	10	30	
4-Chloroaniline	1.81	0.667	mg/kg wet	3.333		54	40-140	13	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch C191213 - 3546

4-Chloro-phenyl-phenyl ether	2.86	0.333	mg/kg wet	3.333		86	40-140	11	30	
4-Nitroaniline	3.00	0.333	mg/kg wet	3.333		90	40-140	7	30	
4-Nitrophenol	3.18	1.67	mg/kg wet	3.333		95	30-130	10	30	
Acenaphthene	2.48	0.333	mg/kg wet	3.333		74	40-140	11	30	
Acenaphthylene	2.36	0.333	mg/kg wet	3.333		71	40-140	10	30	
Acetophenone	2.31	0.667	mg/kg wet	3.333		69	40-140	4	30	
Aniline	1.97	0.667	mg/kg wet	3.333		59	40-140	6	30	
Anthracene	2.96	0.333	mg/kg wet	3.333		89	40-140	6	30	
Azobenzene	2.71	0.333	mg/kg wet	3.333		81	40-140	6	30	
Benzo(a)anthracene	3.13	0.333	mg/kg wet	3.333		94	40-140	8	30	
Benzo(a)pyrene	2.98	0.167	mg/kg wet	3.333		89	40-140	8	30	
Benzo(b)fluoranthene	3.28	0.333	mg/kg wet	3.333		98	40-140	9	30	
Benzo(g,h,i)perylene	2.75	0.333	mg/kg wet	3.333		82	40-140	6	30	
Benzo(k)fluoranthene	3.10	0.333	mg/kg wet	3.333		93	40-140	7	30	
Benzoic Acid	2.47	1.67	mg/kg wet	3.333		74	40-140	11	30	
Benzyl Alcohol	2.20	0.333	mg/kg wet	3.333		66	40-140	6	30	
bis(2-Chloroethoxy)methane	2.22	0.333	mg/kg wet	3.333		67	40-140	4	30	
bis(2-Chloroethyl)ether	2.33	0.333	mg/kg wet	3.333		70	40-140	3	30	
bis(2-chloroisopropyl)Ether	2.17	0.333	mg/kg wet	3.333		65	40-140	2	30	
bis(2-Ethylhexyl)phthalate	3.43	0.333	mg/kg wet	3.333		103	40-140	9	30	
Butylbenzylphthalate	3.30	0.333	mg/kg wet	3.333		99	40-140	10	30	
Carbazole	3.22	0.333	mg/kg wet	3.333		97	40-140	6	30	
Chrysene	3.06	0.167	mg/kg wet	3.333		92	40-140	8	30	
Dibenzo(a,h)Anthracene	2.86	0.167	mg/kg wet	3.333		86	40-140	6	30	
Dibenzofuran	2.62	0.333	mg/kg wet	3.333		79	40-140	12	30	
Diethylphthalate	3.28	0.333	mg/kg wet	3.333		98	40-140	8	30	
Dimethylphthalate	3.04	0.333	mg/kg wet	3.333		91	40-140	10	30	
Di-n-butylphthalate	3.35	0.333	mg/kg wet	3.333		101	40-140	5	30	
Di-n-octylphthalate	3.85	0.333	mg/kg wet	3.333		115	40-140	12	30	
Fluoranthene	3.32	0.333	mg/kg wet	3.333		100	40-140	7	30	
Fluorene	2.99	0.333	mg/kg wet	3.333		90	40-140	12	30	
Hexachlorobenzene	2.67	0.167	mg/kg wet	3.333		80	40-140	5	30	
Hexachlorobutadiene	2.09	0.333	mg/kg wet	3.333		63	40-140	4	30	
Hexachlorocyclopentadiene	1.40	1.67	mg/kg wet	3.333		42	40-140	7	30	
Hexachloroethane	2.17	0.333	mg/kg wet	3.333		65	40-140	1	30	
Indeno(1,2,3-cd)Pyrene	2.82	0.333	mg/kg wet	3.333		85	40-140	6	30	
Isophorone	2.02	0.333	mg/kg wet	3.333		61	40-140	7	30	
Naphthalene	2.27	0.333	mg/kg wet	3.333		68	40-140	5	30	
Nitrobenzene	2.18	0.333	mg/kg wet	3.333		65	40-140	5	30	
N-Nitrosodimethylamine	1.95	0.333	mg/kg wet	3.333		59	40-140	2	30	
N-Nitroso-Di-n-Propylamine	2.39	0.333	mg/kg wet	3.333		72	40-140	4	30	
N-nitrosodiphenylamine	2.75	0.333	mg/kg wet	3.333		83	40-140	6	30	
Pentachlorophenol	2.66	1.67	mg/kg wet	3.333		80	30-130	5	30	
Phenanthrene	2.92	0.333	mg/kg wet	3.333		88	40-140	7	30	
Phenol	2.78	0.333	mg/kg wet	3.333		83	30-130	6	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CI91213 - 3546										
Pyrene	2.92	0.333	mg/kg wet	3.333		88	40-140	7	30	
Pyridine	1.89	1.67	mg/kg wet	3.333		57	40-140	0.9	30	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	2.35		mg/kg wet	3.333		70	30-130			
<i>Surrogate: 2,4,6-Tribromophenol</i>	4.44		mg/kg wet	5.000		89	30-130			
<i>Surrogate: 2-Chlorophenol-d4</i>	3.96		mg/kg wet	5.000		79	30-130			
<i>Surrogate: 2-Fluorobiphenyl</i>	2.42		mg/kg wet	3.333		72	30-130			
<i>Surrogate: 2-Fluorophenol</i>	3.88		mg/kg wet	5.000		78	30-130			
<i>Surrogate: Nitrobenzene-d5</i>	2.40		mg/kg wet	3.333		72	30-130			
<i>Surrogate: Phenol-d6</i>	4.10		mg/kg wet	5.000		82	30-130			
<i>Surrogate: p-Terphenyl-d14</i>	3.17		mg/kg wet	3.333		95	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

Notes and Definitions

- U Analyte included in the analysis, but not detected
- Q Calibration required quadratic regression (Q).
- D Diluted.
- CD- Continuing Calibration %Diff/Drift is below control limit (CD-).
- 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
- RL Reporting Limit
- EDL Estimated Detection Limit
- MF Membrane Filtration
- MPN Most Probably Number
- TNTC Too numerous to Count
- CFU Colony Forming Units



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19I0291

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

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.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML
 Shipped/Delivered Via: ESS Courier

ESS Project ID: 19I0291
 Date Received: 9/11/2019
 Project Due Date: 9/18/2019
 Days for Project: 5 Day

- 1. Air bill manifest present? No
Air No.: NA
- 2. Were custody seals present? No
- 3. Is radiation count <100 CPM? Yes
- 4. Is a Cooler Present? Yes
Temp: 4.6 Iced with: Ice
- 5. Was COC signed and dated by client? Yes

- 6. Does COC match bottles? Yes
- 7. Is COC complete and correct? Yes
- 8. Were samples received intact? Yes
- 9. Were labs informed about **short holds & rushes**? Yes / No / NA
- 10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes / No
 ESS Sample IDs: _____
 Analysis: _____
 TAT: _____

12. Were VOAs received? Yes / No
 a. Air bubbles in aqueous VOAs? Yes / No
 b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes / No
 a. If metals preserved upon receipt: Date: 9/11/19 Time: _____ By: _____
 b. Low Level VOA vials frozen: Date: 9/11/19 Time: 1343 By: W

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes No
 a. Was there a need to contact the client? Yes No
 Who was contacted? _____ Date: _____ Time: _____ By: _____

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
01	386764	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
01	386767	Yes	NA	Yes	VOA Vial - Other	Other	
01	386768	Yes	NA	Yes	VOA Vial - Other	Other	
01	386770	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
02	386763	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
02	386765	Yes	NA	Yes	VOA Vial - Other	Other	
02	386766	Yes	NA	Yes	VOA Vial - Other	Other	
02	386769	Yes	NA	Yes	8 oz. Jar - Unpres	NP	

2nd Review

- Were all containers scanned into storage/lab?
- Are barcode labels on correct containers?
- Are all Flashpoint stickers attached/container ID # circled?
- Are all Hex Chrome stickers attached?
- Are all QC stickers attached?
- Are VOA stickers attached if bubbles noted?

Initials: ea
 Yes / No
 Yes / No / NA
 Yes / No / NA
 Yes / No / NA
 Yes / No / NA

Completed By: [Signature] Date & Time: 9/11/19 12:00
 Reviewed By: [Signature] Date & Time: 9/11/19 1343

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 19I0291

Date Received: 9/11/2019

Delivered
By:



9/11/19

1343

ESS Laboratory

Division of Thielsch Engineering, Inc.
 185 Frances Avenue, Cranston RI 02910
 Tel. (401) 461-7181 Fax (401) 461-4486
 www.esslaboratory.com

CHAIN OF CUSTODY

ESS Lab # **1910291**
 Reporting Limits **RIDEM RESDEC/DEDEC**

Turn Time: **Std** Rush:
 Regulatory State: **RI**
 Is this project for any of the following?:
 MA-MCP CT-RCP RGP Remediation

Project # **6912** Project Name **NRC II A-4 and IIAS**
 Address **201 George Washington Hwy** PO #
 City **Litchfield** State **RI** Zip Code **02825**
 Telephone Number **401 333 2382** Email Address **jim@esslab.com**

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Analysis	
						VOCs	SVOCs
1	9/10/14	9:15	Grab	Soil	B-8 4-6'	X	X
2	9/10/14	9:45	I	I	B-8 6-10'	X	X

Electronic Deliverables	Limit Checker	Other (Please Specify)
<input checked="" type="checkbox"/> Excel	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	TH
<input type="checkbox"/>	<input type="checkbox"/>	SVOCs
<input type="checkbox"/>	<input type="checkbox"/>	PCBs
<input type="checkbox"/>	<input type="checkbox"/>	AP-13 Metals

Number of Containers: **3**

Container Type:	AG-Amber Glass	B-BOD Bottle	G-Glass	P-Poly	S-Sterile	V-Vial	O-Other
Preservation Code:	1-Non Preserved	2-HCl	3-H2SO4	4-HNO3	5-NaOH	6-Methanol	7-Na2S2O3
	8-ZnAc2	9-NaOH	10-DI H2O	11-Other			

Laboratory Use Only		Received By: (Signature, Date & Time)	Relinquished By: (Signature, Date & Time)
Cooler Present:	<input checked="" type="checkbox"/>		
Seals Intact:	<input checked="" type="checkbox"/>		
Cooler Temperature:	4.6 °C ice		
Relinquished by:	SJA 9/10/14 11:31	THOMAS 9/11/14 11:30	

Sampled by: **SJA**
 Comments: ***20x Rule metals (hdm 9/16/19)**
 Please specify "Other" preservative and containers types in this space

ESS Laboratory

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 www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time: Std Rush:
 Regulatory State: RI
 Is this project for any of the following?:
 MA-MCP CT-RCP RGP Remediation
 Project # 6912 Project Name NRC II A-4 and IIAS
 Address 701 George Washington Hwy PO #
 City Litch State RI Zip Code 02865
 Telephone Number 401 333 2382 Email Address jmcloves@nrc.com

ESS Lab # 1910291
 Reporting Limits RIDEM ResDEC/DecDEC

Electronic Deliverables Limit Checker Excel
 Other (Please Specify) →

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	VOCs	SVOCs	THP	PCBS	HP-13	Analysis
1	9/10/19	9:15	Grab	Soil	B-8 A-6'	X	X	X	X	X	
2	9/10/19	9:45	I	I	B-8 C-10'	X	X	X	X	X	

Container Type: AG-Amber Glass B-BOD Bottle G-Glass P-Poly S-Sterile V-Vial O-Other
 Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAc2 9-NH4Cl 10-DI H2O 11-Other

Number of Containers: 3
 Sampled by: [Signature]
 Comments: Please specify "Other" preservative and containers types in this space

Cooler Present:	Seals Intact:	Cooler Temperature:	Relinquished by:	Received By:
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>4.6</u> °C <u>ice</u> <u>Wen</u>	<u>[Signature]</u> 9/10/19 11:31	<u>[Signature]</u> 9/11/19 11:30



CERTIFICATE OF ANALYSIS

Joe McLoughlin
Beta Engineering
701 George Washington Hwy 2nd FL
Lincoln, RI 02865

RE: NBC III (N/A)
ESS Laboratory Work Order Number: 19H0999

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 4:37 pm, Nov 07, 2019

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 TNI and relative state standards, 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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

SAMPLE RECEIPT

The following samples were received on August 30, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Low Level VOA vials were frozen by ESS Laboratory on 8/30/19 at 14:52.

Revision 1 November 7, 2019: This report has been revised to include corrected TPH results for 19H0999-02.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
19H0999-01	B-7 0-2ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D
19H0999-02	B-7 2-4ft	Soil	6010C, 7471B, 8082A, 8100M, 8260B, 8260B Low, 8270D
19H0999-03	B-7 4-6ft	Soil	6010C, 6020A, 7471B, 8082A, 8100M, 8260B, 8260B Low, 8270D
19H0999-04	B-7 6-10ft	Soil	1311, 1311/6010C, 6010C, 6020A, 7471B, 8082A, 8100M, 8260B Low, 8270D



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

PROJECT NARRATIVE

5035/8260B Volatile Organic Compounds / Low Level

- 19H0999-02 Internal Standard(s) outside of criteria. Sample was reanalyzed to confirm (IC).
 1,4-Dichlorobenzene-D4 (9% @ 50-200%), Chlorobenzene-d5 (31% @ 50-200%)
- 19H0999-02 Surrogate recovery(ies) outside of criteria. Reextraction/Reanalysis confirms results (SC).
 4-Bromofluorobenzene (48% @ 70-130%), Toluene-d8 (162% @ 70-130%)
- 19H0999-03 Internal Standard(s) outside of criteria. Sample was reanalyzed to confirm (IC).
 1,4-Dichlorobenzene-D4 (6% @ 50-200%), Chlorobenzene-d5 (20% @ 50-200%), Pentafluorobenzene (43% @ 50-200%)
- 19H0999-03 Surrogate recovery(ies) outside of criteria. Reextraction/Reanalysis confirms results (SC).
 1,2-Dichloroethane-d4 (156% @ 70-130%), 4-Bromofluorobenzene (45% @ 70-130%),
 Dibromofluoromethane (165% @ 70-130%), Toluene-d8 (175% @ 70-130%)
- C9H0632-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).
 Chloromethane (32% @ 30%)
- CH93024-BS1 Blank Spike recovery is below lower control limit (B-).
 Chloromethane (68% @ 70-130%), Dichlorodifluoromethane (68% @ 70-130%)

5035/8260B Volatile Organic Compounds / Methanol

- CI90432-BSD1 Blank Spike recovery is below lower control limit (B-).
 1,2-Dibromo-3-Chloropropane (66% @ 70-130%), 1,4-Dioxane - Screen (0% @ 44-241%)

8100M Total Petroleum Hydrocarbons

- 19H0999-01 Surrogate recovery(ies) diluted below the MRL (SD).
 O-Terphenyl (% @ 40-140%)
- 19H0999-02 Surrogate recovery(ies) diluted below the MRL (SD).
 O-Terphenyl (% @ 40-140%)
- 19H0999-03 Surrogate recovery(ies) diluted below the MRL (SD).
 O-Terphenyl (% @ 40-140%)

8270D Semi-Volatile Organic Compounds

- C9H0626-CCV1 Calibration required quadratic regression (Q).
 2,4-Dinitrophenol (106% @ 80-120%), 4,6-Dinitro-2-Methylphenol (104% @ 80-120%), Benzoic Acid (102% @ 80-120%)
- C9H0626-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).
 2-Methylnaphthalene (23% @ 20%)
- C9H0626-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).
 Aniline (23% @ 20%), Hexachlorocyclopentadiene (27% @ 20%), Isophorone (21% @ 20%)
- C9I0053-CCV1 Calibration required quadratic regression (Q).
 2,4-Dinitrophenol (104% @ 80-120%), 4,6-Dinitro-2-Methylphenol (84% @ 80-120%), Benzoic Acid (108% @ 80-120%), Pentachlorophenol (109% @ 80-120%)
- C9I0053-CCV1 Continuing Calibration %Diff/Drift is below control limit (CD-).



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

2-Nitroaniline (34% @ 20%), 4-Nitrophenol (22% @ 20%), Azobenzene (35% @ 20%),
 Hexachlorocyclopentadiene (25% @ 20%), Nitrobenzene (25% @ 20%), N-Nitrosodimethylamine (36%
 @ 20%), Pyridine (29% @ 20%)

C9I0053-TUN1

Pentachlorophenol tailing factor > 2.

CH93011-BS1

Blank Spike recovery is below lower control limit (B-).

Aniline (39% @ 40-140%), Hexachlorocyclopentadiene (38% @ 40-140%)

CH93011-BSD1

Blank Spike recovery is below lower control limit (B-).

Aniline (39% @ 40-140%), Hexachlorocyclopentadiene (38% @ 40-140%), N-Nitrosodimethylamine
 (38% @ 40-140%), Pyridine (39% @ 40-140%)

Total Metals

19H0999-04

Elevated Method Reporting Limits due to sample matrix (EL).

Cadmium , Silver

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

*To ensure you are viewing the most current version of the documents below, please clear your internet cookies for
 www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.*

[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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

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
- 8015C - 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
- MADEP 18-2.1 - 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
- 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 0-2ft
Date Sampled: 08/30/19 08:20
Percent Solids: 88

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-01
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (3.29)		6010C		1	KJK	09/06/19 4:37	3.46	100	CI90551
Arsenic	3.82 (1.65)		6010C		1	KJK	09/06/19 13:12	3.46	100	CI90551
Beryllium	0.37 (0.07)		6010C		1	KJK	09/06/19 4:37	3.46	100	CI90551
Cadmium	ND (0.33)		6010C		1	KJK	09/06/19 4:37	3.46	100	CI90551
Chromium	4.95 (0.66)		6010C		1	KJK	09/06/19 4:37	3.46	100	CI90551
Copper	7.56 (1.65)		6010C		1	KJK	09/06/19 4:37	3.46	100	CI90551
Lead	6.43 (3.29)		6010C		1	KJK	09/06/19 4:37	3.46	100	CI90551
Mercury	ND (0.027)		7471B		1	MKS	09/06/19 9:30	0.83	40	CI90552
Nickel	6.77 (1.65)		6010C		1	KJK	09/06/19 4:37	3.46	100	CI90551
Selenium	ND (3.29)		6010C		1	KJK	09/06/19 4:37	3.46	100	CI90551
Silver	ND (0.33)		6010C		1	KJK	09/06/19 4:37	3.46	100	CI90551
Thallium	ND (0.33)		6020A		1	NAR	09/06/19 14:18	3.46	100	CI90551
Zinc	25.2 (1.65)		6010C		1	KJK	09/06/19 4:37	3.46	100	CI90551



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 0-2ft
Date Sampled: 08/30/19 08:20
Percent Solids: 88
Initial Volume: 7.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,1,1-Trichloroethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,1,2,2-Tetrachloroethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,1,2-Trichloroethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,1-Dichloroethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,1-Dichloroethene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,1-Dichloropropene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,2,3-Trichlorobenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,2,3-Trichloropropane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,2,4-Trichlorobenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,2,4-Trimethylbenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,2-Dibromo-3-Chloropropane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,2-Dibromoethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,2-Dichlorobenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,2-Dichloroethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,2-Dichloropropane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,3,5-Trimethylbenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,3-Dichlorobenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,3-Dichloropropane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,4-Dichlorobenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1,4-Dioxane	ND (0.0791)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
1-Chlorohexane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
2,2-Dichloropropane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
2-Butanone	ND (0.0395)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
2-Chlorotoluene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
2-Hexanone	ND (0.0395)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
4-Chlorotoluene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
4-Isopropyltoluene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
4-Methyl-2-Pentanone	ND (0.0395)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Acetone	ND (0.0395)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Benzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Bromobenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 0-2ft
Date Sampled: 08/30/19 08:20
Percent Solids: 88
Initial Volume: 7.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Bromodichloromethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Bromoform	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Bromomethane	ND (0.0079)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Carbon Disulfide	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Carbon Tetrachloride	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Chlorobenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Chloroethane	ND (0.0079)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Chloroform	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Chloromethane	ND (0.0079)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
cis-1,2-Dichloroethene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
cis-1,3-Dichloropropene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Dibromochloromethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Dibromomethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Dichlorodifluoromethane	ND (0.0079)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Diethyl Ether	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Di-isopropyl ether	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Ethyl tertiary-butyl ether	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Ethylbenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Hexachlorobutadiene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Isopropylbenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Methyl tert-Butyl Ether	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Methylene Chloride	ND (0.0198)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Naphthalene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
n-Butylbenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
n-Propylbenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
sec-Butylbenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Styrene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
tert-Butylbenzene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Tertiary-amyl methyl ether	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Tetrachloroethene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Tetrahydrofuran	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 0-2ft
Date Sampled: 08/30/19 08:20
Percent Solids: 88
Initial Volume: 7.2
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
trans-1,2-Dichloroethene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
trans-1,3-Dichloropropene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Trichloroethene	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Trichlorofluoromethane	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Vinyl Acetate	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Vinyl Chloride	ND (0.0079)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Xylene O	ND (0.0040)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Xylene P,M	ND (0.0079)		8260B Low		1	08/30/19 17:33	C9H0632	CH93024
Xylenes (Total)	ND (0.00791)		8260B Low		1	08/30/19 17:33		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>109 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>82 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>107 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>109 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 0-2ft
Date Sampled: 08/30/19 08:20
Percent Solids: 88
Initial Volume: 19.4
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/3/19 16:30

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	09/04/19 17:37		CI90307
Aroclor 1221	ND (0.06)		8082A		1	09/04/19 17:37		CI90307
Aroclor 1232	ND (0.06)		8082A		1	09/04/19 17:37		CI90307
Aroclor 1242	ND (0.06)		8082A		1	09/04/19 17:37		CI90307
Aroclor 1248	ND (0.06)		8082A		1	09/04/19 17:37		CI90307
Aroclor 1254	ND (0.06)		8082A		1	09/04/19 17:37		CI90307
Aroclor 1260	ND (0.06)		8082A		1	09/04/19 17:37		CI90307
Aroclor 1262	ND (0.06)		8082A		1	09/04/19 17:37		CI90307
Aroclor 1268	ND (0.06)		8082A		1	09/04/19 17:37		CI90307

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	44 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	55 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	49 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	60 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 0-2ft
Date Sampled: 08/30/19 08:20
Percent Solids: 88
Initial Volume: 19.9
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/30/19 16:29

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	973 (858)		8100M		20	09/03/19 23:54	C910015	CH93012
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		<i>%</i>	<i>SD</i>	<i>40-140</i>				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 0-2ft
Date Sampled: 08/30/19 08:20
Percent Solids: 88
Initial Volume: 14.9
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.459)		8270D		2	09/05/19 14:19	C9I0053	CH93011
1,2,4-Trichlorobenzene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
1,2-Dichlorobenzene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
1,3-Dichlorobenzene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
1,4-Dichlorobenzene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2,3,4,6-Tetrachlorophenol	ND (7.66)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2,4,5-Trichlorophenol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2,4,6-Trichlorophenol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2,4-Dichlorophenol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2,4-Dimethylphenol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2,4-Dinitrophenol	ND (7.66)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2,4-Dinitrotoluene	ND (0.766)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2,6-Dinitrotoluene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2-Chloronaphthalene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2-Chlorophenol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2-Methylnaphthalene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2-Methylphenol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2-Nitroaniline	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
2-Nitrophenol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
3,3'-Dichlorobenzidine	ND (0.766)		8270D		2	09/05/19 14:19	C9I0053	CH93011
3+4-Methylphenol	ND (3.06)		8270D		2	09/05/19 14:19	C9I0053	CH93011
3-Nitroaniline	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
4,6-Dinitro-2-Methylphenol	ND (7.66)		8270D		2	09/05/19 14:19	C9I0053	CH93011
4-Bromophenyl-phenylether	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
4-Chloro-3-Methylphenol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
4-Chloroaniline	ND (3.06)		8270D		2	09/05/19 14:19	C9I0053	CH93011
4-Chloro-phenyl-phenyl ether	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
4-Nitroaniline	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
4-Nitrophenol	ND (7.66)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Acenaphthene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Acenaphthylene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Acetophenone	ND (3.06)		8270D		2	09/05/19 14:19	C9I0053	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 0-2ft
Date Sampled: 08/30/19 08:20
Percent Solids: 88
Initial Volume: 14.9
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (3.06)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Anthracene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Azobenzene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Benzo(a)anthracene	ND (0.766)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Benzo(a)pyrene	ND (0.305)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Benzo(b)fluoranthene	ND (0.766)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Benzo(g,h,i)perylene	ND (0.459)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Benzo(k)fluoranthene	ND (0.766)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Benzoic Acid	ND (7.66)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Benzyl Alcohol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
bis(2-Chloroethoxy)methane	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
bis(2-Chloroethyl)ether	ND (0.459)		8270D		2	09/05/19 14:19	C9I0053	CH93011
bis(2-chloroisopropyl)Ether	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
bis(2-Ethylhexyl)phthalate	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Butylbenzylphthalate	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Carbazole	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Chrysene	ND (0.305)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Dibenzo(a,h)Anthracene	ND (0.305)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Dibenzofuran	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Diethylphthalate	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Dimethylphthalate	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Di-n-butylphthalate	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Di-n-octylphthalate	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Fluoranthene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Fluorene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Hexachlorobenzene	ND (0.305)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Hexachlorobutadiene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Hexachlorocyclopentadiene	ND (7.66)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Hexachloroethane	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Indeno(1,2,3-cd)Pyrene	ND (0.766)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Isophorone	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Naphthalene	ND (0.382)		8270D		2	09/05/19 14:19	C9I0053	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 0-2ft
Date Sampled: 08/30/19 08:20
Percent Solids: 88
Initial Volume: 14.9
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-01
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
N-Nitrosodimethylamine	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
N-Nitroso-Di-n-Propylamine	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
N-nitrosodiphenylamine	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Pentachlorophenol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Phenanthrene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Phenol	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Pyrene	ND (1.53)		8270D		2	09/05/19 14:19	C9I0053	CH93011
Pyridine	ND (7.66)		8270D		2	09/05/19 14:19	C9I0053	CH93011

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	59 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	105 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	81 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	83 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	63 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	55 %		30-130
<i>Surrogate: Phenol-d6</i>	76 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	111 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (4.75)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Arsenic	9.20 (2.37)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Beryllium	0.30 (0.10)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Cadmium	ND (0.47)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Chromium	9.32 (0.95)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Copper	23.1 (2.37)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Lead	28.9 (4.75)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Mercury	0.157 (0.024)		7471B		1	MKS	09/06/19 9:38	0.98	40	CI90552
Nickel	9.50 (2.37)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Selenium	ND (4.75)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Silver	ND (0.47)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Thallium	ND (4.75)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551
Zinc	41.4 (2.37)		6010C		1	KJK	09/06/19 4:41	2.49	100	CI90551



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85
Initial Volume: 6.4
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,1,1-Trichloroethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,1,2,2-Tetrachloroethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,1,2-Trichloroethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,1-Dichloroethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,1-Dichloroethene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,1-Dichloropropene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,2,3-Trichlorobenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,2,3-Trichloropropane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,2,4-Trichlorobenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,2,4-Trimethylbenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,2-Dibromo-3-Chloropropane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,2-Dibromoethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,2-Dichlorobenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,2-Dichloroethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,2-Dichloropropane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,3,5-Trimethylbenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,3-Dichlorobenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,3-Dichloropropane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,4-Dichlorobenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1,4-Dioxane	ND (0.0923)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
1-Chlorohexane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
2,2-Dichloropropane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
2-Butanone	ND (0.0462)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
2-Chlorotoluene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
2-Hexanone	ND (0.0462)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
4-Chlorotoluene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
4-Isopropyltoluene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
4-Methyl-2-Pentanone	ND (0.0462)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Acetone	0.0472 (0.0462)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Benzene	0.0062 (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Bromobenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85
Initial Volume: 6.4
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Bromodichloromethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Bromoform	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Bromomethane	ND (0.0092)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Carbon Disulfide	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Carbon Tetrachloride	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Chlorobenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Chloroethane	ND (0.0092)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Chloroform	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Chloromethane	ND (0.0092)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
cis-1,2-Dichloroethene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
cis-1,3-Dichloropropene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Dibromochloromethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Dibromomethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Dichlorodifluoromethane	ND (0.0092)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Diethyl Ether	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Di-isopropyl ether	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Ethyl tertiary-butyl ether	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Ethylbenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Hexachlorobutadiene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Isopropylbenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Methyl tert-Butyl Ether	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Methylene Chloride	ND (0.0231)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Naphthalene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
n-Butylbenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
n-Propylbenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
sec-Butylbenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Styrene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
tert-Butylbenzene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Tertiary-amyl methyl ether	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Tetrachloroethene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Tetrahydrofuran	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85
Initial Volume: 6.4
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
trans-1,2-Dichloroethene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
trans-1,3-Dichloropropene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Trichloroethene	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Trichlorofluoromethane	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Vinyl Acetate	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Vinyl Chloride	ND (0.0092)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Xylene O	ND (0.0046)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Xylene P,M	ND (0.0092)		8260B Low		1	08/30/19 15:51	C9H0632	CH93024
Xylenes (Total)	ND (0.00923)		8260B Low		1	08/30/19 15:51		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>128 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>48 %</i>	<i>SC</i>	<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>130 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>162 %</i>	<i>SC</i>	<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85
Initial Volume: 19.8
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,1,1-Trichloroethane	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,1,2,2-Tetrachloroethane	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,1,2-Trichloroethane	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,1-Dichloroethane	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,1-Dichloroethene	ND (0.216)	0.0647	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,1-Dichloropropene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,2,3-Trichlorobenzene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,2,3-Trichloropropane	ND (0.216)	0.0647	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,2,4-Trichlorobenzene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,2,4-Trimethylbenzene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,2-Dibromo-3-Chloropropane	ND (1.08)	0.216	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,2-Dibromoethane	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,2-Dichlorobenzene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,2-Dichloroethane	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,2-Dichloropropane	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,3,5-Trimethylbenzene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,3-Dichlorobenzene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,3-Dichloropropane	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,4-Dichlorobenzene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
1,4-Dioxane - Screen	ND (43.1)	40.9	8260B		1	09/04/19 12:24	C9I0045	CI90432
1-Chlorohexane	ND (0.216)	0.0862	8260B		1	09/04/19 12:24	C9I0045	CI90432
2,2-Dichloropropane	ND (0.216)	0.0647	8260B		1	09/04/19 12:24	C9I0045	CI90432
2-Butanone	ND (1.08)	0.733	8260B		1	09/04/19 12:24	C9I0045	CI90432
2-Chlorotoluene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
2-Hexanone	ND (1.08)	0.323	8260B		1	09/04/19 12:24	C9I0045	CI90432
4-Chlorotoluene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
4-Isopropyltoluene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
4-Methyl-2-Pentanone	ND (1.08)	0.345	8260B		1	09/04/19 12:24	C9I0045	CI90432
Acetone	ND (1.08)	0.582	8260B		1	09/04/19 12:24	C9I0045	CI90432
Benzene	0.291 (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Bromobenzene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85
Initial Volume: 19.8
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.216)	0.0647	8260B		1	09/04/19 12:24	C9I0045	CI90432
Bromodichloromethane	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Bromoform	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Bromomethane	ND (0.216)	0.0862	8260B		1	09/04/19 12:24	C9I0045	CI90432
Carbon Disulfide	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Carbon Tetrachloride	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Chlorobenzene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Chloroethane	ND (0.216)	0.0862	8260B		1	09/04/19 12:24	C9I0045	CI90432
Chloroform	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Chloromethane	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
cis-1,2-Dichloroethene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
cis-1,3-Dichloropropene	ND (0.216)	0.0647	8260B		1	09/04/19 12:24	C9I0045	CI90432
Dibromochloromethane	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Dibromomethane	ND (0.216)	0.0647	8260B		1	09/04/19 12:24	C9I0045	CI90432
Dichlorodifluoromethane	ND (0.216)	0.0647	8260B		1	09/04/19 12:24	C9I0045	CI90432
Diethyl Ether	ND (0.216)	0.0647	8260B		1	09/04/19 12:24	C9I0045	CI90432
Di-isopropyl ether	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Ethyl tertiary-butyl ether	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Ethylbenzene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Hexachlorobutadiene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Isopropylbenzene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Methyl tert-Butyl Ether	ND (0.216)	0.0647	8260B		1	09/04/19 12:24	C9I0045	CI90432
Methylene Chloride	J 0.0733 (0.431)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Naphthalene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
n-Butylbenzene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
n-Propylbenzene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
sec-Butylbenzene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Styrene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
tert-Butylbenzene	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Tertiary-amyl methyl ether	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Tetrachloroethene	J 0.0560 (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Tetrahydrofuran	ND (1.08)	0.345	8260B		1	09/04/19 12:24	C9I0045	CI90432



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-7 2-4ft
 Date Sampled: 08/30/19 08:35
 Percent Solids: 85
 Initial Volume: 19.8
 Final Volume: 15
 Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
 ESS Laboratory Sample ID: 19H0999-02
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	J 0.151 (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
trans-1,2-Dichloroethene	ND (0.216)	0.0647	8260B		1	09/04/19 12:24	C9I0045	CI90432
trans-1,3-Dichloropropene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Trichloroethene	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Trichlorofluoromethane	ND (0.216)	0.0862	8260B		1	09/04/19 12:24	C9I0045	CI90432
Vinyl Acetate	ND (0.216)	0.108	8260B		1	09/04/19 12:24	C9I0045	CI90432
Vinyl Chloride	ND (0.216)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Xylene O	ND (0.216)	0.0216	8260B		1	09/04/19 12:24	C9I0045	CI90432
Xylene P,M	J 0.0539 (0.431)	0.0431	8260B		1	09/04/19 12:24	C9I0045	CI90432
Xylenes (Total)	ND (0.431)		8260B		1	09/04/19 12:24		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	115 %		70-130
<i>Surrogate: 4-Bromofluorobenzene</i>	111 %		70-130
<i>Surrogate: Dibromofluoromethane</i>	120 %		70-130
<i>Surrogate: Toluene-d8</i>	113 %		70-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85
Initial Volume: 19.5
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/3/19 16:30

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	09/04/19 17:56		CI90307
Aroclor 1221	ND (0.06)		8082A		1	09/04/19 17:56		CI90307
Aroclor 1232	ND (0.06)		8082A		1	09/04/19 17:56		CI90307
Aroclor 1242	ND (0.06)		8082A		1	09/04/19 17:56		CI90307
Aroclor 1248	ND (0.06)		8082A		1	09/04/19 17:56		CI90307
Aroclor 1254	ND (0.06)		8082A		1	09/04/19 17:56		CI90307
Aroclor 1260	ND (0.06)		8082A		1	09/04/19 17:56		CI90307
Aroclor 1262	ND (0.06)		8082A		1	09/04/19 17:56		CI90307
Aroclor 1268	ND (0.06)		8082A		1	09/04/19 17:56		CI90307

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	37 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	45 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	37 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	46 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85
Initial Volume: 19.3
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/30/19 16:29

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	735 (398)		8100M		20	09/04/19 0:27	C910015	CH93012
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		<i>%</i>	<i>SD</i>	<i>40-140</i>				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85
Initial Volume: 14.4
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.493)		8270D		2	09/05/19 14:47	C9I0053	CH93011
1,2,4-Trichlorobenzene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
1,2-Dichlorobenzene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
1,3-Dichlorobenzene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
1,4-Dichlorobenzene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2,3,4,6-Tetrachlorophenol	ND (8.23)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2,4,5-Trichlorophenol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2,4,6-Trichlorophenol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2,4-Dichlorophenol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2,4-Dimethylphenol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2,4-Dinitrophenol	ND (8.23)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2,4-Dinitrotoluene	ND (0.823)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2,6-Dinitrotoluene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2-Chloronaphthalene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2-Chlorophenol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2-Methylnaphthalene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2-Methylphenol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2-Nitroaniline	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
2-Nitrophenol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
3,3'-Dichlorobenzidine	ND (0.823)		8270D		2	09/05/19 14:47	C9I0053	CH93011
3+4-Methylphenol	ND (3.29)		8270D		2	09/05/19 14:47	C9I0053	CH93011
3-Nitroaniline	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
4,6-Dinitro-2-Methylphenol	ND (8.23)		8270D		2	09/05/19 14:47	C9I0053	CH93011
4-Bromophenyl-phenylether	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
4-Chloro-3-Methylphenol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
4-Chloroaniline	ND (3.29)		8270D		2	09/05/19 14:47	C9I0053	CH93011
4-Chloro-phenyl-phenyl ether	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
4-Nitroaniline	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
4-Nitrophenol	ND (8.23)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Acenaphthene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Acenaphthylene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Acetophenone	ND (3.29)		8270D		2	09/05/19 14:47	C9I0053	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85
Initial Volume: 14.4
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (3.29)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Anthracene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Azobenzene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Benzo(a)anthracene	ND (0.823)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Benzo(a)pyrene	0.399 (0.328)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Benzo(b)fluoranthene	ND (0.823)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Benzo(g,h,i)perylene	ND (0.493)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Benzo(k)fluoranthene	ND (0.823)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Benzoic Acid	ND (8.23)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Benzyl Alcohol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
bis(2-Chloroethoxy)methane	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
bis(2-Chloroethyl)ether	ND (0.493)		8270D		2	09/05/19 14:47	C9I0053	CH93011
bis(2-chloroisopropyl)Ether	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
bis(2-Ethylhexyl)phthalate	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Butylbenzylphthalate	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Carbazole	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Chrysene	0.413 (0.328)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Dibenzo(a,h)Anthracene	ND (0.328)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Dibenzofuran	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Diethylphthalate	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Dimethylphthalate	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Di-n-butylphthalate	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Di-n-octylphthalate	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Fluoranthene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Fluorene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Hexachlorobenzene	ND (0.328)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Hexachlorobutadiene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Hexachlorocyclopentadiene	ND (8.23)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Hexachloroethane	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Indeno(1,2,3-cd)Pyrene	ND (0.823)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Isophorone	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Naphthalene	ND (0.410)		8270D		2	09/05/19 14:47	C9I0053	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 2-4ft
Date Sampled: 08/30/19 08:35
Percent Solids: 85
Initial Volume: 14.4
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-02
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
N-Nitrosodimethylamine	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
N-Nitroso-Di-n-Propylamine	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
N-nitrosodiphenylamine	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Pentachlorophenol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Phenanthrene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Phenol	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Pyrene	ND (1.64)		8270D		2	09/05/19 14:47	C9I0053	CH93011
Pyridine	ND (8.23)		8270D		2	09/05/19 14:47	C9I0053	CH93011

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	57 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	106 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	72 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	82 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	60 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	43 %		30-130
<i>Surrogate: Phenol-d6</i>	68 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	116 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (2.39)		6010C		1	KJK	09/06/19 4:56	5.17	100	CI90551
Arsenic	8.15 (1.19)		6010C		1	KJK	09/06/19 4:56	5.17	100	CI90551
Beryllium	0.41 (0.05)		6010C		1	KJK	09/06/19 4:56	5.17	100	CI90551
Cadmium	ND (0.24)		6010C		1	KJK	09/06/19 4:56	5.17	100	CI90551
Chromium	9.59 (0.48)		6010C		1	KJK	09/06/19 4:56	5.17	100	CI90551
Copper	20.7 (1.19)		6010C		1	KJK	09/06/19 4:56	5.17	100	CI90551
Lead	21.8 (2.39)		6010C		1	KJK	09/06/19 4:56	5.17	100	CI90551
Mercury	0.092 (0.011)		7471B		1	MKS	09/06/19 9:40	2.19	40	CI90552
Nickel	9.89 (1.19)		6010C		1	KJK	09/06/19 4:56	5.17	100	CI90551
Selenium	ND (2.39)		6010C		1	KJK	09/06/19 4:56	5.17	100	CI90551
Silver	ND (0.48)		6010C		2	KJK	09/06/19 13:16	5.17	100	CI90551
Thallium	ND (0.24)		6020A		1	NAR	09/06/19 14:23	5.17	100	CI90551
Zinc	37.1 (1.19)		6010C		1	KJK	09/06/19 4:56	5.17	100	CI90551



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81
Initial Volume: 5.3
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,1,1-Trichloroethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,1,2,2-Tetrachloroethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,1,2-Trichloroethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,1-Dichloroethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,1-Dichloroethene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,1-Dichloropropene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,2,3-Trichlorobenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,2,3-Trichloropropane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,2,4-Trichlorobenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,2,4-Trimethylbenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,2-Dibromo-3-Chloropropane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,2-Dibromoethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,2-Dichlorobenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,2-Dichloroethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,2-Dichloropropane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,3,5-Trimethylbenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,3-Dichlorobenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,3-Dichloropropane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,4-Dichlorobenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1,4-Dioxane	ND (0.116)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
1-Chlorohexane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
2,2-Dichloropropane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
2-Butanone	ND (0.0582)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
2-Chlorotoluene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
2-Hexanone	ND (0.0582)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
4-Chlorotoluene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
4-Isopropyltoluene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
4-Methyl-2-Pentanone	ND (0.0582)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Acetone	ND (0.0582)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Benzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Bromobenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81
Initial Volume: 5.3
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Bromodichloromethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Bromoform	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Bromomethane	ND (0.0116)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Carbon Disulfide	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Carbon Tetrachloride	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Chlorobenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Chloroethane	ND (0.0116)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Chloroform	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Chloromethane	ND (0.0116)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
cis-1,2-Dichloroethene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
cis-1,3-Dichloropropene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Dibromochloromethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Dibromomethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Dichlorodifluoromethane	ND (0.0116)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Diethyl Ether	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Di-isopropyl ether	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Ethyl tertiary-butyl ether	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Ethylbenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Hexachlorobutadiene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Isopropylbenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Methyl tert-Butyl Ether	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Methylene Chloride	ND (0.0291)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Naphthalene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
n-Butylbenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
n-Propylbenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
sec-Butylbenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Styrene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
tert-Butylbenzene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Tertiary-amyl methyl ether	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Tetrachloroethene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Tetrahydrofuran	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81
Initial Volume: 5.3
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
trans-1,2-Dichloroethene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
trans-1,3-Dichloropropene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Trichloroethene	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Trichlorofluoromethane	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Vinyl Acetate	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Vinyl Chloride	ND (0.0116)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Xylene O	ND (0.0058)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Xylene P,M	ND (0.0116)		8260B Low		1	08/30/19 16:16	C9H0632	CH93024
Xylenes (Total)	ND (0.0116)		8260B Low		1	08/30/19 16:16		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>156 %</i>	<i>SC</i>	<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>45 %</i>	<i>SC</i>	<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>165 %</i>	<i>SC</i>	<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>175 %</i>	<i>SC</i>	<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81
Initial Volume: 16.5
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,1,1-Trichloroethane	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,1,2,2-Tetrachloroethane	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,1,2-Trichloroethane	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,1-Dichloroethane	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,1-Dichloroethene	ND (0.271)	0.0814	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,1-Dichloropropene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,2,3-Trichlorobenzene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,2,3-Trichloropropane	ND (0.271)	0.0814	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,2,4-Trichlorobenzene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,2,4-Trimethylbenzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,2-Dibromo-3-Chloropropane	ND (1.36)	0.271	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,2-Dibromoethane	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,2-Dichlorobenzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,2-Dichloroethane	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,2-Dichloropropane	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,3,5-Trimethylbenzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,3-Dichlorobenzene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,3-Dichloropropane	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,4-Dichlorobenzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
1,4-Dioxane - Screen	ND (54.3)	51.5	8260B		1	09/04/19 12:51	C9I0045	CI90432
1-Chlorohexane	ND (0.271)	0.109	8260B		1	09/04/19 12:51	C9I0045	CI90432
2,2-Dichloropropane	ND (0.271)	0.0814	8260B		1	09/04/19 12:51	C9I0045	CI90432
2-Butanone	ND (1.36)	0.922	8260B		1	09/04/19 12:51	C9I0045	CI90432
2-Chlorotoluene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
2-Hexanone	ND (1.36)	0.407	8260B		1	09/04/19 12:51	C9I0045	CI90432
4-Chlorotoluene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
4-Isopropyltoluene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
4-Methyl-2-Pentanone	ND (1.36)	0.434	8260B		1	09/04/19 12:51	C9I0045	CI90432
Acetone	ND (1.36)	0.732	8260B		1	09/04/19 12:51	C9I0045	CI90432
Benzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Bromobenzene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81
Initial Volume: 16.5
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.271)	0.0814	8260B		1	09/04/19 12:51	C9I0045	CI90432
Bromodichloromethane	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Bromoform	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Bromomethane	ND (0.271)	0.109	8260B		1	09/04/19 12:51	C9I0045	CI90432
Carbon Disulfide	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Carbon Tetrachloride	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Chlorobenzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Chloroethane	ND (0.271)	0.109	8260B		1	09/04/19 12:51	C9I0045	CI90432
Chloroform	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Chloromethane	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
cis-1,2-Dichloroethene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
cis-1,3-Dichloropropene	ND (0.271)	0.0814	8260B		1	09/04/19 12:51	C9I0045	CI90432
Dibromochloromethane	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Dibromomethane	ND (0.271)	0.0814	8260B		1	09/04/19 12:51	C9I0045	CI90432
Dichlorodifluoromethane	ND (0.271)	0.0814	8260B		1	09/04/19 12:51	C9I0045	CI90432
Diethyl Ether	ND (0.271)	0.0814	8260B		1	09/04/19 12:51	C9I0045	CI90432
Di-isopropyl ether	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Ethyl tertiary-butyl ether	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Ethylbenzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Hexachlorobutadiene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Isopropylbenzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Methyl tert-Butyl Ether	ND (0.271)	0.0814	8260B		1	09/04/19 12:51	C9I0045	CI90432
Methylene Chloride	J 0.0732 (0.543)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Naphthalene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
n-Butylbenzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
n-Propylbenzene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
sec-Butylbenzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Styrene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
tert-Butylbenzene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Tertiary-amyl methyl ether	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Tetrachloroethene	J 0.0787 (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Tetrahydrofuran	ND (1.36)	0.434	8260B		1	09/04/19 12:51	C9I0045	CI90432



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81
Initial Volume: 16.5
Final Volume: 15
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Methanol

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
trans-1,2-Dichloroethene	ND (0.271)	0.0814	8260B		1	09/04/19 12:51	C9I0045	CI90432
trans-1,3-Dichloropropene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Trichloroethene	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Trichlorofluoromethane	ND (0.271)	0.109	8260B		1	09/04/19 12:51	C9I0045	CI90432
Vinyl Acetate	ND (0.271)	0.136	8260B		1	09/04/19 12:51	C9I0045	CI90432
Vinyl Chloride	ND (0.271)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Xylene O	ND (0.271)	0.0271	8260B		1	09/04/19 12:51	C9I0045	CI90432
Xylene P,M	ND (0.543)	0.0543	8260B		1	09/04/19 12:51	C9I0045	CI90432
Xylenes (Total)	ND (0.543)		8260B		1	09/04/19 12:51		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>99 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>100 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>105 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>99 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81
Initial Volume: 19.4
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/3/19 16:30

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	09/04/19 18:15		CI90307
Aroclor 1221	ND (0.06)		8082A		1	09/04/19 18:15		CI90307
Aroclor 1232	ND (0.06)		8082A		1	09/04/19 18:15		CI90307
Aroclor 1242	ND (0.06)		8082A		1	09/04/19 18:15		CI90307
Aroclor 1248	ND (0.06)		8082A		1	09/04/19 18:15		CI90307
Aroclor 1254	ND (0.06)		8082A		1	09/04/19 18:15		CI90307
Aroclor 1260	ND (0.06)		8082A		1	09/04/19 18:15		CI90307
Aroclor 1262	ND (0.06)		8082A		1	09/04/19 18:15		CI90307
Aroclor 1268	ND (0.06)		8082A		1	09/04/19 18:15		CI90307

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	37 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	47 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	41 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	50 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81
Initial Volume: 19.4
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/30/19 16:29

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	1220 (954)		8100M		20	09/04/19 0:59	C910015	CH93012
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		<i>%</i>	<i>SD</i>	<i>40-140</i>				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81
Initial Volume: 14.8
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.500)		8270D		2	09/05/19 15:16	C9I0053	CH93011
1,2,4-Trichlorobenzene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
1,2-Dichlorobenzene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
1,3-Dichlorobenzene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
1,4-Dichlorobenzene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2,3,4,6-Tetrachlorophenol	ND (8.36)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2,4,5-Trichlorophenol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2,4,6-Trichlorophenol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2,4-Dichlorophenol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2,4-Dimethylphenol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2,4-Dinitrophenol	ND (8.36)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2,4-Dinitrotoluene	ND (0.836)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2,6-Dinitrotoluene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2-Chloronaphthalene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2-Chlorophenol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2-Methylnaphthalene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2-Methylphenol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2-Nitroaniline	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
2-Nitrophenol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
3,3'-Dichlorobenzidine	ND (0.836)		8270D		2	09/05/19 15:16	C9I0053	CH93011
3+4-Methylphenol	ND (3.34)		8270D		2	09/05/19 15:16	C9I0053	CH93011
3-Nitroaniline	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
4,6-Dinitro-2-Methylphenol	ND (8.36)		8270D		2	09/05/19 15:16	C9I0053	CH93011
4-Bromophenyl-phenylether	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
4-Chloro-3-Methylphenol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
4-Chloroaniline	ND (3.34)		8270D		2	09/05/19 15:16	C9I0053	CH93011
4-Chloro-phenyl-phenyl ether	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
4-Nitroaniline	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
4-Nitrophenol	ND (8.36)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Acenaphthene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Acenaphthylene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Acetophenone	ND (3.34)		8270D		2	09/05/19 15:16	C9I0053	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 4-6ft
Date Sampled: 08/30/19 08:50
Percent Solids: 81
Initial Volume: 14.8
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-03
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (3.34)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Anthracene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Azobenzene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Benzo(a)anthracene	ND (0.836)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Benzo(a)pyrene	0.394 (0.333)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Benzo(b)fluoranthene	ND (0.836)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Benzo(g,h,i)perylene	ND (0.500)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Benzo(k)fluoranthene	ND (0.836)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Benzoic Acid	ND (8.36)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Benzyl Alcohol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
bis(2-Chloroethoxy)methane	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
bis(2-Chloroethyl)ether	ND (0.500)		8270D		2	09/05/19 15:16	C9I0053	CH93011
bis(2-chloroisopropyl)Ether	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
bis(2-Ethylhexyl)phthalate	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Butylbenzylphthalate	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Carbazole	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Chrysene	0.485 (0.333)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Dibenzo(a,h)Anthracene	ND (0.333)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Dibenzofuran	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Diethylphthalate	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Dimethylphthalate	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Di-n-butylphthalate	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Di-n-octylphthalate	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Fluoranthene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Fluorene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Hexachlorobenzene	ND (0.333)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Hexachlorobutadiene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Hexachlorocyclopentadiene	ND (8.36)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Hexachloroethane	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Indeno(1,2,3-cd)Pyrene	ND (0.836)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Isophorone	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Naphthalene	ND (0.417)		8270D		2	09/05/19 15:16	C9I0053	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: B-7 4-6ft
 Date Sampled: 08/30/19 08:50
 Percent Solids: 81
 Initial Volume: 14.8
 Final Volume: 1
 Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
 ESS Laboratory Sample ID: 19H0999-03
 Sample Matrix: Soil
 Units: mg/kg dry
 Analyst: TJ
 Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
N-Nitrosodimethylamine	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
N-Nitroso-Di-n-Propylamine	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
N-nitrosodiphenylamine	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Pentachlorophenol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Phenanthrene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Phenol	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Pyrene	ND (1.67)		8270D		2	09/05/19 15:16	C9I0053	CH93011
Pyridine	ND (8.36)		8270D		2	09/05/19 15:16	C9I0053	CH93011

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	58 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	102 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	74 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	79 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	59 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	46 %		30-130
<i>Surrogate: Phenol-d6</i>	69 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	121 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: mg/kg dry

Extraction Method: 3050B

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	5.24 (0.25)		6020A		1	NAR	09/06/19 14:28	5.16	100	CI90551
Arsenic	52.5 (1.23)		6010C		1	KJK	09/06/19 5:00	5.16	100	CI90551
Beryllium	ND (0.05)		6010C		1	KJK	09/06/19 5:00	5.16	100	CI90551
Cadmium	EL ND (2.46)		6010C		10	KJK	09/06/19 13:20	5.16	100	CI90551
Chromium	17.2 (0.49)		6010C		1	KJK	09/06/19 5:00	5.16	100	CI90551
Copper	327 (1.23)		6010C		1	KJK	09/06/19 5:00	5.16	100	CI90551
Lead	153 (2.46)		6010C		1	KJK	09/06/19 5:00	5.16	100	CI90551
Mercury	0.177 (0.011)		7471B		1	MKS	09/06/19 9:42	2.25	40	CI90552
Nickel	105 (1.23)		6010C		1	KJK	09/06/19 5:00	5.16	100	CI90551
Selenium	0.72 (0.25)		6020A		1	NAR	09/06/19 14:28	5.16	100	CI90551
Silver	EL ND (2.46)		6010C		10	KJK	09/06/19 13:20	5.16	100	CI90551
Thallium	ND (0.25)		6020A		1	NAR	09/06/19 14:28	5.16	100	CI90551
Zinc	106 (1.23)		6010C		1	KJK	09/06/19 5:00	5.16	100	CI90551



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: mg/L

Extraction Method: 3005A TCLP

1311 TCLP Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>TCLP Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Lead	0.054 (0.050)		1311/6010C		1	NAR	09/09/19 14:57	50	50	CI90902



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79
Initial Volume: 7.8
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,1,1-Trichloroethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,1,2,2-Tetrachloroethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,1,2-Trichloroethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,1-Dichloroethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,1-Dichloroethene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,1-Dichloropropene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,2,3-Trichlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,2,3-Trichloropropane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,2,4-Trichlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,2,4-Trimethylbenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,2-Dibromo-3-Chloropropane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,2-Dibromoethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,2-Dichlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,2-Dichloroethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,2-Dichloropropane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,3,5-Trimethylbenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,3-Dichlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,3-Dichloropropane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,4-Dichlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1,4-Dioxane	ND (0.0814)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
1-Chlorohexane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
2,2-Dichloropropane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
2-Butanone	ND (0.0407)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
2-Chlorotoluene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
2-Hexanone	ND (0.0407)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
4-Chlorotoluene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
4-Isopropyltoluene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
4-Methyl-2-Pentanone	ND (0.0407)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Acetone	ND (0.0407)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Benzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Bromobenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79
Initial Volume: 7.8
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Bromodichloromethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Bromoform	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Bromomethane	ND (0.0081)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Carbon Disulfide	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Carbon Tetrachloride	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Chlorobenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Chloroethane	ND (0.0081)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Chloroform	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Chloromethane	ND (0.0081)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
cis-1,2-Dichloroethene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
cis-1,3-Dichloropropene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Dibromochloromethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Dibromomethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Dichlorodifluoromethane	ND (0.0081)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Diethyl Ether	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Di-isopropyl ether	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Ethyl tertiary-butyl ether	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Ethylbenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Hexachlorobutadiene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Isopropylbenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Methyl tert-Butyl Ether	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Methylene Chloride	ND (0.0204)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Naphthalene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
n-Butylbenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
n-Propylbenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
sec-Butylbenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Styrene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
tert-Butylbenzene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Tertiary-amyl methyl ether	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Tetrachloroethene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Tetrahydrofuran	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79
Initial Volume: 7.8
Final Volume: 10
Extraction Method: 5035

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MD

5035/8260B Volatile Organic Compounds / Low Level

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Toluene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
trans-1,2-Dichloroethene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
trans-1,3-Dichloropropene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Trichloroethene	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Trichlorofluoromethane	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Vinyl Acetate	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Vinyl Chloride	ND (0.0081)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Xylene O	ND (0.0041)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Xylene P,M	ND (0.0081)		8260B Low		1	08/30/19 16:42	C9H0632	CH93024
Xylenes (Total)	ND (0.00814)		8260B Low		1	08/30/19 16:42		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>111 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>88 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>105 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>103 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79
Initial Volume: 20.5
Final Volume: 10
Extraction Method: 3540C

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: MJV
Prepared: 9/3/19 16:30

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.06)		8082A		1	09/04/19 18:34		CI90307
Aroclor 1221	ND (0.06)		8082A		1	09/04/19 18:34		CI90307
Aroclor 1232	ND (0.06)		8082A		1	09/04/19 18:34		CI90307
Aroclor 1242	ND (0.06)		8082A		1	09/04/19 18:34		CI90307
Aroclor 1248	ND (0.06)		8082A		1	09/04/19 18:34		CI90307
Aroclor 1254	ND (0.06)		8082A		1	09/04/19 18:34		CI90307
Aroclor 1260	ND (0.06)		8082A		1	09/04/19 18:34		CI90307
Aroclor 1262	ND (0.06)		8082A		1	09/04/19 18:34		CI90307
Aroclor 1268	ND (0.06)		8082A		1	09/04/19 18:34		CI90307

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	62 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	74 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	60 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	82 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79
Initial Volume: 19.6
Final Volume: 1
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: CAD
Prepared: 8/30/19 16:29

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	143 (48.6)		8100M		1	09/03/19 21:45	C910015	CH93012
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		99 %		40-140				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79
Initial Volume: 15.3
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.125)		8270D		1	09/05/19 15:44	C9I0053	CH93011
1,2,4-Trichlorobenzene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
1,2-Dichlorobenzene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
1,3-Dichlorobenzene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
1,4-Dichlorobenzene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2,3,4,6-Tetrachlorophenol	ND (2.08)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2,4,5-Trichlorophenol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2,4,6-Trichlorophenol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2,4-Dichlorophenol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2,4-Dimethylphenol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2,4-Dinitrophenol	ND (2.08)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2,4-Dinitrotoluene	ND (0.208)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2,6-Dinitrotoluene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2-Chloronaphthalene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2-Chlorophenol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2-Methylnaphthalene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2-Methylphenol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2-Nitroaniline	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
2-Nitrophenol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
3,3'-Dichlorobenzidine	ND (0.208)		8270D		1	09/05/19 15:44	C9I0053	CH93011
3+4-Methylphenol	ND (0.831)		8270D		1	09/05/19 15:44	C9I0053	CH93011
3-Nitroaniline	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
4,6-Dinitro-2-Methylphenol	ND (2.08)		8270D		1	09/05/19 15:44	C9I0053	CH93011
4-Bromophenyl-phenylether	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
4-Chloro-3-Methylphenol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
4-Chloroaniline	ND (0.831)		8270D		1	09/05/19 15:44	C9I0053	CH93011
4-Chloro-phenyl-phenyl ether	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
4-Nitroaniline	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
4-Nitrophenol	ND (2.08)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Acenaphthene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Acenaphthylene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Acetophenone	ND (0.831)		8270D		1	09/05/19 15:44	C9I0053	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79
Initial Volume: 15.3
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aniline	ND (0.831)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Anthracene	0.523 (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Azobenzene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Benzo(a)anthracene	1.83 (0.208)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Benzo(a)pyrene	1.70 (0.083)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Benzo(b)fluoranthene	1.49 (0.208)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Benzo(g,h,i)perylene	0.847 (0.125)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Benzo(k)fluoranthene	1.58 (0.208)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Benzoic Acid	ND (2.08)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Benzyl Alcohol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
bis(2-Chloroethoxy)methane	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
bis(2-Chloroethyl)ether	ND (0.125)		8270D		1	09/05/19 15:44	C9I0053	CH93011
bis(2-chloroisopropyl)Ether	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
bis(2-Ethylhexyl)phthalate	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Butylbenzylphthalate	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Carbazole	0.505 (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Chrysene	1.95 (0.083)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Dibenzo(a,h)Anthracene	0.305 (0.083)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Dibenzofuran	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Diethylphthalate	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Dimethylphthalate	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Di-n-butylphthalate	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Di-n-octylphthalate	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Fluoranthene	4.49 (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Fluorene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Hexachlorobenzene	ND (0.083)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Hexachlorobutadiene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Hexachlorocyclopentadiene	ND (2.08)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Hexachloroethane	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Indeno(1,2,3-cd)Pyrene	0.811 (0.208)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Isophorone	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Naphthalene	0.401 (0.104)		8270D		1	09/05/19 15:44	C9I0053	CH93011



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79
Initial Volume: 15.3
Final Volume: 0.5
Extraction Method: 3546

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: mg/kg dry
Analyst: TJ
Prepared: 8/30/19 16:29

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Nitrobenzene	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
N-Nitrosodimethylamine	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
N-Nitroso-Di-n-Propylamine	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
N-nitrosodiphenylamine	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Pentachlorophenol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Phenanthrene	3.47 (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Phenol	ND (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Pyrene	3.73 (0.415)		8270D		1	09/05/19 15:44	C9I0053	CH93011
Pyridine	ND (2.08)		8270D		1	09/05/19 15:44	C9I0053	CH93011

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	73 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	87 %		30-130
<i>Surrogate: 2-Chlorophenol-d4</i>	79 %		30-130
<i>Surrogate: 2-Fluorobiphenyl</i>	73 %		30-130
<i>Surrogate: 2-Fluorophenol</i>	73 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	56 %		30-130
<i>Surrogate: Phenol-d6</i>	73 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	96 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: B-7 6-10ft
Date Sampled: 08/30/19 09:10
Percent Solids: 79
Initial Volume: 100
Final Volume: 2000
Extraction Method: 1311

ESS Laboratory Work Order: 19H0999
ESS Laboratory Sample ID: 19H0999-04
Sample Matrix: Soil
Units: °C
Analyst: KJK
Prepared: 9/6/19 20:00

TCLP Extraction by 1311

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Batch</u>
Temperature (Min C)	20.4 (N/A)		1311		1	KJK	09/07/19 12:10	CI90635
Temperature (Max C)	21.2 (N/A)		1311		1	KJK	09/07/19 12:10	CI90635
Temperature (Range)	Temperature is not within 23 +/-2 °C. (N/A)							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch C190551 - 3050B

Blank

Antimony	ND	5.00	mg/kg wet
Arsenic	ND	2.50	mg/kg wet
Beryllium	ND	0.11	mg/kg wet
Cadmium	ND	0.50	mg/kg wet
Chromium	ND	1.00	mg/kg wet
Copper	ND	2.50	mg/kg wet
Lead	ND	5.00	mg/kg wet
Nickel	ND	2.50	mg/kg wet
Selenium	ND	5.00	mg/kg wet
Silver	ND	0.50	mg/kg wet
Thallium	ND	5.00	mg/kg wet
Zinc	ND	2.50	mg/kg wet

Blank

Antimony	ND	0.50	mg/kg wet
Selenium	ND	0.50	mg/kg wet
Thallium	ND	0.50	mg/kg wet

LCS

Antimony	47.0	17.5	mg/kg wet	42.40	111	80-120
Arsenic	128	8.77	mg/kg wet	128.0	100	80-120
Beryllium	220	0.39	mg/kg wet	217.0	101	80-120
Cadmium	103	1.75	mg/kg wet	99.00	104	80-120
Chromium	120	3.51	mg/kg wet	116.0	103	80-120
Copper	91.1	8.77	mg/kg wet	89.60	102	80-120
Lead	288	17.5	mg/kg wet	277.0	104	80-120
Nickel	109	8.77	mg/kg wet	107.0	102	80-120
Selenium	239	17.5	mg/kg wet	242.0	99	80-120
Silver	65.8	1.75	mg/kg wet	64.30	102	80-120
Thallium	189	17.5	mg/kg wet	183.0	103	80-120
Zinc	566	8.77	mg/kg wet	561.0	101	80-120

LCS

Antimony	45.3	8.77	mg/kg wet	42.40	107	80-120
Selenium	261	8.77	mg/kg wet	242.0	108	80-120
Thallium	196	8.77	mg/kg wet	183.0	107	80-120

LCS Dup

Antimony	42.9	16.9	mg/kg wet	42.40	101	80-120	9	20
Arsenic	123	8.47	mg/kg wet	128.0	96	80-120	4	20
Beryllium	216	0.37	mg/kg wet	217.0	99	80-120	2	20
Cadmium	97.8	1.69	mg/kg wet	99.00	99	80-120	5	20
Chromium	117	3.39	mg/kg wet	116.0	100	80-120	3	20
Copper	87.9	8.47	mg/kg wet	89.60	98	80-120	4	20
Lead	275	16.9	mg/kg wet	277.0	99	80-120	4	20
Nickel	110	8.47	mg/kg wet	107.0	103	80-120	0.8	20
Selenium	229	16.9	mg/kg wet	242.0	95	80-120	4	20



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CI90551 - 3050B

Silver	64.4	1.69	mg/kg wet	64.30		100	80-120	2	20	
Thallium	182	16.9	mg/kg wet	183.0		100	80-120	3	20	
Zinc	550	8.47	mg/kg wet	561.0		98	80-120	3	20	

LCS Dup

Antimony	38.9	8.47	mg/kg wet	42.40		92	80-120	15	30	
Selenium	242	8.47	mg/kg wet	242.0		100	80-120	8	30	
Thallium	179	8.47	mg/kg wet	183.0		98	80-120	9	30	

Batch CI90552 - 7471B

Blank

Mercury	ND	0.033	mg/kg wet							
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LCS

Mercury	23.5	3.36	mg/kg wet	27.30		86	80-120			
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LCS Dup

Mercury	22.2	3.54	mg/kg wet	27.30		81	80-120	6	20	
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1311 TCLP Metals

Batch CI90902 - 3005A_TCLP

Blank

Lead	ND	0.050	mg/L							
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LCS

Lead	0.451	0.050	mg/L	0.5000		90	80-120			
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LCS Dup

Lead	0.445	0.050	mg/L	0.5000		89	80-120	1	20	
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 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	0.0050	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							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 5035

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							
1-Chlorohexane	ND	0.0050	mg/kg wet							
2,2-Dichloropropane	ND	0.0050	mg/kg wet							
2-Butanone	ND	0.0500	mg/kg wet							
2-Chlorotoluene	ND	0.0050	mg/kg wet							
2-Hexanone	ND	0.0500	mg/kg wet							
4-Chlorotoluene	ND	0.0050	mg/kg wet							
4-Isopropyltoluene	ND	0.0050	mg/kg wet							
4-Methyl-2-Pentanone	ND	0.0500	mg/kg wet							
Acetone	ND	0.0500	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	0.0050	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	0.0250	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							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 5035

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 Acetate	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	0.0526		mg/kg wet	0.05000		105	70-130			
Surrogate: 4-Bromofluorobenzene	0.0440		mg/kg wet	0.05000		88	70-130			
Surrogate: Dibromofluoromethane	0.0501		mg/kg wet	0.05000		100	70-130			
Surrogate: Toluene-d8	0.0527		mg/kg wet	0.05000		105	70-130			

LCS

1,1,1,2-Tetrachloroethane	0.0499	0.0050	mg/kg wet	0.05000		100	70-130			
1,1,1-Trichloroethane	0.0490	0.0050	mg/kg wet	0.05000		98	70-130			
1,1,2,2-Tetrachloroethane	0.0445	0.0050	mg/kg wet	0.05000		89	70-130			
1,1,2-Trichloroethane	0.0463	0.0050	mg/kg wet	0.05000		93	70-130			
1,1-Dichloroethane	0.0481	0.0050	mg/kg wet	0.05000		96	70-130			
1,1-Dichloroethene	0.0477	0.0050	mg/kg wet	0.05000		95	70-130			
1,1-Dichloropropene	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
1,2,3-Trichlorobenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130			
1,2,3-Trichloropropane	0.0426	0.0050	mg/kg wet	0.05000		85	70-130			
1,2,4-Trichlorobenzene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
1,2,4-Trimethylbenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130			
1,2-Dibromo-3-Chloropropane	0.0401	0.0050	mg/kg wet	0.05000		80	70-130			
1,2-Dibromoethane	0.0481	0.0050	mg/kg wet	0.05000		96	70-130			
1,2-Dichlorobenzene	0.0487	0.0050	mg/kg wet	0.05000		97	70-130			
1,2-Dichloroethane	0.0486	0.0050	mg/kg wet	0.05000		97	70-130			
1,2-Dichloropropane	0.0458	0.0050	mg/kg wet	0.05000		92	70-130			
1,3,5-Trimethylbenzene	0.0487	0.0050	mg/kg wet	0.05000		97	70-130			
1,3-Dichlorobenzene	0.0476	0.0050	mg/kg wet	0.05000		95	70-130			
1,3-Dichloropropane	0.0484	0.0050	mg/kg wet	0.05000		97	70-130			
1,4-Dichlorobenzene	0.0472	0.0050	mg/kg wet	0.05000		94	70-130			
1,4-Dioxane	0.719	0.100	mg/kg wet	1.000		72	70-130			
1-Chlorohexane	0.0447	0.0050	mg/kg wet	0.05000		89	70-130			
2,2-Dichloropropane	0.0516	0.0050	mg/kg wet	0.05000		103	70-130			
2-Butanone	0.214	0.0500	mg/kg wet	0.2500		85	70-130			
2-Chlorotoluene	0.0476	0.0050	mg/kg wet	0.05000		95	70-130			
2-Hexanone	0.207	0.0500	mg/kg wet	0.2500		83	70-130			
4-Chlorotoluene	0.0483	0.0050	mg/kg wet	0.05000		97	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 5035

4-Isopropyltoluene	0.0471	0.0050	mg/kg wet	0.05000		94	70-130			
4-Methyl-2-Pentanone	0.215	0.0500	mg/kg wet	0.2500		86	70-130			
Acetone	0.181	0.0500	mg/kg wet	0.2500		72	70-130			
Benzene	0.0455	0.0050	mg/kg wet	0.05000		91	70-130			
Bromobenzene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130			
Bromochloromethane	0.0505	0.0050	mg/kg wet	0.05000		101	70-130			
Bromodichloromethane	0.0498	0.0050	mg/kg wet	0.05000		100	70-130			
Bromoform	0.0443	0.0050	mg/kg wet	0.05000		89	70-130			
Bromomethane	0.0633	0.0100	mg/kg wet	0.05000		127	70-130			
Carbon Disulfide	0.0513	0.0050	mg/kg wet	0.05000		103	70-130			
Carbon Tetrachloride	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
Chlorobenzene	0.0461	0.0050	mg/kg wet	0.05000		92	70-130			
Chloroethane	0.0391	0.0100	mg/kg wet	0.05000		78	70-130			
Chloroform	0.0473	0.0050	mg/kg wet	0.05000		95	70-130			
Chloromethane	0.0338	0.0100	mg/kg wet	0.05000		68	70-130			B-
cis-1,2-Dichloroethene	0.0482	0.0050	mg/kg wet	0.05000		96	70-130			
cis-1,3-Dichloropropene	0.0538	0.0050	mg/kg wet	0.05000		108	70-130			
Dibromochloromethane	0.0514	0.0050	mg/kg wet	0.05000		103	70-130			
Dibromomethane	0.0486	0.0050	mg/kg wet	0.05000		97	70-130			
Dichlorodifluoromethane	0.0341	0.0100	mg/kg wet	0.05000		68	70-130			B-
Diethyl Ether	0.0534	0.0050	mg/kg wet	0.05000		107	70-130			
Di-isopropyl ether	0.0521	0.0050	mg/kg wet	0.05000		104	70-130			
Ethyl tertiary-butyl ether	0.0535	0.0050	mg/kg wet	0.05000		107	70-130			
Ethylbenzene	0.0483	0.0050	mg/kg wet	0.05000		97	70-130			
Hexachlorobutadiene	0.0468	0.0050	mg/kg wet	0.05000		94	70-130			
Isopropylbenzene	0.0485	0.0050	mg/kg wet	0.05000		97	70-130			
Methyl tert-Butyl Ether	0.0548	0.0050	mg/kg wet	0.05000		110	70-130			
Methylene Chloride	0.0522	0.0250	mg/kg wet	0.05000		104	70-130			
Naphthalene	0.0445	0.0050	mg/kg wet	0.05000		89	70-130			
n-Butylbenzene	0.0489	0.0050	mg/kg wet	0.05000		98	70-130			
n-Propylbenzene	0.0479	0.0050	mg/kg wet	0.05000		96	70-130			
sec-Butylbenzene	0.0462	0.0050	mg/kg wet	0.05000		92	70-130			
Styrene	0.0467	0.0050	mg/kg wet	0.05000		93	70-130			
tert-Butylbenzene	0.0483	0.0050	mg/kg wet	0.05000		97	70-130			
Tertiary-amyl methyl ether	0.0568	0.0050	mg/kg wet	0.05000		114	70-130			
Tetrachloroethene	0.0433	0.0050	mg/kg wet	0.05000		87	70-130			
Tetrahydrofuran	0.0391	0.0050	mg/kg wet	0.05000		78	70-130			
Toluene	0.0461	0.0050	mg/kg wet	0.05000		92	70-130			
trans-1,2-Dichloroethene	0.0490	0.0050	mg/kg wet	0.05000		98	70-130			
trans-1,3-Dichloropropene	0.0469	0.0050	mg/kg wet	0.05000		94	70-130			
Trichloroethene	0.0449	0.0050	mg/kg wet	0.05000		90	70-130			
Trichlorofluoromethane	0.0421	0.0050	mg/kg wet	0.05000		84	70-130			
Vinyl Acetate	0.0474	0.0050	mg/kg wet	0.05000		95	70-130			
Vinyl Chloride	0.0393	0.0100	mg/kg wet	0.05000		79	70-130			
Xylene O	0.0496	0.0050	mg/kg wet	0.05000		99	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 5035

Xylene P,M	0.0995	0.0100	mg/kg wet	0.1000		99	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0479		mg/kg wet	0.05000		96	70-130			
Surrogate: 4-Bromofluorobenzene	0.0501		mg/kg wet	0.05000		100	70-130			
Surrogate: Dibromofluoromethane	0.0493		mg/kg wet	0.05000		99	70-130			
Surrogate: Toluene-d8	0.0497		mg/kg wet	0.05000		99	70-130			

LCS Dup

1,1,1,2-Tetrachloroethane	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	3	25	
1,1,1-Trichloroethane	0.0503	0.0050	mg/kg wet	0.05000		101	70-130	3	25	
1,1,2,2-Tetrachloroethane	0.0478	0.0050	mg/kg wet	0.05000		96	70-130	7	25	
1,1,2-Trichloroethane	0.0479	0.0050	mg/kg wet	0.05000		96	70-130	4	25	
1,1-Dichloroethane	0.0498	0.0050	mg/kg wet	0.05000		100	70-130	4	25	
1,1-Dichloroethene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	7	25	
1,1-Dichloropropene	0.0495	0.0050	mg/kg wet	0.05000		99	70-130	6	25	
1,2,3-Trichlorobenzene	0.0544	0.0050	mg/kg wet	0.05000		109	70-130	5	25	
1,2,3-Trichloropropane	0.0463	0.0050	mg/kg wet	0.05000		93	70-130	8	25	
1,2,4-Trichlorobenzene	0.0565	0.0050	mg/kg wet	0.05000		113	70-130	5	25	
1,2,4-Trimethylbenzene	0.0541	0.0050	mg/kg wet	0.05000		108	70-130	5	25	
1,2-Dibromo-3-Chloropropane	0.0462	0.0050	mg/kg wet	0.05000		92	70-130	14	25	
1,2-Dibromoethane	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	5	25	
1,2-Dichlorobenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	5	25	
1,2-Dichloroethane	0.0494	0.0050	mg/kg wet	0.05000		99	70-130	2	25	
1,2-Dichloropropane	0.0483	0.0050	mg/kg wet	0.05000		97	70-130	5	25	
1,3,5-Trimethylbenzene	0.0514	0.0050	mg/kg wet	0.05000		103	70-130	5	25	
1,3-Dichlorobenzene	0.0497	0.0050	mg/kg wet	0.05000		99	70-130	4	25	
1,3-Dichloropropane	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	3	25	
1,4-Dichlorobenzene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	7	25	
1,4-Dioxane	0.848	0.100	mg/kg wet	1.000		85	70-130	17	20	
1-Chlorohexane	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	8	25	
2,2-Dichloropropane	0.0526	0.0050	mg/kg wet	0.05000		105	70-130	2	25	
2-Butanone	0.232	0.0500	mg/kg wet	0.2500		93	70-130	8	25	
2-Chlorotoluene	0.0502	0.0050	mg/kg wet	0.05000		100	70-130	5	25	
2-Hexanone	0.236	0.0500	mg/kg wet	0.2500		95	70-130	13	25	
4-Chlorotoluene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	6	25	
4-Isopropyltoluene	0.0499	0.0050	mg/kg wet	0.05000		100	70-130	6	25	
4-Methyl-2-Pentanone	0.240	0.0500	mg/kg wet	0.2500		96	70-130	11	25	
Acetone	0.212	0.0500	mg/kg wet	0.2500		85	70-130	16	25	
Benzene	0.0479	0.0050	mg/kg wet	0.05000		96	70-130	5	25	
Bromobenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	3	25	
Bromochloromethane	0.0517	0.0050	mg/kg wet	0.05000		103	70-130	2	25	
Bromodichloromethane	0.0507	0.0050	mg/kg wet	0.05000		101	70-130	2	25	
Bromoform	0.0464	0.0050	mg/kg wet	0.05000		93	70-130	5	25	
Bromomethane	0.0645	0.0100	mg/kg wet	0.05000		129	70-130	2	25	
Carbon Disulfide	0.0552	0.0050	mg/kg wet	0.05000		110	70-130	7	25	
Carbon Tetrachloride	0.0494	0.0050	mg/kg wet	0.05000		99	70-130	6	25	
Chlorobenzene	0.0482	0.0050	mg/kg wet	0.05000		96	70-130	4	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Low Level

Batch CH93024 - 5035

Chloroethane	0.0409	0.0100	mg/kg wet	0.05000		82	70-130	5	25	
Chloroform	0.0488	0.0050	mg/kg wet	0.05000		98	70-130	3	25	
Chloromethane	0.0359	0.0100	mg/kg wet	0.05000		72	70-130	6	25	
cis-1,2-Dichloroethene	0.0505	0.0050	mg/kg wet	0.05000		101	70-130	5	25	
cis-1,3-Dichloropropene	0.0551	0.0050	mg/kg wet	0.05000		110	70-130	2	25	
Dibromochloromethane	0.0530	0.0050	mg/kg wet	0.05000		106	70-130	3	25	
Dibromomethane	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	4	25	
Dichlorodifluoromethane	0.0365	0.0100	mg/kg wet	0.05000		73	70-130	7	25	
Diethyl Ether	0.0554	0.0050	mg/kg wet	0.05000		111	70-130	4	25	
Di-isopropyl ether	0.0538	0.0050	mg/kg wet	0.05000		108	70-130	3	25	
Ethyl tertiary-butyl ether	0.0565	0.0050	mg/kg wet	0.05000		113	70-130	5	25	
Ethylbenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	6	25	
Hexachlorobutadiene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	7	25	
Isopropylbenzene	0.0513	0.0050	mg/kg wet	0.05000		103	70-130	6	25	
Methyl tert-Butyl Ether	0.0574	0.0050	mg/kg wet	0.05000		115	70-130	5	25	
Methylene Chloride	0.0545	0.0250	mg/kg wet	0.05000		109	70-130	4	25	
Naphthalene	0.0500	0.0050	mg/kg wet	0.05000		100	70-130	12	25	
n-Butylbenzene	0.0522	0.0050	mg/kg wet	0.05000		104	70-130	7	25	
n-Propylbenzene	0.0511	0.0050	mg/kg wet	0.05000		102	70-130	6	25	
sec-Butylbenzene	0.0496	0.0050	mg/kg wet	0.05000		99	70-130	7	25	
Styrene	0.0490	0.0050	mg/kg wet	0.05000		98	70-130	5	25	
tert-Butylbenzene	0.0519	0.0050	mg/kg wet	0.05000		104	70-130	7	25	
Tertiary-amyl methyl ether	0.0608	0.0050	mg/kg wet	0.05000		122	70-130	7	25	
Tetrachloroethene	0.0456	0.0050	mg/kg wet	0.05000		91	70-130	5	25	
Tetrahydrofuran	0.0434	0.0050	mg/kg wet	0.05000		87	70-130	10	25	
Toluene	0.0484	0.0050	mg/kg wet	0.05000		97	70-130	5	25	
trans-1,2-Dichloroethene	0.0524	0.0050	mg/kg wet	0.05000		105	70-130	7	25	
trans-1,3-Dichloropropene	0.0489	0.0050	mg/kg wet	0.05000		98	70-130	4	25	
Trichloroethene	0.0471	0.0050	mg/kg wet	0.05000		94	70-130	5	25	
Trichlorofluoromethane	0.0449	0.0050	mg/kg wet	0.05000		90	70-130	6	25	
Vinyl Acetate	0.0506	0.0050	mg/kg wet	0.05000		101	70-130	7	25	
Vinyl Chloride	0.0425	0.0100	mg/kg wet	0.05000		85	70-130	8	25	
Xylene O	0.0528	0.0050	mg/kg wet	0.05000		106	70-130	6	25	
Xylene P,M	0.105	0.0100	mg/kg wet	0.1000		105	70-130	6	25	
Surrogate: 1,2-Dichloroethane-d4	0.0466		mg/kg wet	0.05000		93	70-130			
Surrogate: 4-Bromofluorobenzene	0.0497		mg/kg wet	0.05000		99	70-130			
Surrogate: Dibromofluoromethane	0.0478		mg/kg wet	0.05000		96	70-130			
Surrogate: Toluene-d8	0.0485		mg/kg wet	0.05000		97	70-130			

5035/8260B Volatile Organic Compounds / Methanol

Batch CI90432 - 5035

Blank										
1,1,1,2-Tetrachloroethane	ND	0.200	mg/kg wet							
1,1,1-Trichloroethane	ND	0.200	mg/kg wet							
1,1,2,2-Tetrachloroethane	ND	0.200	mg/kg wet							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Methanol

Batch C190432 - 5035

1,1,2-Trichloroethane	ND	0.200	mg/kg wet							
1,1-Dichloroethane	ND	0.200	mg/kg wet							
1,1-Dichloroethene	ND	0.200	mg/kg wet							
1,1-Dichloropropene	ND	0.200	mg/kg wet							
1,2,3-Trichlorobenzene	ND	0.200	mg/kg wet							
1,2,3-Trichloropropane	ND	0.200	mg/kg wet							
1,2,4-Trichlorobenzene	ND	0.200	mg/kg wet							
1,2,4-Trimethylbenzene	ND	0.200	mg/kg wet							
1,2-Dibromo-3-Chloropropane	ND	1.00	mg/kg wet							
1,2-Dibromoethane	ND	0.200	mg/kg wet							
1,2-Dichlorobenzene	ND	0.200	mg/kg wet							
1,2-Dichloroethane	ND	0.200	mg/kg wet							
1,2-Dichloropropane	ND	0.200	mg/kg wet							
1,3,5-Trimethylbenzene	ND	0.200	mg/kg wet							
1,3-Dichlorobenzene	ND	0.200	mg/kg wet							
1,3-Dichloropropane	ND	0.200	mg/kg wet							
1,4-Dichlorobenzene	ND	0.200	mg/kg wet							
1,4-Dioxane - Screen	ND	40.0	mg/kg wet							
1-Chlorohexane	ND	0.200	mg/kg wet							
2,2-Dichloropropane	ND	0.200	mg/kg wet							
2-Butanone	ND	1.00	mg/kg wet							
2-Chlorotoluene	ND	0.200	mg/kg wet							
2-Hexanone	ND	1.00	mg/kg wet							
4-Chlorotoluene	ND	0.200	mg/kg wet							
4-Isopropyltoluene	ND	0.200	mg/kg wet							
4-Methyl-2-Pentanone	ND	1.00	mg/kg wet							
Acetone	ND	1.00	mg/kg wet							
Benzene	ND	0.200	mg/kg wet							
Bromobenzene	ND	0.200	mg/kg wet							
Bromochloromethane	ND	0.200	mg/kg wet							
Bromodichloromethane	ND	0.200	mg/kg wet							
Bromoform	ND	0.200	mg/kg wet							
Bromomethane	ND	0.200	mg/kg wet							
Carbon Disulfide	ND	0.200	mg/kg wet							
Carbon Tetrachloride	ND	0.200	mg/kg wet							
Chlorobenzene	ND	0.200	mg/kg wet							
Chloroethane	ND	0.200	mg/kg wet							
Chloroform	ND	0.200	mg/kg wet							
Chloromethane	ND	0.200	mg/kg wet							
cis-1,2-Dichloroethene	ND	0.200	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.200	mg/kg wet							
Dibromochloromethane	ND	0.200	mg/kg wet							
Dibromomethane	ND	0.200	mg/kg wet							
Dichlorodifluoromethane	ND	0.200	mg/kg wet							
Diethyl Ether	ND	0.200	mg/kg wet							



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
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5035/8260B Volatile Organic Compounds / Methanol

Batch C190432 - 5035

Di-isopropyl ether	ND	0.200	mg/kg wet							
Ethyl tertiary-butyl ether	ND	0.200	mg/kg wet							
Ethylbenzene	ND	0.200	mg/kg wet							
Hexachlorobutadiene	ND	0.200	mg/kg wet							
Isopropylbenzene	ND	0.200	mg/kg wet							
Methyl tert-Butyl Ether	ND	0.200	mg/kg wet							
Methylene Chloride	0.0900	0.400	mg/kg wet							J
Naphthalene	ND	0.200	mg/kg wet							
n-Butylbenzene	ND	0.200	mg/kg wet							
n-Propylbenzene	ND	0.200	mg/kg wet							
sec-Butylbenzene	ND	0.200	mg/kg wet							
Styrene	ND	0.200	mg/kg wet							
tert-Butylbenzene	ND	0.200	mg/kg wet							
Tertiary-amyl methyl ether	ND	0.200	mg/kg wet							
Tetrachloroethene	0.0500	0.200	mg/kg wet							J
Tetrahydrofuran	ND	1.00	mg/kg wet							
Toluene	ND	0.200	mg/kg wet							
trans-1,2-Dichloroethene	ND	0.200	mg/kg wet							
trans-1,3-Dichloropropene	ND	0.200	mg/kg wet							
Trichloroethene	ND	0.200	mg/kg wet							
Trichlorofluoromethane	ND	0.200	mg/kg wet							
Vinyl Acetate	ND	0.200	mg/kg wet							
Vinyl Chloride	ND	0.200	mg/kg wet							
Xylene O	ND	0.200	mg/kg wet							
Xylene P,M	ND	0.400	mg/kg wet							
Surrogate: 1,2-Dichloroethane-d4	5.35		mg/kg wet	5.000		107	70-130			
Surrogate: 4-Bromofluorobenzene	5.10		mg/kg wet	5.000		102	70-130			
Surrogate: Dibromofluoromethane	5.35		mg/kg wet	5.000		107	70-130			
Surrogate: Toluene-d8	5.10		mg/kg wet	5.000		102	70-130			

LCS

1,1,1,2-Tetrachloroethane	1.92	0.200	mg/kg wet	2.000		96	70-130			
1,1,1-Trichloroethane	2.12	0.200	mg/kg wet	2.000		106	70-130			
1,1,2,2-Tetrachloroethane	1.83	0.200	mg/kg wet	2.000		91	70-130			
1,1,2-Trichloroethane	1.95	0.200	mg/kg wet	2.000		98	70-130			
1,1-Dichloroethane	2.30	0.200	mg/kg wet	2.000		115	70-130			
1,1-Dichloroethene	2.43	0.200	mg/kg wet	2.000		122	70-130			
1,1-Dichloropropene	2.17	0.200	mg/kg wet	2.000		109	70-130			
1,2,3-Trichlorobenzene	2.16	0.200	mg/kg wet	2.000		108	70-130			
1,2,3-Trichloropropane	1.82	0.200	mg/kg wet	2.000		91	70-130			
1,2,4-Trichlorobenzene	2.10	0.200	mg/kg wet	2.000		105	70-130			
1,2,4-Trimethylbenzene	2.12	0.200	mg/kg wet	2.000		106	70-130			
1,2-Dibromo-3-Chloropropane	1.46	1.00	mg/kg wet	2.000		73	70-130			
1,2-Dibromoethane	2.19	0.200	mg/kg wet	2.000		110	70-130			
1,2-Dichlorobenzene	2.16	0.200	mg/kg wet	2.000		108	70-130			
1,2-Dichloroethane	2.13	0.200	mg/kg wet	2.000		106	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Methanol

Batch C190432 - 5035

1,2-Dichloropropane	1.93	0.200	mg/kg wet	2.000		97	70-130			
1,3,5-Trimethylbenzene	2.11	0.200	mg/kg wet	2.000		106	70-130			
1,3-Dichlorobenzene	2.18	0.200	mg/kg wet	2.000		109	70-130			
1,3-Dichloropropane	2.10	0.200	mg/kg wet	2.000		105	70-130			
1,4-Dichlorobenzene	2.05	0.200	mg/kg wet	2.000		102	70-130			
1,4-Dioxane - Screen	54.7	40.0	mg/kg wet	40.00		137	44-241			
1-Chlorohexane	2.11	0.200	mg/kg wet	2.000		106	70-130			
2,2-Dichloropropane	2.33	0.200	mg/kg wet	2.000		116	70-130			
2-Butanone	10.3	1.00	mg/kg wet	10.00		103	70-130			
2-Chlorotoluene	2.23	0.200	mg/kg wet	2.000		111	70-130			
2-Hexanone	9.05	1.00	mg/kg wet	10.00		90	70-130			
4-Chlorotoluene	2.17	0.200	mg/kg wet	2.000		109	70-130			
4-Isopropyltoluene	2.10	0.200	mg/kg wet	2.000		105	70-130			
4-Methyl-2-Pentanone	8.45	1.00	mg/kg wet	10.00		84	70-130			
Acetone	10.0	1.00	mg/kg wet	10.00		100	70-130			
Benzene	2.24	0.200	mg/kg wet	2.000		112	70-130			
Bromobenzene	2.25	0.200	mg/kg wet	2.000		112	70-130			
Bromochloromethane	2.23	0.200	mg/kg wet	2.000		111	70-130			
Bromodichloromethane	1.85	0.200	mg/kg wet	2.000		93	70-130			
Bromoform	1.60	0.200	mg/kg wet	2.000		80	70-130			
Bromomethane	2.24	0.200	mg/kg wet	2.000		112	70-130			
Carbon Disulfide	2.40	0.200	mg/kg wet	2.000		120	70-130			
Carbon Tetrachloride	2.15	0.200	mg/kg wet	2.000		107	70-130			
Chlorobenzene	2.28	0.200	mg/kg wet	2.000		114	70-130			
Chloroethane	1.70	0.200	mg/kg wet	2.000		85	70-130			
Chloroform	2.24	0.200	mg/kg wet	2.000		112	70-130			
Chloromethane	1.89	0.200	mg/kg wet	2.000		94	70-130			
cis-1,2-Dichloroethene	2.17	0.200	mg/kg wet	2.000		108	70-130			
cis-1,3-Dichloropropene	2.00	0.200	mg/kg wet	2.000		100	70-130			
Dibromochloromethane	1.84	0.200	mg/kg wet	2.000		92	70-130			
Dibromomethane	2.14	0.200	mg/kg wet	2.000		107	70-130			
Dichlorodifluoromethane	1.65	0.200	mg/kg wet	2.000		82	70-130			
Diethyl Ether	1.84	0.200	mg/kg wet	2.000		92	70-130			
Di-isopropyl ether	2.24	0.200	mg/kg wet	2.000		112	70-130			
Ethyl tertiary-butyl ether	2.02	0.200	mg/kg wet	2.000		101	70-130			
Ethylbenzene	2.12	0.200	mg/kg wet	2.000		106	70-130			
Hexachlorobutadiene	2.14	0.200	mg/kg wet	2.000		107	70-130			
Isopropylbenzene	2.25	0.200	mg/kg wet	2.000		113	70-130			
Methyl tert-Butyl Ether	2.02	0.200	mg/kg wet	2.000		101	70-130			
Methylene Chloride	2.35	0.400	mg/kg wet	2.000		118	70-130			
Naphthalene	1.87	0.200	mg/kg wet	2.000		93	70-130			
n-Butylbenzene	2.32	0.200	mg/kg wet	2.000		116	70-130			
n-Propylbenzene	2.18	0.200	mg/kg wet	2.000		109	70-130			
sec-Butylbenzene	2.11	0.200	mg/kg wet	2.000		105	70-130			
Styrene	2.14	0.200	mg/kg wet	2.000		107	70-130			



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
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5035/8260B Volatile Organic Compounds / Methanol

Batch C190432 - 5035

tert-Butylbenzene	2.18	0.200	mg/kg wet	2.000		109	70-130			
Tertiary-amyl methyl ether	2.08	0.200	mg/kg wet	2.000		104	70-130			
Tetrachloroethene	2.02	0.200	mg/kg wet	2.000		101	70-130			
Tetrahydrofuran	2.18	1.00	mg/kg wet	2.000		109	70-130			
Toluene	2.17	0.200	mg/kg wet	2.000		108	70-130			
trans-1,2-Dichloroethene	2.32	0.200	mg/kg wet	2.000		116	70-130			
trans-1,3-Dichloropropene	1.99	0.200	mg/kg wet	2.000		100	70-130			
Trichloroethene	2.07	0.200	mg/kg wet	2.000		103	70-130			
Trichlorofluoromethane	2.24	0.200	mg/kg wet	2.000		112	70-130			
Vinyl Acetate	1.90	0.200	mg/kg wet	2.000		95	70-130			
Vinyl Chloride	1.88	0.200	mg/kg wet	2.000		94	70-130			
Xylene O	2.14	0.200	mg/kg wet	2.000		107	70-130			
Xylene P,M	4.43	0.400	mg/kg wet	4.000		111	70-130			
Surrogate: 1,2-Dichloroethane-d4	4.00		mg/kg wet	5.000		80	70-130			
Surrogate: 4-Bromofluorobenzene	4.59		mg/kg wet	5.000		92	70-130			
Surrogate: Dibromofluoromethane	4.21		mg/kg wet	5.000		84	70-130			
Surrogate: Toluene-d8	4.14		mg/kg wet	5.000		83	70-130			

LCS Dup

1,1,1,2-Tetrachloroethane	1.99	0.200	mg/kg wet	2.000		100	70-130	4	25	
1,1,1-Trichloroethane	2.13	0.200	mg/kg wet	2.000		106	70-130	0.5	25	
1,1,2,2-Tetrachloroethane	1.71	0.200	mg/kg wet	2.000		86	70-130	6	25	
1,1,2-Trichloroethane	1.87	0.200	mg/kg wet	2.000		93	70-130	4	25	
1,1-Dichloroethane	2.29	0.200	mg/kg wet	2.000		114	70-130	0.3	25	
1,1-Dichloroethene	2.26	0.200	mg/kg wet	2.000		113	70-130	7	25	
1,1-Dichloropropene	2.09	0.200	mg/kg wet	2.000		104	70-130	4	25	
1,2,3-Trichlorobenzene	1.86	0.200	mg/kg wet	2.000		93	70-130	15	25	
1,2,3-Trichloropropane	1.81	0.200	mg/kg wet	2.000		90	70-130	0.4	25	
1,2,4-Trichlorobenzene	1.93	0.200	mg/kg wet	2.000		97	70-130	8	25	
1,2,4-Trimethylbenzene	2.07	0.200	mg/kg wet	2.000		103	70-130	3	25	
1,2-Dibromo-3-Chloropropane	1.33	1.00	mg/kg wet	2.000		66	70-130	10	25	B-
1,2-Dibromoethane	2.10	0.200	mg/kg wet	2.000		105	70-130	4	25	
1,2-Dichlorobenzene	2.12	0.200	mg/kg wet	2.000		106	70-130	2	25	
1,2-Dichloroethane	2.22	0.200	mg/kg wet	2.000		111	70-130	4	25	
1,2-Dichloropropane	1.99	0.200	mg/kg wet	2.000		99	70-130	3	25	
1,3,5-Trimethylbenzene	2.09	0.200	mg/kg wet	2.000		105	70-130	0.9	25	
1,3-Dichlorobenzene	2.13	0.200	mg/kg wet	2.000		107	70-130	2	25	
1,3-Dichloropropane	2.22	0.200	mg/kg wet	2.000		111	70-130	5	25	
1,4-Dichlorobenzene	2.09	0.200	mg/kg wet	2.000		104	70-130	2	25	
1,4-Dioxane - Screen	ND	40.0	mg/kg wet	40.00		0	44-241	200	200	B-
1-Chlorohexane	2.11	0.200	mg/kg wet	2.000		105	70-130	0.3	25	
2,2-Dichloropropane	2.32	0.200	mg/kg wet	2.000		116	70-130	0.3	25	
2-Butanone	10.1	1.00	mg/kg wet	10.00		101	70-130	2	25	
2-Chlorotoluene	2.22	0.200	mg/kg wet	2.000		111	70-130	0.09	25	
2-Hexanone	8.53	1.00	mg/kg wet	10.00		85	70-130	6	25	
4-Chlorotoluene	2.21	0.200	mg/kg wet	2.000		111	70-130	2	25	



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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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5035/8260B Volatile Organic Compounds / Methanol

Batch C190432 - 5035

4-Isopropyltoluene	2.02	0.200	mg/kg wet	2.000		101	70-130	4	25	
4-Methyl-2-Pentanone	8.23	1.00	mg/kg wet	10.00		82	70-130	3	25	
Acetone	8.97	1.00	mg/kg wet	10.00		90	70-130	11	25	
Benzene	2.17	0.200	mg/kg wet	2.000		109	70-130	3	25	
Bromobenzene	2.30	0.200	mg/kg wet	2.000		115	70-130	2	25	
Bromochloromethane	2.26	0.200	mg/kg wet	2.000		113	70-130	2	25	
Bromodichloromethane	1.97	0.200	mg/kg wet	2.000		99	70-130	6	25	
Bromoform	1.61	0.200	mg/kg wet	2.000		80	70-130	0.2	25	
Bromomethane	2.17	0.200	mg/kg wet	2.000		108	70-130	4	25	
Carbon Disulfide	2.34	0.200	mg/kg wet	2.000		117	70-130	2	25	
Carbon Tetrachloride	2.09	0.200	mg/kg wet	2.000		105	70-130	2	25	
Chlorobenzene	2.24	0.200	mg/kg wet	2.000		112	70-130	1	25	
Chloroethane	1.86	0.200	mg/kg wet	2.000		93	70-130	9	25	
Chloroform	2.26	0.200	mg/kg wet	2.000		113	70-130	1	25	
Chloromethane	1.94	0.200	mg/kg wet	2.000		97	70-130	3	25	
cis-1,2-Dichloroethene	2.16	0.200	mg/kg wet	2.000		108	70-130	0.2	25	
cis-1,3-Dichloropropene	2.06	0.200	mg/kg wet	2.000		103	70-130	3	25	
Dibromochloromethane	1.87	0.200	mg/kg wet	2.000		94	70-130	2	25	
Dibromomethane	2.08	0.200	mg/kg wet	2.000		104	70-130	3	25	
Dichlorodifluoromethane	1.57	0.200	mg/kg wet	2.000		79	70-130	5	25	
Diethyl Ether	1.78	0.200	mg/kg wet	2.000		89	70-130	4	25	
Di-isopropyl ether	2.26	0.200	mg/kg wet	2.000		113	70-130	1	25	
Ethyl tertiary-butyl ether	1.97	0.200	mg/kg wet	2.000		99	70-130	2	25	
Ethylbenzene	2.18	0.200	mg/kg wet	2.000		109	70-130	3	25	
Hexachlorobutadiene	2.02	0.200	mg/kg wet	2.000		101	70-130	6	25	
Isopropylbenzene	2.16	0.200	mg/kg wet	2.000		108	70-130	4	25	
Methyl tert-Butyl Ether	2.00	0.200	mg/kg wet	2.000		100	70-130	1	25	
Methylene Chloride	2.38	0.400	mg/kg wet	2.000		119	70-130	1	25	
Naphthalene	1.73	0.200	mg/kg wet	2.000		86	70-130	8	25	
n-Butylbenzene	2.20	0.200	mg/kg wet	2.000		110	70-130	6	25	
n-Propylbenzene	2.14	0.200	mg/kg wet	2.000		107	70-130	2	25	
sec-Butylbenzene	2.10	0.200	mg/kg wet	2.000		105	70-130	0.3	25	
Styrene	2.14	0.200	mg/kg wet	2.000		107	70-130	0.2	25	
tert-Butylbenzene	2.12	0.200	mg/kg wet	2.000		106	70-130	3	25	
Tertiary-amyl methyl ether	2.07	0.200	mg/kg wet	2.000		103	70-130	0.9	25	
Tetrachloroethene	2.04	0.200	mg/kg wet	2.000		102	70-130	0.8	25	
Tetrahydrofuran	1.98	1.00	mg/kg wet	2.000		99	70-130	10	25	
Toluene	2.13	0.200	mg/kg wet	2.000		107	70-130	1	25	
trans-1,2-Dichloroethene	2.30	0.200	mg/kg wet	2.000		115	70-130	0.6	25	
trans-1,3-Dichloropropene	1.94	0.200	mg/kg wet	2.000		97	70-130	3	25	
Trichloroethene	2.21	0.200	mg/kg wet	2.000		111	70-130	7	25	
Trichlorofluoromethane	2.24	0.200	mg/kg wet	2.000		112	70-130	0.2	25	
Vinyl Acetate	1.84	0.200	mg/kg wet	2.000		92	70-130	3	25	
Vinyl Chloride	2.02	0.200	mg/kg wet	2.000		101	70-130	7	25	
Xylene O	2.22	0.200	mg/kg wet	2.000		111	70-130	4	25	



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5035/8260B Volatile Organic Compounds / Methanol

Batch CI90432 - 5035

Xylene P,M	4.38	0.400	mg/kg wet	4.000		110	70-130	1	25	
Surrogate: 1,2-Dichloroethane-d4	3.91		mg/kg wet	5.000		78	70-130			
Surrogate: 4-Bromofluorobenzene	4.67		mg/kg wet	5.000		93	70-130			
Surrogate: Dibromofluoromethane	4.17		mg/kg wet	5.000		83	70-130			
Surrogate: Toluene-d8	4.24		mg/kg wet	5.000		85	70-130			

8082A Polychlorinated Biphenyls (PCB)

Batch CI90307 - 3540C

Blank

Aroclor 1016	ND	0.02	mg/kg wet							
Aroclor 1016 [2C]	ND	0.02	mg/kg wet							
Aroclor 1221	ND	0.02	mg/kg wet							
Aroclor 1221 [2C]	ND	0.02	mg/kg wet							
Aroclor 1232	ND	0.02	mg/kg wet							
Aroclor 1232 [2C]	ND	0.02	mg/kg wet							
Aroclor 1242	ND	0.02	mg/kg wet							
Aroclor 1242 [2C]	ND	0.02	mg/kg wet							
Aroclor 1248	ND	0.02	mg/kg wet							
Aroclor 1248 [2C]	ND	0.02	mg/kg wet							
Aroclor 1254	ND	0.02	mg/kg wet							
Aroclor 1254 [2C]	ND	0.02	mg/kg wet							
Aroclor 1260	ND	0.02	mg/kg wet							
Aroclor 1260 [2C]	ND	0.02	mg/kg wet							
Aroclor 1262	ND	0.02	mg/kg wet							
Aroclor 1262 [2C]	ND	0.02	mg/kg wet							
Aroclor 1268	ND	0.02	mg/kg wet							
Aroclor 1268 [2C]	ND	0.02	mg/kg wet							

Surrogate: Decachlorobiphenyl	0.0229		mg/kg wet	0.02500		92	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0242		mg/kg wet	0.02500		97	30-150			
Surrogate: Tetrachloro-m-xylene	0.0161		mg/kg wet	0.02500		65	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0208		mg/kg wet	0.02500		83	30-150			

LCS

Aroclor 1016	0.4	0.05	mg/kg wet	0.5000		89	40-140			
Aroclor 1016 [2C]	0.5	0.05	mg/kg wet	0.5000		103	40-140			
Aroclor 1260	0.5	0.05	mg/kg wet	0.5000		100	40-140			
Aroclor 1260 [2C]	0.5	0.05	mg/kg wet	0.5000		98	40-140			

Surrogate: Decachlorobiphenyl	0.0231		mg/kg wet	0.02500		92	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0246		mg/kg wet	0.02500		98	30-150			
Surrogate: Tetrachloro-m-xylene	0.0181		mg/kg wet	0.02500		72	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0208		mg/kg wet	0.02500		83	30-150			

LCS Dup

Aroclor 1016	0.5	0.05	mg/kg wet	0.5000		92	40-140	4	30	
Aroclor 1016 [2C]	0.5	0.05	mg/kg wet	0.5000		106	40-140	4	30	



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8082A Polychlorinated Biphenyls (PCB)

Batch C190307 - 3540C

Aroclor 1260	0.5	0.05	mg/kg wet	0.5000		104	40-140	4	30	
Aroclor 1260 [2C]	0.5	0.05	mg/kg wet	0.5000		101	40-140	3	30	
<i>Surrogate: Decachlorobiphenyl</i>	<i>0.0239</i>		mg/kg wet	<i>0.02500</i>		<i>96</i>	<i>30-150</i>			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	<i>0.0254</i>		mg/kg wet	<i>0.02500</i>		<i>102</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>0.0190</i>		mg/kg wet	<i>0.02500</i>		<i>76</i>	<i>30-150</i>			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>0.0216</i>		mg/kg wet	<i>0.02500</i>		<i>86</i>	<i>30-150</i>			

8100M Total Petroleum Hydrocarbons

Batch CH93012 - 3546

Blank

Decane (C10)	ND	0.2	mg/kg wet							
Docosane (C22)	ND	0.2	mg/kg wet							
Dodecane (C12)	ND	0.2	mg/kg wet							
Eicosane (C20)	ND	0.2	mg/kg wet							
Hexacosane (C26)	ND	0.2	mg/kg wet							
Hexadecane (C16)	ND	0.2	mg/kg wet							
Nonadecane (C19)	ND	0.2	mg/kg wet							
Nonane (C9)	ND	0.2	mg/kg wet							
Octacosane (C28)	ND	0.2	mg/kg wet							
Octadecane (C18)	ND	0.2	mg/kg wet							
Tetracosane (C24)	ND	0.2	mg/kg wet							
Tetradecane (C14)	ND	0.2	mg/kg wet							
Total Petroleum Hydrocarbons	ND	16.2	mg/kg wet							
Triacontane (C30)	ND	0.2	mg/kg wet							

<i>Surrogate: O-Terphenyl</i>	<i>4.66</i>		mg/kg wet	<i>5.000</i>		<i>93</i>	<i>40-140</i>			
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LCS

Decane (C10)	2.0	0.2	mg/kg wet	2.500		81	40-140			
Docosane (C22)	2.5	0.2	mg/kg wet	2.500		102	40-140			
Dodecane (C12)	2.2	0.2	mg/kg wet	2.500		87	40-140			
Eicosane (C20)	2.5	0.2	mg/kg wet	2.500		101	40-140			
Hexacosane (C26)	2.4	0.2	mg/kg wet	2.500		98	40-140			
Hexadecane (C16)	2.4	0.2	mg/kg wet	2.500		97	40-140			
Nonadecane (C19)	2.6	0.2	mg/kg wet	2.500		106	40-140			
Nonane (C9)	1.8	0.2	mg/kg wet	2.500		74	30-140			
Octacosane (C28)	2.4	0.2	mg/kg wet	2.500		96	40-140			
Octadecane (C18)	2.5	0.2	mg/kg wet	2.500		101	40-140			
Tetracosane (C24)	2.5	0.2	mg/kg wet	2.500		100	40-140			
Tetradecane (C14)	2.3	0.2	mg/kg wet	2.500		92	40-140			
Total Petroleum Hydrocarbons	32.4	37.5	mg/kg wet	35.00		93	40-140			
Triacontane (C30)	2.3	0.2	mg/kg wet	2.500		91	40-140			

<i>Surrogate: O-Terphenyl</i>	<i>4.98</i>		mg/kg wet	<i>5.000</i>		<i>100</i>	<i>40-140</i>			
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LCS Dup



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8100M Total Petroleum Hydrocarbons

Batch CH93012 - 3546

Decane (C10)	1.8	0.2	mg/kg wet	2.500		71	40-140	14	25	
Docosane (C22)	2.2	0.2	mg/kg wet	2.500		88	40-140	14	25	
Dodecane (C12)	1.9	0.2	mg/kg wet	2.500		77	40-140	12	25	
Eicosane (C20)	2.2	0.2	mg/kg wet	2.500		87	40-140	15	25	
Hexacosane (C26)	2.1	0.2	mg/kg wet	2.500		85	40-140	14	25	
Hexadecane (C16)	2.1	0.2	mg/kg wet	2.500		84	40-140	14	25	
Nonadecane (C19)	2.3	0.2	mg/kg wet	2.500		92	40-140	14	25	
Nonane (C9)	1.6	0.2	mg/kg wet	2.500		64	30-140	14	25	
Octacosane (C28)	2.1	0.2	mg/kg wet	2.500		83	40-140	14	25	
Octadecane (C18)	2.2	0.2	mg/kg wet	2.500		88	40-140	14	25	
Tetracosane (C24)	2.2	0.2	mg/kg wet	2.500		87	40-140	14	25	
Tetradecane (C14)	2.0	0.2	mg/kg wet	2.500		81	40-140	13	25	
Total Petroleum Hydrocarbons	28.2	37.5	mg/kg wet	35.00		81	40-140	14	25	
Triacontane (C30)	2.0	0.2	mg/kg wet	2.500		80	40-140	13	25	

Surrogate: O-Terphenyl 4.30 mg/kg wet 5.000 86 40-140

8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

Blank

1,1-Biphenyl	ND	0.100	mg/kg wet							
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							
2,3,4,6-Tetrachlorophenol	ND	1.67	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	0.167	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-Nitroaniline	ND	0.333	mg/kg wet							
2-Nitrophenol	ND	0.333	mg/kg wet							
3,3'-Dichlorobenzidine	ND	0.167	mg/kg wet							
3+4-Methylphenol	ND	0.667	mg/kg wet							
3-Nitroaniline	ND	0.333	mg/kg wet							
4,6-Dinitro-2-Methylphenol	ND	1.67	mg/kg wet							
4-Bromophenyl-phenylether	ND	0.333	mg/kg wet							
4-Chloro-3-Methylphenol	ND	0.333	mg/kg wet							



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8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

4-Chloroaniline	ND	0.667	mg/kg wet
4-Chloro-phenyl-phenyl ether	ND	0.333	mg/kg wet
4-Nitroaniline	ND	0.333	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	0.667	mg/kg wet
Anthracene	ND	0.333	mg/kg wet
Azobenzene	ND	0.333	mg/kg wet
Benzo(a)anthracene	ND	0.167	mg/kg wet
Benzo(a)pyrene	ND	0.067	mg/kg wet
Benzo(b)fluoranthene	ND	0.167	mg/kg wet
Benzo(g,h,i)perylene	ND	0.100	mg/kg wet
Benzo(k)fluoranthene	ND	0.167	mg/kg wet
Benzoic Acid	ND	1.67	mg/kg wet
Benzyl Alcohol	ND	0.333	mg/kg wet
bis(2-Chloroethoxy)methane	ND	0.333	mg/kg wet
bis(2-Chloroethyl)ether	ND	0.100	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
Carbazole	ND	0.333	mg/kg wet
Chrysene	ND	0.067	mg/kg wet
Dibenzo(a,h)Anthracene	ND	0.067	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	0.067	mg/kg wet
Hexachlorobutadiene	ND	0.333	mg/kg wet
Hexachlorocyclopentadiene	ND	1.67	mg/kg wet
Hexachloroethane	ND	0.333	mg/kg wet
Indeno(1,2,3-cd)Pyrene	ND	0.167	mg/kg wet
Isophorone	ND	0.333	mg/kg wet
Naphthalene	ND	0.083	mg/kg wet
Nitrobenzene	ND	0.333	mg/kg wet
N-Nitrosodimethylamine	ND	0.333	mg/kg wet
N-Nitroso-Di-n-Propylamine	ND	0.333	mg/kg wet
N-nitrosodiphenylamine	ND	0.333	mg/kg wet
Pentachlorophenol	ND	0.333	mg/kg wet
Phenanthrene	ND	0.333	mg/kg wet



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8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

Phenol	ND	0.333	mg/kg wet							
Pyrene	ND	0.333	mg/kg wet							
Pyridine	ND	1.67	mg/kg wet							
Surrogate: 1,2-Dichlorobenzene-d4	1.99		mg/kg wet	3.333		60	30-130			
Surrogate: 2,4,6-Tribromophenol	3.55		mg/kg wet	5.000		71	30-130			
Surrogate: 2-Chlorophenol-d4	3.17		mg/kg wet	5.000		63	30-130			
Surrogate: 2-Fluorobiphenyl	2.27		mg/kg wet	3.333		68	30-130			
Surrogate: 2-Fluorophenol	2.98		mg/kg wet	5.000		60	30-130			
Surrogate: Nitrobenzene-d5	2.08		mg/kg wet	3.333		62	30-130			
Surrogate: Phenol-d6	2.90		mg/kg wet	5.000		58	30-130			
Surrogate: p-Terphenyl-d14	2.89		mg/kg wet	3.333		87	30-130			

LCS

1,1-Biphenyl	2.18	0.100	mg/kg wet	3.333		66	40-140			
1,2,4-Trichlorobenzene	2.21	0.333	mg/kg wet	3.333		66	40-140			
1,2-Dichlorobenzene	1.98	0.333	mg/kg wet	3.333		59	40-140			
1,3-Dichlorobenzene	1.88	0.333	mg/kg wet	3.333		56	40-140			
1,4-Dichlorobenzene	1.87	0.333	mg/kg wet	3.333		56	40-140			
2,3,4,6-Tetrachlorophenol	2.95	1.67	mg/kg wet	3.333		88	30-130			
2,4,5-Trichlorophenol	2.86	0.333	mg/kg wet	3.333		86	30-130			
2,4,6-Trichlorophenol	2.56	0.333	mg/kg wet	3.333		77	30-130			
2,4-Dichlorophenol	2.43	0.333	mg/kg wet	3.333		73	30-130			
2,4-Dimethylphenol	2.10	0.333	mg/kg wet	3.333		63	30-130			
2,4-Dinitrophenol	2.79	1.67	mg/kg wet	3.333		84	30-130			
2,4-Dinitrotoluene	2.76	0.167	mg/kg wet	3.333		83	40-140			
2,6-Dinitrotoluene	2.78	0.333	mg/kg wet	3.333		83	40-140			
2-Chloronaphthalene	2.16	0.333	mg/kg wet	3.333		65	40-140			
2-Chlorophenol	1.90	0.333	mg/kg wet	3.333		57	30-130			
2-Methylnaphthalene	2.24	0.333	mg/kg wet	3.333		67	40-140			
2-Methylphenol	1.93	0.333	mg/kg wet	3.333		58	30-130			
2-Nitroaniline	1.88	0.333	mg/kg wet	3.333		56	40-140			
2-Nitrophenol	1.99	0.333	mg/kg wet	3.333		60	30-130			
3,3'-Dichlorobenzidine	2.86	0.167	mg/kg wet	3.333		86	40-140			
3+4-Methylphenol	4.34	0.667	mg/kg wet	6.667		65	30-130			
3-Nitroaniline	2.31	0.333	mg/kg wet	3.333		69	40-140			
4,6-Dinitro-2-Methylphenol	2.83	1.67	mg/kg wet	3.333		85	30-130			
4-Bromophenyl-phenylether	3.15	0.333	mg/kg wet	3.333		95	40-140			
4-Chloro-3-Methylphenol	2.59	0.333	mg/kg wet	3.333		78	30-130			
4-Chloroaniline	1.66	0.667	mg/kg wet	3.333		50	40-140			
4-Chloro-phenyl-phenyl ether	2.85	0.333	mg/kg wet	3.333		85	40-140			
4-Nitroaniline	2.39	0.333	mg/kg wet	3.333		72	40-140			
4-Nitrophenol	1.96	1.67	mg/kg wet	3.333		59	30-130			
Acenaphthene	2.36	0.333	mg/kg wet	3.333		71	40-140			
Acenaphthylene	2.08	0.333	mg/kg wet	3.333		63	40-140			
Acetophenone	1.73	0.667	mg/kg wet	3.333		52	40-140			
Aniline	1.29	0.667	mg/kg wet	3.333		39	40-140			B-



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

Anthracene	2.67	0.333	mg/kg wet	3.333		80	40-140			
Azobenzene	2.04	0.333	mg/kg wet	3.333		61	40-140			
Benzo(a)anthracene	2.87	0.167	mg/kg wet	3.333		86	40-140			
Benzo(a)pyrene	2.64	0.067	mg/kg wet	3.333		79	40-140			
Benzo(b)fluoranthene	2.63	0.167	mg/kg wet	3.333		79	40-140			
Benzo(g,h,i)perylene	2.80	0.100	mg/kg wet	3.333		84	40-140			
Benzo(k)fluoranthene	2.68	0.167	mg/kg wet	3.333		80	40-140			
Benzoic Acid	2.35	1.67	mg/kg wet	3.333		70	40-140			
Benzyl Alcohol	1.46	0.333	mg/kg wet	3.333		44	40-140			
bis(2-Chloroethoxy)methane	1.76	0.333	mg/kg wet	3.333		53	40-140			
bis(2-Chloroethyl)ether	1.73	0.100	mg/kg wet	3.333		52	40-140			
bis(2-chloroisopropyl)Ether	1.77	0.333	mg/kg wet	3.333		53	40-140			
bis(2-Ethylhexyl)phthalate	2.94	0.333	mg/kg wet	3.333		88	40-140			
Butylbenzylphthalate	2.90	0.333	mg/kg wet	3.333		87	40-140			
Carbazole	2.74	0.333	mg/kg wet	3.333		82	40-140			
Chrysene	2.72	0.067	mg/kg wet	3.333		82	40-140			
Dibenzo(a,h)Anthracene	2.72	0.067	mg/kg wet	3.333		82	40-140			
Dibenzofuran	2.46	0.333	mg/kg wet	3.333		74	40-140			
Diethylphthalate	2.81	0.333	mg/kg wet	3.333		84	40-140			
Dimethylphthalate	2.82	0.333	mg/kg wet	3.333		85	40-140			
Di-n-butylphthalate	3.15	0.333	mg/kg wet	3.333		94	40-140			
Di-n-octylphthalate	2.92	0.333	mg/kg wet	3.333		88	40-140			
Fluoranthene	3.02	0.333	mg/kg wet	3.333		91	40-140			
Fluorene	2.63	0.333	mg/kg wet	3.333		79	40-140			
Hexachlorobenzene	3.17	0.067	mg/kg wet	3.333		95	40-140			
Hexachlorobutadiene	2.21	0.333	mg/kg wet	3.333		66	40-140			
Hexachlorocyclopentadiene	1.28	1.67	mg/kg wet	3.333		38	40-140			B-
Hexachloroethane	1.63	0.333	mg/kg wet	3.333		49	40-140			
Indeno(1,2,3-cd)Pyrene	2.70	0.167	mg/kg wet	3.333		81	40-140			
Isophorone	1.54	0.333	mg/kg wet	3.333		46	40-140			
Naphthalene	2.00	0.083	mg/kg wet	3.333		60	40-140			
Nitrobenzene	1.60	0.333	mg/kg wet	3.333		48	40-140			
N-Nitrosodimethylamine	1.64	0.333	mg/kg wet	3.333		49	40-140			
N-Nitroso-Di-n-Propylamine	1.64	0.333	mg/kg wet	3.333		49	40-140			
N-nitrosodiphenylamine	2.79	0.333	mg/kg wet	3.333		84	40-140			
Pentachlorophenol	3.18	0.333	mg/kg wet	3.333		95	30-130			
Phenanthrene	2.74	0.333	mg/kg wet	3.333		82	40-140			
Phenol	1.80	0.333	mg/kg wet	3.333		54	30-130			
Pyrene	2.81	0.333	mg/kg wet	3.333		84	40-140			
Pyridine	1.61	1.67	mg/kg wet	3.333		48	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	1.81		mg/kg wet	3.333		54	30-130			
Surrogate: 2,4,6-Tribromophenol	4.62		mg/kg wet	5.000		92	30-130			
Surrogate: 2-Chlorophenol-d4	2.95		mg/kg wet	5.000		59	30-130			
Surrogate: 2-Fluorobiphenyl	2.29		mg/kg wet	3.333		69	30-130			
Surrogate: 2-Fluorophenol	2.90		mg/kg wet	5.000		58	30-130			
Surrogate: Nitrobenzene-d5	1.78		mg/kg wet	3.333		53	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CH93011 - 3546										
Surrogate: Phenol-d6	2.80		mg/kg wet	5.000		56	30-130			
Surrogate: p-Terphenyl-d14	2.92		mg/kg wet	3.333		88	30-130			
LCS Dup										
1,1-Biphenyl	2.16	0.100	mg/kg wet	3.333		65	40-140	1	30	
1,2,4-Trichlorobenzene	2.24	0.333	mg/kg wet	3.333		67	40-140	1	30	
1,2-Dichlorobenzene	2.00	0.333	mg/kg wet	3.333		60	40-140	1	30	
1,3-Dichlorobenzene	1.92	0.333	mg/kg wet	3.333		57	40-140	2	30	
1,4-Dichlorobenzene	1.87	0.333	mg/kg wet	3.333		56	40-140	0.03	30	
2,3,4,6-Tetrachlorophenol	2.88	1.67	mg/kg wet	3.333		86	30-130	2	30	
2,4,5-Trichlorophenol	2.77	0.333	mg/kg wet	3.333		83	30-130	3	30	
2,4,6-Trichlorophenol	2.51	0.333	mg/kg wet	3.333		75	30-130	2	30	
2,4-Dichlorophenol	2.39	0.333	mg/kg wet	3.333		72	30-130	1	30	
2,4-Dimethylphenol	2.07	0.333	mg/kg wet	3.333		62	30-130	1	30	
2,4-Dinitrophenol	2.70	1.67	mg/kg wet	3.333		81	30-130	3	30	
2,4-Dinitrotoluene	2.71	0.167	mg/kg wet	3.333		81	40-140	2	30	
2,6-Dinitrotoluene	2.79	0.333	mg/kg wet	3.333		84	40-140	0.2	30	
2-Chloronaphthalene	2.11	0.333	mg/kg wet	3.333		63	40-140	3	30	
2-Chlorophenol	1.98	0.333	mg/kg wet	3.333		59	30-130	4	30	
2-Methylnaphthalene	2.21	0.333	mg/kg wet	3.333		66	40-140	1	30	
2-Methylphenol	1.93	0.333	mg/kg wet	3.333		58	30-130	0.009	30	
2-Nitroaniline	1.87	0.333	mg/kg wet	3.333		56	40-140	0.2	30	
2-Nitrophenol	1.92	0.333	mg/kg wet	3.333		58	30-130	3	30	
3,3'-Dichlorobenzidine	2.72	0.167	mg/kg wet	3.333		82	40-140	5	30	
3+4-Methylphenol	4.39	0.667	mg/kg wet	6.667		66	30-130	1	30	
3-Nitroaniline	2.30	0.333	mg/kg wet	3.333		69	40-140	0.3	30	
4,6-Dinitro-2-Methylphenol	2.75	1.67	mg/kg wet	3.333		83	30-130	3	30	
4-Bromophenyl-phenylether	3.06	0.333	mg/kg wet	3.333		92	40-140	3	30	
4-Chloro-3-Methylphenol	2.54	0.333	mg/kg wet	3.333		76	30-130	2	30	
4-Chloroaniline	1.65	0.667	mg/kg wet	3.333		49	40-140	0.9	30	
4-Chloro-phenyl-phenyl ether	2.71	0.333	mg/kg wet	3.333		81	40-140	5	30	
4-Nitroaniline	2.37	0.333	mg/kg wet	3.333		71	40-140	1	30	
4-Nitrophenol	1.83	1.67	mg/kg wet	3.333		55	30-130	7	30	
Acenaphthene	2.34	0.333	mg/kg wet	3.333		70	40-140	0.7	30	
Acenaphthylene	2.08	0.333	mg/kg wet	3.333		62	40-140	0.2	30	
Acetophenone	1.77	0.667	mg/kg wet	3.333		53	40-140	2	30	
Aniline	1.30	0.667	mg/kg wet	3.333		39	40-140	0.5	30	B-
Anthracene	2.63	0.333	mg/kg wet	3.333		79	40-140	1	30	
Azobenzene	2.01	0.333	mg/kg wet	3.333		60	40-140	2	30	
Benzo(a)anthracene	2.74	0.167	mg/kg wet	3.333		82	40-140	5	30	
Benzo(a)pyrene	2.57	0.067	mg/kg wet	3.333		77	40-140	3	30	
Benzo(b)fluoranthene	2.50	0.167	mg/kg wet	3.333		75	40-140	5	30	
Benzo(g,h,i)perylene	2.82	0.100	mg/kg wet	3.333		85	40-140	0.8	30	
Benzo(k)fluoranthene	2.71	0.167	mg/kg wet	3.333		81	40-140	1	30	
Benzoic Acid	2.31	1.67	mg/kg wet	3.333		69	40-140	2	30	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch CH93011 - 3546

Benzyl Alcohol	1.49	0.333	mg/kg wet	3.333		45	40-140	2	30	
bis(2-Chloroethoxy)methane	1.80	0.333	mg/kg wet	3.333		54	40-140	2	30	
bis(2-Chloroethyl)ether	1.79	0.100	mg/kg wet	3.333		54	40-140	4	30	
bis(2-chloroisopropyl)Ether	1.83	0.333	mg/kg wet	3.333		55	40-140	3	30	
bis(2-Ethylhexyl)phthalate	2.70	0.333	mg/kg wet	3.333		81	40-140	8	30	
Butylbenzylphthalate	2.65	0.333	mg/kg wet	3.333		79	40-140	9	30	
Carbazole	2.64	0.333	mg/kg wet	3.333		79	40-140	4	30	
Chrysene	2.68	0.067	mg/kg wet	3.333		81	40-140	1	30	
Dibenzo(a,h)Anthracene	2.77	0.067	mg/kg wet	3.333		83	40-140	2	30	
Dibenzofuran	2.47	0.333	mg/kg wet	3.333		74	40-140	0.1	30	
Diethylphthalate	2.82	0.333	mg/kg wet	3.333		84	40-140	0.2	30	
Dimethylphthalate	2.81	0.333	mg/kg wet	3.333		84	40-140	0.3	30	
Di-n-butylphthalate	2.89	0.333	mg/kg wet	3.333		87	40-140	9	30	
Di-n-octylphthalate	2.72	0.333	mg/kg wet	3.333		82	40-140	7	30	
Fluoranthene	2.85	0.333	mg/kg wet	3.333		85	40-140	6	30	
Fluorene	2.64	0.333	mg/kg wet	3.333		79	40-140	0.2	30	
Hexachlorobenzene	3.07	0.067	mg/kg wet	3.333		92	40-140	3	30	
Hexachlorobutadiene	2.12	0.333	mg/kg wet	3.333		64	40-140	4	30	
Hexachlorocyclopentadiene	1.28	1.67	mg/kg wet	3.333		38	40-140	0.03	30	B-
Hexachloroethane	1.63	0.333	mg/kg wet	3.333		49	40-140	0.3	30	
Indeno(1,2,3-cd)Pyrene	2.76	0.167	mg/kg wet	3.333		83	40-140	2	30	
Isophorone	1.53	0.333	mg/kg wet	3.333		46	40-140	0.4	30	
Naphthalene	2.00	0.083	mg/kg wet	3.333		60	40-140	0.1	30	
Nitrobenzene	1.60	0.333	mg/kg wet	3.333		48	40-140	0.05	30	
N-Nitrosodimethylamine	1.27	0.333	mg/kg wet	3.333		38	40-140	26	30	B-
N-Nitroso-Di-n-Propylamine	1.71	0.333	mg/kg wet	3.333		51	40-140	4	30	
N-nitrosodiphenylamine	2.78	0.333	mg/kg wet	3.333		83	40-140	0.2	30	
Pentachlorophenol	3.13	0.333	mg/kg wet	3.333		94	30-130	2	30	
Phenanthrene	2.63	0.333	mg/kg wet	3.333		79	40-140	4	30	
Phenol	1.80	0.333	mg/kg wet	3.333		54	30-130	0.3	30	
Pyrene	2.67	0.333	mg/kg wet	3.333		80	40-140	5	30	
Pyridine	1.31	1.67	mg/kg wet	3.333		39	40-140	21	30	B-
Surrogate: 1,2-Dichlorobenzene-d4	1.79		mg/kg wet	3.333		54	30-130			
Surrogate: 2,4,6-Tribromophenol	4.32		mg/kg wet	5.000		86	30-130			
Surrogate: 2-Chlorophenol-d4	2.91		mg/kg wet	5.000		58	30-130			
Surrogate: 2-Fluorobiphenyl	2.22		mg/kg wet	3.333		66	30-130			
Surrogate: 2-Fluorophenol	3.12		mg/kg wet	5.000		62	30-130			
Surrogate: Nitrobenzene-d5	1.72		mg/kg wet	3.333		52	30-130			
Surrogate: Phenol-d6	2.75		mg/kg wet	5.000		55	30-130			
Surrogate: p-Terphenyl-d14	2.76		mg/kg wet	3.333		83	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

Notes and Definitions

- Z18 Temperature is not within 23 +/-2 °C.
- U Analyte included in the analysis, but not detected
- SD Surrogate recovery(ies) diluted below the MRL (SD).
- SC Surrogate recovery(ies) outside of criteria. Reextraction/Reanalysis confirms results (SC).
- Q Calibration required quadratic regression (Q).
- PT Pentachlorophenol tailing factor > 2.
- J Reported between MDL and MRL
- IC Internal Standard(s) outside of criteria. Sample was reanalyzed to confirm (IC).
- EL Elevated Method Reporting Limits due to sample matrix (EL).
- D Diluted.
- CD+ Continuing Calibration %Diff/Drift is above control limit (CD+).
- CD- Continuing Calibration %Diff/Drift is below control limit (CD-).
- 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
- RL Reporting Limit
- EDL Estimated Detection Limit
- MF Membrane Filtration
- MPN Most Probably Number
- TNTC Too numerous to Count
- CFU Colony Forming Units



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 19H0999

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

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.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML
 Shipped/Delivered Via: Client

ESS Project ID: 19H0999
 Date Received: 8/30/2019
 Project Due Date: 9/9/2019
 Days for Project: 5 Day

- 1. Air bill manifest present? No
Air No.: NA
- 2. Were custody seals present? No
- 3. Is radiation count <100 CPM? Yes
- 4. Is a Cooler Present? Yes
Temp: 4.8 Iced with: Ice
- 5. Was COC signed and dated by client? Yes

- 6. Does COC match bottles? Yes
- 7. Is COC complete and correct? Yes
- 8. Were samples received intact? Yes
- 9. Were labs informed about short holds & rushes? Yes / No / NA
- 10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes / No
 ESS Sample IDs: _____
 Analysis: _____
 TAT: _____

12. Were VOAs received? Yes / No
 a. Air bubbles in aqueous VOAs? Yes / No
 b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes / No
 a. If metals preserved upon receipt: Date: 8/30/19 Time: _____ By: _____
 b. Low Level VOA vials frozen: Date: _____ Time: 1452 By: u

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / No
 a. Was there a need to contact the client? Yes / No
 Who was contacted? _____ Date: _____ Time: _____ By: _____

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
01	383141	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
01	383148	Yes	NA	Yes	VOA Vial - Other	Other	
01	383149	Yes	NA	Yes	VOA Vial - Other	Other	
01	383153	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
02	383140	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
02	383146	Yes	NA	Yes	VOA Vial - Other	Other	
02	383147	Yes	NA	Yes	VOA Vial - Other	Other	
02	383152	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
03	383139	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
03	383144	Yes	NA	Yes	VOA Vial - Other	Other	
03	383145	Yes	NA	Yes	VOA Vial - Other	Other	
03	383151	Yes	NA	Yes	8 oz. Jar - Unpres	NP	
04	383138	Yes	NA	Yes	VOA Vial - Methanol	MeOH	
04	383142	Yes	NA	Yes	VOA Vial - Other	Other	
04	383143	Yes	NA	Yes	VOA Vial - Other	Other	
04	383150	Yes	NA	Yes	8 oz. Jar - Unpres	NP	

2nd Review

Were all containers scanned into storage/lab?

Are barcode labels on correct containers?

Are all Flashpoint stickers attached/container ID # circled?

Are all Hex Chrome stickers attached?

Initials [Signature]
 Yes / No / NA
 Yes / No / NA
 Yes / No / NA

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/ML

ESS Project ID: 19H0999

Date Received: 8/30/2019


Are all QC stickers attached?

Yes / No / NA

Are VOA stickers attached if bubbles noted?


Yes / No / NA

Completed

By: 

Date & Time: 8/30/19 1440

Reviewed

By: 

Date & Time: 8/30/19 1453

Delivered

By: 

Date & Time: 8/30/19 1453

ESS Laboratory

Division of Thielsch Engineering, Inc.
 185 Frances Avenue, Cranston RI 02910
 Tel. (401) 461-7181 Fax (401) 461-4486
 www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time _____ Days
 Regulatory State RI
 Is this project for any of the following?
 OCT RCP MA MCP ORGP

ESS Lab # 19H0999
 Reporting Limits RIDEM ResDec/Dec

Electronic Deliverables Data Checker Other (Please Specify →) Excel

Company Name Beta Gray Project Name IDA-4 and IDA-5
 Contact Person Joe McLaughlin Address 701 Gross, W. W. Highway Hwy PO # _____
 City L. W. 02865 State RI Zip Code 02865
 Telephone Number 401.333.2352 Email Address j.mclaughlin@beta-inc.com

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Analysis
1	8/30/19	8:20	Grab	Soil	B-7 0-2'	VOCs X TPH X RBs X PR-13 Metals X
2		8:35	I	I	B-7 2-4'	VOCs X TPH X RBs X PR-13 Metals X
3		8:50	I	I	B-7 4-6'	VOCs X TPH X RBs X PR-13 Metals X
4		9:10	Comp	I	B-7 6-10'	VOCs X TPH X RBs X PR-13 Metals X

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial
 Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VDA 8-2 oz 9-4 oz 10-8 oz 11-Other
 Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Az2O3 8-ZnAc2 NaOH 9-NH4Cl 10-DI H2O 11-Other

Number of Containers per Sample: 3

Sampled by: Scott Mac
 Comments: 20X Rule as per client jjs 9/6/19

Relinquished by: (Signature, Date & Time)	Relinquished By: (Signature, Date & Time)	Received By: (Signature, Date & Time)
<u>SM</u> 8/30/19 13:37	<u>JJS</u> 9/6/19 13:37	

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CHAIN OF CUSTODY

Turn Time Std Days RI

Regulatory State RI

Is this project for any of the following?

OCT RCP MA MCP ORGP

Project # 701 Gross Wilmington Hwy Address 701 Gross Wilmington Hwy Project Name IDA-4 and IDA-5

Company Name Beta Gray State RI PO #

Contact Person Joe McLaughlin Zip Code 02865

City Lincoln Email Address jmcloshin@beta-inc.com

Telephone Number 401.333.2352 FAX Number

ESS Lab ID

Collection Date

Collection Time

Sample Type

Sample Matrix

Sample ID

Analysis

Electronic Deliverables

Data Checker

Other (Please Specify ->)

ESS Lab # 19H0999

Reporting Limits RIDEM RIDDEC/IDDEC

Excel

Analysis

VOCs

SVOCs

TPH

RBs

PR-13 Metals

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

Laboratory Use Only

Cooler Present: Y

Seals Intact: Y

Cooler Temperature: 4.5 °C

Relinquished by: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished by: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished by: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Number of Containers per Sample: 3

Sampled by: Scott Mac

Comments:

Please specify "Other" preservative and containers types in this space

Relinquished By: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished By: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished By: (Signature, Date & Time)

Received By: (Signature, Date & Time)

APPENDIX G
GROUNDWATER SAMPLING LOGS



WELL SAMPLING LOG

Project No. 6412
 Well ID MW-4
 Page # 1
 Date 3/12/2020
 Sampler SN

Equipment Used: Geotech pump and YSI 6820

Calibration Performed (Ask for zero calib of DO) _____

A: Set Up:

Well/Road Box condition Okay
 Well Gauging Reference Point: (i.e. road box, PVC casing) Top of PVC
 Well Screen Depth Interval Reference Point _____
 Bottom Depth (if known, if not known do not measure as it will increase turbidity): 24'
 Initial Groundwater Depth from reference point: 17.93'
 Pump Intake Depth _____

B: Flow Rate

B-1 - Calculated Allowable Drawdown
 Calculated Depth not to exceed: 18.23'
 B-2 - Measure Flow Rate (generally 100 to 500 ml/min) (VOA Vials are 40 ml)
 Volume/Time= 40 mL/30 seconds
 Allowable Drawdown Exceeded (Y/N) N
 (if water table was in screen interval, allowable drawdown can be exceeded if at lowest flow setting)

C: Stabilization

C-1 - Calculate Time Interval for Independent Water Quality Readings
 (Flow-thru cell volume approx. 400 ml) (Cell volume/flow rate generally 2-4 min.)
 Cell Volume/Flow Rate= _____
 C-2 - Measure Stabilized Water Quality parameters and Turbidity

Time	Temperature	SpCond	DO	pH	ORP	Turbidity	Water Depth	Flow	Comments
hr:min	Celsius	uS/cm	mg/L	units	mV	NTU	ft.	ml/min	
Criteria		3%	10% or 0.2	0.2	20 mV	10% or <1			
10:35	12.49	1,204	2.18	6.55	79.7	--	17.98	80	
10:40	12.3	1,221	1.84	6.54	80.5	--	18.01	80	
10:45	12.24	1,238	1.49	6.53	81.7	--	18.05	80	
10:50	12.35	1,231	1.33	6.53	79.8	--	18.11	80	
10:55	12.37	1,221	1.28	6.53	77.3	--	18.18	80	
11:00	12.39	1,219	1.26	6.52	76.1	--	18.16	80	

D. Sample Collection

Sample from pump discharge line (if not disconnected from flow thru cell, decon and filed bland are needed)
 Appearance of sample water Clear
 Sample Time: 9:43



WELL SAMPLING LOG

Project No.	6412
Well ID	MW-7
Page #	1
Date	3/12/2020
Sampler	SN

Equipment Used: Geotech pump and YSI 6820

Calibration Performed (Ask for zero calib of DO) _____

A: Set Up:

Well/Road Box condition Okay

Well Gauging Reference Point: (i.e. road box, PVC casing) Top of PVC

Well Screen Depth Interval Reference Point _____

Bottom Depth (if known, if not known do not measure as it will increase turbidity): 20.0

Initial Groundwater Depth from reference point: 8.32

Pump Intake Depth _____

B: Flow Rate

B-1 - Calculated Allowable Drawdown

Calculated Depth not to exceed: 8.62'

B-2 - Measure Flow Rate (generally 100 to 500 ml/min) (VOA Vials are 40 ml)

Volume/Time= 40 mL/30 seconds

Allowable Drawdown Exceeded (Y/N) N

(if water table was in screen interval, allowable drawdown can be exceeded if at lowest flow setting)

C: Stabilization

C-1 - Calculate Time Interval for Independent Water Quality Readings

(Flow-thru cell volume approx. 400 ml) (Cell volume/flow rate generally 2-4 min.)

Cell Volume/Flow Rate= _____

C-2 - Measure Stabilized Water Quality parameters and Turbidity

Time	Temperature	SpCond	DO	pH	ORP	Turbidity	Water Depth	Flow	Comments
hr:min	Celsius	uS/cm	mg/L	units	mV	NTU	ft.	ml/min	
Criteria		3%	10% or 0.2	0.2	20 mV	10% or <1			
8:55	11.21	607	2.78	7.14	-78.90	--	8.35	80	
9:00	11.68	619	1.50	6.99	-56.60	--	8.37	80	
9:05	11.63	604	1.41	6.90	-41.80	--	8.39	80	
9:10	11.59	589	1.23	6.83	-37.50	--	8.41	80	
9:15	11.53	611	1.21	6.80	-23.40	--	8.43	80	
9:20	11.49	627	1.18	6.77	-3.00	--	8.44	80	
9:25	11.51	622	1.16	6.77	-4.90	--	8.45	80	
9:30	11.53	623	1.15	6.77	-6.00	--	8.46	80	
9:35	11.56	626	1.15	6.77	-6.80	--	8.48	80	

J. Sample Collection

Sample from pump discharge line (if not disconnected from flow thru cell, decon and filed bland are needed)

Appearance of sample water Clear

Sample Time: 9:35

APPENDIX H

GROUNDWATER LABORATORY CERTIFICATES OF ANALYSIS



CERTIFICATE OF ANALYSIS

Joe McLoughlin
Beta Engineering
701 George Washington Hwy 2nd FL
Lincoln, RI 02865

RE: NBC III (6412)
ESS Laboratory Work Order Number: 20C0407

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 5:37 pm, Mar 20, 2020

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 TNI and relative state standards, 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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

SAMPLE RECEIPT

The following samples were received on March 12, 2020 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
20C0407-01	MW-4	Ground Water	6010C, 6020A, 7010, 7470A, 8082A, 8100M, 8260B, 8270D, 8270D SIM
20C0407-02	MW-7	Ground Water	6010C, 6020A, 7010, 7470A, 8082A, 8100M, 8260B, 8270D, 8270D SIM



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

PROJECT NARRATIVE

8270D Semi-Volatile Organic Compounds

- D0C0310-CCV2 [Calibration required quadratic regression \(Q\).](#)
2,4-Dinitrophenol (125% @ 80-120%), 4,6-Dinitro-2-Methylphenol (118% @ 80-120%), Benzoic Acid (112% @ 80-120%)
- D0C0310-CCV2 [Continuing Calibration %Diff/Drift is above control limit \(CD+\).](#)
2,4-Dinitrophenol (25% @ 20%), 2-Nitroaniline (25% @ 20%)
- D0C0310-CCV2 [Continuing Calibration %Diff/Drift is below control limit \(CD-\).](#)
Hexachlorocyclopentadiene (30% @ 20%)

8270D(SIM) Semi-Volatile Organic Compounds

- D0C0353-CCV1 [Calibration required quadratic regression \(Q\).](#)
Pentachlorophenol (80% @ 80-120%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

- [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: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

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
- 8015C - 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
- MADEP 18-2.1 - 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
- 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-4
Date Sampled: 03/12/20 11:00
Percent Solids: N/A

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (1.0)		6020A		1	BJV	03/17/20 11:51	50	25	DC01341
Arsenic	3.0 (2.5)		7010		1	KJK	03/17/20 19:56	50	25	DC01341
Beryllium	ND (0.5)		6010C		1	KJK	03/13/20 23:45	50	25	DC01341
Cadmium	ND (2.5)		6010C		1	KJK	03/13/20 23:45	50	25	DC01341
Chromium	10.1 (10.0)		6010C		1	KJK	03/13/20 23:45	50	25	DC01341
Copper	13.4 (10.0)		6010C		1	KJK	03/13/20 23:45	50	25	DC01341
Lead	ND (10.0)		6010C		1	KJK	03/13/20 23:45	50	25	DC01341
Mercury	ND (0.20)		7470A		1	MKS	03/16/20 12:38	20	40	DC01342
Nickel	ND (25.0)		6010C		1	KJK	03/13/20 23:45	50	25	DC01341
Selenium	ND (25.0)		6010C		1	KJK	03/13/20 23:45	50	25	DC01341
Silver	ND (5.0)		6010C		1	KJK	03/13/20 23:45	50	25	DC01341
Thallium	ND (0.5)		6020A		1	BJV	03/17/20 11:51	50	25	DC01341
Zinc	ND (25.0)		6010C		1	KJK	03/13/20 23:45	50	25	DC01341



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-4
Date Sampled: 03/12/20 11:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: DMC
Prepared: 3/13/20 10:03

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)		8082A		1	03/13/20 13:47		DC01204
Aroclor 1221	ND (0.09)		8082A		1	03/13/20 13:47		DC01204
Aroclor 1232	ND (0.09)		8082A		1	03/13/20 13:47		DC01204
Aroclor 1242	ND (0.09)		8082A		1	03/13/20 13:47		DC01204
Aroclor 1248	ND (0.09)		8082A		1	03/13/20 13:47		DC01204
Aroclor 1254	ND (0.09)		8082A		1	03/13/20 13:47		DC01204
Aroclor 1260	ND (0.09)		8082A		1	03/13/20 13:47		DC01204
Aroclor 1262	ND (0.09)		8082A		1	03/13/20 13:47		DC01204
Aroclor 1268	ND (0.09)		8082A		1	03/13/20 13:47		DC01204

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	93 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	89 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	71 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	80 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-4
Date Sampled: 03/12/20 11:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: CAD
Prepared: 3/17/20 13:01

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	ND (0.19)		8100M		1	03/17/20 17:33	D0C0268	DC01705
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		<i>99 %</i>		<i>40-140</i>				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-4
Date Sampled: 03/12/20 11:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,1,1-Trichloroethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,1,2,2-Tetrachloroethane	ND (0.0005)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,1,2-Trichloroethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,1-Dichloroethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,1-Dichloroethene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,1-Dichloropropene	ND (0.0020)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,2,3-Trichlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,2,3-Trichloropropane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,2,4-Trichlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,2,4-Trimethylbenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,2-Dibromo-3-Chloropropane	ND (0.0050)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,2-Dibromoethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,2-Dichlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,2-Dichloroethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,2-Dichloropropane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,3,5-Trimethylbenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,3-Dichlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,3-Dichloropropane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,4-Dichlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1,4-Dioxane - Screen	ND (0.500)		8260B		1	03/12/20 17:27	D0C0232	DC01261
1-Chlorohexane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
2,2-Dichloropropane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
2-Butanone	ND (0.0100)		8260B		1	03/12/20 17:27	D0C0232	DC01261
2-Chlorotoluene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
2-Hexanone	ND (0.0100)		8260B		1	03/12/20 17:27	D0C0232	DC01261
4-Chlorotoluene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
4-Isopropyltoluene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
4-Methyl-2-Pentanone	ND (0.0250)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Acetone	ND (0.0100)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Benzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Bromobenzene	ND (0.0020)		8260B		1	03/12/20 17:27	D0C0232	DC01261



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-4
Date Sampled: 03/12/20 11:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Bromodichloromethane	ND (0.0006)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Bromoform	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Bromomethane	ND (0.0020)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Carbon Disulfide	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Carbon Tetrachloride	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Chlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Chloroethane	ND (0.0020)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Chloroform	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Chloromethane	ND (0.0020)		8260B		1	03/12/20 17:27	D0C0232	DC01261
cis-1,2-Dichloroethene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
cis-1,3-Dichloropropene	ND (0.0004)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Dibromochloromethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Dibromomethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Dichlorodifluoromethane	ND (0.0020)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Diethyl Ether	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Di-isopropyl ether	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Ethyl tertiary-butyl ether	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Ethylbenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Hexachlorobutadiene	ND (0.0006)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Hexachloroethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Isopropylbenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Methyl tert-Butyl Ether	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Methylene Chloride	ND (0.0020)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Naphthalene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
n-Butylbenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
n-Propylbenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
sec-Butylbenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Styrene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
tert-Butylbenzene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Tertiary-amyl methyl ether	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Tetrachloroethene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-4
Date Sampled: 03/12/20 11:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Tetrahydrofuran	ND (0.0050)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Toluene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
trans-1,2-Dichloroethene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
trans-1,3-Dichloropropene	ND (0.0004)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Trichloroethene	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Trichlorofluoromethane	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Vinyl Acetate	ND (0.0050)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Vinyl Chloride	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Xylene O	ND (0.0010)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Xylene P,M	ND (0.0020)		8260B		1	03/12/20 17:27	D0C0232	DC01261
Xylenes (Total)	ND (0.00200)		8260B		1	03/12/20 17:27		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>110 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>91 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>119 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>102 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-4
Date Sampled: 03/12/20 11:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: TJ
Prepared: 3/16/20 16:00

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
1,2,4-Trichlorobenzene	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
1,2-Dichlorobenzene	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
1,3-Dichlorobenzene	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
1,4-Dichlorobenzene	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2,3,4,6-Tetrachlorophenol	ND (0.047)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2,4,5-Trichlorophenol	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2,4,6-Trichlorophenol	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2,4-Dichlorophenol	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2,4-Dimethylphenol	ND (0.047)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2,4-Dinitrophenol	ND (0.047)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2,4-Dinitrotoluene	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2,6-Dinitrotoluene	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2-Chloronaphthalene	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2-Chlorophenol	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2-Methylphenol	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2-Nitroaniline	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
2-Nitrophenol	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
3,3'-Dichlorobenzidine	ND (0.019)		8270D		1	03/17/20 23:07	D0C0310	DC01608
3+4-Methylphenol	ND (0.019)		8270D		1	03/17/20 23:07	D0C0310	DC01608
3-Nitroaniline	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
4,6-Dinitro-2-Methylphenol	ND (0.047)		8270D		1	03/17/20 23:07	D0C0310	DC01608
4-Bromophenyl-phenylether	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
4-Chloro-3-Methylphenol	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
4-Chloroaniline	ND (0.019)		8270D		1	03/17/20 23:07	D0C0310	DC01608
4-Chloro-phenyl-phenyl ether	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
4-Nitroaniline	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
4-Nitrophenol	ND (0.047)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Acetophenone	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Aniline	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Azobenzene	ND (0.019)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Benzoic Acid	ND (0.093)		8270D		1	03/17/20 23:07	D0C0310	DC01608



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-4
Date Sampled: 03/12/20 11:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: TJ
Prepared: 3/16/20 16:00

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Benzyl Alcohol	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
bis(2-Chloroethoxy)methane	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
bis(2-Chloroethyl)ether	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
bis(2-chloroisopropyl)Ether	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
bis(2-Ethylhexyl)phthalate	ND (0.006)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Butylbenzylphthalate	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Carbazole	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Dibenzofuran	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Diethylphthalate	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Dimethylphthalate	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Di-n-butylphthalate	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Di-n-octylphthalate	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Hexachlorobutadiene	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Hexachlorocyclopentadiene	ND (0.023)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Hexachloroethane	ND (0.005)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Isophorone	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Nitrobenzene	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
N-Nitrosodimethylamine	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
N-Nitroso-Di-n-Propylamine	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
N-nitrosodiphenylamine	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Phenol	ND (0.009)		8270D		1	03/17/20 23:07	D0C0310	DC01608
Pyridine	ND (0.093)		8270D		1	03/17/20 23:07	D0C0310	DC01608

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>73 %</i>		<i>30-130</i>
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>85 %</i>		<i>15-110</i>
<i>Surrogate: 2-Chlorophenol-d4</i>	<i>76 %</i>		<i>15-110</i>
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>77 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorophenol</i>	<i>68 %</i>		<i>15-110</i>
<i>Surrogate: Nitrobenzene-d5</i>	<i>83 %</i>		<i>30-130</i>
<i>Surrogate: Phenol-d6</i>	<i>79 %</i>		<i>15-110</i>
<i>Surrogate: p-Terphenyl-d14</i>	<i>84 %</i>		<i>30-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III
 Client Sample ID: MW-4
 Date Sampled: 03/12/20 11:00
 Percent Solids: N/A
 Initial Volume: 1070
 Final Volume: 0.25
 Extraction Method: 3520C

ESS Laboratory Work Order: 20C0407
 ESS Laboratory Sample ID: 20C0407-01
 Sample Matrix: Ground Water
 Units: mg/L
 Analyst: VSC
 Prepared: 3/16/20 16:00

8270D(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2-Methylnaphthalene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Acenaphthene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Acenaphthylene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Anthracene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Benzo(a)anthracene	ND (0.00005)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Benzo(a)pyrene	ND (0.00005)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Benzo(b)fluoranthene	0.00005 (0.00005)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Benzo(g,h,i)perylene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Benzo(k)fluoranthene	ND (0.00005)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Chrysene	ND (0.00005)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Dibenzo(a,h)Anthracene	ND (0.00005)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Fluoranthene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Fluorene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Hexachlorobenzene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Indeno(1,2,3-cd)Pyrene	ND (0.00005)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Naphthalene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Pentachlorophenol	ND (0.00084)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Phenanthrene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608
Pyrene	ND (0.00019)		8270D SIM		1	03/19/20 19:18	D0C0353	DC01608

%Recovery Qualifier Limits



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-7
Date Sampled: 03/12/20 09:35
Percent Solids: N/A

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-02
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (1.0)		6020A		1	BJV	03/17/20 12:18	50	25	DC01341
Arsenic	2.7 (2.5)		7010		1	KJK	03/17/20 20:25	50	25	DC01341
Beryllium	ND (0.5)		6010C		1	KJK	03/14/20 0:16	50	25	DC01341
Cadmium	ND (2.5)		6010C		1	KJK	03/14/20 0:16	50	25	DC01341
Chromium	ND (10.0)		6010C		1	KJK	03/14/20 0:16	50	25	DC01341
Copper	14.2 (10.0)		6010C		1	KJK	03/14/20 0:16	50	25	DC01341
Lead	17.5 (10.0)		6010C		1	KJK	03/17/20 15:29	50	25	DC01341
Mercury	ND (0.20)		7470A		1	MKS	03/16/20 12:41	20	40	DC01342
Nickel	ND (25.0)		6010C		1	KJK	03/14/20 0:16	50	25	DC01341
Selenium	ND (25.0)		6010C		1	KJK	03/14/20 0:16	50	25	DC01341
Silver	ND (5.0)		6010C		1	KJK	03/14/20 0:16	50	25	DC01341
Thallium	ND (0.5)		6020A		1	BJV	03/17/20 12:18	50	25	DC01341
Zinc	27.9 (25.0)		6010C		1	KJK	03/14/20 0:16	50	25	DC01341



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-7
Date Sampled: 03/12/20 09:35
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: DMC
Prepared: 3/13/20 10:03

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)		8082A		1	03/13/20 14:06		DC01204
Aroclor 1221	ND (0.09)		8082A		1	03/13/20 14:06		DC01204
Aroclor 1232	ND (0.09)		8082A		1	03/13/20 14:06		DC01204
Aroclor 1242	ND (0.09)		8082A		1	03/13/20 14:06		DC01204
Aroclor 1248	ND (0.09)		8082A		1	03/13/20 14:06		DC01204
Aroclor 1254	ND (0.09)		8082A		1	03/13/20 14:06		DC01204
Aroclor 1260	ND (0.09)		8082A		1	03/13/20 14:06		DC01204
Aroclor 1262	ND (0.09)		8082A		1	03/13/20 14:06		DC01204
Aroclor 1268	ND (0.09)		8082A		1	03/13/20 14:06		DC01204

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	<i>84 %</i>		<i>30-150</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	<i>80 %</i>		<i>30-150</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>78 %</i>		<i>30-150</i>
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>87 %</i>		<i>30-150</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-7
Date Sampled: 03/12/20 09:35
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: CAD
Prepared: 3/17/20 13:01

8100M Total Petroleum Hydrocarbons

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Total Petroleum Hydrocarbons	ND (0.19)		8100M		1	03/17/20 18:06	D0C0268	DC01705
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: O-Terphenyl</i>		<i>96 %</i>		<i>40-140</i>				



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-7
Date Sampled: 03/12/20 09:35
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1,2-Tetrachloroethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,1,1-Trichloroethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,1,2,2-Tetrachloroethane	ND (0.0005)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,1,2-Trichloroethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,1-Dichloroethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,1-Dichloroethene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,1-Dichloropropene	ND (0.0020)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,2,3-Trichlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,2,3-Trichloropropane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,2,4-Trichlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,2,4-Trimethylbenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,2-Dibromo-3-Chloropropane	ND (0.0050)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,2-Dibromoethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,2-Dichlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,2-Dichloroethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,2-Dichloropropane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,3,5-Trimethylbenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,3-Dichlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,3-Dichloropropane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,4-Dichlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1,4-Dioxane - Screen	ND (0.500)		8260B		1	03/12/20 17:55	D0C0232	DC01261
1-Chlorohexane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
2,2-Dichloropropane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
2-Butanone	ND (0.0100)		8260B		1	03/12/20 17:55	D0C0232	DC01261
2-Chlorotoluene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
2-Hexanone	ND (0.0100)		8260B		1	03/12/20 17:55	D0C0232	DC01261
4-Chlorotoluene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
4-Isopropyltoluene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
4-Methyl-2-Pentanone	ND (0.0250)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Acetone	ND (0.0100)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Benzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Bromobenzene	ND (0.0020)		8260B		1	03/12/20 17:55	D0C0232	DC01261



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-7
Date Sampled: 03/12/20 09:35
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Bromochloromethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Bromodichloromethane	ND (0.0006)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Bromoform	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Bromomethane	ND (0.0020)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Carbon Disulfide	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Carbon Tetrachloride	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Chlorobenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Chloroethane	ND (0.0020)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Chloroform	0.0021 (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Chloromethane	ND (0.0020)		8260B		1	03/12/20 17:55	D0C0232	DC01261
cis-1,2-Dichloroethene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
cis-1,3-Dichloropropene	ND (0.0004)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Dibromochloromethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Dibromomethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Dichlorodifluoromethane	ND (0.0020)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Diethyl Ether	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Di-isopropyl ether	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Ethyl tertiary-butyl ether	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Ethylbenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Hexachlorobutadiene	ND (0.0006)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Hexachloroethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Isopropylbenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Methyl tert-Butyl Ether	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Methylene Chloride	ND (0.0020)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Naphthalene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
n-Butylbenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
n-Propylbenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
sec-Butylbenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Styrene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
tert-Butylbenzene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Tertiary-amyl methyl ether	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Tetrachloroethene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-7
Date Sampled: 03/12/20 09:35
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Tetrahydrofuran	ND (0.0050)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Toluene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
trans-1,2-Dichloroethene	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
trans-1,3-Dichloropropene	ND (0.0004)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Trichloroethene	0.0016 (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Trichlorofluoromethane	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Vinyl Acetate	ND (0.0050)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Vinyl Chloride	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Xylene O	ND (0.0010)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Xylene P,M	ND (0.0020)		8260B		1	03/12/20 17:55	D0C0232	DC01261
Xylenes (Total)	ND (0.00200)		8260B		1	03/12/20 17:55		[CALC]

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>118 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>88 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>127 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>114 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-7
Date Sampled: 03/12/20 09:35
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: TJ
Prepared: 3/16/20 16:00

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1-Biphenyl	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
1,2,4-Trichlorobenzene	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
1,2-Dichlorobenzene	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
1,3-Dichlorobenzene	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
1,4-Dichlorobenzene	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2,3,4,6-Tetrachlorophenol	ND (0.047)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2,4,5-Trichlorophenol	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2,4,6-Trichlorophenol	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2,4-Dichlorophenol	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2,4-Dimethylphenol	ND (0.047)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2,4-Dinitrophenol	ND (0.047)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2,4-Dinitrotoluene	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2,6-Dinitrotoluene	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2-Chloronaphthalene	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2-Chlorophenol	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2-Methylphenol	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2-Nitroaniline	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
2-Nitrophenol	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
3,3'-Dichlorobenzidine	ND (0.019)		8270D		1	03/17/20 23:34	D0C0310	DC01608
3+4-Methylphenol	ND (0.019)		8270D		1	03/17/20 23:34	D0C0310	DC01608
3-Nitroaniline	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
4,6-Dinitro-2-Methylphenol	ND (0.047)		8270D		1	03/17/20 23:34	D0C0310	DC01608
4-Bromophenyl-phenylether	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
4-Chloro-3-Methylphenol	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
4-Chloroaniline	ND (0.019)		8270D		1	03/17/20 23:34	D0C0310	DC01608
4-Chloro-phenyl-phenyl ether	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
4-Nitroaniline	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
4-Nitrophenol	ND (0.047)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Acetophenone	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Aniline	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Azobenzene	ND (0.019)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Benzoic Acid	ND (0.093)		8270D		1	03/17/20 23:34	D0C0310	DC01608



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-7
Date Sampled: 03/12/20 09:35
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: TJ
Prepared: 3/16/20 16:00

8270D Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Benzyl Alcohol	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
bis(2-Chloroethoxy)methane	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
bis(2-Chloroethyl)ether	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
bis(2-chloroisopropyl)Ether	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
bis(2-Ethylhexyl)phthalate	ND (0.006)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Butylbenzylphthalate	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Carbazole	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Dibenzofuran	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Diethylphthalate	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Dimethylphthalate	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Di-n-butylphthalate	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Di-n-octylphthalate	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Hexachlorobutadiene	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Hexachlorocyclopentadiene	ND (0.023)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Hexachloroethane	ND (0.005)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Isophorone	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Nitrobenzene	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
N-Nitrosodimethylamine	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
N-Nitroso-Di-n-Propylamine	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
N-nitrosodiphenylamine	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Phenol	ND (0.009)		8270D		1	03/17/20 23:34	D0C0310	DC01608
Pyridine	ND (0.093)		8270D		1	03/17/20 23:34	D0C0310	DC01608

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>75 %</i>		<i>30-130</i>
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>84 %</i>		<i>15-110</i>
<i>Surrogate: 2-Chlorophenol-d4</i>	<i>67 %</i>		<i>15-110</i>
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>80 %</i>		<i>30-130</i>
<i>Surrogate: 2-Fluorophenol</i>	<i>52 %</i>		<i>15-110</i>
<i>Surrogate: Nitrobenzene-d5</i>	<i>85 %</i>		<i>30-130</i>
<i>Surrogate: Phenol-d6</i>	<i>71 %</i>		<i>15-110</i>
<i>Surrogate: p-Terphenyl-d14</i>	<i>91 %</i>		<i>30-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III
Client Sample ID: MW-7
Date Sampled: 03/12/20 09:35
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3520C

ESS Laboratory Work Order: 20C0407
ESS Laboratory Sample ID: 20C0407-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: VSC
Prepared: 3/16/20 16:00

8270D(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
2-Methylnaphthalene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Acenaphthene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Acenaphthylene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Anthracene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Benzo(a)anthracene	ND (0.00005)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Benzo(a)pyrene	ND (0.00005)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Benzo(b)fluoranthene	ND (0.00005)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Benzo(g,h,i)perylene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Benzo(k)fluoranthene	ND (0.00005)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Chrysene	ND (0.00005)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Dibenzo(a,h)Anthracene	ND (0.00005)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Fluoranthene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Fluorene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Hexachlorobenzene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Indeno(1,2,3-cd)Pyrene	ND (0.00005)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Naphthalene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Pentachlorophenol	ND (0.00084)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Phenanthrene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608
Pyrene	ND (0.00019)		8270D SIM		1	03/19/20 20:06	D0C0353	DC01608

%Recovery Qualifier Limits



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch DC01341 - 3005A/200.7										
Blank										
Beryllium	ND	0.5	ug/L							
Cadmium	ND	2.5	ug/L							
Chromium	ND	10.0	ug/L							
Copper	ND	10.0	ug/L							
Lead	ND	10.0	ug/L							
Nickel	ND	25.0	ug/L							
Selenium	ND	25.0	ug/L							
Silver	ND	5.0	ug/L							
Zinc	ND	25.0	ug/L							
Blank										
Antimony	ND	1.0	ug/L							
Thallium	ND	0.5	ug/L							
Blank										
Arsenic	ND	2.5	ug/L							
LCS										
Beryllium	22.4	0.5	ug/L	25.00		89	80-120			
Cadmium	112	2.5	ug/L	125.0		90	80-120			
Chromium	223	10.0	ug/L	250.0		89	80-120			
Copper	233	10.0	ug/L	250.0		93	80-120			
Lead	231	10.0	ug/L	250.0		92	80-120			
Nickel	225	25.0	ug/L	250.0		90	80-120			
Selenium	452	25.0	ug/L	500.0		90	80-120			
Silver	117	5.0	ug/L	125.0		94	80-120			
Zinc	222	25.0	ug/L	250.0		89	80-120			
LCS										
Antimony	276	5.0	ug/L	250.0		110	80-120			
Thallium	277	2.5	ug/L	250.0		111	80-120			
LCS										
Arsenic	212	62.5	ug/L	250.0		85	80-120			
LCS Dup										
Beryllium	22.4	0.5	ug/L	25.00		90	80-120	0.07	20	
Cadmium	110	2.5	ug/L	125.0		88	80-120	2	20	
Chromium	225	10.0	ug/L	250.0		90	80-120	1	20	
Copper	234	10.0	ug/L	250.0		93	80-120	0.2	20	
Lead	228	10.0	ug/L	250.0		91	80-120	2	20	
Nickel	226	25.0	ug/L	250.0		90	80-120	0.6	20	
Selenium	446	25.0	ug/L	500.0		89	80-120	1	20	
Silver	117	5.0	ug/L	125.0		94	80-120	0.01	20	
Zinc	222	25.0	ug/L	250.0		89	80-120	0.009	20	
LCS Dup										
Antimony	273	5.0	ug/L	250.0		109	80-120	1	20	
Thallium	273	2.5	ug/L	250.0		109	80-120	1	20	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch DC01341 - 3005A/200.7

LCS Dup

Arsenic	214	62.5	ug/L	250.0		85	80-120	0.9	20	
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Batch DC01342 - 245.1/7470A

Blank

Mercury	ND	0.20	ug/L							
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LCS

Mercury	5.60	0.20	ug/L	6.042		93	80-120			
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LCS Dup

Mercury	5.46	0.20	ug/L	6.042		90	80-120	3	20	
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8082A Polychlorinated Biphenyls (PCB)

Batch DC01204 - 3510C

Blank

Aroclor 1016	ND	0.05	ug/L							
Aroclor 1016 [2C]	ND	0.05	ug/L							
Aroclor 1221	ND	0.05	ug/L							
Aroclor 1221 [2C]	ND	0.05	ug/L							
Aroclor 1232	ND	0.05	ug/L							
Aroclor 1232 [2C]	ND	0.05	ug/L							
Aroclor 1242	ND	0.05	ug/L							
Aroclor 1242 [2C]	ND	0.05	ug/L							
Aroclor 1248	ND	0.05	ug/L							
Aroclor 1248 [2C]	ND	0.05	ug/L							
Aroclor 1254	ND	0.05	ug/L							
Aroclor 1254 [2C]	ND	0.05	ug/L							
Aroclor 1260	ND	0.05	ug/L							
Aroclor 1260 [2C]	ND	0.05	ug/L							
Aroclor 1262	ND	0.05	ug/L							
Aroclor 1262 [2C]	ND	0.05	ug/L							
Aroclor 1268	ND	0.05	ug/L							
Aroclor 1268 [2C]	ND	0.05	ug/L							

Surrogate: Decachlorobiphenyl	0.0508		ug/L	0.05000		102	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0515		ug/L	0.05000		103	30-150			
Surrogate: Tetrachloro-m-xylene	0.0306		ug/L	0.05000		61	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0340		ug/L	0.05000		68	30-150			

LCS

Aroclor 1016	0.73	0.05	ug/L	1.000		73	40-140			
Aroclor 1016 [2C]	0.78	0.05	ug/L	1.000		78	40-140			
Aroclor 1260	0.87	0.05	ug/L	1.000		87	40-140			
Aroclor 1260 [2C]	0.91	0.05	ug/L	1.000		91	40-140			

Surrogate: Decachlorobiphenyl	0.0538		ug/L	0.05000		108	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0543		ug/L	0.05000		109	30-150			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082A Polychlorinated Biphenyls (PCB)

Batch DC01204 - 3510C

Surrogate: Tetrachloro-m-xylene	0.0318		ug/L	0.05000		64	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0347		ug/L	0.05000		69	30-150			

LCS Dup

Aroclor 1016	0.73	0.05	ug/L	1.000		73	40-140	0.6	20	
Aroclor 1016 [2C]	0.81	0.05	ug/L	1.000		81	40-140	3	20	
Aroclor 1260	0.85	0.05	ug/L	1.000		85	40-140	3	20	
Aroclor 1260 [2C]	0.90	0.05	ug/L	1.000		90	40-140	1	20	

Surrogate: Decachlorobiphenyl	0.0541		ug/L	0.05000		108	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0542		ug/L	0.05000		108	30-150			
Surrogate: Tetrachloro-m-xylene	0.0305		ug/L	0.05000		61	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0360		ug/L	0.05000		72	30-150			

8100M Total Petroleum Hydrocarbons

Batch DC01705 - 3510C

Blank

Decane (C10)	ND	0.005	mg/L							
Docosane (C22)	ND	0.005	mg/L							
Dodecane (C12)	ND	0.005	mg/L							
Eicosane (C20)	ND	0.005	mg/L							
Hexacosane (C26)	ND	0.005	mg/L							
Hexadecane (C16)	ND	0.005	mg/L							
Nonadecane (C19)	ND	0.005	mg/L							
Nonane (C9)	ND	0.005	mg/L							
Octacosane (C28)	ND	0.005	mg/L							
Octadecane (C18)	ND	0.005	mg/L							
Tetracosane (C24)	ND	0.005	mg/L							
Tetradecane (C14)	ND	0.005	mg/L							
Total Petroleum Hydrocarbons	ND	0.20	mg/L							
Triacotane (C30)	ND	0.005	mg/L							

Surrogate: O-Terphenyl	0.0980		mg/L	0.1000		98	40-140			
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LCS

Decane (C10)	0.041	0.005	mg/L	0.05000		81	40-140			
Docosane (C22)	0.048	0.005	mg/L	0.05000		96	40-140			
Dodecane (C12)	0.045	0.005	mg/L	0.05000		90	40-140			
Eicosane (C20)	0.048	0.005	mg/L	0.05000		95	40-140			
Hexacosane (C26)	0.048	0.005	mg/L	0.05000		96	40-140			
Hexadecane (C16)	0.047	0.005	mg/L	0.05000		94	40-140			
Nonadecane (C19)	0.048	0.005	mg/L	0.05000		95	40-140			
Nonane (C9)	0.036	0.005	mg/L	0.05000		71	30-140			
Octacosane (C28)	0.049	0.005	mg/L	0.05000		97	40-140			
Octadecane (C18)	0.047	0.005	mg/L	0.05000		94	40-140			
Tetracosane (C24)	0.048	0.005	mg/L	0.05000		96	40-140			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8100M Total Petroleum Hydrocarbons

Batch DC01705 - 3510C

Tetradecane (C14)	0.047	0.005	mg/L	0.05000		93	40-140			
Total Petroleum Hydrocarbons	0.641	0.20	mg/L	0.7000		92	40-140			
Triacontane (C30)	0.047	0.005	mg/L	0.05000		95	40-140			
<i>Surrogate: O-Terphenyl</i>	<i>0.100</i>		mg/L	<i>0.1000</i>		<i>100</i>	<i>40-140</i>			

LCS Dup

Decane (C10)	0.041	0.005	mg/L	0.05000		81	40-140	0.2	25	
Docosane (C22)	0.047	0.005	mg/L	0.05000		94	40-140	1	25	
Dodecane (C12)	0.045	0.005	mg/L	0.05000		90	40-140	0.6	25	
Eicosane (C20)	0.047	0.005	mg/L	0.05000		94	40-140	2	25	
Hexacosane (C26)	0.047	0.005	mg/L	0.05000		94	40-140	2	25	
Hexadecane (C16)	0.046	0.005	mg/L	0.05000		92	40-140	1	25	
Nonadecane (C19)	0.047	0.005	mg/L	0.05000		94	40-140	2	25	
Nonane (C9)	0.036	0.005	mg/L	0.05000		72	30-140	1	25	
Octacosane (C28)	0.048	0.005	mg/L	0.05000		96	40-140	2	25	
Octadecane (C18)	0.046	0.005	mg/L	0.05000		93	40-140	1	25	
Tetracosane (C24)	0.047	0.005	mg/L	0.05000		94	40-140	1	25	
Tetradecane (C14)	0.046	0.005	mg/L	0.05000		92	40-140	2	25	
Total Petroleum Hydrocarbons	0.634	0.20	mg/L	0.7000		91	40-140	1	25	
Triacontane (C30)	0.047	0.005	mg/L	0.05000		94	40-140	1	25	
<i>Surrogate: O-Terphenyl</i>	<i>0.0971</i>		mg/L	<i>0.1000</i>		<i>97</i>	<i>40-140</i>			

8260B Volatile Organic Compounds

Batch DC01261 - 5030B

Blank

1,1,1,2-Tetrachloroethane	ND	0.0010	mg/L							
1,1,1-Trichloroethane	ND	0.0010	mg/L							
1,1,2,2-Tetrachloroethane	ND	0.0005	mg/L							
1,1,2-Trichloroethane	ND	0.0010	mg/L							
1,1-Dichloroethane	ND	0.0010	mg/L							
1,1-Dichloroethene	ND	0.0010	mg/L							
1,1-Dichloropropene	ND	0.0020	mg/L							
1,2,3-Trichlorobenzene	ND	0.0010	mg/L							
1,2,3-Trichloropropane	ND	0.0010	mg/L							
1,2,4-Trichlorobenzene	ND	0.0010	mg/L							
1,2,4-Trimethylbenzene	ND	0.0010	mg/L							
1,2-Dibromo-3-Chloropropane	ND	0.0050	mg/L							
1,2-Dibromoethane	ND	0.0010	mg/L							
1,2-Dichlorobenzene	ND	0.0010	mg/L							
1,2-Dichloroethane	ND	0.0010	mg/L							
1,2-Dichloropropane	ND	0.0010	mg/L							
1,3,5-Trimethylbenzene	ND	0.0010	mg/L							
1,3-Dichlorobenzene	ND	0.0010	mg/L							
1,3-Dichloropropane	ND	0.0010	mg/L							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch DC01261 - 5030B

1,4-Dichlorobenzene	ND	0.0010	mg/L							
1,4-Dioxane - Screen	ND	0.500	mg/L							
1-Chlorohexane	ND	0.0010	mg/L							
2,2-Dichloropropane	ND	0.0010	mg/L							
2-Butanone	ND	0.0100	mg/L							
2-Chlorotoluene	ND	0.0010	mg/L							
2-Hexanone	ND	0.0100	mg/L							
4-Chlorotoluene	ND	0.0010	mg/L							
4-Isopropyltoluene	ND	0.0010	mg/L							
4-Methyl-2-Pentanone	ND	0.0250	mg/L							
Acetone	ND	0.0100	mg/L							
Benzene	ND	0.0010	mg/L							
Bromobenzene	ND	0.0020	mg/L							
Bromochloromethane	ND	0.0010	mg/L							
Bromodichloromethane	ND	0.0006	mg/L							
Bromoform	ND	0.0010	mg/L							
Bromomethane	ND	0.0020	mg/L							
Carbon Disulfide	ND	0.0010	mg/L							
Carbon Tetrachloride	ND	0.0010	mg/L							
Chlorobenzene	ND	0.0010	mg/L							
Chloroethane	ND	0.0020	mg/L							
Chloroform	ND	0.0010	mg/L							
Chloromethane	ND	0.0020	mg/L							
cis-1,2-Dichloroethene	ND	0.0010	mg/L							
cis-1,3-Dichloropropene	ND	0.0004	mg/L							
Dibromochloromethane	ND	0.0010	mg/L							
Dibromomethane	ND	0.0010	mg/L							
Dichlorodifluoromethane	ND	0.0020	mg/L							
Diethyl Ether	ND	0.0010	mg/L							
Di-isopropyl ether	ND	0.0010	mg/L							
Ethyl tertiary-butyl ether	ND	0.0010	mg/L							
Ethylbenzene	ND	0.0010	mg/L							
Hexachlorobutadiene	ND	0.0006	mg/L							
Hexachloroethane	ND	0.0010	mg/L							
Isopropylbenzene	ND	0.0010	mg/L							
Methyl tert-Butyl Ether	ND	0.0010	mg/L							
Methylene Chloride	ND	0.0020	mg/L							
Naphthalene	ND	0.0010	mg/L							
n-Butylbenzene	ND	0.0010	mg/L							
n-Propylbenzene	ND	0.0010	mg/L							
sec-Butylbenzene	ND	0.0010	mg/L							
Styrene	ND	0.0010	mg/L							
tert-Butylbenzene	ND	0.0010	mg/L							
Tertiary-amyl methyl ether	ND	0.0010	mg/L							
Tetrachloroethene	ND	0.0010	mg/L							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch DC01261 - 5030B

Tetrahydrofuran	ND	0.0050	mg/L							
Toluene	ND	0.0010	mg/L							
trans-1,2-Dichloroethene	ND	0.0010	mg/L							
trans-1,3-Dichloropropene	ND	0.0004	mg/L							
Trichloroethene	ND	0.0010	mg/L							
Trichlorofluoromethane	ND	0.0010	mg/L							
Vinyl Acetate	ND	0.0050	mg/L							
Vinyl Chloride	ND	0.0010	mg/L							
Xylene O	ND	0.0010	mg/L							
Xylene P,M	ND	0.0020	mg/L							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0273</i>		mg/L	<i>0.02500</i>		<i>109</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0235</i>		mg/L	<i>0.02500</i>		<i>94</i>	<i>70-130</i>			
<i>Surrogate: Dibromofluoromethane</i>	<i>0.0286</i>		mg/L	<i>0.02500</i>		<i>114</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0247</i>		mg/L	<i>0.02500</i>		<i>99</i>	<i>70-130</i>			

LCS

1,1,1,2-Tetrachloroethane	0.0085	0.0010	mg/L	0.01000		85	70-130			
1,1,1-Trichloroethane	0.0100	0.0010	mg/L	0.01000		100	70-130			
1,1,2,2-Tetrachloroethane	0.0114	0.0005	mg/L	0.01000		114	70-130			
1,1,2-Trichloroethane	0.0120	0.0010	mg/L	0.01000		120	70-130			
1,1-Dichloroethane	0.0109	0.0010	mg/L	0.01000		109	70-130			
1,1-Dichloroethene	0.0116	0.0010	mg/L	0.01000		116	70-130			
1,1-Dichloropropene	0.0110	0.0020	mg/L	0.01000		110	70-130			
1,2,3-Trichlorobenzene	0.0088	0.0010	mg/L	0.01000		88	70-130			
1,2,3-Trichloropropane	0.0099	0.0010	mg/L	0.01000		99	70-130			
1,2,4-Trichlorobenzene	0.0081	0.0010	mg/L	0.01000		81	70-130			
1,2,4-Trimethylbenzene	0.0101	0.0010	mg/L	0.01000		101	70-130			
1,2-Dibromo-3-Chloropropane	0.0093	0.0050	mg/L	0.01000		93	70-130			
1,2-Dibromoethane	0.0101	0.0010	mg/L	0.01000		101	70-130			
1,2-Dichlorobenzene	0.0092	0.0010	mg/L	0.01000		92	70-130			
1,2-Dichloroethane	0.0106	0.0010	mg/L	0.01000		106	70-130			
1,2-Dichloropropane	0.0123	0.0010	mg/L	0.01000		123	70-130			
1,3,5-Trimethylbenzene	0.0092	0.0010	mg/L	0.01000		92	70-130			
1,3-Dichlorobenzene	0.0095	0.0010	mg/L	0.01000		95	70-130			
1,3-Dichloropropane	0.0103	0.0010	mg/L	0.01000		103	70-130			
1,4-Dichlorobenzene	0.0100	0.0010	mg/L	0.01000		100	70-130			
1,4-Dioxane - Screen	0.220	0.500	mg/L	0.2000		110	0-332			
1-Chlorohexane	0.0091	0.0010	mg/L	0.01000		91	70-130			
2,2-Dichloropropane	0.0104	0.0010	mg/L	0.01000		104	70-130			
2-Butanone	0.0581	0.0100	mg/L	0.05000		116	70-130			
2-Chlorotoluene	0.0098	0.0010	mg/L	0.01000		98	70-130			
2-Hexanone	0.0488	0.0100	mg/L	0.05000		98	70-130			
4-Chlorotoluene	0.0097	0.0010	mg/L	0.01000		97	70-130			
4-Isopropyltoluene	0.0092	0.0010	mg/L	0.01000		92	70-130			
4-Methyl-2-Pentanone	0.0642	0.0250	mg/L	0.05000		128	70-130			
Acetone	0.0495	0.0100	mg/L	0.05000		99	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch DC01261 - 5030B

Benzene	0.0116	0.0010	mg/L	0.01000		116	70-130			
Bromobenzene	0.0090	0.0020	mg/L	0.01000		90	70-130			
Bromochloromethane	0.0112	0.0010	mg/L	0.01000		112	70-130			
Bromodichloromethane	0.0108	0.0006	mg/L	0.01000		108	70-130			
Bromoform	0.0072	0.0010	mg/L	0.01000		72	70-130			
Bromomethane	0.0114	0.0020	mg/L	0.01000		114	70-130			
Carbon Disulfide	0.0119	0.0010	mg/L	0.01000		119	70-130			
Carbon Tetrachloride	0.0101	0.0010	mg/L	0.01000		101	70-130			
Chlorobenzene	0.0091	0.0010	mg/L	0.01000		91	70-130			
Chloroethane	0.0093	0.0020	mg/L	0.01000		93	70-130			
Chloroform	0.0106	0.0010	mg/L	0.01000		106	70-130			
Chloromethane	0.0108	0.0020	mg/L	0.01000		108	70-130			
cis-1,2-Dichloroethene	0.0114	0.0010	mg/L	0.01000		114	70-130			
cis-1,3-Dichloropropene	0.0118	0.0004	mg/L	0.01000		118	70-130			
Dibromochloromethane	0.0082	0.0010	mg/L	0.01000		82	70-130			
Dibromomethane	0.0113	0.0010	mg/L	0.01000		113	70-130			
Dichlorodifluoromethane	0.0090	0.0020	mg/L	0.01000		91	70-130			
Diethyl Ether	0.0115	0.0010	mg/L	0.01000		115	70-130			
Di-isopropyl ether	0.0117	0.0010	mg/L	0.01000		117	70-130			
Ethyl tertiary-butyl ether	0.0111	0.0010	mg/L	0.01000		111	70-130			
Ethylbenzene	0.0087	0.0010	mg/L	0.01000		87	70-130			
Hexachlorobutadiene	0.0096	0.0006	mg/L	0.01000		96	70-130			
Hexachloroethane	0.0095	0.0010	mg/L	0.01000		95	70-130			
Isopropylbenzene	0.0099	0.0010	mg/L	0.01000		99	70-130			
Methyl tert-Butyl Ether	0.0109	0.0010	mg/L	0.01000		109	70-130			
Methylene Chloride	0.0112	0.0020	mg/L	0.01000		112	70-130			
Naphthalene	0.0097	0.0010	mg/L	0.01000		97	70-130			
n-Butylbenzene	0.0102	0.0010	mg/L	0.01000		102	70-130			
n-Propylbenzene	0.0100	0.0010	mg/L	0.01000		100	70-130			
sec-Butylbenzene	0.0095	0.0010	mg/L	0.01000		95	70-130			
Styrene	0.0087	0.0010	mg/L	0.01000		87	70-130			
tert-Butylbenzene	0.0097	0.0010	mg/L	0.01000		97	70-130			
Tertiary-amyl methyl ether	0.0105	0.0010	mg/L	0.01000		105	70-130			
Tetrachloroethene	0.0072	0.0010	mg/L	0.01000		72	70-130			
Tetrahydrofuran	0.0123	0.0050	mg/L	0.01000		123	70-130			
Toluene	0.0105	0.0010	mg/L	0.01000		105	70-130			
trans-1,2-Dichloroethene	0.0108	0.0010	mg/L	0.01000		108	70-130			
trans-1,3-Dichloropropene	0.0099	0.0004	mg/L	0.01000		99	70-130			
Trichloroethene	0.0105	0.0010	mg/L	0.01000		105	70-130			
Trichlorofluoromethane	0.0103	0.0010	mg/L	0.01000		103	70-130			
Vinyl Acetate	0.0109	0.0050	mg/L	0.01000		109	70-130			
Vinyl Chloride	0.0095	0.0010	mg/L	0.01000		95	70-130			
Xylene O	0.0096	0.0010	mg/L	0.01000		96	70-130			
Xylene P,M	0.0179	0.0020	mg/L	0.02000		89	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0283		mg/L	0.02500		113	70-130			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch DC01261 - 5030B

Surrogate: 4-Bromofluorobenzene	0.0226		mg/L	0.02500		91	70-130			
Surrogate: Dibromofluoromethane	0.0297		mg/L	0.02500		119	70-130			
Surrogate: Toluene-d8	0.0247		mg/L	0.02500		99	70-130			

LCS Dup										
1,1,1,2-Tetrachloroethane	0.0086	0.0010	mg/L	0.01000		86	70-130	1	25	
1,1,1-Trichloroethane	0.0100	0.0010	mg/L	0.01000		100	70-130	0.2	25	
1,1,2,2-Tetrachloroethane	0.0111	0.0005	mg/L	0.01000		111	70-130	2	25	
1,1,2-Trichloroethane	0.0111	0.0010	mg/L	0.01000		111	70-130	7	25	
1,1-Dichloroethane	0.0107	0.0010	mg/L	0.01000		107	70-130	2	25	
1,1-Dichloroethene	0.0107	0.0010	mg/L	0.01000		107	70-130	8	25	
1,1-Dichloropropene	0.0106	0.0020	mg/L	0.01000		106	70-130	3	25	
1,2,3-Trichlorobenzene	0.0083	0.0010	mg/L	0.01000		83	70-130	6	25	
1,2,3-Trichloropropane	0.0100	0.0010	mg/L	0.01000		100	70-130	0.7	25	
1,2,4-Trichlorobenzene	0.0076	0.0010	mg/L	0.01000		76	70-130	7	25	
1,2,4-Trimethylbenzene	0.0098	0.0010	mg/L	0.01000		98	70-130	3	25	
1,2-Dibromo-3-Chloropropane	0.0084	0.0050	mg/L	0.01000		84	70-130	11	25	
1,2-Dibromoethane	0.0094	0.0010	mg/L	0.01000		94	70-130	7	25	
1,2-Dichlorobenzene	0.0095	0.0010	mg/L	0.01000		95	70-130	3	25	
1,2-Dichloroethane	0.0101	0.0010	mg/L	0.01000		101	70-130	5	25	
1,2-Dichloropropane	0.0118	0.0010	mg/L	0.01000		118	70-130	4	25	
1,3,5-Trimethylbenzene	0.0097	0.0010	mg/L	0.01000		97	70-130	5	25	
1,3-Dichlorobenzene	0.0091	0.0010	mg/L	0.01000		91	70-130	4	25	
1,3-Dichloropropane	0.0099	0.0010	mg/L	0.01000		99	70-130	4	25	
1,4-Dichlorobenzene	0.0097	0.0010	mg/L	0.01000		97	70-130	2	25	
1,4-Dioxane - Screen	0.226	0.500	mg/L	0.2000		113	0-332	2	200	
1-Chlorohexane	0.0087	0.0010	mg/L	0.01000		87	70-130	4	25	
2,2-Dichloropropane	0.0096	0.0010	mg/L	0.01000		96	70-130	8	25	
2-Butanone	0.0621	0.0100	mg/L	0.05000		124	70-130	7	25	
2-Chlorotoluene	0.0099	0.0010	mg/L	0.01000		99	70-130	1	25	
2-Hexanone	0.0507	0.0100	mg/L	0.05000		101	70-130	4	25	
4-Chlorotoluene	0.0094	0.0010	mg/L	0.01000		94	70-130	4	25	
4-Isopropyltoluene	0.0094	0.0010	mg/L	0.01000		94	70-130	2	25	
4-Methyl-2-Pentanone	0.0589	0.0250	mg/L	0.05000		118	70-130	8	25	
Acetone	0.0559	0.0100	mg/L	0.05000		112	70-130	12	25	
Benzene	0.0113	0.0010	mg/L	0.01000		113	70-130	3	25	
Bromobenzene	0.0090	0.0020	mg/L	0.01000		90	70-130	0.4	25	
Bromochloromethane	0.0108	0.0010	mg/L	0.01000		108	70-130	3	25	
Bromodichloromethane	0.0109	0.0006	mg/L	0.01000		109	70-130	1	25	
Bromoform	0.0072	0.0010	mg/L	0.01000		72	70-130	0.8	25	
Bromomethane	0.0117	0.0020	mg/L	0.01000		117	70-130	3	25	
Carbon Disulfide	0.0114	0.0010	mg/L	0.01000		114	70-130	4	25	
Carbon Tetrachloride	0.0102	0.0010	mg/L	0.01000		102	70-130	0.6	25	
Chlorobenzene	0.0090	0.0010	mg/L	0.01000		90	70-130	0.8	25	
Chloroethane	0.0092	0.0020	mg/L	0.01000		92	70-130	0.8	25	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch DC01261 - 5030B

Chloroform	0.0103	0.0010	mg/L	0.01000		103	70-130	3	25	
Chloromethane	0.0095	0.0020	mg/L	0.01000		95	70-130	12	25	
cis-1,2-Dichloroethene	0.0105	0.0010	mg/L	0.01000		105	70-130	8	25	
cis-1,3-Dichloropropene	0.0112	0.0004	mg/L	0.01000		112	70-130	5	25	
Dibromochloromethane	0.0080	0.0010	mg/L	0.01000		80	70-130	3	25	
Dibromomethane	0.0108	0.0010	mg/L	0.01000		108	70-130	5	25	
Dichlorodifluoromethane	0.0087	0.0020	mg/L	0.01000		87	70-130	4	25	
Diethyl Ether	0.0115	0.0010	mg/L	0.01000		115	70-130	0.4	25	
Di-isopropyl ether	0.0118	0.0010	mg/L	0.01000		118	70-130	0.6	25	
Ethyl tertiary-butyl ether	0.0102	0.0010	mg/L	0.01000		102	70-130	9	25	
Ethylbenzene	0.0086	0.0010	mg/L	0.01000		86	70-130	1	25	
Hexachlorobutadiene	0.0094	0.0006	mg/L	0.01000		94	70-130	2	25	
Hexachloroethane	0.0093	0.0010	mg/L	0.01000		93	70-130	3	25	
Isopropylbenzene	0.0100	0.0010	mg/L	0.01000		100	70-130	2	25	
Methyl tert-Butyl Ether	0.0105	0.0010	mg/L	0.01000		105	70-130	3	25	
Methylene Chloride	0.0109	0.0020	mg/L	0.01000		109	70-130	3	25	
Naphthalene	0.0090	0.0010	mg/L	0.01000		90	70-130	7	25	
n-Butylbenzene	0.0102	0.0010	mg/L	0.01000		102	70-130	0.1	25	
n-Propylbenzene	0.0098	0.0010	mg/L	0.01000		98	70-130	2	25	
sec-Butylbenzene	0.0096	0.0010	mg/L	0.01000		97	70-130	2	25	
Styrene	0.0086	0.0010	mg/L	0.01000		86	70-130	1	25	
tert-Butylbenzene	0.0095	0.0010	mg/L	0.01000		95	70-130	2	25	
Tertiary-amyl methyl ether	0.0103	0.0010	mg/L	0.01000		103	70-130	2	25	
Tetrachloroethene	0.0072	0.0010	mg/L	0.01000		72	70-130	0.3	25	
Tetrahydrofuran	0.0112	0.0050	mg/L	0.01000		112	70-130	9	25	
Toluene	0.0099	0.0010	mg/L	0.01000		99	70-130	6	25	
trans-1,2-Dichloroethene	0.0108	0.0010	mg/L	0.01000		108	70-130	0.6	25	
trans-1,3-Dichloropropene	0.0095	0.0004	mg/L	0.01000		95	70-130	4	25	
Trichloroethene	0.0110	0.0010	mg/L	0.01000		110	70-130	4	25	
Trichlorofluoromethane	0.0100	0.0010	mg/L	0.01000		100	70-130	3	25	
Vinyl Acetate	0.0106	0.0050	mg/L	0.01000		106	70-130	3	25	
Vinyl Chloride	0.0089	0.0010	mg/L	0.01000		89	70-130	6	25	
Xylene O	0.0091	0.0010	mg/L	0.01000		91	70-130	5	25	
Xylene P,M	0.0184	0.0020	mg/L	0.02000		92	70-130	3	25	
Surrogate: 1,2-Dichloroethane-d4	0.0276		mg/L	0.02500		111	70-130			
Surrogate: 4-Bromofluorobenzene	0.0239		mg/L	0.02500		95	70-130			
Surrogate: Dibromofluoromethane	0.0278		mg/L	0.02500		111	70-130			
Surrogate: Toluene-d8	0.0245		mg/L	0.02500		98	70-130			

8270D Semi-Volatile Organic Compounds

Batch DC01608 - 3520C

Blank										
1,1-Biphenyl	ND	0.010	mg/L							
1,2,4-Trichlorobenzene	ND	0.010	mg/L							
1,2-Dichlorobenzene	ND	0.010	mg/L							



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch DC01608 - 3520C

1,3-Dichlorobenzene	ND	0.010	mg/L							
1,4-Dichlorobenzene	ND	0.010	mg/L							
2,3,4,6-Tetrachlorophenol	ND	0.050	mg/L							
2,4,5-Trichlorophenol	ND	0.010	mg/L							
2,4,6-Trichlorophenol	ND	0.010	mg/L							
2,4-Dichlorophenol	ND	0.010	mg/L							
2,4-Dimethylphenol	ND	0.050	mg/L							
2,4-Dinitrophenol	ND	0.050	mg/L							
2,4-Dinitrotoluene	ND	0.010	mg/L							
2,6-Dinitrotoluene	ND	0.010	mg/L							
2-Chloronaphthalene	ND	0.010	mg/L							
2-Chlorophenol	ND	0.010	mg/L							
2-Methylphenol	ND	0.010	mg/L							
2-Nitroaniline	ND	0.010	mg/L							
2-Nitrophenol	ND	0.010	mg/L							
3,3'-Dichlorobenzidine	ND	0.020	mg/L							
3+4-Methylphenol	ND	0.020	mg/L							
3-Nitroaniline	ND	0.010	mg/L							
4,6-Dinitro-2-Methylphenol	ND	0.050	mg/L							
4-Bromophenyl-phenylether	ND	0.010	mg/L							
4-Chloro-3-Methylphenol	ND	0.010	mg/L							
4-Chloroaniline	ND	0.020	mg/L							
4-Chloro-phenyl-phenyl ether	ND	0.010	mg/L							
4-Nitroaniline	ND	0.010	mg/L							
4-Nitrophenol	ND	0.050	mg/L							
Acetophenone	ND	0.010	mg/L							
Aniline	ND	0.010	mg/L							
Azobenzene	ND	0.020	mg/L							
Benzoic Acid	ND	0.100	mg/L							
Benzyl Alcohol	ND	0.010	mg/L							
bis(2-Chloroethoxy)methane	ND	0.010	mg/L							
bis(2-Chloroethyl)ether	ND	0.010	mg/L							
bis(2-chloroisopropyl)Ether	ND	0.010	mg/L							
bis(2-Ethylhexyl)phthalate	ND	0.006	mg/L							
Butylbenzylphthalate	ND	0.010	mg/L							
Carbazole	ND	0.010	mg/L							
Dibenzofuran	ND	0.010	mg/L							
Diethylphthalate	ND	0.010	mg/L							
Dimethylphthalate	ND	0.010	mg/L							
Di-n-butylphthalate	ND	0.010	mg/L							
Di-n-octylphthalate	ND	0.010	mg/L							
Hexachlorobutadiene	ND	0.010	mg/L							
Hexachlorocyclopentadiene	ND	0.025	mg/L							
Hexachloroethane	ND	0.005	mg/L							
Isophorone	ND	0.010	mg/L							



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
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8270D Semi-Volatile Organic Compounds

Batch DC01608 - 3520C

Nitrobenzene	ND	0.010	mg/L							
N-Nitrosodimethylamine	ND	0.010	mg/L							
N-Nitroso-Di-n-Propylamine	ND	0.010	mg/L							
N-nitrosodiphenylamine	ND	0.010	mg/L							
Phenol	ND	0.010	mg/L							
Pyridine	ND	0.100	mg/L							
Surrogate: 1,2-Dichlorobenzene-d4	0.0572		mg/L	0.1000		57	30-130			
Surrogate: 2,4,6-Tribromophenol	0.0934		mg/L	0.1500		62	15-110			
Surrogate: 2-Chlorophenol-d4	0.0859		mg/L	0.1500		57	15-110			
Surrogate: 2-Fluorobiphenyl	0.0576		mg/L	0.1000		58	30-130			
Surrogate: 2-Fluorophenol	0.0682		mg/L	0.1500		45	15-110			
Surrogate: Nitrobenzene-d5	0.0653		mg/L	0.1000		65	30-130			
Surrogate: Phenol-d6	0.0834		mg/L	0.1500		56	15-110			
Surrogate: p-Terphenyl-d14	0.0662		mg/L	0.1000		66	30-130			

LCS

1,1-Biphenyl	0.088	0.010	mg/L	0.1000		88	40-140			
1,2,4-Trichlorobenzene	0.081	0.010	mg/L	0.1000		81	40-140			
1,2-Dichlorobenzene	0.080	0.010	mg/L	0.1000		80	40-140			
1,3-Dichlorobenzene	0.078	0.010	mg/L	0.1000		78	40-140			
1,4-Dichlorobenzene	0.079	0.010	mg/L	0.1000		79	40-140			
2,3,4,6-Tetrachlorophenol	0.086	0.050	mg/L	0.1000		86	40-140			
2,4,5-Trichlorophenol	0.092	0.010	mg/L	0.1000		92	30-130			
2,4,6-Trichlorophenol	0.088	0.010	mg/L	0.1000		88	30-130			
2,4-Dichlorophenol	0.083	0.010	mg/L	0.1000		83	30-130			
2,4-Dimethylphenol	0.076	0.050	mg/L	0.1000		76	30-130			
2,4-Dinitrophenol	0.107	0.050	mg/L	0.1000		107	30-130			
2,4-Dinitrotoluene	0.103	0.010	mg/L	0.1000		103	40-140			
2,6-Dinitrotoluene	0.092	0.010	mg/L	0.1000		92	40-140			
2-Chloronaphthalene	0.084	0.010	mg/L	0.1000		84	40-140			
2-Chlorophenol	0.076	0.010	mg/L	0.1000		76	30-130			
2-Methylphenol	0.079	0.010	mg/L	0.1000		79	30-130			
2-Nitroaniline	0.114	0.010	mg/L	0.1000		114	40-140			
2-Nitrophenol	0.084	0.010	mg/L	0.1000		84	30-130			
3,3'-Dichlorobenzidine	0.090	0.020	mg/L	0.1000		90	40-140			
3+4-Methylphenol	0.167	0.020	mg/L	0.2000		83	30-130			
3-Nitroaniline	0.097	0.010	mg/L	0.1000		97	40-140			
4,6-Dinitro-2-Methylphenol	0.110	0.050	mg/L	0.1000		110	30-130			
4-Bromophenyl-phenylether	0.091	0.010	mg/L	0.1000		91	40-140			
4-Chloro-3-Methylphenol	0.092	0.010	mg/L	0.1000		92	30-130			
4-Chloroaniline	0.064	0.020	mg/L	0.1000		64	40-140			
4-Chloro-phenyl-phenyl ether	0.089	0.010	mg/L	0.1000		89	40-140			
4-Nitroaniline	0.102	0.010	mg/L	0.1000		102	40-140			
4-Nitrophenol	0.104	0.050	mg/L	0.1000		104	30-130			
Acetophenone	0.083	0.010	mg/L	0.1000		83	40-140			
Aniline	0.079	0.010	mg/L	0.1000		79	40-140			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch DC01608 - 3520C

Azobenzene	0.102	0.020	mg/L	0.1000		102	40-140			
Benzoic Acid	0.084	0.100	mg/L	0.1000		84	40-140			
Benzyl Alcohol	0.086	0.010	mg/L	0.1000		86	40-140			
bis(2-Chloroethoxy)methane	0.089	0.010	mg/L	0.1000		89	40-140			
bis(2-Chloroethyl)ether	0.088	0.010	mg/L	0.1000		88	40-140			
bis(2-chloroisopropyl)Ether	0.082	0.010	mg/L	0.1000		82	40-140			
bis(2-Ethylhexyl)phthalate	0.115	0.006	mg/L	0.1000		115	40-140			
Butylbenzylphthalate	0.112	0.010	mg/L	0.1000		112	40-140			
Carbazole	0.099	0.010	mg/L	0.1000		99	40-140			
Dibenzofuran	0.088	0.010	mg/L	0.1000		88	40-140			
Diethylphthalate	0.094	0.010	mg/L	0.1000		94	40-140			
Dimethylphthalate	0.094	0.010	mg/L	0.1000		94	40-140			
Di-n-butylphthalate	0.103	0.010	mg/L	0.1000		103	40-140			
Di-n-octylphthalate	0.107	0.010	mg/L	0.1000		107	40-140			
Hexachlorobutadiene	0.081	0.010	mg/L	0.1000		81	40-140			
Hexachlorocyclopentadiene	0.053	0.025	mg/L	0.1000		53	40-140			
Hexachloroethane	0.081	0.005	mg/L	0.1000		81	40-140			
Isophorone	0.077	0.010	mg/L	0.1000		77	40-140			
Nitrobenzene	0.089	0.010	mg/L	0.1000		89	40-140			
N-Nitrosodimethylamine	0.085	0.010	mg/L	0.1000		85	40-140			
N-Nitroso-Di-n-Propylamine	0.090	0.010	mg/L	0.1000		90	40-140			
N-nitrosodiphenylamine	0.087	0.010	mg/L	0.1000		87	40-140			
Phenol	0.087	0.010	mg/L	0.1000		87	30-130			
Pyridine	0.073	0.100	mg/L	0.1000		73	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	0.0841		mg/L	0.1000		84	30-130			
Surrogate: 2,4,6-Tribromophenol	0.147		mg/L	0.1500		98	15-110			
Surrogate: 2-Chlorophenol-d4	0.121		mg/L	0.1500		80	15-110			
Surrogate: 2-Fluorobiphenyl	0.0911		mg/L	0.1000		91	30-130			
Surrogate: 2-Fluorophenol	0.101		mg/L	0.1500		67	15-110			
Surrogate: Nitrobenzene-d5	0.0988		mg/L	0.1000		99	30-130			
Surrogate: Phenol-d6	0.126		mg/L	0.1500		84	15-110			
Surrogate: p-Terphenyl-d14	0.105		mg/L	0.1000		105	30-130			

LCS Dup

1,1-Biphenyl	0.091	0.010	mg/L	0.1000		91	40-140	4	20	
1,2,4-Trichlorobenzene	0.083	0.010	mg/L	0.1000		83	40-140	2	20	
1,2-Dichlorobenzene	0.083	0.010	mg/L	0.1000		83	40-140	3	20	
1,3-Dichlorobenzene	0.080	0.010	mg/L	0.1000		80	40-140	3	20	
1,4-Dichlorobenzene	0.081	0.010	mg/L	0.1000		81	40-140	3	20	
2,3,4,6-Tetrachlorophenol	0.091	0.050	mg/L	0.1000		91	40-140	6	20	
2,4,5-Trichlorophenol	0.099	0.010	mg/L	0.1000		99	30-130	7	20	
2,4,6-Trichlorophenol	0.096	0.010	mg/L	0.1000		96	30-130	8	20	
2,4-Dichlorophenol	0.090	0.010	mg/L	0.1000		90	30-130	8	20	
2,4-Dimethylphenol	0.084	0.050	mg/L	0.1000		84	30-130	10	20	
2,4-Dinitrophenol	0.121	0.050	mg/L	0.1000		121	30-130	13	20	
2,4-Dinitrotoluene	0.108	0.010	mg/L	0.1000		108	40-140	5	20	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch DC01608 - 3520C

2,6-Dinitrotoluene	0.097	0.010	mg/L	0.1000		97	40-140	5	20	
2-Chloronaphthalene	0.087	0.010	mg/L	0.1000		87	40-140	4	20	
2-Chlorophenol	0.084	0.010	mg/L	0.1000		84	30-130	10	20	
2-Methylphenol	0.088	0.010	mg/L	0.1000		88	30-130	10	20	
2-Nitroaniline	0.121	0.010	mg/L	0.1000		121	40-140	6	20	
2-Nitrophenol	0.090	0.010	mg/L	0.1000		90	30-130	7	20	
3,3'-Dichlorobenzidine	0.093	0.020	mg/L	0.1000		93	40-140	3	20	
3+4-Methylphenol	0.186	0.020	mg/L	0.2000		93	30-130	11	20	
3-Nitroaniline	0.102	0.010	mg/L	0.1000		102	40-140	5	20	
4,6-Dinitro-2-Methylphenol	0.120	0.050	mg/L	0.1000		120	30-130	8	20	
4-Bromophenyl-phenylether	0.096	0.010	mg/L	0.1000		96	40-140	5	20	
4-Chloro-3-Methylphenol	0.098	0.010	mg/L	0.1000		98	30-130	6	20	
4-Chloroaniline	0.068	0.020	mg/L	0.1000		68	40-140	6	20	
4-Chloro-phenyl-phenyl ether	0.094	0.010	mg/L	0.1000		94	40-140	6	20	
4-Nitroaniline	0.109	0.010	mg/L	0.1000		109	40-140	6	20	
4-Nitrophenol	0.110	0.050	mg/L	0.1000		110	30-130	6	20	
Acetophenone	0.089	0.010	mg/L	0.1000		89	40-140	7	20	
Aniline	0.087	0.010	mg/L	0.1000		87	40-140	9	20	
Azobenzene	0.121	0.020	mg/L	0.1000		121	40-140	17	20	
Benzoic Acid	0.101	0.100	mg/L	0.1000		101	40-140	18	20	
Benzyl Alcohol	0.088	0.010	mg/L	0.1000		88	40-140	3	20	
bis(2-Chloroethoxy)methane	0.093	0.010	mg/L	0.1000		93	40-140	4	20	
bis(2-Chloroethyl)ether	0.092	0.010	mg/L	0.1000		92	40-140	5	20	
bis(2-chloroisopropyl)Ether	0.087	0.010	mg/L	0.1000		87	40-140	5	20	
bis(2-Ethylhexyl)phthalate	0.122	0.006	mg/L	0.1000		122	40-140	6	20	
Butylbenzylphthalate	0.120	0.010	mg/L	0.1000		120	40-140	6	20	
Carbazole	0.102	0.010	mg/L	0.1000		102	40-140	3	20	
Dibenzofuran	0.092	0.010	mg/L	0.1000		92	40-140	4	20	
Diethylphthalate	0.099	0.010	mg/L	0.1000		99	40-140	5	20	
Dimethylphthalate	0.098	0.010	mg/L	0.1000		97	40-140	3	20	
Di-n-butylphthalate	0.107	0.010	mg/L	0.1000		107	40-140	4	20	
Di-n-octylphthalate	0.116	0.010	mg/L	0.1000		116	40-140	8	20	
Hexachlorobutadiene	0.081	0.010	mg/L	0.1000		81	40-140	0.8	20	
Hexachlorocyclopentadiene	0.056	0.025	mg/L	0.1000		56	40-140	5	20	
Hexachloroethane	0.083	0.005	mg/L	0.1000		83	40-140	2	20	
Isophorone	0.081	0.010	mg/L	0.1000		81	40-140	5	20	
Nitrobenzene	0.092	0.010	mg/L	0.1000		92	40-140	3	20	
N-Nitrosodimethylamine	0.086	0.010	mg/L	0.1000		86	40-140	2	20	
N-Nitroso-Di-n-Propylamine	0.097	0.010	mg/L	0.1000		97	40-140	8	20	
N-nitrosodiphenylamine	0.090	0.010	mg/L	0.1000		90	40-140	3	20	
Phenol	0.096	0.010	mg/L	0.1000		96	30-130	10	20	
Pyridine	0.075	0.100	mg/L	0.1000		75	40-140	3	20	
Surrogate: 1,2-Dichlorobenzene-d4	0.0868		mg/L	0.1000		87	30-130			
Surrogate: 2,4,6-Tribromophenol	0.153		mg/L	0.1500		102	15-110			
Surrogate: 2-Chlorophenol-d4	0.131		mg/L	0.1500		87	15-110			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D Semi-Volatile Organic Compounds

Batch DC01608 - 3520C

Surrogate: 2-Fluorobiphenyl	0.0922		mg/L	0.1000		92	30-130			
Surrogate: 2-Fluorophenol	0.113		mg/L	0.1500		75	15-110			
Surrogate: Nitrobenzene-d5	0.0999		mg/L	0.1000		100	30-130			
Surrogate: Phenol-d6	0.136		mg/L	0.1500		91	15-110			
Surrogate: p-Terphenyl-d14	0.110		mg/L	0.1000		110	30-130			

8270D(SIM) Semi-Volatile Organic Compounds

Batch DC01608 - 3520C

Blank

2-Methylnaphthalene	ND	0.00020	mg/L							
Acenaphthene	ND	0.00020	mg/L							
Acenaphthylene	ND	0.00020	mg/L							
Anthracene	ND	0.00020	mg/L							
Benzo(a)anthracene	ND	0.00005	mg/L							
Benzo(a)pyrene	ND	0.00005	mg/L							
Benzo(b)fluoranthene	ND	0.00005	mg/L							
Benzo(g,h,i)perylene	ND	0.00020	mg/L							
Benzo(k)fluoranthene	ND	0.00005	mg/L							
Chrysene	ND	0.00005	mg/L							
Dibenzo(a,h)Anthracene	ND	0.00005	mg/L							
Fluoranthene	ND	0.00020	mg/L							
Fluorene	ND	0.00020	mg/L							
Hexachlorobenzene	ND	0.00020	mg/L							
Indeno(1,2,3-cd)Pyrene	ND	0.00005	mg/L							
Naphthalene	ND	0.00020	mg/L							
Pentachlorophenol	ND	0.00090	mg/L							
Phenanthrene	ND	0.00020	mg/L							
Pyrene	ND	0.00020	mg/L							

LCS

2-Methylnaphthalene	0.0777	0.00400	mg/L	0.1000		78	40-140			
Acenaphthene	0.0856	0.00400	mg/L	0.1000		86	40-140			
Acenaphthylene	0.0791	0.00400	mg/L	0.1000		79	40-140			
Anthracene	0.0873	0.00400	mg/L	0.1000		87	40-140			
Benzo(a)anthracene	0.0848	0.00100	mg/L	0.1000		85	40-140			
Benzo(a)pyrene	0.0908	0.00100	mg/L	0.1000		91	40-140			
Benzo(b)fluoranthene	0.0933	0.00100	mg/L	0.1000		93	40-140			
Benzo(g,h,i)perylene	0.0917	0.00400	mg/L	0.1000		92	40-140			
Benzo(k)fluoranthene	0.0894	0.00100	mg/L	0.1000		89	40-140			
Chrysene	0.0895	0.00100	mg/L	0.1000		89	40-140			
Dibenzo(a,h)Anthracene	0.0939	0.00100	mg/L	0.1000		94	40-140			
Fluoranthene	0.0967	0.00400	mg/L	0.1000		97	40-140			
Fluorene	0.0926	0.00400	mg/L	0.1000		93	40-140			
Hexachlorobenzene	0.104	0.00400	mg/L	0.1000		104	40-140			
Indeno(1,2,3-cd)Pyrene	0.101	0.00100	mg/L	0.1000		101	40-140			



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
 Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D(SIM) Semi-Volatile Organic Compounds

Batch DC01608 - 3520C

Naphthalene	0.0762	0.00400	mg/L	0.1000		76	40-140			
Pentachlorophenol	0.0713	0.0180	mg/L	0.1000		71	30-130			
Phenanthrene	0.0869	0.00400	mg/L	0.1000		87	40-140			
Pyrene	0.0968	0.00400	mg/L	0.1000		97	40-140			

LCS Dup

2-Methylnaphthalene	0.0848	0.00400	mg/L	0.1000		85	40-140	9	20	
Acenaphthene	0.0917	0.00400	mg/L	0.1000		92	40-140	7	20	
Acenaphthylene	0.0853	0.00400	mg/L	0.1000		85	40-140	7	20	
Anthracene	0.0922	0.00400	mg/L	0.1000		92	40-140	5	20	
Benzo(a)anthracene	0.0895	0.00100	mg/L	0.1000		89	40-140	5	20	
Benzo(a)pyrene	0.0971	0.00100	mg/L	0.1000		97	40-140	7	20	
Benzo(b)fluoranthene	0.0993	0.00100	mg/L	0.1000		99	40-140	6	20	
Benzo(g,h,i)perylene	0.0947	0.00400	mg/L	0.1000		95	40-140	3	20	
Benzo(k)fluoranthene	0.0952	0.00100	mg/L	0.1000		95	40-140	6	20	
Chrysene	0.0936	0.00100	mg/L	0.1000		94	40-140	5	20	
Dibenzo(a,h)Anthracene	0.0961	0.00100	mg/L	0.1000		96	40-140	2	20	
Fluoranthene	0.102	0.00400	mg/L	0.1000		102	40-140	5	20	
Fluorene	0.0988	0.00400	mg/L	0.1000		99	40-140	7	20	
Hexachlorobenzene	0.115	0.00400	mg/L	0.1000		115	40-140	11	20	
Indeno(1,2,3-cd)Pyrene	0.104	0.00100	mg/L	0.1000		104	40-140	3	20	
Naphthalene	0.0798	0.00400	mg/L	0.1000		80	40-140	5	20	
Pentachlorophenol	0.0766	0.0180	mg/L	0.1000		77	30-130	7	20	
Phenanthrene	0.0922	0.00400	mg/L	0.1000		92	40-140	6	20	
Pyrene	0.105	0.00400	mg/L	0.1000		105	40-140	8	20	



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

Notes and Definitions

- U Analyte included in the analysis, but not detected
- Q Calibration required quadratic regression (Q).
- D Diluted.
- CD+ Continuing Calibration %Diff/Drift is above control limit (CD+).
- CD- Continuing Calibration %Diff/Drift is below control limit (CD-).
- 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
- RL Reporting Limit
- EDL Estimated Detection Limit
- MF Membrane Filtration
- MPN Most Probably Number
- TNTC Too numerous to Count
- CFU Colony Forming Units



CERTIFICATE OF ANALYSIS

Client Name: Beta Engineering
Client Project ID: NBC III

ESS Laboratory Work Order: 20C0407

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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: RI00002

<http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml>

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.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx>

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/TB
 Shipped/Delivered Via: Client

ESS Project ID: 20C0407
 Date Received: 3/12/2020
 Project Due Date: 3/19/2020
 Days for Project: 5 Day

1. Air bill manifest present? No
 Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
 Temp: 1.9 Iced with: Ice
5. Was COC signed and dated by client? Yes

6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. Were labs informed about short holds & rushes? Yes / No / NA
10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes No
 ESS Sample IDs: _____
 Analysis: _____
 TAT: _____

12. Were VOAs received? Yes / No
 a. Air bubbles in aqueous VOAs? Yes / No
 b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? Yes / No
 a. If metals preserved upon receipt: Date: _____ Time: _____ By: _____
 b. Low Level VOA vials frozen: Date: _____ Time: _____ By: _____

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / No
 a. Was there a need to contact the client? Yes / No
 Who was contacted? _____ Date: _____ Time: _____ By: _____

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	23032	Yes	N/A	Yes	1L Amber	NP	
1	23033	Yes	N/A	Yes	1L Amber	NP	
1	23034	Yes	N/A	Yes	1L Amber	NP	
1	23035	Yes	N/A	Yes	1L Amber	NP	
1	23036	Yes	N/A	Yes	1L Amber	NP	
1	23042	Yes	N/A	Yes	250 mL Poly	HNO3	
1	23044	Yes	No	Yes	VOA Vial	HCl	
1	23045	Yes	No	Yes	VOA Vial	HCl	
1	23046	Yes	No	Yes	VOA Vial	HCl	
2	23037	Yes	N/A	Yes	1L Amber	NP	
2	23038	Yes	N/A	Yes	1L Amber	NP	
2	23039	Yes	N/A	Yes	1L Amber	NP	
2	23040	Yes	N/A	Yes	1L Amber	NP	
2	23041	Yes	N/A	Yes	1L Amber	NP	
2	23043	Yes	N/A	Yes	250 mL Poly	HNO3	
2	23047	Yes	No	Yes	VOA Vial	HCl	
2	23048	Yes	No	Yes	VOA Vial	HCl	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Beta Engineering - ML/TB

ESS Project ID: 20C0407

Date Received: 3/12/2020

2 23049 Yes No Yes VOA Vial HCI

2nd Review

Were all containers scanned into storage/lab?

Are barcode labels on correct containers?

Are all Flashpoint stickers attached/container ID # circled?

Are all Hex Chrome stickers attached?

Are all QC stickers attached?

Are VOA stickers attached if bubbles noted?

Initials GA

Yes / No
 Yes / No / NA
 Yes / No / NA
 Yes / No / NA
 Yes / No / NA

Completed
By:

[Signature]

Date & Time:

3/12/20 1517

Reviewed
By:

[Signature]

Date & Time:

3/12/20 1643

Delivered
By:

[Signature]

Date & Time:

3/12/20 1643

ESS Laboratory

Division of Thielsch Engineering, Inc.
 185 Frances Avenue, Cranston RI 02910
 Tel. (401) 461-7181 Fax (401) 461-4486
 www.esslaboratory.com

CHAIN OF CUSTODY

Turn Time: 5 Days
 Regulatory State: RI
 Is this project for any of the following?:
 CT RCP MA MCP RGP

Project # 6412
 Project Name: NRC IIIA-4 and IIIA-5
 Address: 701 George Washington Highway
 Zip Code: 02885
 Email Address: jmcloughlin@beth-nrc.com

Company Name: Boh Corp
 Contact Person: Joe McLaughlin
 State: RI
 FAX Number: [Blank]

ESS Lab # 200407
 Reporting Limits: RIDEA RASDEC/ICDCC
 Electronic Deliverables: Data Checker Excel
 Other (Please Specify →)

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	VOCs	SVOCs	PCBs	TPH	PR-13 Metals
1	3/12/26	11:00	Grab	GW	MW-4	X	X	X	X	X
2	3/12/26	9:35	Grab	GW	MW-7	X	X	X	X	X

Container Type: AC-Air Cassette 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*
 Container Volume: 1-100 mL 2-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAcAc, NaOH 9-NH4Cl 10-DI H2O 11-Other*
 Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAcAc, NaOH 9-NH4Cl 10-DI H2O 11-Other*
 Number of Containers per Sample: 3

Sampled by: S. M. [Signature]
 Comments: Please specify "Other" preservative and containers types in this space

Laboratory Use Only
 Cooler Present: Drop Off Pickup
 Seals Intact: Pickup Drop Off
 Cooler Temperature: 19 °C

Relinquished by: (Signature, Date & Time)
 Received By: (Signature, Date & Time)

Relinquished by: (Signature, Date & Time)
 Received By: (Signature, Date & Time)

Relinquished by: (Signature, Date & Time)
 Received By: (Signature, Date & Time)

Relinquished by: (Signature, Date & Time)
 Received By: (Signature, Date & Time)

APEPNDIX I

RIDOT I-95 ELUR AND SMP

ENVIRONMENTAL LAND USAGE RESTRICTION

This Declaration of Environmental Land Usage Restriction (.Restriction.) is made on this _____ day of _____, 20____ by Rhode Island Department of Transportation (RIDOT), and its successors and/or assigns (hereinafter, the "Grantor").

WITNESSETH:

WHEREAS, the Grantor Rhode Island Department of Transportation is the owner in fee simple of certain real property identified as A.P 23 Lot 589, A.P. 23 Lot 619, A.P 53 Lot 703, A.P. Lot 766 and a portion of A.P. 54 Lot 806 in Pawtucket, Rhode Island (the "Property"), more particularly described in Exhibit 1A (Legal Descriptions) which is attached hereto and made a part hereof;

WHEREAS, the Property [as identified in the Class I survey which is attached hereto as Exhibit 2A (ELUR Parcels)] and is made a part hereof has been determined to contain soil which is contaminated with certain hazardous materials and/or petroleum in excess of applicable residential direct exposure criteria pursuant to the Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases ("Remediation Regulations");

WHEREAS, the Grantor and the Rhode Island Department of Environmental Management ("Department") have determined that the environmental land use restrictions set forth below are consistent with the regulations adopted by the Department pursuant to R.I.G.L. § 23-19.14-1 and that this restriction shall be a Conservation Restriction pursuant to R.I.G.L. § 34-39--1 et. seq. and shall not be subject to the 30 year limitation provided in R.I.G.L. § 34-4-21;

WHEREAS, the Department's written approval of this Restriction is contained in the document entitled: Remedial Approval Letter CASE # 2009-013 dated January 21, 2010 issued pursuant to the Remediation Regulations;

WHEREAS, to prevent exposure to or migration of hazardous materials and petroleum and to abate hazards to human health and/or the environment, and in accordance with the Remedial Approval Letter, the Grantor desires to impose certain restrictions upon the use, occupancy, and activities of and at the Property;

WHEREAS, the Grantor believes that this Restriction will effectively protect public health and the environment from such contamination; and

WHEREAS, the Grantor intends that such restrictions shall run with the land and be binding upon and enforceable against the Grantor and the Grantor's successors and assigns.

NOW, THEREFORE, Grantor agrees as follows:

A. Restrictions Applicable to the Property: In accordance with the Remedial Approval Letter, the use, occupancy and activity of and at the Property is restricted as follows:

- i. No residential use of the Property shall be permitted. Any future use of the property is limited to industrial/commercial activity that is not contrary to Department approvals and restrictions contained herein;
- ii. No groundwater at the Property shall be used as potable water;
- iii. No soil at the Property shall be disturbed in any manner without written permission of the Department's Office of Waste Management, except as permitted in the Remedial Action Work Plan (RAWP) and Soil Management Plan (SMP) approved by the Department in a written Remedial Approval Letter CASE # 2009-013 dated January 21, 2010 Exhibit 1B and attached hereto;
- iv. Humans engaged in activities at the Property shall not be exposed to soils containing hazardous materials and/or petroleum in concentrations exceeding the applicable Department approved direct exposure criteria set forth in the Remediation Regulations;
- v. The engineered controls at the Property described in the Post Remediation Soil Management Plan contained in Exhibit 2B attached hereto shall not be disturbed and shall be properly maintained to prevent humans from being exposed to soils containing hazardous materials and/or petroleum in concentrations exceeding the applicable Department-approved residential direct exposure criteria in accordance with the Remediation Regulations;

B. No action shall be taken, allowed, suffered, or omitted at the Property if such action or omission is reasonably likely to:

- i Create a risk of migration of hazardous materials and/or petroleum;
- ii Create a potential hazard to human health or the environment; or
- iii Result in the disturbance of any engineered controls utilized at the Property, except as permitted in the Department-approved Post Remediation Soil Management Plan contained in Exhibit 2B.

C. Emergencies: In the event of any emergency which presents a significant risk to human health or to the environment, including but not limited to, maintenance and repair of utility lines or a response to emergencies such as fire or flood, the application of Paragraphs A (iii. - viii.) and B above may be suspended, provided such risk cannot be abated without suspending such Paragraphs and the Grantor complies with the following:

- i Grantor shall notify the Department's Office of Waste Management in writing of the emergency as soon as possible but no more than three (3) business days after Grantor's having learned of the emergency. (This does not remove Grantor's obligation to notify any other necessary state, local or federal agencies.);
- ii Grantor shall limit both the extent and duration of the suspension to the minimum period

reasonable and necessary to adequately respond to the emergency;

- iii Grantor shall implement reasonable measures necessary to prevent actual, potential, present and future risk to human health and the environment resulting from such suspension;
- iv Grantor shall communicate at the time of written notification to the Department its intention to conduct the emergency response actions and provide a schedule to complete the emergency response actions;
- v Grantor shall continue to implement the emergency response actions, on the schedule submitted to the Department, to ensure that the Property is remediated, if applicable in accordance with the Remediation Regulations (or applicable variance) or restored to its condition prior to such emergency. Based upon information submitted to the Department at the time the ELUR was recorded pertaining to known environmental conditions at the Property, emergency maintenance and repair of utility lines shall only require restoration of the Property to its condition prior to the maintenance and repair of the utility lines; and
- vi Grantor shall submit to the Department, within ten (10) days after the completion of the emergency response action, a status report describing the emergency activities that have been completed.

D. Release of Restriction; Alterations of Subject Area: The Grantor shall not make, or allow or suffer to be made, any alteration of any kind in, to, or about any portion of the Property inconsistent with this Restriction unless the Grantor has received the Department's prior written approval for such alteration. If the Department determines that the proposed alteration is significant, the Department may require the amendment of this Restriction. Alterations deemed insignificant by the Department will be approved via a letter from the Department. The Department shall not approve any such alteration and shall not release the Property from the provisions of this Restriction unless the Grantor demonstrates to the Department's satisfaction that Grantor has managed the Property in accordance with applicable regulations.

E. Notice of Lessees and Other Holders of Interests in the Property: The Grantor, or any future holder of any interest in the Property, shall cause any lease, grant, or other transfer of any interest in the Property to include a provision expressly requiring the lessee, grantee, or transferee to comply with this Restriction. The failure to include such provision shall not affect the validity or applicability of this Restriction to the Property.

F. Enforceability: If any court of competent jurisdiction determines that any provision of this Restriction is invalid or unenforceable, the Grantor shall notify the Department in writing within fourteen (14) days of such determination.

G. Binding Effect: All of the terms, covenants, and conditions of this Restriction shall run with the land and shall be binding on the Grantor, its successors and assigns, and each Owner and any other party entitled to control, possession or use of the Property during such period of

Ownership or possession.

H. Inspection & Non-Compliance: It shall be the obligation of the Grantor, or any future holder of any interest in the Property, to provide for annual inspections of the Property for compliance with the ELUR in accordance with Department requirements. See Exhibit 3B

A qualified environmental professional will, on behalf of the Grantor or future holder of any interest in the Property, evaluate the compliance status of the Property on an annual basis. Upon completion of the evaluation, the environmental professional will prepare and simultaneously submit to the Department and to the Grantor or future holder of any interest in the Property an evaluation report detailing the findings of the inspection, and noting any compliance violations at the Property. If the Property is determined to be out of compliance with the terms of the ELUR, the Grantor or future holder of any interest in the Property shall submit a corrective action plan in writing to the Department within ten (10) days of receipt of the evaluation report, indicating the plans to bring the Property into compliance with the ELUR, including, at a minimum, a schedule for implementation of the plan.

In the event of any violation of the terms of this Restriction, which remains uncured more than ninety (90) days after written notice of violation, all Department approvals and agreements relating to the Property may be voided at the sole discretion of the Department.

I. Terms Used Herein: The definitions of terms used herein shall be the same as the definitions contained in Section 3 (DEFINITIONS) of the Remediation Regulations.

IN WITNESS WHEREOF, the Grantor has hereunto set (his/her) hand and seal on the day and year set forth above.

[Name of Person(s), company, LLC or LLP]

By: _____
Grantor (signature)

Grantor (typed name)

STATE OF RHODE ISLAND

COUNTY OF PROVIDENCE

In Pawtucket, in said County and State, on the ____ day of _____, 20____, before me personally appeared _____, to me known and known by me to be the party executing the foregoing instrument and (he/she) acknowledged said instrument by (him/her) executed to be (his/her) free act and deed.

Notary Public: _____

My Comm. Expires: _____

EXHIBIT 1A
LEGAL DESCRIPTIONS

E.L.U.R. PARCEL A.P. 23 LOT 575

That certain tract or parcel of land situated on the westerly side of River Street, and the northerly side of Division St. in the City of Pawtucket, County of Providence and State of Rhode Island being more particularly bounded and described as follows:

Beginning at a point on the northerly sideline of said Division Street, said point being the southwesterly corner of herein described parcel;

Thence N20° - 28' - 40" W for a distance of one hundred six and 55/100 (106.55) feet to a point;

Thence N76° - 31' - 38" E for a distance of two hundred ninety-seven and 82/100 (297.82) feet to a point in the westerly sideline of said River Street;

Thence S14° - 28' - 40" E along the westerly sideline of said River Street for a distance of one hundred twenty-one and 51/100 (121.51) feet to a point;

Thence southerly bearing southwesterly along the arc of a curve having a radius of twenty and 00/100 (20.00) feet and an arc length of eleven and 91/100 (11.91) feet to a point in the northerly sideline of said Division Street;

Thence S80° - 00' - 57" W along the northerly sideline of said Division Street for a distance of one hundred fifty-four and 26/100 (154.26) feet to a point;

Thence S84° - 15' - 57" W along the northerly sideline of said Division Street for a distance of one hundred thirty and 93/100 (130.93) feet to the point and place of beginning.

The above described parcel contains an area of 35,562 square feet of land more or less (0.82 ac ±) and is shown as A.P. 23 Lot 575 on a plan titled "Environmental Land Usage Restriction Parcels Bridge Replacement Pawtucket Bridge No. 550 Pawtucket, Rhode Island scale 1"=50', date Dec 5, 2014, prepared for Commonwealth Engineers and Consultants Inc. by Crossman Engineering."

E.L.U.R. PARCEL A.P. 23 LOT 589

That certain tract or parcel of land situated between School St. and Water St., and northerly of Division St. in the City of Pawtucket, County of Providence and State of Rhode Island being more particularly bounded and described as follows:

Beginning at a point on the easterly sideline of said Water Street, said point being the southwesterly corner of herein describes parcel;

Thence N08° - 53' - 48" W along the easterly sideline of said Water Street for a distance of two hundred fifty-seven and 89/100 (257.89) feet to a point;

Thence N60° - 30' - 27" E for a distance of forty-nine and 90/100 (49.90) feet to a point;

Thence N43° - 51' - 46" E for a distance of one hundred twenty-two and 40/100 (122.40) feet to a point;

Thence N79° - 39' - 45" E for a distance of twenty and 11/100 (20.11) feet to a point on the westerly sideline of said School Street;

Thence S09° - 19' - 57" E along the westerly sideline of said School Street for a distance of two hundred ninety-four and 81/100 (294.81) feet to a point;

Thence S80° - 17' - 47" W for a distance of eighty and 23/100 (80.23) feet to a point;

Thence S08° - 38' - 47" E for a distance of twenty-four and 23/100 (24.23) feet to a point, said last 2 courses bounded southerly and easterly by land now or formerly of Sun Refining and Marketing Co.;

Thence S61° - 59' - 31" W for a distance of ninety-one and 20/100 (91.20) feet to the point and place of beginning, the last course bounded southerly by land now or formerly of Pawtucket Business Associates.

The above described parcel contains an area of 44,717 square feet of land more or less (1.03 ac ±) and is shown as A.P. 23 Lot 589 on a plan titled "Environmental Land Usage Restriction Parcels Bridge Replacement Pawtucket Bridge No. 550 Pawtucket, Rhode Island scale 1"=50', date Dec 5, 2014, prepared for Commonwealth Engineers and Consultants Inc. by Crossman Engineering."

E.L.U.R. PARCEL A.P. 23 LOT 619

That certain tract or parcel of land situated between Water Street and the Seekonk River, and northerly of Division St. in the City of Pawtucket, County of Providence and State of Rhode Island being more particularly bounded and described as follows:

Beginning at a point on the easterly side of the Seekonk River, said point being the southwesterly corner of herein described parcel;

Thence N01° - 08' - 52" E for a distance of two hundred fifty-one and 80/100 (251.80) feet to a point;

Thence N81° - 18' - 03" E for a distance of two hundred forty-six and 27/100 (246.27) feet to a point;

Thence N03° - 15' - 42" W for a distance of forty-eight and 38/100 (48.38) feet to a point;

Thence N80° - 25' - 51" E for a distance of one hundred eighty-eight and 80/100 (188.80) feet to a point;

Thence N07° - 10' - 06" W for a distance of twenty and 49/100 (20.49) feet to a point;

Thence N82° - 46' - 46" E for a distance of thirty-six and 00/100 (36.00) feet to a point;

Thence N80° - 25' - 51" E for a distance of one hundred forty-nine and 27/100 (149.27) feet to a point;

Thence N60° - 30' - 27" E for a distance of eleven and 75/100 (11.75) feet to a point;

Thence N80° - 26' - 05" E for a distance of nine and 04/100 (9.04) feet to a point in the westerly sideline of said Water Street;

Thence S08° - 53' - 44" E along the westerly sideline of said Water Street for a distance of two hundred fifty-seven and 24/100 (257.24) feet to a point;

Thence S67° - 51' - 54" W for a distance of seventy-eight and 35/100 (78.35) feet to a point;

Thence S59° - 38' - 08" W for a distance of thirty-seven and 99/100 (37.99) feet to a point;

Thence S84° - 13' - 30" W for a distance of seventy and 00/100 (70.00) feet to a point;

Thence S63° - 05' - 48" W for a distance of thirty-eight and 58/100 (38.58) feet to a point;

Thence S80° - 51' - 51" W for a distance of one hundred forty and 71/100 (140.71) feet to a point on the easterly sideline of River Street;

Thence N14° - 46' - 52" W along the easterly sideline of said River Street for a distance of twenty-seven and 17/100 (27.17) feet to a point;

Thence S75° - 13' - 08" W along the northerly side of said River Street for a distance of thirty-three and 66/100 (33.66) feet to a point;

Thence S14° - 28' - 23" E along the westerly sideline of said River Street for a distance of twenty-five and 02/100 (25.02) feet to a point;

Thence S76° - 31' - 38" W for a distance of two hundred ninety-seven and 82/100 (297.82) feet to the point and place of beginning.

The above described parcel contains an area of 170,901 square feet of land more or less (3.92 ac ±) and is shown as A.P. 23 Lot 619 on a plan titled "Environmental Land Usage Restriction Parcels Bridge Replacement Pawtucket Bridge No. 550 Pawtucket, Rhode Island scale 1"=50', date Dec 5, 2014, prepared for Commonwealth Engineers and Consultants Inc. by Crossman Engineering."

E.L.U.R. PARCEL A.P. 54 LOT 766 AND A PORTION OF A.P. 54 LOT 806

That certain tract or parcel of land situated between Taft Street and Pleasant Street, and northerly of Division St. in the City of Pawtucket, County of Providence and State of Rhode Island being more particularly bounded and described as follows:

Beginning at a point on the easterly sideline of said Pleasant Street, said point being the southwesterly corner of herein described parcel;

Thence N04° – 56' – 31" E along the easterly sideline of said Pleasant Street for a distance of two hundred seventy-five and 76/100 (275.76) feet to a point;

Thence S84° - 09' – 55" E for a distance of one hundred five and 22/100 (105.22) feet to a point on the westerly sideline of said Taft Street, said last course bounded northerly by land now or formerly of Elkin, Alfred A. and Gisele J.;

Thence S01° - 19' - 25" E along the westerly sideline of said Taft Street for a distance of two hundred thirty-eight and 94/100 (238.94) feet to a point;

Thence S79° - 21' – 38" W for a distance of one hundred thirty-six and 29/100 (136.29) feet to the point and place of beginning, said last course bounded southerly by land now or formerly of The City of Pawtucket.

The above described parcel contains an area of 30,573 square feet of land more or less (0.70 ac ±) and is shown as A.P. 54 Lot 766 and a portion of A.P. 54 Lot 806 on a plan titled "Environmental Land Usage Restriction Parcels Bridge Replacement Pawtucket Bridge No. 550 Pawtucket, Rhode Island scale 1"=50', date Dec 5, 2014, prepared for Commonwealth Engineers and Consultants Inc. by Crossman Engineering."

E.L.U.R. PARCEL A.P. 54 LOT 703

That certain tract or parcel of land situated between Taft Street and the Seekonk River, and northerly of Division St. in the City of Pawtucket, County of Providence and State of Rhode Island being more particularly bounded and described as follows:

Beginning at a point on the easterly sideline of said Taft Street, said point being the southwesterly corner of herein described parcel;

Thence N01° - 19' - 25" W along the easterly sideline of said Taft Street for a distance of one hundred ninety nine and 99/100 (199.99) feet to a point;

Thence N88° - 40' - 35" E for a distance of thirty-three and 29/100 (33.29) feet to a point;

Thence S07° - 46' - 57" W for a distance of one hundred twelve and 07/100 (112.07) feet to a point;

Thence S12° - 41' - 17" E for a distance of ninety-one and 12/100 (91.12) feet to a point;

Thence S88° - 40' - 37" W for a distance of thirty-three and 51/100 (33.51) feet to the point and place of beginning, said last course bounded southerly by land now or formerly of the State of RI and Providence Plantations.

The above described parcel contains an area of 4,894 square feet of land more or less (0.11 ac ±) and is shown as A.P. 54 Lot 703 on a plan titled "Environmental Land Usage Restriction Parcels Bridge Replacement Pawtucket Bridge No. 550 Pawtucket, Rhode Island scale 1"=50', date Dec 5, 2014, prepared for Commonwealth Engineers and Consultants Inc. by Crossman Engineering."

EXHIBIT 2A
STAMPED SITE PLAN

LEGEND

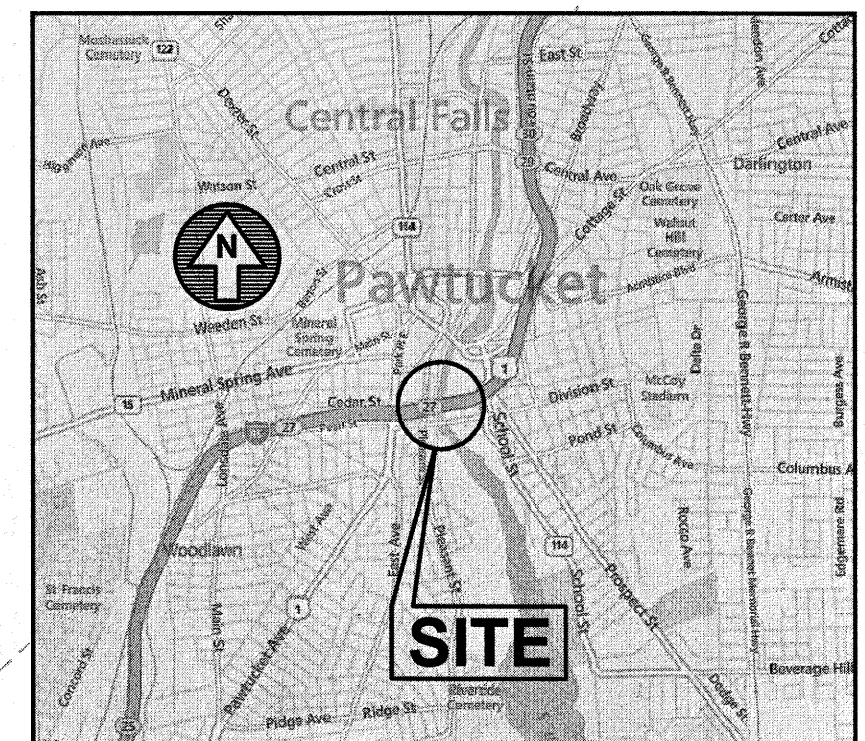
- PROPOSED ELUR PARCELS
- STATE FREEWAY LINE
- STATE HIGHWAY LINE
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- R.I.H.B.
- A.P.
- N/F
- *
NOW OR FORMERLY
- *
GROUND LIGHT
- *
LIGHT POLE
- *
UTILITY POLE
- *
ELECTRIC HANDHOLE
- *
ELECTRIC MANHOLE
- *
DRAINAGE MANHOLE
- *
CATCH BASIN
- *
CATCH BASIN W/ CURB INLET
- *
MANHOLE
- *
FIRE HYDRANT
- *
GAS VALVE
- *
RETAINING WALL
- *
CHAIN LINK FENCE
- *
SIGN

PLAN REFERENCES

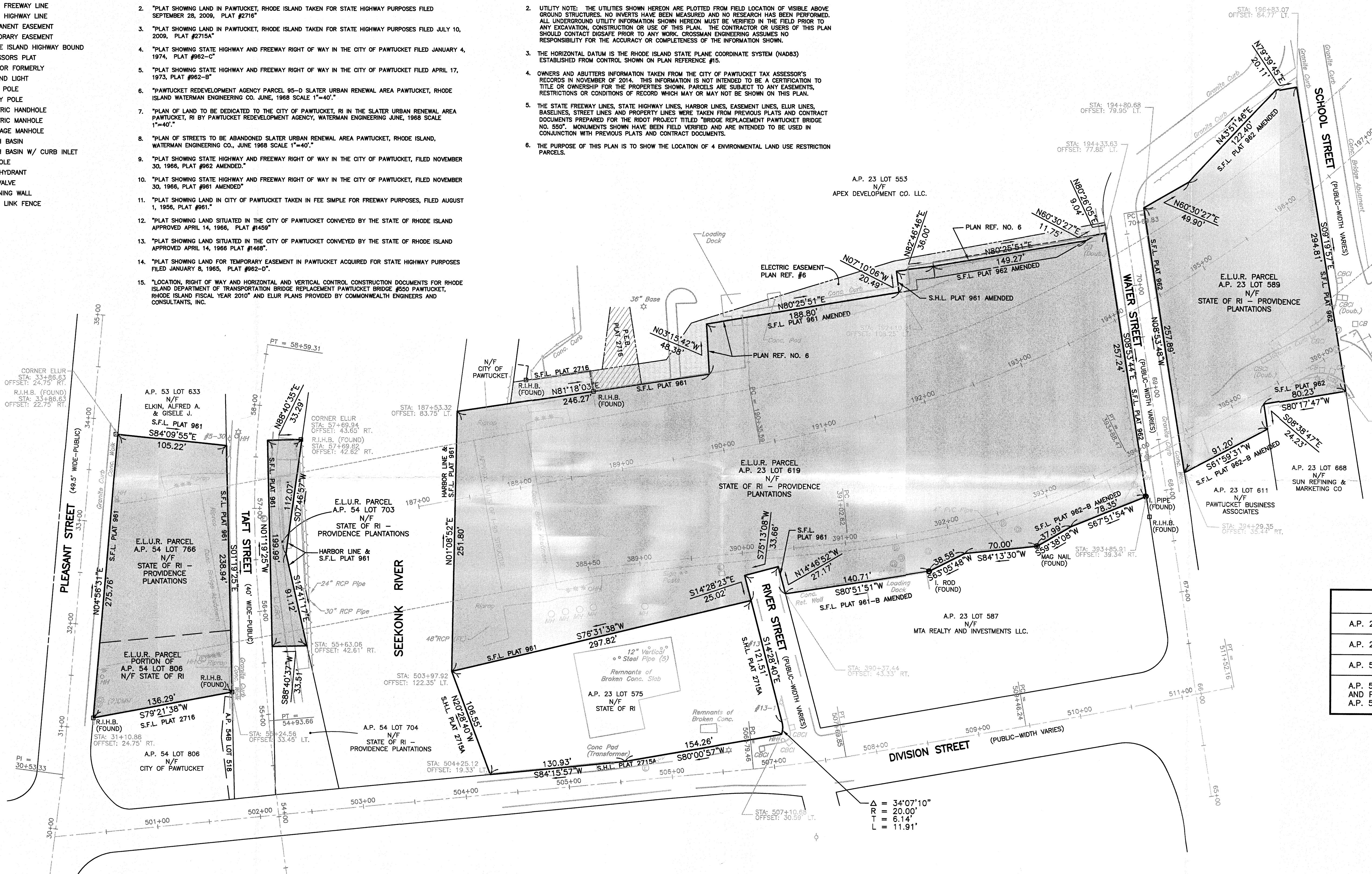
1. "PLAT SHOWING LAND IN PAWTUCKET, RHODE ISLAND TAKEN FOR STATE HIGHWAY PURPOSES FILED DECEMBER 27, 2012, PLAT #2716A"
2. "PLAT SHOWING LAND IN PAWTUCKET, RHODE ISLAND TAKEN FOR STATE HIGHWAY PURPOSES FILED SEPTEMBER 26, 2009, PLAT #2716"
3. "PLAT SHOWING LAND IN PAWTUCKET, RHODE ISLAND TAKEN FOR STATE HIGHWAY PURPOSES FILED JULY 10, 2009, PLAT #2715A"
4. "PLAT SHOWING STATE HIGHWAY AND FREEWAY RIGHT OF WAY IN THE CITY OF PAWTUCKET FILED JANUARY 4, 1974, PLAT #982-C"
5. "PLAT SHOWING STATE HIGHWAY AND FREEWAY RIGHT OF WAY IN THE CITY OF PAWTUCKET FILED APRIL 17, 1973, PLAT #982-B"
6. "PAWTUCKET REDEVELOPMENT AGENCY PARCEL 95-D SLATER URBAN RENEWAL AREA PAWTUCKET, RHODE ISLAND WATERMAN ENGINEERING CO., JUNE, 1968 SCALE 1"=40."
7. "PLAN OF LAND TO BE DEDICATED TO THE CITY OF PAWTUCKET, RI IN THE SLATER URBAN RENEWAL AREA PAWTUCKET, RI BY PAWTUCKET REDEVELOPMENT AGENCY, WATERMAN ENGINEERING JUNE, 1968 SCALE 1"=40."
8. "PLAN OF STREETS TO BE ABANDONED SLATER URBAN RENEWAL AREA PAWTUCKET, RHODE ISLAND, WATERMAN ENGINEERING CO., JUNE 1968 SCALE 1"=40."
9. "PLAT SHOWING STATE HIGHWAY AND FREEWAY RIGHT OF WAY IN THE CITY OF PAWTUCKET, FILED NOVEMBER 30, 1966, PLAT #962 AMENDED."
10. "PLAT SHOWING STATE HIGHWAY AND FREEWAY RIGHT OF WAY IN THE CITY OF PAWTUCKET, FILED NOVEMBER 30, 1966, PLAT #961 AMENDED"
11. "PLAT SHOWING LAND IN CITY OF PAWTUCKET TAKEN IN FEE SIMPLE FOR FREEWAY PURPOSES, FILED AUGUST 1, 1956, PLAT #961."
12. "PLAT SHOWING LAND SITUATED IN THE CITY OF PAWTUCKET CONVEYED BY THE STATE OF RHODE ISLAND APPROVED APRIL 14, 1966, PLAT #1459"
13. "PLAT SHOWING LAND SITUATED IN THE CITY OF PAWTUCKET CONVEYED BY THE STATE OF RHODE ISLAND APPROVED APRIL 14, 1966 PLAT #1469"
14. "PLAT SHOWING LAND FOR TEMPORARY EASEMENT IN PAWTUCKET ACQUIRED FOR STATE HIGHWAY PURPOSES FILED JANUARY 8, 1965, PLAT #962-D."
15. "LOCATION, RIGHT OF WAY AND HORIZONTAL AND VERTICAL CONTROL CONSTRUCTION DOCUMENTS FOR RHODE ISLAND DEPARTMENT OF TRANSPORTATION BRIDGE REPLACEMENT PAWTUCKET BRIDGE #550 PAWTUCKET, RHODE ISLAND FISCAL YEAR 2010" AND ELUR PLANS PROVIDED BY COMMONWEALTH ENGINEERS AND CONSULTANTS, INC.

NOTES

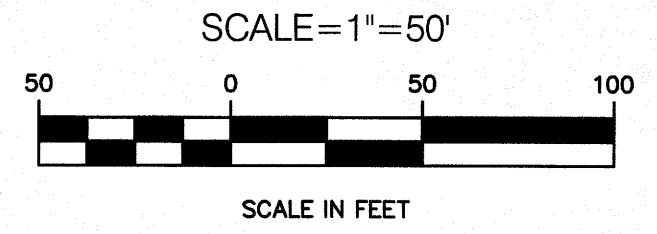
1. FIELD SURVEY WORK FOR EXISTING CONDITIONS PERFORMED BY CROSSMAN ENGINEERING IN NOVEMBER OF 2014.
2. UTILITY NOTE: THE UTILITIES SHOWN HEREON ARE PLOTTED FROM FIELD LOCATION OF VISIBLE ABOVE GROUND STRUCTURES. NO INVERTS HAVE BEEN MEASURED AND NO RESEARCH HAS BEEN PERFORMED. ALL UNDERGROUND UTILITY INFORMATION SHOWN HEREON MUST BE VERIFIED IN THE FIELD PRIOR TO ANY EXCAVATION, CONSTRUCTION OR USE OF THIS PLAN. THE CONTRACTOR OR USERS OF THIS PLAN SHOULD CONTACT DISAFAE PRIOR TO ANY WORK. CROSSMAN ENGINEERING ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN.
3. THE HORIZONTAL DATUM IS THE RHODE ISLAND STATE PLANE COORDINATE SYSTEM (NAD83) ESTABLISHED FROM CONTROL SHOWN ON PLAN REFERENCE #15.
4. OWNERS AND ABUTTERS INFORMATION TAKEN FROM THE CITY OF PAWTUCKET TAX ASSESSOR'S RECORDS IN NOVEMBER OF 2014. THIS INFORMATION IS NOT INTENDED TO BE A CERTIFICATION TO TITLE OR OWNERSHIP FOR THE PROPERTIES SHOWN. PARCELS ARE SUBJECT TO ANY EASEMENTS, RESTRICTIONS OR CONDITIONS OF RECORD WHICH MAY OR MAY NOT BE SHOWN ON THIS PLAN.
5. THE STATE FREEWAY LINES, STATE HIGHWAY LINES, HARBOR LINES, EASEMENT LINES, ELUR LINES, BASELINES, STREET LINES AND PROPERTY LINES WERE TAKEN FROM PREVIOUS PLATS AND CONTRACT DOCUMENTS PREPARED FOR THE RIDOT PROJECT TITLED "BRIDGE REPLACEMENT PAWTUCKET BRIDGE NO. 550". MONUMENTS SHOWN HAVE BEEN FIELD VERIFIED AND ARE INTENDED TO BE USED IN CONJUNCTION WITH PREVIOUS PLATS AND CONTRACT DOCUMENTS.
6. THE PURPOSE OF THIS PLAN IS TO SHOW THE LOCATION OF 4 ENVIRONMENTAL LAND USE RESTRICTION PARCELS.



LOCUS MAP
NOT TO SCALE



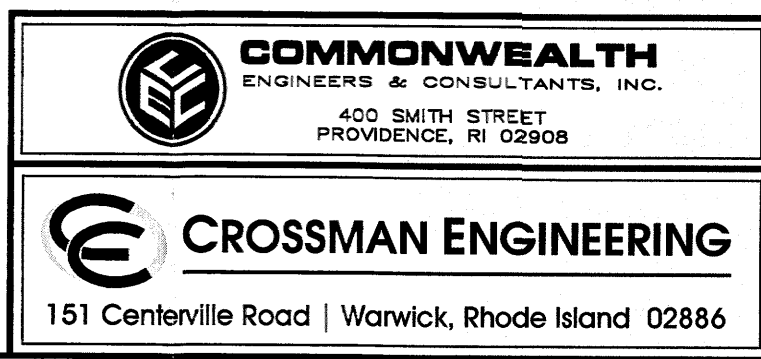
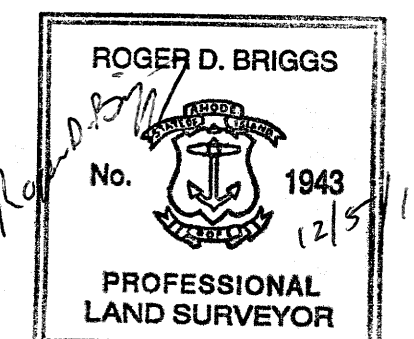
E.L.U.R. PARCELS AREA SUMMARY		
A.P. 23 LOT 589	44,717± S.F.	1.03± AC.
A.P. 23 LOT 619	170,901± S.F.	3.92± AC.
A.P. 54 LOT 703	4,894± S.F.	0.11± AC.
A.P. 54 LOT 766 AND PORTION OF A.P. 54 LOT 806	30,573± S.F.	0.70± AC.



CERTIFICATION

THIS PLAN SUBSTANTIALLY CONFORMS TO A CLASS 1 STANDARD AS ADOPTED BY THE RHODE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS.

By: *Roger D. Briggs* 12/5/14
REGISTERED PROFESSIONAL LAND SURVEYOR DATE
CROSSMAN ENGINEERING



**BRIDGE REPLACEMENT
PAWTUCKET BRIDGE NO. 550**

PAWTUCKET RHODE ISLAND

**ENVIRONMENTAL LAND
USAGE RESTRICTION PARCELS**

CHECKED BY R.D.B. DATE DEC. 5, 2014 SCALE 1" = 50'

V:\1485-ELUR\dwg\CURRENT\1485-ELUR.dwg, Layout1, 12/12/2014 9:47:29 AM, 1:1

EXHIBIT 1B

Remedial Approval Letter CASE # 2009-013

Dated January 21, 2010



RHODE ISLAND

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

235 Promenade Street, Providence, RI 02908-5767

TDD 401-222-4482

State of Rhode Island
Dept. of Transportation

JAN 22 2010

**REMEDIAL APPROVAL LETTER
CASE # 2009-013**

Engineering
Received

Mr. Peter Healey, P.E.
Supervising Chief Engineer
RI Department of Transportation
Two Capital Hill
Providence, Rhode Island 02903-1124

January 21, 2010

RE: Contract #1: Pawtucket Bridge #550 Replacement and Improvements and ROW
Elm Street, Water Street, River Street, George Street, Garden Street, Pleasant Street
Pine Street and Taft Street (Plat 23, Lots 619, 589/ Plat 54, Lots 703,766,827)

Dear Mr. Healey:

On February 24, 2004, the Rhode Island Department of Environmental Management's (the Department) Office of Waste Management (the Office) amended the Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (the Remediation Regulations). The purpose of these regulations is to create an integrated program requiring reporting, investigation and remediation of contaminated sites in order to eliminate and/or control threats to human health and the environment in a timely and cost-effective manner. A Remedial Approval Letter is a document used by the Department to approve remedial actions at contaminated sites that do not involve the use of complex engineered systems or techniques (e.g., groundwater pump and treat systems, soil vapor extraction systems, etc.).

The Office has received and reviewed the following documents:

- Site Investigation Report (Two Volumes) by Wright-Pierce, Inc. (WPI) dated September 18, 2009, and received September 22, 2009;
- Remedial Action Work Plan (Revised) for the Pawtucket River Bridge #550 Replacement and Improvements, Pawtucket R.I. dated December 23, 2009, received January 6, 2010, and prepared by Wright-Pierce Engineering for Commonwealth Engineers & Consultants, Inc. on behalf of the R.I. Department of Transportation.
- Construction Phase Soil Management Plan (Revised) for the Pawtucket River Bridge #550 Replacement and Improvements, Pawtucket R.I. dated December 23, 2009,

Remedial Approval Letter
RIDOT Pawtucket River Bridge #550 Replacement and Improvements,
Pawtucket, RI
Page 1

received January 6, 2010, and prepared by Wright-Pierce Engineering for Commonwealth Engineers & Consultants, Inc. on behalf of the R.I. Department of Transportation; and

- Public Notice to abutters dated October 20, 2009.

Together these documents fulfill the requirements of Section 8.00 (Risk Management) and Section 9.00 (Remedial Action Work Plan (RAWP)) of the Remediation Regulations.

At this time, the Office of Waste Management offers its concurrence with the RAWP and Construction Phase Soil Management Plan (SMP) that details the following proposed remedial action at the property:

Contract #1- Implement the approved Remedial Action Work Plan (RAWP) and Construction SMP for all contaminated soils associated with the Pawtucket Bridge #550 Replacement and Improvement project.

Upon completion of all site construction and remedial work associated with each contract, RIDOT shall submit a Closure Report with all disposal documentation, laboratory analysis and a draft Environmental Land Usage Restriction (ELUR) with an SMP, for review and approval. The ELUR to be recorded on the property will restrict certain activities on the entire site and will also ensure that the engineered cap is not disturbed. The ELUR will include a post-construction SMP, which will outline the procedures for managing the soils onsite should disturbances below the cap be required after construction. The ELUR will require maintenance of all engineered controls and will act to further limit direct exposure to contaminated areas. As part of the ELUR, it is the responsibility of the RIDOT to provide for annual inspections of the property by a qualified environmental professional, and to submit a report, subject to review by the Department, which shall certify that the property is in compliance with the terms of the ELUR.

Soil material excavated as part of this project which is not going to be placed under an approved capped surface, as part of the abovementioned engineered and institutional controls must be assumed to be contaminated and therefore jurisdictional until analytical testing has determined otherwise. It is the responsibility of the RIDOT and its contractor (s) to ensure that all soil materials and solid waste excavated is properly characterized and is managed according to all appropriate local, State and Federal regulations. All solid waste must be disposed of at a licensed disposal facility. Additionally, any inaccessible contaminated soil and/or residual groundwater that cannot be remediated may be subject to additional post closure remedial requirements.

The Department approves the proposed RAWP and SMP provided that all activities and procedures detailed in the RAWP are strictly adhered to. Any significant changes to the

RAWP shall be pre-approved by the Department, and any minor changes shall be reported to the Department by telephone within one (1) day and in writing within five (5) working days.

RIDOT is reminded of its obligation to submit bimonthly updates regarding the status of the remediation work being performed at the Site. These updates must be submitted to the Department in an electronic format, via e-mail (with supporting photo-documentation, if appropriate) during the duration of the remediation project. One hard copy must also be submitted for the Department's file. In addition, dust suppression techniques must be employed at all times during all soil disturbing/handling activities at the Site in order to minimize the generation of fugitive dust.

This Remedial Approval Letter does not remove your obligation to obtain any other necessary permits from other local, state, and/or federal agencies. Please notify the Department at least forty-eight (48) hours in advance of any remedial work.

Within thirty (30) days of completion of all remedial work, including site capping and bridge construction completion, please forward a Closure Report summarizing the performed activities, inclusive of any disposal documentation and laboratory sampling analysis. Concurrently, the Department shall review the draft ELUR and SMP provided in the RAWP for final review and approval. Upon approval by the Department of the Closure Report, ELUR and SMP, the RIDOT shall record the ELUR and SMP in the Land Evidence Records for the City of Pawtucket and return a recorded copy of the document to the Department within 15 days of recording. Upon receipt, the Department will issue a Letter of Compliance.

If you have any questions regarding this letter, please contact me by telephone at (401) 222-2797, ext. 7102 or by e-mail at jeff.crawford@dem.ri.gov.

Sincerely,



Jeffrey Crawford
Principal Environmental Scientist

Authorized:



Kelly Owens
Supervising Engineer

EXHIBIT 2B

POST REMEDIATION SOIL MANAGEMENT PLAN

POST REMEDIATION SOIL MANAGEMENT PLAN
RIDOT I-95 ROW (“PROPERTY”)
(A.P 23 LOT 589, A.P. 23 LOT 619, A.P 53 LOT 703, A.P. LOT 766
& A PORTION OF A.P. 54 LOT 806)
PAWTUCKET, RHODE ISLAND

This Post Remediation Soil Management Plan (PRSMP) has been prepared to establish procedures that will be followed should future construction/maintenance activities at the Property require the need to manage soils excavated from the subsurface or when existing site surfaces/Rhode Island Department of Environmental Management (“Department”) approved engineered controls (asphalt, concrete, landscaping, unfenced grass areas, fenced grassed areas, riprap and/or foundations) are disturbed. The plan serves to supplement, and will be initiated by, the RIDEM notification requirement established by the Environmental Land Use Restriction (ELUR) for the property.

Background

The Property, located within the limits of the RIDOT I-95 ROW underwent remedial activities in conjunction with the RIDOT’s Pawtucket Bridge No.550 Replacement and Improvements. All remedial activities discussed were conducted in accordance with the Department’s Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (short title: Remediation Regulations), August 1996, as amended February 2004 and November 2011, RIDEM’s Remedial Decision Letter dated January 8, 2010 and RIDEM’s Remedial Approval Letter dated January 21, 2010.

The Property was found to contain arsenic, lead, Total Petroleum Hydrocarbon (TPHs), Polycyclic Aromatic Hydrocarbon (PAH) and Volatile Organic Compounds (VOCs) based on Phase I, Phase II and Phase II Environmental Site Assessments and investigations performed on the Property. As identified in the Revised December 2009 Remedial Action Work Plan, the Department approved remedial activities conducted on the Property consisted of: precharacterizing insitu soils prior to and during construction via test pitting to enable excavation, removal, hauling and disposal at an approved disposal site by the Contractor; conducting asbestos abatement and demolishing the building on Parcel 230575 to the slab foundation; stockpiling excavated soils and characterizing stockpiled soils prior to removal, hauling and disposal of soils at an approved disposal site by the Contractor; having a qualified 3rd party remediation company characterize, excavate, remove, haul and dispose of hot spot soils; and reviewing available analytical results for imported backfill to ensure material met RDEC requirements.

The regulated site soils have been either completely removed and disposal at an approved disposal site or covered with Department approved engineered controls, consisting of bridge or MSE wall foundations, asphalt pavement, concrete, landscaping, unfenced grass areas, fenced grassed areas, riprap and/or foundations in order to prevent direct exposure to regulated soils

and/or infiltration through soils which exceed the Department's Method 1 (GA or GB) Leachability Criteria.

The remedial action, in conjunction with the implementation of an Environmental Land Usage Restriction (ELUR) and this Post Remediation Soil Management Plan will ensure that the RIDOT I-95 ROW, or restricted portion thereof, is not used for any residential activity in the future and that any future use of the property is limited to industrial/commercial activity.

Applicable Area

The remedial action, in conjunction with the implementation of this Post Remediation Soil Management Plan and affiliated Environmental Land Usage Restriction (ELUR) will ensure that the entire RIDOT I-95 ROW Property is not used for any residential activity in the future and that any future use of the property is limited to industrial/commercial activity that is not contrary to Department approvals and restrictions. See Exhibit 2A Site Plan for area covered by this restriction.

Soil Management

The direct exposure pathway is the primary concern at the site. Individuals engaged in activities on the Property may be exposed through incidental ingestion, dermal contact, or inhalation of entrained soil particles if proper precautions are not taken. Therefore, the following procedures will be followed to minimize the potential of exposure.

Most of the RIDOT I-95 ROW Property is fenced with locked gates to restrict unauthorized access around elevated portions of the RIDOT's Pawtucket Bridge No.550 and I-95. The remaining non-roadway RIDOT I-95 and City of Pawtucket ROW associated with at grade entrance or exit ramps are grassed but not fenced. During site work of RIDOT ROW, appropriate notification to RIDOT shall be made and precautions must be taken to restrict unauthorized access to the Property.

During all site/earth work, dust suppression (e.g. watering, etc) techniques must be employed at all times. Due to the nature of past contaminants of concern all deep excavations (greater than 8 feet) in natural insitu soil and soil generated during site activities must be monitored for VOCs. [For example, deep utility excavations (greater than 8 feet) in locations not previously excavated for RIDOT I-95 Improvements.] Due to the nature of past contaminants of concern odors will not be generated.

In the event, an unexpected observation or situation arises during site work (as stated below), such activities will immediately stop. Workers will not attempt to handle the situation themselves but will contact the appropriate authority for further direction.

Most, if not all of the RIDOT ROW Property has been either precharacterized prior to removal and disposal or characterized after excavation and prior to disposal. Due the removal and replacement of the bridge and utilities most the ROW has been characterized with most of the contaminated soils removed and replaced with clean backfill. That said, in the unlikely event that

site work encounters natural insitu soil that may not have been previously characterized, these soils are presumed to be regulated until such time that it is demonstrated to the Department, through soil sampling and laboratory analysis that they are not regulated [Department's Method 1 Residential Direct Exposure Criteria (RDEC) or below]. [For example, deep utility excavations (greater than 8 feet) in locations not previously excavated for RIDOT I-95 Improvements.]

In general, most site/earth work excavated materials will remain on site due to past precharacterization, characterization and backfilling of clean backfill materials on the Property. Excavated material will be used to backfill excavations and area disturbed by excavation returned to its original condition. All excess soil generated or excavated to be disposed offsite will remain on the Property until such time soil sampling and analytical testing is performed by an environmental professional to determine the appropriate disposal and/or management options. Excess soil must be placed on double layers of 10 mil polyethylene/plastic sheeting and covered with 10 mil polyethylene /plastic sheeting during the entire duration of its staging and secured with appropriate controls to limit the loss of the cover and protect against stormwater and/or wind erosion (e.g. hay bales, silt fencing, rocks, etc).

All excess soil will be temporarily stored in a designated area of the Property. Within reason, the storage location will be in an area away from stormwater impacts and limits unauthorized access to the materials (e.g., away from public roadways/walkways). No regulated soil will be stockpiled on the Property for greater than 60 days without prior Department approval.

In general, all site/earth work materials excavated that seem to pose a risk or threat of leaching contaminated materials based on visual observation, smell or air monitoring (unexpected observation) shall be deposited back in the hole, equipment decontaminated and the work stopped until appropriate management options are determined. In the unlikely event that after stockpiling the excavated material it begins to pose a risk or threat of leaching contaminated materials, replace the polyethylene/plastic liner system with a proper leak-proof container (e.g. lined roll-off) or provide containment around stockpile using booms and/or absorbent pads.

Uncharacterized excavated material shall not be re-used as backfill on commercial/industrial properties until such time that it is demonstrated to the Department, through soil sampling and laboratory analysis that they meet the Department's Method 1 RDEC for all constituents listed in Table 1 of the Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (Remediation Regulations). Copies of laboratory analysis results shall be maintained by the Property Owner and included in the annual inspection report for the Property, or the Remedial Action Closure Report, as applicable. In the event that the soil does not meet Method 1 RDEC, the material must be properly managed and disposed of off site at a licensed facility.

Uncharacterized excavated material and excess soil generated or excavated to be disposed offsite soils, must be done so at a licensed facility in accordance with all local, state, and federal laws. Copies of the material shipping records associated with the disposal of the material shall be maintained by the Property owner and included in the annual inspection report for the site.

Best soil management practices should be employed at all times and regulated soils should be segregated into separate piles (or cells or containers) as appropriate based upon the results of analytical testing, when multiple reuse options are planned (e.g. reuse on-site or disposal at a Department approved licensed facility).

All non-disposable equipment used during the soil disturbance activities will be properly decontaminated, as appropriate prior to removal from the site. All disposable equipment used during the soil disturbance activities will be properly containerized and disposed of following completion of the work. All vehicles utilized during the work shall be properly decontaminated, as appropriate prior to leaving the site.

At the completion of site work, all exposed soils are required to be recapped with Department approved engineered controls (2 ft of clean fill or equivalent: building foundations, 4 inches of pavement/concrete underlain with 6 inches of clean fill, and/or 1 foot of clean fill underlain with a geotextile liner) or better than the site surface conditions prior to the work that took place. These measures must also be consistent with the Department approved ELUR recorded on the property. Any clean fill material brought on site is required to meet the Department's Method 1 RDEC or be designated by an environmental professional as Non-Jurisdictional under the Remediation Regulations. The Annual Inspection Report for the site, or Remedial Action Closure Report, as applicable should include either analytical sampling results from the fill demonstrating compliance or alternatively include written certification by an Environmental Professional that the fill is Non-Jurisdictional.

Worker Health and Safety

To ensure the health and safety of any on-site workers in the future, persons involved in the excavation and handling of the material on site are required to wear a minimum of Level D personal protection equipment, including gloves, work boots and eye protection. Workers are also required to wash their hands with soap and water prior to eating, drinking, smoking, or leaving the site.

Department Approval

In accordance with Section A iii of the ELUR, no soil at the Property is to be disturbed in any manner without prior written permission of the Department's Office of Waste Management, except for minor inspections, maintenance, and landscaping activities that do not disturb the contaminated soil at the Site. As part of the notification process, the Property owner shall provide a brief written description of the anticipated Property activity involving soil excavation. The Notification should be submitted to the Department no later than 60 days prior to the proposed initiation of the start of site activities. The description shall include an estimate of the volume of soil to be excavated, a list of the known and anticipated contaminants of concern, a site figure clearly identifying the proposed areas to be disturbed or excavated, the duration of the project and the proposed disposal location of the soil.

Following written Notification, the Department will determine the post closure reporting requirements. Significant disturbances of regulated soil will require submission of a Remedial

Closure Report for Department review and approval documenting that the activities were performed in accordance with this PCSMP and the Department approved ELUR. Minor disturbances of regulated soil may be documented through the attached annual certification submitted in accordance with Section H (**Inspection & Non-Compliance**) of the Department approved ELUR. The Department will also make a determination regarding the necessity of performing Public Notice to abutting property owners/tenants concerning the proposed activities. Work associated with the Notification will not commence until written Department approval has been issued. Once Department approval has been issued, the Department will be notified a minimum of two (2) days prior to the start of activities at the site. Shall any significant alterations to the Department approved plan be necessary, a written description of the proposed deviation, will be submitted to the Department for review and approval prior to initiating such changes.

EXHIBIT 3B

RIDEM ELUR ANNUAL COMPLIANCE FORM

**RI DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
ENVIRONMENTAL LAND USAGE RESTRICTION (ELUR)
ANNUAL COMPLIANCE SELF-EVALUATION FORM**

(Please type or print)

Site Name: _____ Property Owner: _____

RIDEM File No.: _____ Owner Mailing Address: _____

RIDEM Project Manager: _____

ELUR Recording Date: _____ Inspection Date: _____

Owner Telephone Number: _____ E-Mail: _____

This Annual Compliance Self-Evaluation Form is not appropriate for use on sites that require the use of any active remediation systems (e.g. active SSDS, ongoing air or groundwater monitoring, etc.) unless explicit, written permission has been granted by the Department.

1. Site Description

a. Site Address: _____

b. Plat: _____ Lot(s): _____

c. Is the ELUR applicable to the entire site? _____ Yes _____ No

If no, please describe the portion of the property subject to the ELUR: _____

d. What does the ELUR restrict? (Select all that apply)

_____ Residential Uses

_____ Groundwater

_____ Exposure to Site Soils

_____ Infiltration of Water

_____ Subsurface Structures

_____ Other (Please Explain): _____

2. Groundwater

a. Are there any known or observed groundwater wells present? _____ Yes _____ No

b. Are these well(s) used for drinking water? _____ Yes _____ No _____ Not Applicable

If no, please state what they are used for (i.e. irrigation, cooling, etc.): _____

c. Are there environmental monitoring wells present? _____ Yes _____ No

3. Engineered Controls (e.g. asphalt, concrete, building foundations, landscaped areas, etc.)

a. Please provide a brief description of the engineered control(s) (e.g. building foundations, one foot of clean fill over a geotextile liner, etc.): _____

b. Overall Condition of Engineered Control(s)

_____ Good _____ Non-compliant
_____ Acceptable _____ Not Applicable (Sites where only groundwater is restricted)

c. Are there any areas on the property that have broken concrete, cracked asphalt, potholes, eroded landscaping, etc.? _____ Yes _____ No

If yes:

Please provide a description of the area(s) of concern: _____

Could water infiltrate through these areas into underlying contaminated soils?

_____ Yes _____ No _____ N/A; Infiltration Not Restricted

When will the area(s) of concern be repaired? _____

d. Has there been any soil disturbance or excavation into the cap (engineered control) in the last year? _____ Yes _____ No

If yes:

How large was the area of disturbance? _____

Please provide the reason or cause for disturbance or excavation: _____

Was this disturbance or excavation approved by the Department?
_____ Yes, Date of Approval: _____ _____ No

Was the Soil Management Plan (SMP) properly followed? _____ Yes _____ No

If no, please explain: _____

Was any soil taken offsite? _____ Yes _____ No

e. Within the past year has there been any construction at the property unauthorized by the department? _____ Yes _____ No

If yes:

Please explain: _____

Did this construction disturb site soils, the existing building or capped surfaces (asphalt, concrete, or landscaped areas)? _____ Yes _____ No

If yes, please specify: _____

f. Have there been any subsurface structures (underground storage tanks, below grade foundations, septic systems, storm water systems, french drains, etc.) constructed or installed since the remediation was completed? _____ Yes _____ No

If yes:

Please Explain: _____

Was permission of the Department's Office of Waste Management obtained?
_____ Yes, Date of Approval: _____ _____ No

g. Condition of landscaped areas
_____ Good _____ Acceptable _____ Non-compliant _____ N/A

h. Does this site effectively limit exposure to contaminated subsurface soil?
_____ Yes _____ No

4. Property Use

- a. Are there any residential uses on the property (i.e. houses, apartments or condominiums, etc.) except as previously agreed upon by the Department? _____ Yes _____ No

If yes, please explain: _____

- b. Are there any schools, daycare facilities or recreational facilities on the property except as previously agreed upon by the Department? _____ Yes _____ No

If yes, please explain: _____

- c. Has the property use changed in anyway since the ELUR was recorded?
_____ Yes _____ No

If yes, please explain: _____

5. Fencing (if applicable)

- a. Overall Condition of the Fencing
_____ Good _____ Acceptable _____ Non-Compliant _____ No Fence Required
- b. Does the fencing effectively limit the ELUR area? _____ Yes _____ No _____ N/A

6. Overall Assessment

Does this site meet the standard imposed in the ELUR?
_____ Compliant _____ Non-Compliant

7. Observations, comments, and areas of concern

8. Please attach photos that document compliance with the ELUR, potential areas of concern, and the current state of the engineered controls.

Certification of Property Owner

I _____ certify to the best of my knowledge that this Annual Compliance Evaluation Form is a complete and an accurate representation of the site and contains all known facts concerning the Environmental Land Use Restriction imposed on the site.

_____ Signature	_____ Owning Company (If applicable)
_____ Printed Name	_____ Title
_____ Date	

Certification of the Inspector (if different than Owner)

I _____ certify to the best of my knowledge that this Annual Compliance Evaluation Form is a complete and accurate representation of the site and contains all known facts concerning the Environmental Land Use Restriction imposed on the site.

_____ Signature	_____ Environmental Company Name
_____ Printed Name	_____ Title
_____ Contact Information (If Applicable)	
_____ Telephone Number	_____ E-Mail Address

APPENDIX C
National Grid Approved Waste Disposal Facilities

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NATIONAL GRID
ENVIRONMENTALLY APPROVED WASTE DISPOSAL FACILITIES
AS OF JUNE 17, 2020

(NOTE: FACILITIES ARE APPROVED TO RECEIVE SPECIFIC PERMITTED WASTES. THE RECOMMENDED WASTE STREAMS COLUMN IS NOT ALL INCLUSIVE. PLEASE CONSULT WITH ENVIRONMENTAL PROIR TO DISPOSING OF WASTES)

VENDOR	RECOMMENDED WASTE STREAMS	FACILITY LOCATION	STATE	PHONE	EPA ID NUMBER	DATE OF LAST APPROVAL	DATE OF LAST AUDIT	TYPE OF AUDIT
ACV Enviro	Non-RCRA, Non-PCB waste including lab pack waste, petroleum contaminated solids & liquids	550 Industrial Drive Lewisberry, PA 17339	Pennsylvania	(717) 938-4700	PAD067098822	3/18/2020	1/29/2019	CHWMEG audit
American Lamp Recycling, LLC	Universal Wastes/ Lamps/Bulbs	55 Riverview Drive Marlboro, NY 12542	New York	(800) 315-6262	NYR000192005	9/13/2017	3/30/2017	CHWMEG audit
American Recyclers Company (ARC)	Non-RCRA, Non-PCB waste including waste oils, oily water, petroleum contaminated solids	177 Wales Avenue Tonawanda, NY 14150	New York	(716) 695-6720	NYD986903904	3/18/2020	3/1/2020	On-site audit
Bayshore Soil Mgt. (ESMI of NJ)	Non-Haz. Petroleum Contaminated Soils Coal Tar Contaminated Soils	75 Crows Mill Road Keasbey, NJ 08832	New Jersey	(732) 738-6000		3/13/2019	7/11/2018	CHWMEG audit
Chemical Waste Management (Waste Management Inc.)	All Facility Permitted Waste Streams	Highway 17 North Emelle, AL 35459	Alabama	(205) 652-8086	ALD000622464	6/13/2018	6/13/2018	On-site audit
Chemical Waste Management*	Haz. and Non-Haz. Wastes Asbestos Waste TSCA Waste	1550 Balmer Road Model City, NY 14107	New York	(716) 754-8231	NYD049836679	9/21/2016	8/15/2013	CHWMEG audit
CID (Chafee) Landfill, Inc.	Asbestos Waste	10860 Olean Road Chaffee, NY 14030	New York	(716) 496-5514	NYD000517458	N/A	N/A	Low Risk. No Further Audits
City of Albany Landfill	Petroleum Contaminated Soils Solid Waste	525 Rapp Road Albany, NY 12202	New York	(518) 869-3651	N/A	N/A	N/A	Low Risk. No Further Audits
Fulton County Landfill	Petroleum Contaminated Soils Solid Waste/ C&D	47 Mud Rd. Johnstown, NY 12095	New York	(518) 736-5501	N/A	N/A	N/A	Low Risk. No Further Audits
Clean Earth Connecticut	Non-Haz. Petroleum Contaminated Soils Coal Tar Contaminated Soils	58 North Washington Street Plainville, CT 06062	Connecticut	(860) 747-8888		6/28/2017	5/16/2017	On-site audit
Clean Earth of Carteret Inc.	Petroleum Contaminated Soils Urban Fills	24 Middlesex Avenue Carteret, NJ 07008	New Jersey	(215) 734-1400		4/4/2018	8/8/2017	CHWMEG Audit
Clean Earth Dredging Technologies, LLC – Claremont	Non-Haz. Sediments	1 Linden Avenue East Jersey City, NJ 07305	New Jersey	(201) 395-0040			5/4/2015	On-site audit
Clean Earth of New Castle, Inc.	Petroleum Contaminated Soils Urban Fills	94 Pyles Lane New Castle, DE 19720	Delaware	(302) 427-6633		9/21/2016	3/10/2015	On-site audit
Clean Earth of North Jersey	Petroleum Contaminated Soils Urban Fills	115 Jacobus Avenue South Kearny, NJ 07032	New Jersey	(973) 344-4004	NJD991291105		2/12/2014	CHWMEG audit
Clean Earth of Philadelphia	Petroleum/Coal Tar Contaminated Soils for thermal desorption, only	3201 South Street Philadelphia, PA 19153	Pennsylvania	(215) 724-5520		12/10/2019	5/16/2019	CHWMEG audit
Clean Earth of Southeast PA	Petroleum Contaminated Soils Coal Tar Contaminated Soils for thermal desorption only	7 Steel Road East Morristown, PA 19067	Pennsylvania	(215) 428-1700		6/13/2018	6/13/2018	CHWMEG audit
Clean Earth Dredging Technologies, LLC – Koppers	Non-Haz. Sediment	1 Fish House Road Kearney, NJ 07052	New Jersey	(201) 997-2949			5/4/2015	On-site audit
Clean Harbors – Cleveland	Wastewater Treatment	2900 Broadway Cleveland, OH 44115	Ohio	(216) 429-2401	OHD000724153		5/7/2014	CHWMEG audit
Clean Harbors – Kimball	Coal Tar Soils Incineration	HC54 Box 28 Kimball, NE 69145	Nebraska	(308) 235-4012	NED981723513	3/13/2019	6/12/2018	CHWMEG Audit
Clean Harbors – Portland, ME	Waste Oil Non-Haz. WWT	37 Rumery Road South Portland, ME 04106	Maine	(207) 799-8111	MED980672182	9/13/2017	9/13/2017	On-site audit
Clean Harbors – Deer Park (Rollins Environmental Services)	Haz. Waste Incineration per Facility Permits	2027 Battleground Road Deer Park, TX 77536	Texas	(281) 930-2300	TXD055141378	3/13/2019	5/5/2018	CHWMEG Audit

NATIONAL GRID
ENVIRONMENTALLY APPROVED WASTE DISPOSAL FACILITIES
AS OF JUNE 17, 2020

(NOTE: FACILITIES ARE APPROVED TO RECEIVE SPECIFIC PERMITTED WASTES. THE RECOMMENDED WASTE STREAMS COLUMN IS NOT ALL INCLUSIVE. PLEASE CONSULT WITH ENVIRONMENTAL PROIR TO DISPOSING OF WASTES)

VENDOR	RECOMMENDED WASTE STREAMS	FACILITY LOCATION	STATE	PHONE	EPA ID NUMBER	DATE OF LAST APPROVAL	DATE OF LAST AUDIT	TYPE OF AUDIT
Clean Harbors Env. Services, Inc.	Incineration	309 American Circle El Dorado, AR 71730	Arkansas	(870) 864-3711	ARD069748192	9/25/2019	6/4/2019	CHWMPEG Audit
Clean Harbors (Grassy Mountain)	Landfill -TSCA,RCRA, Asbestos Waste	Grayback Hills Drive Knolls, UT 84083	Utah	(801) 323-8900	UTD991301748		4/2/2014	CHWMPEG audit
Clean Harbors of Baltimore	Wastewater Treatment	1910 Russell Street Baltimore, MD 21230	Maryland	(410) 244 8200	MDD980555189	9/26/2018	5/23/2018	CHWMPEG audit
Clean Harbors of Braintree	Various Waste Streams per Facility Permits	1 Hill Avenue Braintree, MA 02184	Massachusetts	(781) 849-1807	MAD053452637	3/13/2019	4/13/2018	On-site audit
Clean Harbors of Connecticut	Non-Hazardous Solids Wastewater Treatment	51 Broderick Road Bristol, CT 06010	Connecticut	(860) 583-8917	CTD000604488	6/17/2020	9/18/2019	CHWMPEG audit
Clean Water of New York	Waste Oils Waste Waters	3249 Richmond Terrace P.O. Box 030312 Staten Island, NY 10303	New York	(718) 981-4600		5/27/2015	11/12/2014	On-site audit
Colonia Landfill	Petroleum Contaminated Soils Solid Waste/C&D	Memorial Town Hall Newtonville, NY 12128	New York	(518) 783-2827		N/A	N/A	Low Risk. No Further Audits
Complete Recycling Solutions, LLC	Mercury containing wastes Lighting ballasts and small capacitors (both PCB and non-PCB Electronic waste	1075 Airport Road Fall River, MA 02720	Massachusetts	(508) 402-7700	MAD980915755		6/13/2018	On-site audit
County of Franklin Solid Waste Management Authority	Petroleum Contaminated Soils Solid Waste/C&D	828 County Route 20 Constable, NY 12926	New York	(518) 483-8270	NYN008021891		8/1/2008	On-site audit
Covanta Environmental Solutions - Agawam	Treated Wood Utility Poles	188 M Street Agawam, MA 01001	Massachusetts	(413) 785-5120			6/2/2015	On-site Audit
Covanta Environmental Solutions - Niagara (Green Environmental)	Nonhazardous sludge's Solids and liquids	8335 Quarry Road Niagara Falls, NY 14304	New York	(716) 298-5297		9/21/2016	1/25/2016	CHWMPEG Audit
Covanta Environmental Solutions - Oriskany (Industrial Oil Tank)	Only Water Non-haz solids	120 Dry Road Oriskany, NY 13424	New York	(315) 736-6080	NYR000005298	4/5/2017	7/7/2016	CHWMPEG Audit
Covanta Environmental Solutions - Hempstead (Hempstead Resource Recovery)	Non Hazardous Incinerator	600 Merchants Concourse Westbury, NY 11590	New York	(516) 683-5438	NYD980215511		9/15/2009	On-site audit Low Risk. No Further Audits
Covanta Environmental Solutions - Niagara (American Ref-Fuel Company of Niagara Facility)	MGP Remediation Soils Non-Hazardous Solids (Oil-impacted spill debris)	100 Energy Blvd at 56th St. Niagara Falls, NY 14304	New York	(716) 278-8500	NYD986930543	4/5/2017	1/25/2016	CHWMPEG audit
Development Authority of the North Country (DANC) (Rodman Landfill)	Coal Tar/Petroleum Contaminated Soils/C&D	NYS Route 177 Rodman, NY 13682	New York	(315) 785-2593			6/19/2013	On-site audit
Doe Run Company (Buick Resource Recycling)	Lead Battery Recycling	18594 Highway KK Boss, MO 65440	Missouri	(573) 244-5261	MOD059200089	Pending	5/4/2016	CHWMPEG audit
Emerald Transformer (Clean Harbors PCB Serv.)	TSCA Waste Materials	1672 East Highland Twinsburg, OH 44087	Ohio	(330) 425-3825	OHD986975399	11/13/2015	5/8/2014	CHWMPEG audit
Emerald Transformer (Clean Harbors PPM)	TSCA/Non-TSCA Transformers and Oils	2474 Hwy 169 North Coffeyville, KS 67337	Kansas	(620) 251-6380	KSD981506025	6/28/2017	8/10/2016	CHWMPEG audit
EnerSys (GS YUASA)	Battery Recycling (Transfer)	16 Celina Ave. Nashua, NH 03060	New Hampshire	(800) 343-5526		6/13/2018	6/13/2018	Desk Top Audit
Environmental Products & Services of Vermont	Transfer Station to approved facilities only	552 State Fair Blvd Syracuse, NY 13204	New York	(315) 451-6666	NYR000115733	6/28/2017	7/11/2016	CHWMPEG audit
Environmental Soil Management, Inc. (ESMI - NY) (Clean Earth)	Coal Tar Contaminated Soils Only Soils/Urban Fill	304 Towpath Road Fort Edward, NY 12828	New York	(518) 747-5500		4/4/2018	6/20/2017	CHWMPEG audit

NATIONAL GRID
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AS OF JUNE 17, 2020

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VENDOR	RECOMMENDED WASTE STREAMS	FACILITY LOCATION	STATE	PHONE	EPA ID NUMBER	DATE OF LAST APPROVAL	DATE OF LAST AUDIT	TYPE OF AUDIT
Environmental Soil Management, Inc. (ESMI - Loudon) (Clean Earth)	Coal Tar Contaminated Soils Oily Soils, Urban Fill	67 International Drive Loudon, NH 03301	New Hampshire	(603) 783-0228	NH5986485852	12/10/2019	7/30/2019	CHWMPEG audit
Evoqua	Carbon Recycling	118 Park Road, Darlington, PA 16115	Pennsylvania	(724) 827-8181	PAD0987270725	12/12/2018	7/10/2018	CHWMPEG audit
Global Cycle	Non-hazardous waste water treatment (including excavation, decon, and purge water etc.) Specific Facility Acceptance Criteria/Contaminant Concentrations Apply	700 Richmond Street Taunton, MA 02718	Massachusetts	(508) 828-1005		9/13/2017	9/13/2017	On-site audit
G&S Technologies	Non-TSCA Equipment	1800 Harrison Ave. Keamy, NJ 07032	New Jersey	(201) 998-9244	NJD011370525	9/21/2016	8/17/2016	On-site audit
High Acres Landfill (Waste Management)	Non-Haz Waste	425 Perinton Parkway Fairport, NY 14450	New York	(716) 223-6132			12/15/2006	On-site audit
Hydrodec North America LLC	Non-Haz and Hazardous Oils for re-refining	2021 Steinway Blvd S.E Canton OH 44707	Ohio	1 (330) 454 8202	OHR000143263	4/4/2018	8/18/2015	CHWMPEG audit
INMETCO	Battery Recycling	One Inmetco Drive Ellwood City, PA 16117	Pennsylvania	(724) 758-5515	PAD087561015		3/20/2014	CHWMPEG audit
Lakeview Landfill (Waste Management)	Asbestos Waste	851 Robinson Road East Erie, PA 16509	Pennsylvania	(814) 825-8588				Low Risk. No Further Audits
Lehigh Cement (ESSROC)	Liquids/Sludge's	3084 West County Road 225 South Logansport, Indiana 46947	Indiana	(574) 753-5121	IND005081542	4/30/2019	8/30/2018	CHWMPEG audit
Lewis County Solid Waste Department	Solid Waste	Trinity Avenue Lowville, NY 13367	New York	(315) 376-5394				Low Risk. No Further Audits
Minerva Enterprises	Asbestos Waste	8955 Minerva Road SE Waynesburg, OH 46888	Ohio	(330)866-3435		5/27/2015	3/25/2015	On-site audit
Modern Disposal	Solid Waste	4746 Model City Road Model City, NY 14107	New York	(716) 754-8226	NY0986921237	N/A	N/A	On-site audit
Montgomery County (MOSA)	Solid Waste	P.O. Box 160, Route 7 Howes Cave, NY 12092	New York	(518) 296-8884		N/A	N/A	
Murphy's Waste Oil (Clean Harbors)	Waste Oil Oil Filter Recycling	252 Salem Street Woburn, MA 01801	Massachusetts	(781) 935-9066	MAD066588005	3/19/2020	6/13/2019	CHWMPEG audit
NovaPh, Inc. (Revolution VSC)	Battery Recycling	1200 Garnier St. & St. Catherine, Quebec J5C1B4	Canada	(781) 849-1807		12/17/2014	3/10/2014	CHWMPEG audit
Oneida - Herkimer County Landfill	Solid Waste	7044 State Route 294 Boonville, NY 13309	New York	(315) 733-1224				Low Risk. No Further Audits
Ontario County Sanitary Landfill	Solid Waste	3555 Post Farm Road Stanley, NY 14561	New York	(585) 526-4420			8/17/2004	On-site audit
Reverse Smelting & Refining Corporation	Lead Acid Battery Recycler	65 Ballard Road Middletown, NY 10941	New York	(845) 692-4414	NYD030485288	12/14/2016	11/21/2016	Desk-Top audit
Safety-Kleen Systems Inc.	Part Washer Recycling	17 Green Mountain Road Cohoes, NY 12047	New York	(518) 783-8080	NYD986872869	4/5/2017	10/12/2016	On-site audit
Safety-Kleen Systems Inc.	Part Washer Recycling	80 Seabro Ave. North Amityville, NY 11701	New York	(631) 842-6311	NYD000708198	Fall 2010		Low Risk. No Further Audits
Safety-Kleen Systems, Inc.	Oil Filters, Waste Oil, Transfer Facility	167 Mill Street Cranston, RI	Rhode Island	(401) 781-0808	RID084802842	12/12/2018	4/11/2018	CHWMPEG audit
Seneca Meadows Landfill (IESI)	Non-haz Waste, Asbestos Waste	1786 Saloman Road Waterloo, NY 13165	New York	(315) 539-5624			1/29/2014	On-site audit

**NATIONAL GRID
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AS OF JUNE 17, 2020

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VENDOR	RECOMMENDED WASTE STREAMS	FACILITY LOCATION	STATE	PHONE	EPA ID NUMBER	DATE OF LAST APPROVAL	DATE OF LAST AUDIT	TYPE OF AUDIT
Superior Greentree Landfill (ADS Greentree)	Landfill-Non Hazardous	635 Toby Road, Kersey, PA 15846	Pennsylvania	(814) 265-1975		N/A	N/A	Low Risk. No Further Audits
Tradebe - Norlite Corporation	Used Oil Coal Tar	628 South Saratoga Street Cohoes, NY 12047	New York	(518) 235-0401	NYD080469935	9/25/2019	2/22/2019	CHWMPEG Audit
Tradebe - Bridgeport (Bridgeport United Recycling)	Used Oil Waste Waters	50 Cross Street Bridgeport, CT 06610	Connecticut	(203) 334-4812	CTD002593887	12/12/2018	6/11/2018	CHWMPEG Audit
Tradebe - Meriden (United Oil Recovery Inc.)	Used Oils Waste Waters	136 Gracey Avenue Meriden, CT 06450	Connecticut	(203) 238-6745	CTD021816889	12/12/2018	6/12/2018	CHWMPEG Audit
Trans-Cycle Industries (TCI)	TSCA Transformer and Lead/PCB Cable Disposal	101 Parkway, East Pell City, AL 35125	Alabama	(205) 338-9997	ALD983167891	9/26/2018	5/11/2017	CHWMPEG audit
TCI of New York	Non-TSCA Transformer Disposal Approved for Surplus only-No PILC	Cocymans Industrial Park Lane Cocoymans, NY 12045	New York	(518) 828-9997	NYD986899912	6/28/2017	3/14/2016	CHWMPEG audit
US Ecology - Michigan Disposal Waste Treatment (MDI)	Hazardous waste solids	49350 North I-94 Service Dr. Belleville, MI 48111	Michigan	(800) 592-5489	MID000724831	8/6/2019	9/18/2018	CHWMPEG Audit
US Ecology - Wayne Disposal Inc (WDD)	Solid PCB Waste- Landfill NORM	49350 North I-94 Service Dr. Belleville, MI 48111	Michigan	(800) 592-5489	MID048090633	9/23/2018	9/18/2018	CHWMPEG Audit
Veolia ES Technical Solutions - Port Arthur	Incineration: waste solvents, solvent/oil mixtures, organic and inorganic chemical wastes, pesticide wastes, petroleum wastes, aqueous wastes, contaminated soils, sludges, PCBs and capacitors	7665 Highway 73 Port Arthur, TX 77840	Texas	(409) 736-2821	TXD000838896	9/26/2018	3/29/2018	CHWMPEG audit
Veolia ES Technical Solutions - Sauget	Incineration: various hazardous wastes	7 Mobile Avenue Sauget, IL 62201	Illinois	(618) 271-2804	ILD098642424	9/21/2016	5/16/2016	On-site audit
Veolia ES Technical Solutions - West Bridgewater (Global Recycling)	Lighting ballasts Small capacitors (PCB and non-PCB) E-waste, Universal Waste	90 Pleasant St, West Bridgewater, MA 02379	Massachusetts	(774) 296-6030	MAC300017498	3/13/2019	8/12/2018	On-site audit
Veolia ES Technical Solutions Flanders	Transfer Facility	1 Eden Lane Flanders, NJ 07836	New Jersey	(973) 347-7111	NJD980536593	12/14/2016	2/12/2016	On-site audit
Veolia ES Technical Solutions - Middlesex (Marisol)	Fuels Blending	125 Factory Lane Middlesex, NJ 08846	New Jersey	(732) 469-5100	NJD002454544	12/14/2016	4/4/2016	On-site audit
Veolia ES Technical Solutions - WI	Mercury, PCB Ballasts, Universal Waste	1275 Mineral Springs Drive Port Washington, WI 53074	Wisconsin	(262) 243-8900	WID988566543	3/16/2016	6/3/2014	On-site audit
Waste Management - Fairless Landfill	Construction & Demolition Debris Non-Hazardous Contaminated Soils Friable & Non-Friable Asbestos	1513 Bordentown Road Morrisville, PA 19067	Pennsylvania	(866) 909-4458		10/9/2019	10/1/2019	CHWMPEG Audit
Waste Management - Greenridge RDF	Petroleum Contaminated Soils, C&D Debris, Clean soils	424 Peters Road Ganesvoort, New York 12831	New York	(518) 636-2141		9/26/2018		Low Risk. No Further Audits
Waste Management - Mercury Waste Inc.	Mercury Waste	21211 Durand Avenue Union Grove, WI 53217	Wisconsin	(262) 878-2599	WIR000000356	12/10/2019	9/11/2019	CHWMPEG Audit

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VENDOR	RECOMMENDED WASTE STREAMS	FACILITY LOCATION	STATE	PHONE	EPA ID NUMBER	DATE OF LAST APPROVAL	DATE OF LAST AUDIT	TYPE OF AUDIT
Waste Management – Turnkey	Asbestos Waste, Non- Hazardous	97 Rochester Neck Road Rochester, NH 03867	New Hampshire	(603) 332-2386		12/13/2018	8/8/2017	Desktop Audit
Waste Management Disposal Services of Maine: BDS Waste Disposal Inc.	Asbestos Waste, Non-Hazardous	357 Mercer Road Norridgecock, ME 04957	Maine	(207) 634-2714	MED98254699	3/16/2016	12/18/2015	Desktop Audit
110 Sand & Gravel	C&D Debris Soaked Coal Tar Wrap Pipe	136 Spagnoli Road, Melville, NY	New York	(631) 694-2822				Low Risk. No Further Audits

* = Site has been reported closed

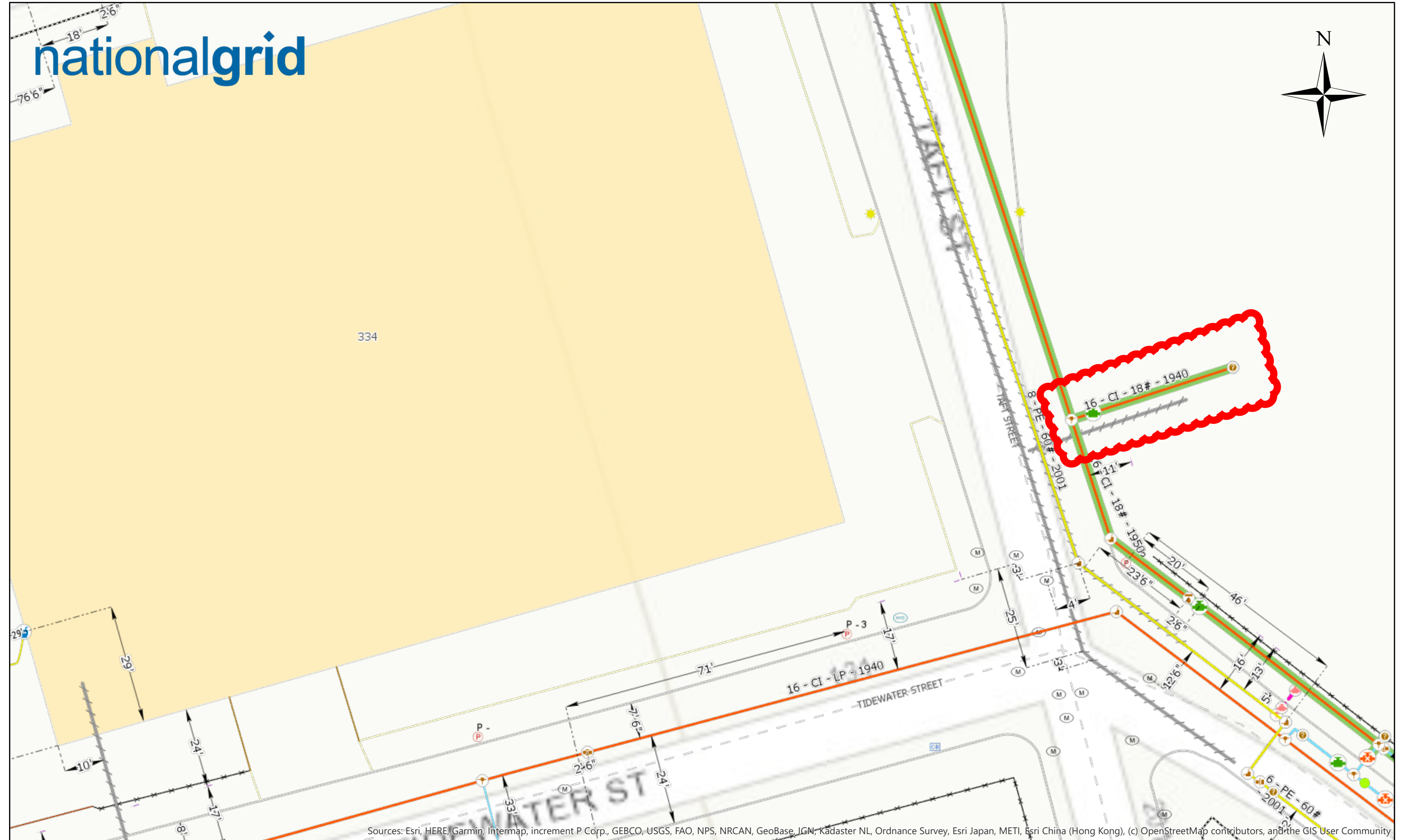
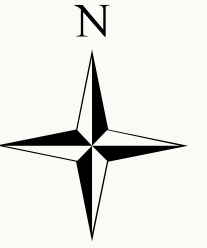
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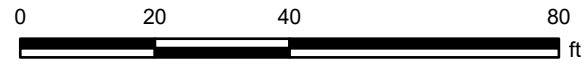
APPENDIX D
National Grid Gas and Electric Service Orders

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nationalgrid



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, JGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



Date Printed: 6/24/2020

GAS PROJECT COST ESTIMATE

Estimate Level	Level III	
Project Name:	NBC Phase III CSO - 16" CI Stub Cut-off using stopoff	
Project Funding Number:(7 char)	CRCC307	GPE ID:
Work Order #:(11 char)	90000xxxxxx	
Region:	New_England	Bid Area:
City:	PAWTUCKET	Overhead Area:
State:	RI	Date:(mm/dd/yyyy)
		Estimated By:
Project Type:	Distribution Main outside of ROW	Project FY:
New Main:	0	Material
Abandon Main:	42'	CI

Warning!
 Be sure to fill in all GREEN cells.
 Failure to do so could result in erroneous or missing costs.
 All YELLOW cells are for data entry

Enter Labor Split %	
CAPEX	100%
OPEX	0%
Removal	0%
Total	100%

Scope of Work: Cost to cut and cap an existing 16" cast iron 18psig main stub at main. Requires TDW Services crew for stop off.

	Direct Costs	Escalator	Contingency	Total Direct Costs	Total Actuals	TOTAL with Actuals	Item
NG Labor (Mgmt)	\$ 1,343.52	\$ 98.37	\$ 216.28	\$ 1,658.17	\$0.00	\$1,658.17	NG Labor (Mgmt)
In-House Labor (Union)	\$ 5,512.00	\$ 412.24	\$ 888.64	\$ 6,812.87	\$0.00	\$6,812.87	In-House Labor (Union)
Total National Grid Labor	\$ 6,855.52	\$ 510.60	\$ 1,104.92	\$ 8,471.04			
5.00% NG Transportation-Vehicles	\$ 342.78	\$ 25.10	\$ 55.18	\$ 423.05	\$0.00	\$423.05	NG Transportation-Vehicles
Stock Materials	\$ 6,409.18	\$ 479.34	\$ 1,033.28	\$ 7,921.79	\$0.00	\$7,921.79	Stock Materials
Non-Stock Materials	\$ 3,979.00	\$ 627.19	\$ 690.93	\$ 5,297.12	\$0.00	\$5,297.12	Non-Stock Materials
Total Materials	\$ 10,388.18	\$ 1,106.53	\$ 1,724.21	\$ 13,218.91			
Construction Contractor	\$ 22,860.37	\$ 1,720.55	\$ 3,687.14	\$ 28,268.05	\$0.00	\$28,268.05	Construction Contractor
Restoration Contractor (In-House Construction Applicable)	\$ 460.00	\$ 43.06	\$ 75.46	\$ 578.52	\$0.00	\$578.52	Restoration Contractor (In-House Construction Applicable)
Police	\$ 1,214.40	\$ 90.82	\$ 195.78	\$ 1,501.01	\$0.00	\$1,501.01	Police
Permits	\$ -	\$ -	\$ -	\$ -	\$0.00	\$0.00	Permits
Other (NO COH APPLIED)	\$ -	\$ -	\$ -	\$ -	\$0.00	\$0.00	Other (NO COH APPLIED)
Total Direct Cost	\$ 42,121.25	\$ 3,496.66	\$ 6,842.69	\$ 52,460.59			

	Overheads	Escalator	Contingency	Total Overheads	Total Actual OH's		
84.80% Payroll Labor OH - NG Mgmt	\$ 1,139.30	\$ 83.42	\$ 183.41	\$ 1,406.13	\$0.00	\$6,389.75	Payroll Labor OH - NG Mgmt
73.15% Payroll Labor OH - NG Union	\$ 4,032.03	\$ 301.55	\$ 650.04	\$ 4,983.62	\$0.00	\$6,389.75	Payroll Labor OH - NG Union
23.00% Material Handling OH - Stock	\$ 1,474.11	\$ 110.25	\$ 237.65	\$ 1,822.01	\$0.00	\$1,822.01	Material Handling OH - Stock

	Capital Overheads (COH)						
40.00%	Capital Overheads (COH)				\$0.00	\$0.00	Capital Overheads (COH)
Applied to	NG Grid Labor (Mgmt)	\$ 537.41	\$ 39.35	\$ 86.51	\$ 663.27	\$663.27	Capital OH for NG Grid Labor (Mgmt)
	In-House Labor (Union)	\$ 2,204.80	\$ 164.89	\$ 355.45	\$ 2,725.15	\$2,725.15	Capital OH for In-House Labor (Union)
	NG Transportation-Vehicles	\$ 137.11	\$ 10.04	\$ 22.07	\$ 169.22	\$0.00	Capital OH for NG Transportation-Vehicles
	Stock Materials	\$ 2,563.67	\$ 191.73	\$ 413.31	\$ 3,168.72	\$3,168.72	Capital OH for Stock Materials
	Non-Stock Materials	\$ 1,591.60	\$ 250.88	\$ 276.37	\$ 2,118.85	\$2,118.85	Capital OH for Non-Stock Materials
	Construction Contractor	\$ 9,144.15	\$ 688.22	\$ 1,474.86	\$ 11,307.22	\$11,307.22	Capital OH for Construction Contractor
	Restoration Contractor (In-House Construction Applicable)	\$ 184.00	\$ 17.23	\$ 30.18	\$ 231.41	\$231.41	Capital OH for Restoration Contractor (In-House Construction Applica
	Police	\$ 485.76	\$ 36.33	\$ 78.31	\$ 600.40	\$600.40	Capital OH for Police
	Permits	\$ -	\$ -	\$ -	\$ -	\$0.00	Capital OH for Permits
						\$0.00	Capital OH for
	Payroll Labor OH - NG Mgmt	\$ 455.72	\$ 33.37	\$ 73.36	\$ 562.45	\$562.45	Capital OH for Payroll Labor OH - NG Mgmt
	Payroll Labor OH - NG Union	\$ 1,612.81	\$ 120.62	\$ 260.01	\$ 1,993.45	\$1,993.45	Capital OH for Payroll Labor OH - NG Union
	Material Handling OH - Stock	\$ 589.64	\$ 44.10	\$ 95.06	\$ 728.80	\$728.80	Capital OH for Material Handling OH - Stock

Total Overhead Cost	\$ 26,152.12	\$ 2,091.96	\$ 4,236.61	\$ 32,480.70	\$0.00	\$0.00	Sales & Use Tax
			AFUDC	\$ 318.53	\$0.00	\$0.00	Supervision & Administration
			Subtotal Direct & Overheads	\$ 84,941.29			

ACTUALS to date				\$ -	\$ -		
Total Project Estimate				\$ 85,259.82	\$0.00	\$85,259.82	Total Checks OK
Overall Footage:		Cost/Foot	\$ -				
Est. Construction Duration:							
Contingency (%)	15%						
Equivalent Overall OH (%)	63%						

Additional Work Order Numbers:

MasterNoun	MaterialShortDesc	MaterialLongDesc	UOM	Material	OldMaterial	Region	RegionalStatus	LOB	MaterialGroup	ProductFamily	ItemType	MaterialTypeDesc	EngineeringStd	MSnubr	Price	Quantity	Total Cost
ANODE	ANODE, MAG BAG 17LB	ANODE, 17LB, MAGNESIUM, HI POT, OPEN CKT POT 1.70V MIN, 3IN SQ (NORMAL) CROSS SECT X 25IN L (PLUS/MIN US 1IN)W 10FT SOLID 12 AWG TW (RED) INSUL CU LEAD WIRE IN A CLOTH SACK, 30IN L, MFG/PKGD/SHPD IN ACC ORDANCE W/SPEC 120004-MS, LATEST REV	EA	9311183	4800460	NE	Active	GAS	Anodes	MISC. PIPE MATERIALS	GAS	Stock	1AAC		\$ 45.29	2	\$90.58
CAP	CAP, LINE VENTED NON-RESTRAIN 17.40IN OD	CAP, LINE, VENTED, NON-RESTRAINING BOLTED, COMPRESSION, FOR 16IN CAST IRON, 17.400IN OD R.S. CAST IRON PIPE, INS ULATED, 7IN Lx0.375IN THK MIDDLE RING, EPOXY COATED WITH ANODE CONNECTOR	EA	9384384	00311132	NE	Active	GAS	Pipes & Fittings - Steel			Stock		00311132	\$ 608.39	1	\$608.39
SLEEVE	SLEEVE, REPAIR INSUL 16IN CTD	SLEEVE, REPAIR, 16IN, INSULATED, NO VENT, STYLE 50A, FOR 17.40IN ODCI, 18-1/4IN FLANGE TO FLANGE CLEARANCE, ALUMINIUM CLAD, EPOXY COATED, WITH 12IN DIA PORTION CENTERED O N TOP HALF OF SLEEVE, MASKED AND UNCOATED, ANODE CONNECT OR, RATED TO 100PSIG	EA	9342323	00364358	NE	Active	GAS	Pipes & Fittings - Steel		GAS	Stock		00364358	\$ 5,618.51	1	\$5,618.51
TAPE	TAPE, WAX BRN 4INx9IN	TAPE, WAX BROWN 4INx9IN, FOR UNDERGROUND USE, 24 ROLLS T O A CASE, TO BE USED WITH M AND S 00390021	ROL	9341928	00390020	NE	Active	GAS	Leak Detection, Control & Repair Equipment/Materials			Stock		00390020	\$ 9.17	10	\$91.70

Non-Stock Materials

Quantity	Region	Category	Part	Product Number	Material	Size	Item Description	Diameter Inch	Pressure Class	Estimated Lead Time (Days)	UOM	Unit Price	Total Cost \$ 3979
1							12"x16" TDW Shortstop Fitting					\$ 3,680.00	\$ 3,680.00
1							2" TDW Equalization Fitting					\$ 299.00	\$ 299.00
												\$	-
												\$	-
												\$	-
												\$	-

Traffic Control - New England (Capital Overhead Applied)

Description	Quantity	Unit	Unit Cost	Total Cost	Comments	Work Order
2 person Police Detail - 4 HR		4 Hours	368.00	\$0.00		90000xxxxx
2 person Police Detail- 8 HR	1.5	8 Hours	809.60	\$1,214.40		90000xxxxx
3 person Police Detail- 4 HR		4 Hours	588.00	\$0.00		90000xxxxx
3 person Police Detail - 8 HR		8 Hours	1,293.60	\$0.00		90000xxxxx
Police Cruiser		8 Hours	30.00	\$0.00		90000xxxxx
Total Traffic Control				\$1,214.40		

Misc. Contractor Labor/Equip/Charges (Capital Overhead Applied)

Description	Quantity	UOM	Unit Cost	Total Cost \$ 22284.35	Comments	Work Order
Inspector (welding, construction, etc.)				\$ -		90000xxxxx
Surveyor				\$ -		90000xxxxx
Rail Road Flagger				\$ -		90000xxxxx
Arborist				\$ -		90000xxxxx
Electrical Contractor				\$ -		90000xxxxx
Special Crane & Operator				\$ -		90000xxxxx
Civil Contractor				\$ -		90000xxxxx
Supplier Surveillance Inspector				\$ -		90000xxxxx
Lighting				\$ -		90000xxxxx
Material Sheeting/Pumping				\$ -		90000xxxxx
Contractor Inspector - Non MSA				\$ -		90000xxxxx
Painting				\$ -		90000xxxxx
Security				\$ -		90000xxxxx
Fencing				\$ -		90000xxxxx
Contractor Inspector - MSA				\$ -		90000xxxxx
Engineering Consultant				\$ -		90000xxxxx
Environmental Consultant				\$ -		90000xxxxx
TDW Services Crew	1		\$ 22,284.35	\$ 22,284.35		90000xxxxx
				\$ -		90000xxxxx
				\$ -		90000xxxxx
				\$ -		90000xxxxx
				\$ -		90000xxxxx
				\$ -		90000xxxxx
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				\$ -		90000xxxxx
				\$ -		90000xxxxx
				\$ -		90000xxxxx
Total Misc. Contractor Labor				\$22,284.35		

Escalator	Contingency	Total Direct Costs (w/Escalator & Contingency)	OH/Burden Rates	OH/Burden Costs	OH/Burden Escalator	OH/Burden Contingency	Total OH/Burden Costs	Capital OH Rate	Capital OH (CAD) Costs	Total LOADED Costs
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$1,666.62	\$3,592.65	\$ 27,543.62					\$0	40.00%	\$11,017.45	\$38,561
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$0.00	\$0.00	\$ -					\$0	40.00%	\$0.00	\$0
\$1,666.62	\$3,592.65	\$27,543.62					\$0.00		\$11,017.45	\$38,561.06

Other	No Capital Overheads Applied	Quantity	UOM	Unit Price	Total Cost	Comments	Work Order

DIRECTIONS: 1. On Row 8, enter % of project spending that will occur in each month of the project. Consider anticipated months for contractor & materials invoices.
 2. Make sure Row 8 totals 100% in cell A88.

Notes: AFUDC will be calculated each month the work order is open plus one additional month.
 Project spending could all occur in 1 month or be spread over several months (up to 24). Gaps in spending are permissible.

Rhode Island		Monthly AFUDC Rate: 0.125%																								Total	
		Cumulative %																									
		50.00%	75.00%	100.00%																							
		25.00%	25.00%	25.00%																							
Enter Projected % Spending / Mo	Current Balance	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24		
Projected Monthly Spending	\$0.00	\$21,235.32	\$21,235.32	\$21,235.32	\$21,235.32	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	100.00%
Cumulative Capital Spending	\$0.00	\$21,235.32	\$42,470.65	\$63,705.97	\$84,941.29	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$84,941.29
AFUDC	\$	13.27	\$ 39.82	\$ 66.36	\$ 92.80	\$ 106.16	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 316.53

TOTAL AFUDC \$316.53

Company Name	Monthly AFUDC Rate
Boston Gas	0.113%
Essex County Gas	0.113%
Colonial Gas	0.113%
Energy North	0.000%
KeySpan Corporate Svcs	0.000%
KeySpan Generation Svcs - NY	0.000%
KeySpan Energy Delivery - LI	0.568%
KeySpan Energy Delivery - NY	0.125%
Rhode Island	0.125%
Upstate NY	0.568%

Allowance for Funds Used During Construction (AFUDC)

A noncash item representing the estimated composite interest costs of debt and return on equity funds used to finance construction. The allowance is capitalized in the property accounts and included in income.

Actual \$ Spend to date	\$0.00
- Actual OPEXS	\$0.00
- Actual AFUDCS	\$0.00
Starting Actual Capital\$	\$0.00
Estimated Capital\$	\$84,941.29
TOTAL Capital\$	\$84,941.29

Labor-Union NE

Description	Quantity- Straight Time	UOM	Quantity - OT	UOM	Unit Cost	Total Cost without Escalator \$ 5512	Escalator \$ 412.24	Total Cost \$ 5924.24
Designer		Hour		Hour	\$ 42.00	\$ -	\$ -	\$ -
Drafter / CAD Tech		Hour		Hour	\$ 42.00	\$ -	\$ -	\$ -
Construction Crew (5-person)	3	Day		Hour	\$ 1,624.00	\$ 4,872.00	\$ 364.37	\$ 5,236.37
Construction Crew (4-person)		Day		Hour	\$ 1,304.00	\$ -	\$ -	\$ -
Construction Crew (3-person)		Day		Hour	\$ 984.00	\$ -	\$ -	\$ -
Construction Crew (2-person)		Day		Hour	\$ 664.00	\$ -	\$ -	\$ -
HDD Crew (3-man)		Day		Hour	\$ 992.00	\$ -	\$ -	\$ -
HDD Crew (4-man)		Day		Hour	\$ 1,312.00	\$ -	\$ -	\$ -
HDD Crew (5-man)		Day		Hour	\$ 1,632.00	\$ -	\$ -	\$ -
Tapping/Purging Crew (2-man)		Day		Hour	\$ 664.00	\$ -	\$ -	\$ -
I&R Crew (2-man)		Day		Hour	\$ 640.00	\$ -	\$ -	\$ -
GEMS		Hour		Hour	\$ 40.00	\$ -	\$ -	\$ -
Meter/Service Person		Day		Hour	\$ 312.00	\$ -	\$ -	\$ -
Meter/Service Crew (2-person)		Day		Hour	\$ 640.00	\$ -	\$ -	\$ -
Meter/Service Crew (3-person)		Day		Hour	\$ 952.00	\$ -	\$ -	\$ -
Distribution Mechanic		Day		Hour	\$ 328.00	\$ -	\$ -	\$ -
Dump Driver		Day		Hour	\$ 320.00	\$ -	\$ -	\$ -
Rack Truck Driver		Day		Hour	\$ 328.00	\$ -	\$ -	\$ -
Corrosion Tech		Hour		Hour	\$ 40.00	\$ -	\$ -	\$ -
Crane Support Crew		Day		Hour	\$ 1,312.00	\$ -	\$ -	\$ -
Welder	16	Hour		Hour	\$ 40.00	\$ 640.00	\$ 47.86	\$ 687.86
Welding Inspector		Hour		Hour	\$ 41.00	\$ -	\$ -	\$ -
Contractor Inspector		Day		Hour	\$ 320.00	\$ -	\$ -	\$ -
NDE Tech		Day		Hour	\$ 328.00	\$ -	\$ -	\$ -
Surveyor		Hour		Hour	\$ 42.00	\$ -	\$ -	\$ -
Field Trainer		Hour		Hour	\$ 42.00	\$ -	\$ -	\$ -

Labor Management

Department	Work Area	Description	Time Type	UOM	Unit #	Hourly Rate	Quantity	Total Cost without Escalator \$ 1343.52	Escalator \$ 98.37	Total Cost \$ 1441.89
GSE Proj Eng & Design	NE	Principal Engineer	Straight Time	per Hour	LM013	\$ 55.98	24.0	\$ 1,343.52	\$ 98.37	\$ 1,441.89

NE Contractor Labor

Quantity	Region	Bid Area	Contractor Name	Contractor #	RFP REF	Unit Code	Family	Work Description (Maximo Description)	Pipe Diameter inches	Volume Interval	UOM	Unit Price	Total Cost Without: Escalator, Fuel Adj, Night Shift \$576.02	Total Escalator \$53.93	Total Cost Fuel Adjustment \$ 0	Total Cost Night Shift Differential \$ 0	Total Cost \$ 629.95
8.0	New England	Providence	AGI	1000011878	842	OSFGRCY	Miscellaneous	PROCESSED GRAVEL PER CY	NA	NA	Cubic Yard	\$28.65	\$229.20	\$21.46	\$ -	\$ -	\$ 250.66
8.0	New England	Providence	AGI	1000011878	843	OSFSACY	Miscellaneous	SAND PER CY	NA	NA	Cubic Yard	\$29.28	\$234.32	\$21.94	\$ -	\$ -	\$ 256.26
30.0	New England	Providence	AGI	1000011878	982	OSLSCUT12	T&M	SAWCUT <=12" PER FOOT	NA	NA	Linear Foot	\$3.75	\$112.50	\$10.53	\$ -	\$ -	\$ 123.03

Quantity	Region	Bid Area	Contractor Name	Contractor #	RFP REF	Unit Code	Family	Work Description (Maximo Description)	Pipe Diameter inches	Volume Interval	UOM	Unit Price	Total Cost Without: Escalator, Fuel Adj, Night Shift \$460	Total Escalator \$43.07	Total Cost Fuel Adjustment \$ 0	Total Cost Night Shift Differential \$ 0	Total Cost \$ 503.07
50.0	New England	Providence	AGI	1000011878	796	OPV09SF	Restoration	ASPHALT RESTORATION 6" TO 9" PER SF	NA	NA	Square Foot	\$9.20	\$460.00	\$43.06	\$ -	\$ -	\$ 503.06

GAS PROJECT COST ESTIMATE

Warning!

Be sure to fill in all GREEN cells.
Failure to do so could result in erroneous or missing costs.

All YELLOW cells are for data entry

Estimate Level	Level III	
Project Name:	NBC Phase III CSO - 16" CI Stub Cut-off	
Project Funding Number:(7 char)	CRCC307	GPE ID:
Work Order #:(11 char)	90000xxxxxx	
Region:	New England	Bid Area:
City:	PAWTUCKET	Overhead Area:
State:	RI	Date:(mm/dd/yyyy)
		Estimated By:
Project Type:	Distribution Main outside of ROW	Project FY
New Main:	Length: 0	Size: 0
Abandon Main:	42"	16"
		Material: n/a
		CI
		Number of Services Involved: 0

Enter Labor Split %	
CAPEX	100%
OPEX	0%
Removal	0%
Total	100%

Scope of Work: Cost to cut and cap an existing 16" cast iron 18psig main stub at main in Taft St. Estimate requires use of existing valve.

		Direct Costs	Escalator	Contingency	Total Direct Costs	Total Actuals	TOTAL with Actuals	Item
	NG Labor (Mgmt)	\$ 1,343.52	\$ 98.37	\$ 216.28	\$ 1,658.17	\$ 0.00	\$ 1,658.17	NG Labor (Mgmt)
	In-House Labor (Union)	\$ 5,684.00	\$ 425.10	\$ 916.36	\$ 7,025.46	\$ 0.00	\$ 7,025.46	In-House Labor (Union)
	Total National Grid Labor	\$ 7,027.52	\$ 523.47	\$ 1,132.65	\$ 8,683.64			
5.00%	NG Transportation-Vehicles	\$ 351.38	\$ 25.73	\$ 56.57	\$ 433.67	\$ 0.00	\$ 433.67	NG Transportation-Vehicles
	Stock Materials	\$ 1,366.55	\$ 102.20	\$ 220.31	\$ 1,689.07	\$ 0.00	\$ 1,689.07	Stock Materials
	Non-Stock Materials	\$ -	\$ -	\$ -	\$ -	\$ 0.00	\$ 0.00	Non-Stock Materials
	Total Materials	\$ 1,366.55	\$ 102.20	\$ 220.31	\$ 1,689.07			
	Construction Contractor	\$ 576.02	\$ 53.93	\$ 94.49	\$ 724.44	\$ 0.00	\$ 724.44	Construction Contractor
	Restoration Contractor (In-House Construction Applicable)	\$ 460.00	\$ 43.06	\$ 75.46	\$ 578.52	\$ 0.00	\$ 578.52	Restoration Contractor (In-House Construction Applicable)
	Police	\$ 809.60	\$ 60.55	\$ 130.52	\$ 1,000.67	\$ 0.00	\$ 1,000.67	Police
	Permits	\$ -	\$ -	\$ -	\$ -	\$ 0.00	\$ 0.00	Permits
	Other (NO COH APPLIED)	\$ -	\$ -	\$ -	\$ -	\$ 0.00	\$ 0.00	Other (NO COH APPLIED)
	Total Direct Cost	\$ 10,591.07	\$ 808.94	\$ 1,710.00	\$ 13,110.00			
		Overheads	Escalator	Contingency	Total Overheads	Total Actual OH's		
84.80%	Payroll Labor OH - NG Mgmt	\$ 1,139.30	\$ 83.42	\$ 183.41	\$ 1,406.13	\$ 0.00	\$ 6,545.26	Payroll Labor OH - NG Mgmt
73.15%	Payroll Labor OH - NG Union	\$ 4,157.85	\$ 310.96	\$ 670.32	\$ 5,139.13	\$ 0.00	\$ 6,545.26	Payroll Labor OH - NG Union
23.00%	Material Handling OH - Stock	\$ 314.31	\$ 23.51	\$ 50.67	\$ 388.49	\$ 0.00	\$ 388.49	Material Handling OH - Stock
40.00%	Capital Overheads (COH)					\$ 0.00	\$ 0.00	Capital Overheads (COH)
Applied to	NG Grid Labor (Mgmt)	\$ 537.41	\$ 39.35	\$ 86.51	\$ 663.27		\$ 663.27	Capital OH for NG Grid Labor (Mgmt)
	In-House Labor (Union)	\$ 2,273.60	\$ 170.04	\$ 366.55	\$ 2,810.19		\$ 2,810.19	Capital OH for In-House Labor (Union)
	NG Transportation-Vehicles	\$ 140.55	\$ 10.29	\$ 22.63	\$ 173.47	\$ 0.00	\$ 173.47	Capital OH for NG Transportation-Vehicles
	Stock Materials	\$ 546.62	\$ 40.88	\$ 88.13	\$ 675.63		\$ 675.63	Capital OH for Stock Materials
	Non-Stock Materials	\$ -	\$ -	\$ -	\$ -		\$ 0.00	Capital OH for Non-Stock Materials
	Construction Contractor	\$ 230.41	\$ 21.57	\$ 37.80	\$ 289.78		\$ 289.78	Capital OH for Construction Contractor
	Restoration Contractor (In-House Construction Applicable)	\$ 184.00	\$ 17.23	\$ 30.18	\$ 231.41		\$ 231.41	Capital OH for Restoration Contractor (In-House Construction Applicable)
	Police	\$ 323.84	\$ 24.22	\$ 52.21	\$ 400.27		\$ 400.27	Capital OH for Police
	Permits	\$ -	\$ -	\$ -	\$ -		\$ 0.00	Capital OH for Permits
							\$ 0.00	Capital OH for
	Payroll Labor OH - NG Mgmt	\$ 455.72	\$ 33.37	\$ 73.36	\$ 562.45		\$ 562.45	Capital OH for Payroll Labor OH - NG Mgmt
	Payroll Labor OH - NG Union	\$ 1,663.14	\$ 124.38	\$ 268.13	\$ 2,055.65		\$ 2,055.65	Capital OH for Payroll Labor OH - NG Union
	Material Handling OH - Stock	\$ 125.72	\$ 9.40	\$ 20.27	\$ 155.39		\$ 155.39	Capital OH for Material Handling OH - Stock
	Total Overhead Cost	\$ 12,092.47	\$ 908.61	\$ 1,950.16	\$ 14,951.24	\$ 0.00	\$ 0.00	Sales & Use Tax
	AFUDC			\$ 105.23	\$ 105.23	\$ 0.00	\$ 105.23	Supervision & Administration
	Subtotal Direct & Overheads			\$ 28,061.24				
	ACTUALS to date			\$ -		\$ -		
	Total Project Estimate			\$ 28,166.47		\$ 0.00	\$ 28,166.47	Total Checks OK
	Overall Footage:			Cost/Foot \$				
	Est. Construction Duration:							
	Contingency (%)	15%						
	Equivalent Overall OH (%)	115%						

MasterNoun	MaterialShortDesc	MaterialLongDesc	UOM	Material	OldMaterial	Region	RegionalStatus	LOB	MaterialGroup	ProductFamily	ItemType	MaterialTypeDesc	EngineeringStd	MSnbr	Price	Quantity	Total Cost
ANODE	ANODE, MAG BAG 17LB	ANODE, 17LB, MAGNESIUM, HI POT, OPEN CKT POT 1.70V MIN, 3IN SQ (NORMAL) CROSS SECT X 25IN L (PLUS/MIN US 1IN)W 10FT SOLID 12 AWG TW (RED) INSUL CU LEAD WIRE IN A CLOTH SACK, 30IN L, MFG/PKGD/SHPD IN ACC ORDANCE W/SPEC 120004-MS, LATEST REV	EA	9311183	4800460	NE	Active	GAS	Anodes	MISC. PIPE MATERIALS	GAS	Stock	1AAC		\$ 45.29	2	\$90.58
CAP	CAP, LINE VENTED NON-RESTRAIN 17.40IN OD	CAP, LINE, VENTED, NON-RESTRAINING BOLTED, COMPRESSION, FOR 16IN CAST IRON, 17.400IN OD R.S. CAST IRON PIPE, INS ULATED, 7IN Lx0.375IN THK MIDDLE RING, EPOXY COATED WITH ANODE CONNECTOR	EA	9384384	00311132	NE	Active	GAS	Pipes & Fittings - Steel			Stock		00311132	\$ 608.39	1	\$608.39
FITTING	FITTING, SHORTSTOPP 12IN	FITTING, SHORTSTOPP 12IN, WELD CONTOURED BASE INCLUDES L EAF-TYPE COMPLETION PLUG AND BLIND FLANGE	EA	9341086	00333117	NE	Active	GAS	Pipes & Fittings - Steel			Stock		00333117	\$ 1,385.70		\$0.00
SADDLE	SADDLE, CI SVCE 16INx3IN	SADDLE, 16IN X 3IN	EA	9308282	4803981	NE	Active	GAS	Pipes & Fittings - Steel	MISC. PIPE MATERIALS	GAS	Stock			\$ 287.94	2	\$575.88
SLEEVE	SLEEVE, REPAIR INSUL 16IN CTD	SLEEVE, REPAIR, 16IN, INSULATED, NO VENT, STYLE 60A, FOR 17.40IN ODCI, 18-14IN FLANGE TO FLANGE CLEARANCE, ALUMI NUM CLAD, EPOXY COATED, WITH 12IN DIA PORTION CENTERED O N TOP HALF OF SLEEVE, MASKED AND UNCOATED, ANODE CONNECT OR, RATED TO 100PSIG	EA	9342323	00364358	NE	Active	GAS	Pipes & Fittings - Steel		GAS	Stock		00364358	\$ 5,618.51		\$0.00
TAPE	TAPE, WAX BRN 4INx9IN	TAPE, WAX BROWN 4INx9IN, FOR UNDERGROUND USE, 24 ROLLS T O A CASE, TO BE USED WITH M AND S 00390021	ROL	9341928	00390020	NE	Active	GAS	Leak Detection, Control & Repair Equipment/Materials			Stock		00390020	\$ 9.17	10	\$91.70

Traffic Control - New England (Capital Overhead Applied)

Description	Quantity	Unit	Unit Cost	Total Cost	Comments	Work Order
2 person Police Detail - 4 HR		4 Hours	368.00	\$0.00		90000xxxxxx
2 person Police Detail- 8 HR	1	8 Hours	809.60	\$809.60		90000xxxxxx
3 person Police Detail- 4 HR		4 Hours	588.00	\$0.00		90000xxxxxx
3 person Police Detail - 8 HR		8 Hours	1,293.60	\$0.00		90000xxxxxx
Police Cruiser		8 Hours	30.00	\$0.00		90000xxxxxx
Total Traffic Control				\$809.60		

Misc. Contractor Labor/Equip/Charges (Capital Overhead Applied)

DIRECTIONS: 1. On Row 8, enter % of project spending that will occur in each month of the project. Consider anticipated months for contractor & materials invoices.
 2. Make sure Row 8 totals 100% in cell A88.

Notes: AFUDC will be calculated each month the work order is open plus one additional month.
 Project spending could all occur in 1 month or be spread over several months (up to 24). Gaps in spending are permissible.

Rhode Island		Monthly AFUDC Rate: 0.125%																								Total			
Current Balance		Cumulative %																											
Month 1		50.00%		75.00%		100.00%		-		-		-		-		-		-		-		-		-		-			
25.00%		25.00%		25.00%		25.00%																						100.00%	
Enter Projected % Spending / Mo																													
Projected Monthly Spending	\$7,015.31	\$7,015.31	\$7,015.31	\$7,015.31	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28,061.24
Cumulative Capital Spending	\$0.00	\$7,015.31	\$14,030.62	\$21,045.93	\$28,061.24	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
AFUDC	\$ 4.38	\$ 13.15	\$ 21.92	\$ 30.69	\$ 39.08	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 105.23

TOTAL AFUDC \$105.23

Company Name	Monthly AFUDC Rate
Boston Gas	0.113%
Essex County Gas	0.113%
Colonial Gas	0.113%
Energy North	0.000%
KeySpan Corporate Svcs	0.000%
KeySpan Generation Svcs - NY	0.000%
KeySpan Energy Delivery - LI	0.568%
KeySpan Energy Delivery - NY	0.125%
Rhode Island	0.125%
Upstate NY	0.568%

Allowance for Funds Used During Construction (AFUDC)

A noncash item representing the estimated composite interest costs of debt and return on equity funds used to finance construction. The allowance is capitalized in the property accounts and included in income.

Actual \$ Spend to date	\$0.00
- Actual OPEXS	\$0.00
- Actual AFUDCS	\$0.00
Starting Actual Capital\$	\$0.00
Estimated Capital\$	\$28,061.24
TOTAL Capital\$	\$28,061.24

Labor-Union NE

Description	Quantity- Straight Time	UOM	Quantity - OT	UOM	Unit Cost	Total Cost without Escalator \$ 5684	Escalator \$ 425.1	Total Cost \$ 6109.1	Comments
Designer		Hour		Hour	\$ 42.00	\$ -	\$ -	\$ -	
Drafter / CAD Tech		Hour		Hour	\$ 42.00	\$ -	\$ -	\$ -	
Construction Crew (5-person)	2	Day	8	Hour	\$ 1,624.00	\$ 5,684.00	\$ 425.10	\$ 6,109.10	
Construction Crew (4-person)		Day		Hour	\$ 1,304.00	\$ -	\$ -	\$ -	
Construction Crew (3-person)		Day		Hour	\$ 984.00	\$ -	\$ -	\$ -	
Construction Crew (2-person)		Day		Hour	\$ 664.00	\$ -	\$ -	\$ -	
HDD Crew (3-man)		Day		Hour	\$ 992.00	\$ -	\$ -	\$ -	
HDD Crew (4-man)		Day		Hour	\$ 1,312.00	\$ -	\$ -	\$ -	
HDD Crew (5-man)		Day		Hour	\$ 1,632.00	\$ -	\$ -	\$ -	
Tapping/Purging Crew (2-man)		Day		Hour	\$ 664.00	\$ -	\$ -	\$ -	
I&R Crew (2-man)		Day		Hour	\$ 640.00	\$ -	\$ -	\$ -	
GEMS		Hour		Hour	\$ 40.00	\$ -	\$ -	\$ -	
Meter/Service Person		Day		Hour	\$ 312.00	\$ -	\$ -	\$ -	
Meter/Service Crew (2-person)		Day		Hour	\$ 640.00	\$ -	\$ -	\$ -	
Meter/Service Crew (3-person)		Day		Hour	\$ 952.00	\$ -	\$ -	\$ -	
Distribution Mechanic		Day		Hour	\$ 328.00	\$ -	\$ -	\$ -	
Dump Driver		Day		Hour	\$ 320.00	\$ -	\$ -	\$ -	
Rack Truck Driver		Day		Hour	\$ 328.00	\$ -	\$ -	\$ -	
Corrosion Tech		Hour		Hour	\$ 40.00	\$ -	\$ -	\$ -	
Crane Support Crew		Day		Hour	\$ 1,312.00	\$ -	\$ -	\$ -	
Welder		Hour		Hour	\$ 40.00	\$ -	\$ -	\$ -	
Welding Inspector		Hour		Hour	\$ 41.00	\$ -	\$ -	\$ -	
Contractor Inspector		Day		Hour	\$ 320.00	\$ -	\$ -	\$ -	
NDE Tech		Day		Hour	\$ 328.00	\$ -	\$ -	\$ -	
Surveyor		Hour		Hour	\$ 42.00	\$ -	\$ -	\$ -	
Field Trainer		Hour		Hour	\$ 42.00	\$ -	\$ -	\$ -	

Labor Management

Department	Work Area	Description	Time Type	UOM	Unit #	Hourly Rate	Quantity	Total Cost without Escalator \$ 1343.52	Escalator \$ 98.37	Total Cost \$ 1441.89
GSE Proj Eng & Design	NE	Principal Engineer	Straight Time	per Hour	LM013	\$ 55.98	24.0	\$ 1,343.52	\$ 98.37	\$ 1,441.89

NE Contractor Labor

Quantity	Region	Bid Area	Contractor Name	Contractor #	RFP REF	Unit Code	Family	Work Description (Maximo Description)	Pipe Diameter inches	Volume Interval	UOM	Unit Price	Total Cost Without: Escalator, Fuel Adj, Night Shift \$576.02	Total Escalator \$53.93	Total Cost Fuel Adjustment \$ 0	Total Cost Night Shift Differential \$ 0	Total Cost \$ 629.95
8.0	New England	Providence	AGI	1000011878	842	OSFGRCY	Miscellaneous	PROCESSED GRAVEL PER CY	NA	NA	Cubic Yard	\$28.65	\$229.20	\$21.46	\$ -	\$ -	\$ 250.66
8.0	New England	Providence	AGI	1000011878	843	OSFSACY	Miscellaneous	SAND PER CY	NA	NA	Cubic Yard	\$29.28	\$234.32	\$21.94	\$ -	\$ -	\$ 256.26
30.0	New England	Providence	AGI	1000011878	982	OSLSCUT12	T&M	SAWCUT <=12" PER FOOT	NA	NA	Linear Foot	\$3.75	\$112.50	\$10.53	\$ -	\$ -	\$ 123.03

Quantity	Region	Bid Area	Contractor Name	Contractor #	RFP REF	Unit Code	Family	Work Description (Maximo Description)	Pipe Diameter inches	Volume Interval	UOM	Unit Price	Total Cost Without: Escalator, Fuel Adj, Night Shift \$460	Total Escalator \$43.07	Total Cost Fuel Adjustment \$ 0	Total Cost Night Shift Differential \$ 0	Total Cost \$ 503.07
50.0	New England	Providence	AGI	1000011878	796	OPV09SF	Restoration	ASPHALT RESTORATION 6" TO 9" PER SF	NA	NA	Square Foot	\$9.20	\$460.00	\$43.06	\$ -	\$ -	\$ 503.06



January 12, 2021

Kathryn Kelly
Narragansett Bay Commission
1 Service Road
Providence, RI 02905

Re: Electric Service Proposal:

Enclosed please find an Electric Service Proposal for crib cuts to de-energize secondary lines and reconnects of the same at Taft Street

If this Proposal is acceptable, please sign and return the enclosed copy of the Service Agreement. Upon receipt of your acceptance, you will then be billed under separate cover in the amount of \$2,435.27 including applicable taxes. This price is valid for 90 days.

This work will be scheduled upon receipt of this signed Service Agreement, payment of invoice, and completion of all responsibilities as outlined in the attached proposal.

Should you have any questions, please contact me 401-784-4358.

Sincerely,

Thomas Bellrose
Complex Commercial Acct Rep
National Grid
280 Melrose St
Providence, RI 02907

ELECTRIC SERVICE PROPOSAL

**Kathryn Kelly
Narragansett Bay Commission
1 Service Road
Providence, RI 02905**

Service Request:	30281741, 30300146, 30313020 & 30313021
Drawings:	
Electrical Contractor:	
Customer's Contribution:	\$2,435.27
Billing Party:	Narragansett Bay Commission
Customer's Responsibilities:	<ul style="list-style-type: none">▶ Return signed Service Agreement, if accepted.▶ Provide all necessary right-of-way easements▶ Notify National Grid if any changes in the Billing Party will occur.▶ Payment in full, upon receipt of the invoice.
National Grid Responsibilities:	Temporary secondary crib cuts at Pole 1 Merry Street and pole 1 Spencer Street and reconnects at a later date. WR# 30281741 crib cut at pole1 Spencer Street WR# 30300146 close crib at Pole1 Spencer Street WR# 30313020 crib cut at Pole1 Merry Street WR# 30313021 close crib at Pole1 Merry Street
Construction Lead Time:	Approximately 2-4 weeks will be necessary for construction. Upon receipt of payments, permits, right-of-way and the signed Proposal, this project will be added to National Grid's construction schedule. Note: Payment must be made upon receipt of the invoice. The correct mailing address for payments will be listed on the invoice.
Remarks:	This proposal is based upon projected cost and rate schedule provisions in effect at the date of this proposal and will be withdrawn if not accepted within 90 days of the date of this Proposal. This proposal and all attached documentation is proprietary property of National Grid and can only be used for its intended purpose crib cuts to de-energize secondary lines and reconnects of the same, at Taft Street and shall not be otherwise disclosed.
Prepared By:	Thomas Bellrose Complex Commercial Acct Rep 401-784-4358



**Narragansett Electric Company, dba National Grid
Miscellaneous Construction**

Quote Date : January 12, 2021
 Name of Complex: _____
 Service Address: Taft Street
Pawtucket, RI 02860

 Contact Name: Kathryn Kelly
 Company Name: Narragansett Bay Commission
 Mailing Address: 1 Service Road
Providence, RI 02905

National Grid Representative: Thomas Bellrose

Work Req. # 30281741

Miscellaneous Construction

Temporary secondary crib cuts at Pole 1 Merry Street and pole 1 Spencer Street with reconnects at a later date.
 WR# 30281741 crib cut at pole1 Spencer Street
 WR# 30300146 close crib at Pole1 Spencer Street

 WR# 30313020 crib cut at Pole1 Merry Street
 WR# 30313021 close crib at Pole1 Merry Street

Cost

The cost of this service, as requested by the customer, is: \$2,435.27 This cost is non-refundable.

Cost Estimates

All cost estimates stated in this agreement are time sensitive and based on the execution date of this agreement. If construction has not commenced within 180 days of the execution date of this agreement and/or a wire inspection has not been completed within 360 days of the execution date of this agreement, National Grid reserves the right to require a new agreement that reflects the policies and costs in effect at that time.

Specifics:

Rate: N/A
 Delivery: N/A
 Maximum Intake: N/A
 Special Conditions: _____

I agree to the terms set forth in the Agreement:
Narragansett Bay Commission

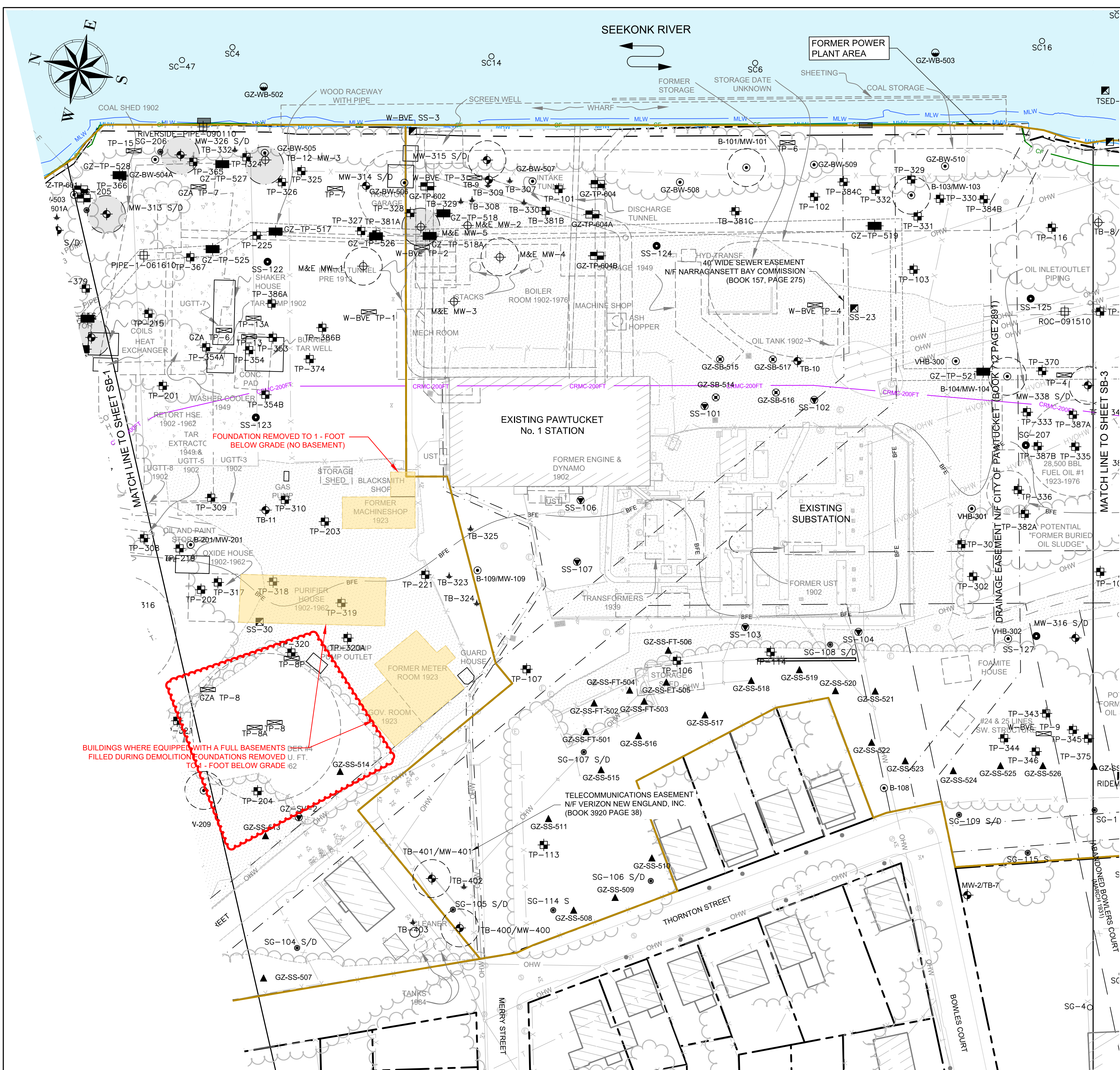
Name: Kathryn Kelly
 Title: _____
 Date: _____

Customer Signature

APPENDIX E
Test Pit Information for Tank Holder
#4 on Tidewater Property

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GZA-VA-ENVA-43654-40\CAD\01-CURRENT\PLANS\EXP-PLANS FOR NSC-BETA\43.645.40_PERMIT-SB-01-03-EXP.DWG 5. EXPLORATION LOCATION PLAN (2 OF 3) OCTOBER 2, 2019 11:58AM SCOTT BUXTON



SAMPLE LEGEND

- SS-9 ATLANTIC SURFACE SOIL SAMPLE LOCATION
- TSED-6 ATLANTIC SEDIMENT SAMPLE LOCATION
- W-BVE SS-3 WESTON/BLACKSTONE VALLEY ELECTRIC SEDIMENT SAMPLE LOCATION
- RDEM SS-3 RIDEM SURFACE SOIL SAMPLE LOCATION
- B-109/MW-109 MONITORING WELL/BORING (VHB) SURVEYED
- TP-3A ATLANTIC TEST PIT LOCATION
- W-BVE WESTON/BLACKSTONE VALLEY ELECTRIC TEST PIT LOCATION
- GZA TP-8 GZA/VALLEY GAS TEST PIT LOCATION
- TB-15 ATLANTIC SOIL BORING LOCATION
- MW-3 ATLANTIC MONITORING WELL LOCATION
- M&E MW-1 METCALF & EDDY MONITORING WELL LOCATION
- VHB-400 VHB SURFACE SOIL SAMPLE LOCATION NON-SURVEYED
- TP-204 VHB TEST PIT (2006)
- GZ-01 GZA TEST PIT (2009)
- TB-300 GZA TEST BORING LOCATION (2010-2011)
- MW-320 S/D GZA MONITORING WELL LOCATION (2010-2011)
- TP-306 GZA TEST PIT LOCATION (2010)
- SS-100 GZA SURFACE SOIL SAMPLE LOCATION (2010)
- SC31 ARCADIS SEDIMENT SAMPLE LOCATION (2008)
- PIPE-1-061610 GZA RESIDUAL MATERIAL SAMPLE (2010)
- SG-200 INTERIOR SOIL GAS SAMPLING LOCATION
- SG-100 PERIMETER SOIL GAS SAMPLING LOCATION
- TB-400 GZA BORING LOCATION (2014)
- MW-400 GZA MONITORING WELL LOCATION (2014)
- MW-01 F & O MONITORING WELL LOCATION (2011-2012)
- SB-08 F & O SOIL BORING LOCATION (2011-2012)
- SS-01 F & O SURFACE SOIL SAMPLE LOCATION (2011-2012)
- SB-101 F & O PRE-DISPOSAL SOIL CHARACTERIZATION SAMPLE LOCATION (2011-2012)
- TP-4 ERA TEST PIT LOCATION (1988)
- ERA-2 ERA MONITORING WELL LOCATION (1988)
- GZ-TP-519 GZA TEST PIT LOCATION (2017)
- GZ-SS-518 GZA SURFACE SOIL SAMPLE LOCATION (2017)
- GZ-SS-FT-502 GZA SURFACE SOIL SAMPLE LOCATION (FORMER TRANSFORMER AREA) (2017)
- GZ-BK-501 GZA SOIL BORING LOCATION (2017)
- GZ-BW-507 GZA SOIL BORING LOCATION (2017)
- GZ-SB-515 GZA SOIL BORING LOCATION (2017)
- GZ-SV-1 GZA SOIL VAC LOCATION (2017)
- GZ-WB-501 GZA WATER BORING LOCATION (2017)
- GZ-CS-501 GZA CONCRETE SAMPLE LOCATION (2017)
- GZ-TP-601 GZA TEST PIT LOCATION (2019)
- LNAPL DETECTED IN (2017)
- DNAPL DETECTED IN (2017)
- WELL TO BE ABANDONED AS PART OF REMEDY

LEGEND:

- WETLAND LINE
- BUILDING
- CONCRETE SURFACE
- FENCE
- GRAVEL SURFACE
- BITUMINOUS PAVEMENT
- RETAINING WALL
- TREE LINE
- PROPERTY LINE
- EASEMENT LINE
- ABANDONED STREET LINE
- MEAN HIGH WATER LINE
- MEAN LOW WATER LINE
- 200 FOOT CRMC JURISDICTION LINE
- COASTAL FEATURE LINE
- HIGH TIDE ELEVATION
- SITE BOUNDARY



PERMITTING SET
NOT FOR CONSTRUCTION

P.E. STAMP:

NO.	ISSUE/DESCRIPTION	BY	DATE
<p style="font-size: small;">THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NATIONAL GRID OR THE NATIONAL GRID'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA AND NATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.</p>			
<p>FORMER TIDEWATER FACILITY PAWTUCKET, RHODE ISLAND PERMIT SET</p>			
<p>EXPLORATION LOCATION PLAN (2 OF 3)</p>			
<p>PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com</p>		<p>PREPARED FOR: nationalgrid</p>	
<p>PROJ MGR: DJR DESIGNED BY: --- DATE: AUGUST 2019</p>	<p>REVIEWED BY: MJP DRAWN BY: SAB PROJECT NO. 43654.40</p>	<p>CHECKED BY: DJR SCALE: AS SHOWN REVISION NO.</p>	<p>DRAWING SB-2 SHEET NO. 5 OF 51</p>

TEST PIT FIELD LOG

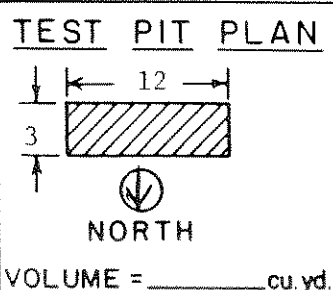
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION <u>Valley Gas Company</u> LOCATION <u>Pawtucket, R.I.</u>	TEST PIT No. <u>8</u> FILE No. <u>C-6873</u> DATE <u>11-14-86</u>
---	---	---

GZA ENGINEER <u>G. Gardner</u> WEATHER <u>Sunny, 30's</u>	EXCAVATION EQUIPMENT CONTRACTOR <u>John Ferri & Sons</u> OPERATOR _____ MAKE _____ MODEL _____ CAPACITY _____ cu.yd. REACH <u>15</u> ft.	GROUND ELEV. _____ TIME STARTED _____ TIME COMPLETED _____
--	---	--

DEPTH	SOIL DESCRIPTION	EXCAV EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Brown, coarse to fine SAND, little(+) Gravel, bricks (Apparent FILL)	M		1.
2'		M		2.
3'		M		
4'		M		
4'±	Bottom of Exploration			
5'				
6'				
7'				
8'				
9'				
10'	(Water inside tank is discolored, strong odor emanating from apparent fill material and water)			
11'				
12'				
13'				
14'				

REMARKS:

1. Test pit located in fill material of previously located No. 4 Holder.
2. Apparent surface water trapped within brick subsurface structure of the No. 4 Holder.



LEGEND:

BOULDER COUNT	
SIZE RANGE	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI)	10 - 20%
SOME (SO)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR - GRAY
BN - BROWN
YEL - YELLOW

EXCAVATION EFFORT

E - EASY
M - MODERATE
D - DIFFICULT

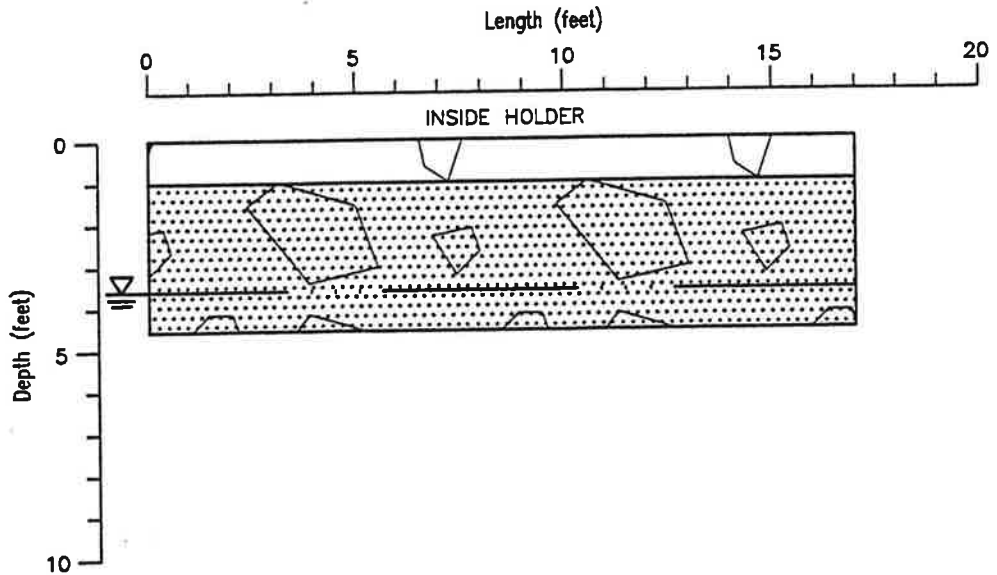
GROUNDWATER

ELAPSED TIME TO READING (HRS)

G.W.L.

TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 2061-03-02 LOCAL "CALL BEFORE YOU DIG" CASE NO.: -
 TEST PIT NUMBER: TP-8/TP-8A OBSERVER: DEAN GUSTAFSON
 GENERAL LOCATION AND/OR PURPOSE: RELIEF HOLDER #4 ASSISTANT: -
 CENTER/NORTHWEST SIDE OTHERS: -
 DATE JULY 10, 1996 OPERATOR: BOB PRENTISS
 TIME OPENED: 7:40 AM TIME CLOSED: 10:00 AM EQUIPMENT: CAT 416B BACKHOE



SOIL DESCRIPTION

- 0-1' BROWN MEDIUM-COARSE SAND, BRICK RUBBLE, STONE, CONCRETE, STEEL (2-3" DIA.) PIPING.
- 1-4.5' BLACK STAINED SOIL, RUBBLE, WOOD, PIPING. STRONG COAL TAR/NAPHTHA ODOR.

VIDEO DOCUMENTED: YES NO
 PHOTOGRAPHED: YES NO
 TOTAL DEPTH: 4.5 FT.
 TOTAL LENGTH: 17/8 FT.

DEPTH TO WATER: 3.6 FT.
 NAPL SEEPAGE: YES NO
 SAMPLE ID: NONE

TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 2061-03-02 LOCAL "CALL BEFORE YOU DIG" CASE NO.: -
 TEST PIT NUMBER: TP-8B OBSERVER: DEAN GUSTAFSON
 GENERAL LOCATION AND/OR PURPOSE: NORTHEAST OUTSIDE WALL ASSISTANT: -
OF RELIEF HOLDER #4 OTHERS: -
 DATE: JULY 10, 1996 OPERATOR: BOB PRENTISS
 TIME OPENED: 8:55 AM TIME CLOSED: 9:43 AM EQUIPMENT: CAT 416B BACKHOE

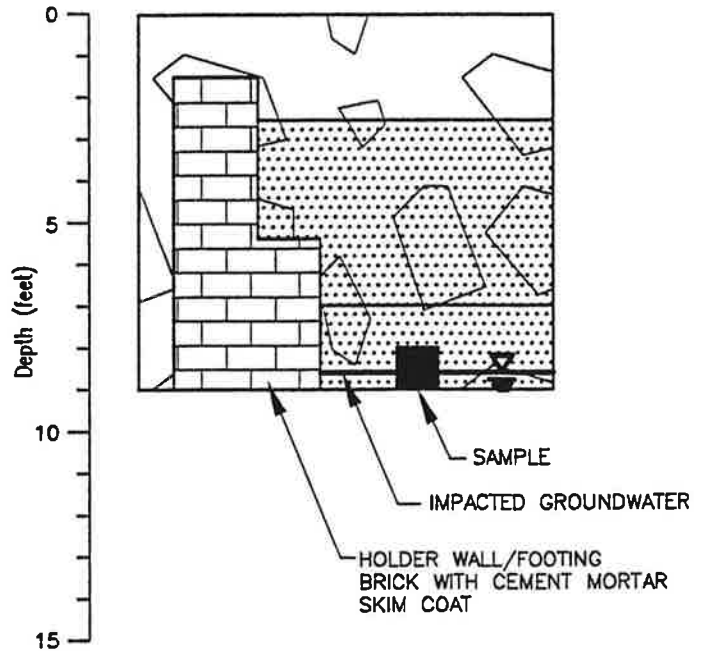
SOIL DESCRIPTION

0-2.5' SOIL, RUBBLE, COAL ASH/CINDERS, BRICK. RELATIVELY CLEAN.

2.5-7' HEAVILY IMPACTED BLACK STAINED SOIL, BRICK RUBBLE. STRONG TAR ODOR.

7-9' SATURATED SOIL, HEAVY SHEEN. VERY STRONG TAR ODOR. GROUNDWATER SEEPING INTO EXCAVATION AT 8.5'. CANNOT GO DEEPER.

NOTE: TARRY SHEEN AND STAINING ON GROUNDWATER SURFACE.



VIDEO DOCUMENTED: YES NO _____
 PHOTOGRAPHED: YES _____ NO
 TOTAL DEPTH: 8.5 FT.
 TOTAL LENGTH: 10 FT.

DEPTH TO WATER: 8.5± FT.
 NAPL SEEPAGE: YES NO _____
 SAMPLE ID: TTP-8B (8-9')



Test Pit Log: **TP-204**

Project: Tidewater	Date: 4/26/06
Test Pit Location: 200 Taft Street	Ground Surface Elevation: 21.9 ft.
Equipment Used: John Deere 410 Backhoe	Contractor: Clean Harbors Environmental Services
Test Pit Dimension (LxWxD): 6 ft.x3 ft.x4 ft.	Logged By: CM
Project No.: 71522	Depth to Water: Not Encountered

DEPTH (feet)	Sample No.	Sample	Excavation Effort	OVM Reading	Description: strata thickness, color, texture, moisture, observations	Remarks
0						
1						
2			E/M		Lt Olive Br vf/c sand and stones, cobbles, asphalt, brick (demolition debris)	Due to proximity to 30-inch gas main, stopped excavation at 4 feet
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

TEST PIT FIELD LOG

GZA GEOENVIRONMENTAL, INC. 530 BROADWAY, PROVIDENCE, RI GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION: Former Tidewater Facility LOCATION: Pawtucket, Rhode Island	TEST PIT NO.: TP-320 FILE NO.: 43654.00 DATE: 6-3-10
---	--	--

GZA ENGINEER: Sean Connolly WEATHER:	CONTRACTOR: T-Ford OPERATOR: Todd Mandella MAKE: Komatsu CAPACITY: ± 3 cu. Yds.	EXCAVATION EQUIPMENT MODEL: PC220LC REACH: ± 17 feet	DATUM: NGVD 1929 GROUND ELEV.: 16.09 TIME STARTED: 09:50 TIME COMPLETED: 10:30
---	--	--	---

DEPTH (ft)	ELEVATION (ft)	Field Testing (ppmv)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
1	15.09	0.3	Brown (10yr 5/3) fine to coarse SAND, some fine to coarse Gravel, little Organics, little Brick (Dry)	M	0	4
2	14.09		Possible Bedrock	M/D	1A	2/3
3	13.09			M/D	2A	
4	12.09	67.6	Black (10yr 2.5/1) fine to coarse SAND, some fine to coarse Gravel, little Coal-like Fragments, little Rock, strong coal tar-like odor, coated-saturated. (Moist-Wet)	M/D	3A	
5	11.09			M/D	3A	1
6	10.09	197	Refusal @ ± 6' bgs	M/D	3A	
7						
8						
9						
10						
11						
12						
13						
14						

REMARKS:

1. GW moderately weeping @ ± 5' bgs in the SW corner of the test pit. Water has coal tar-like impacts.
2. Brick wall in the SW wall of the test pit.
3. Possible bedrock depicted above.
4. Soil samples screened with a 10.6 eV MiniRAE photoionization detector (PID). PID values represent meter response in parts per million/volume air (ppmv) relative to benzene in air and above the background readings. All samples are photo documented. ND=None Detected above background.

TEST PIT PLAN 	LEGEND: <table style="width: 100%;"> <tr> <th>BOULDER SIZE RANGE CLASSIFICATION</th> <th>COUNT LETTER DESIGNATION</th> <th>PROPORTIONS USED</th> </tr> <tr> <td>6"-18"</td> <td>A</td> <td>TRACE (TR) 0-10%</td> </tr> <tr> <td>18"-36"</td> <td>B</td> <td>LITTLE (LI) 10-20%</td> </tr> <tr> <td>36" OR LARGER</td> <td>C</td> <td>SOME (SO) 20-35%</td> </tr> <tr> <td></td> <td></td> <td>AND 35-50%</td> </tr> </table>	BOULDER SIZE RANGE CLASSIFICATION	COUNT LETTER DESIGNATION	PROPORTIONS USED	6"-18"	A	TRACE (TR) 0-10%	18"-36"	B	LITTLE (LI) 10-20%	36" OR LARGER	C	SOME (SO) 20-35%			AND 35-50%	EXCAVATION EFFORT <table style="width: 100%;"> <tr> <td>E</td> <td>EASY</td> </tr> <tr> <td>M</td> <td>MODERATE</td> </tr> <tr> <td>D</td> <td>DIFFICULT</td> </tr> </table> OBSERVED GROUNDWATER LEVEL	E	EASY	M	MODERATE	D	DIFFICULT
BOULDER SIZE RANGE CLASSIFICATION	COUNT LETTER DESIGNATION	PROPORTIONS USED																					
6"-18"	A	TRACE (TR) 0-10%																					
18"-36"	B	LITTLE (LI) 10-20%																					
36" OR LARGER	C	SOME (SO) 20-35%																					
		AND 35-50%																					
E	EASY																						
M	MODERATE																						
D	DIFFICULT																						

APPENDIX F
**National Grid's specifications, guidance and policies for
working near and around gas utilities**

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Cast Iron Gas Main Encroachment Prevention

nationalgrid

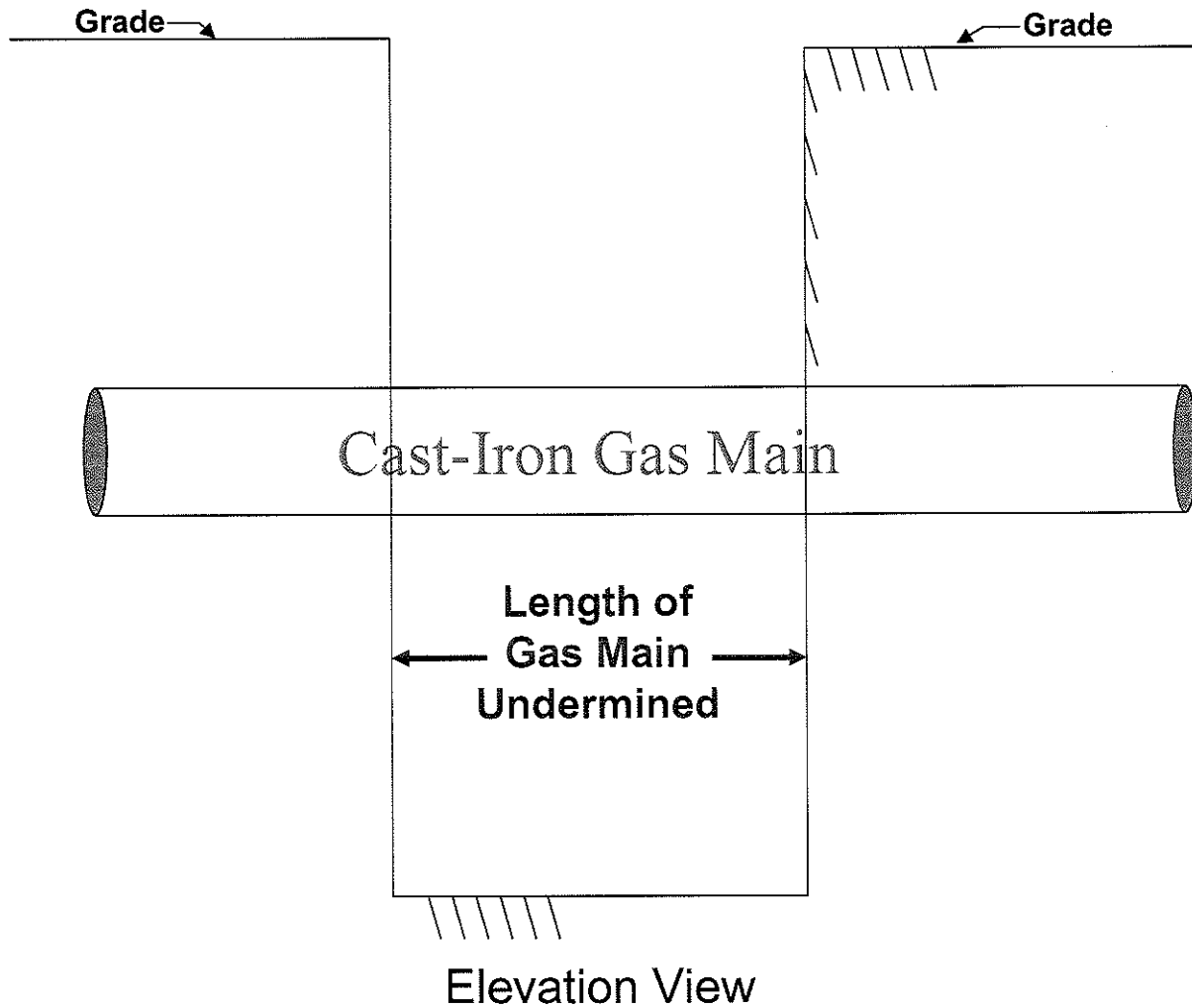
Chris Ferranti
Lead Engineer
Gas Operations & Construction
Rhode Island
Cell: 401-465-9064
chris.ferranti@nationalgrid.com

477 Dexter Street
Providence, RI 02863

CI Encroachments

- CI Encroachments can occur when excavating under or next to CI gas mains
- CI Encroachments can occur Even when a gas main is not exposed
- Two types of Encroachments: Undermine and Parallel
 - Undermine Encroachments (Cross Trench)
 - Parallel Encroachments

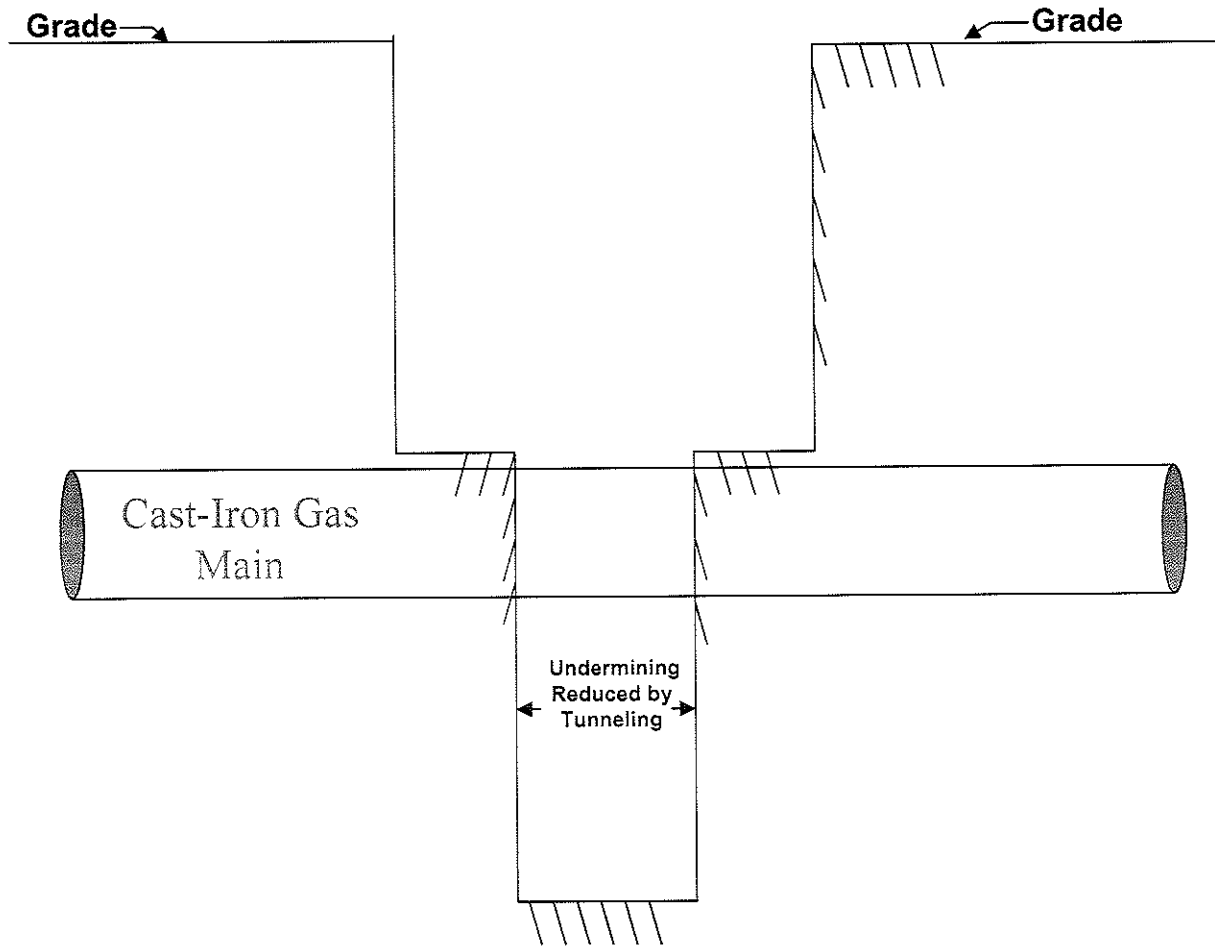
Cross Trench



Cross Trench - Rules of Thumb:

- The shorter the undermine, the better
- Limiting the length of the undermine to 30" or less will always avoid an encroachment

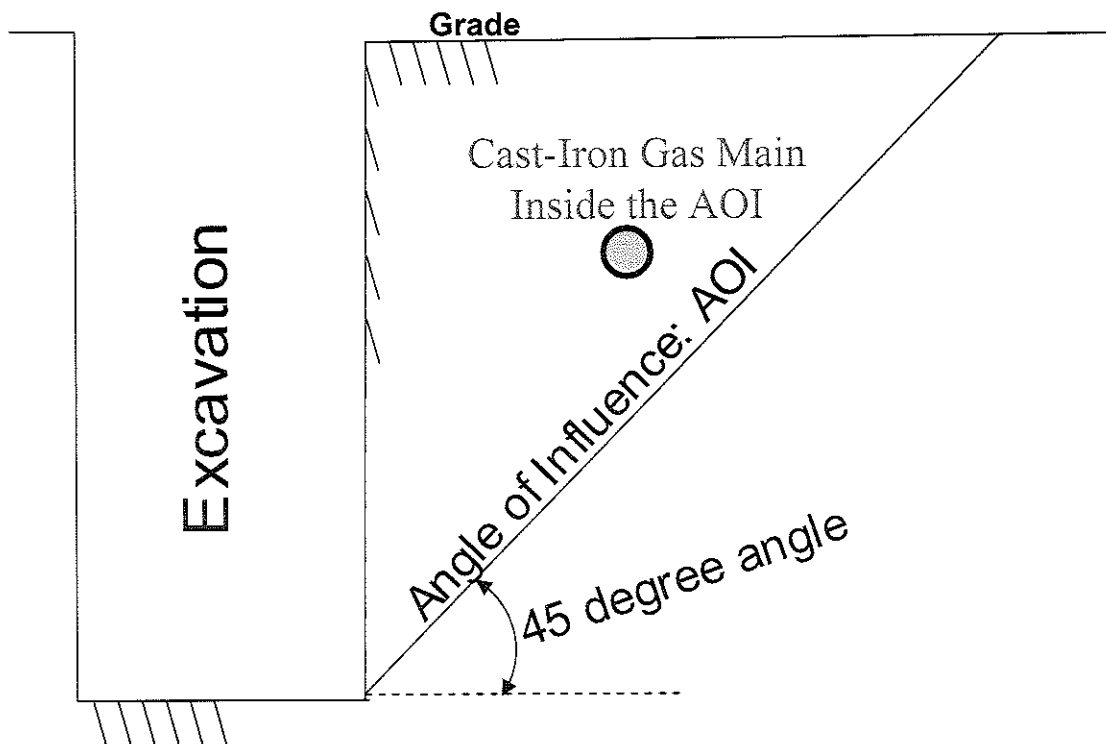
Cross Trench with Tunneling



Elevation View

Tunneling is an Effective Way of Preventing Encroachments

Cast Iron Encroachments can occur even when the Gas Main is not Exposed

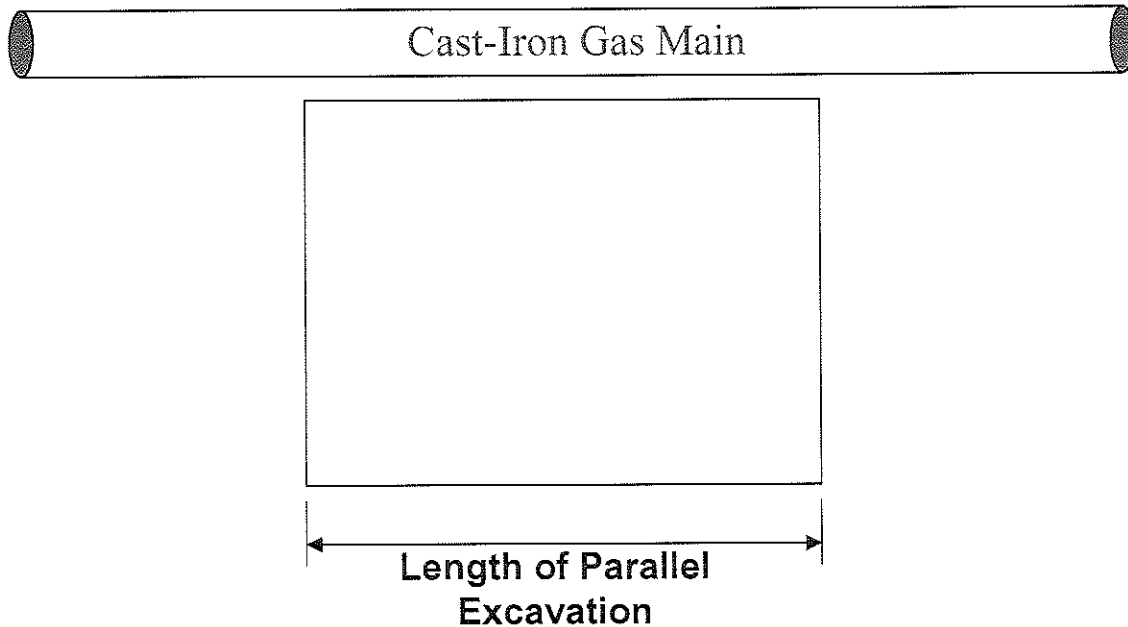


Angle of Influence:

- The AOI extends up from the bottom of the excavation at a 45 degree angle
- The AOI can affect cast iron gas mains even if the gas main is not exposed

Excavation Next to Gas Main

(view from above looking down)

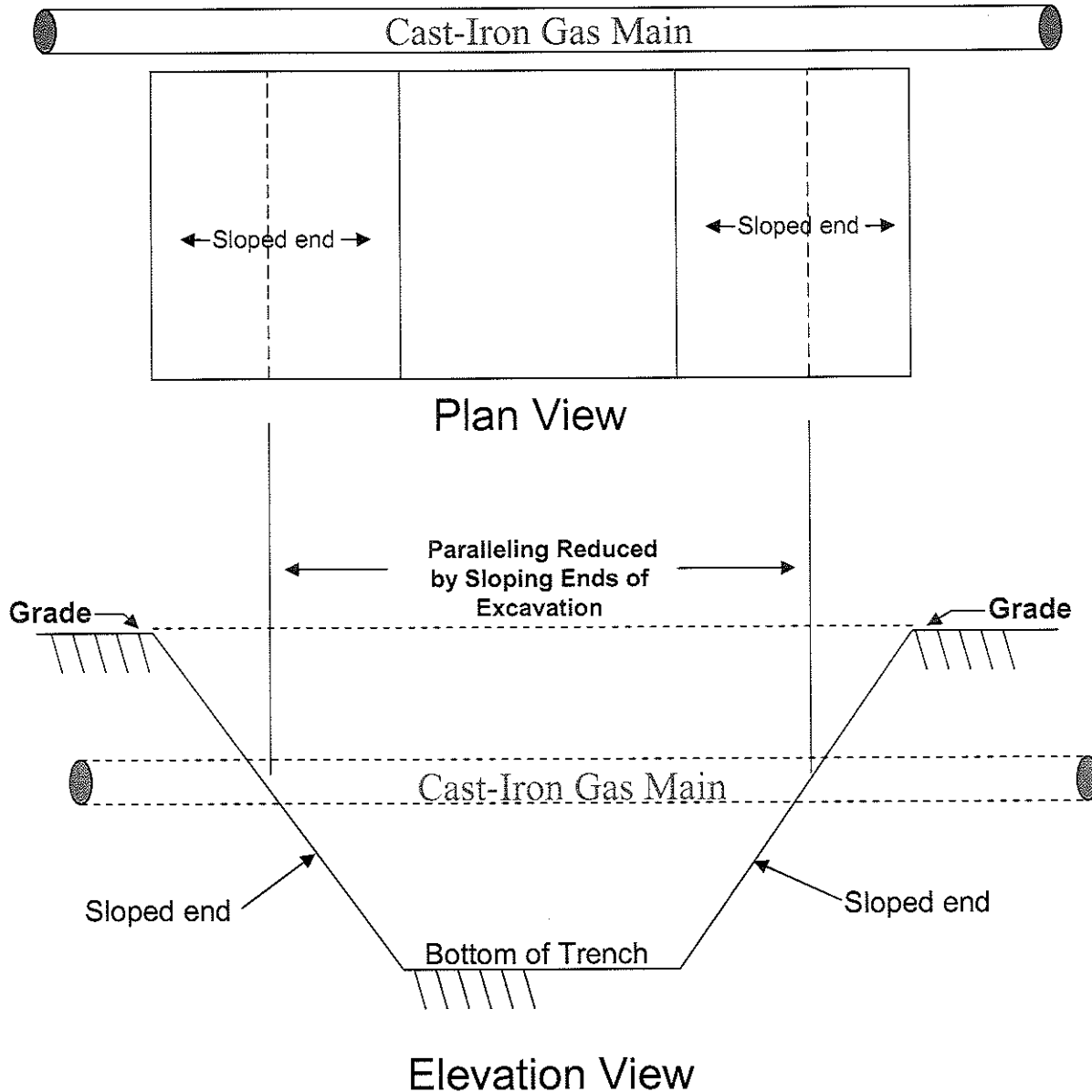


Plan View

Parallel Excavation Rule of Thumb:

- Limiting the length of the parallel to 7'-6" or less will always avoid an encroachment

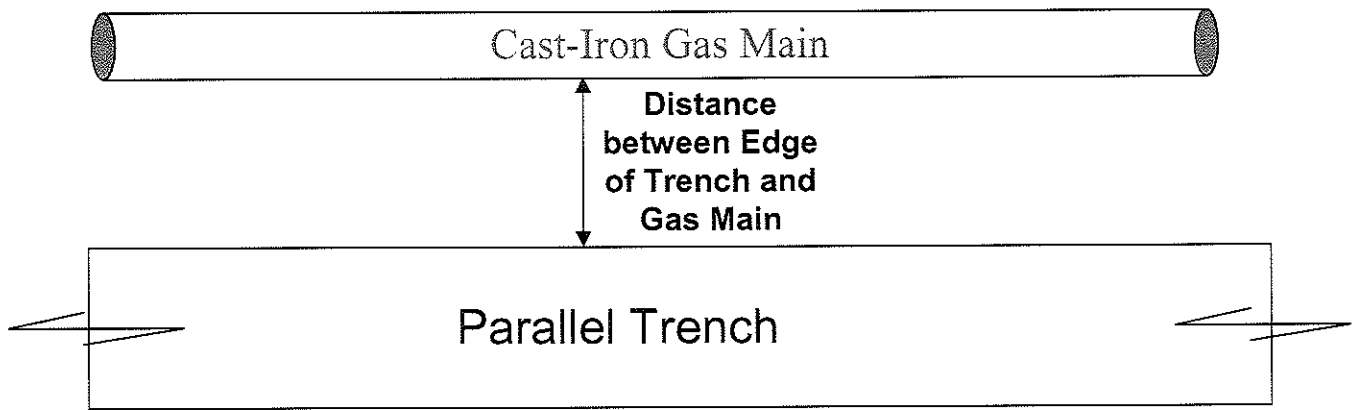
Parallel Excavation with Sloped Ends



Sloping the ends of an Excavation can be an Effective Way of Preventing Encroachments

Trenching Next to Gas Main

(view from above looking down)



Plan View

Parallel Trenching Rules of Thumb:

- The greater the separation between the gas main and the trench, the better
- Keeping the distance between the excavation and the gas main greater than the (depth of the trench - 2') will in most cases avoid an encroachment

CI Encroachments

- CI Encroachments can occur when excavating under or next to CI gas mains
- CI Encroachments can occur **Even when a gas main is not exposed**
- Two types of Encroachments: Undermine and Parallel
 - **Undermine Encroachments (Cross Trench)**
 - In all cases, the shorter the length of gas main undermined the better
 - Limiting undermining to less than 30” in length will always avoid an encroachment
 - Tunneling under the gas main can be an effective method for avoiding encroachments
 - **Parallel Encroachments**
 - Parallel Encroachments can occur even if the gas main is not exposed
 - In all cases, the greater the separation between the gas main and the parallel excavation, the better
 - Limiting excavations adjacent to gas main to less than 7’-6” in length will always avoid an encroachment
 - Keeping parallel excavations more than the (depth of the trench – 2’) from gas main in most cases will prevent an encroachment

GUIDELINES FOR BACKFILL AND COMPACTION AROUND GAS PIPES

PERMANENT BACKFILL AND COMPACTION

DESCRIPTION

This work shall consist of backfilling and compacting all disturbed material at and around existing gas pipes and facilities. Size of pipe, material, length of exposed pipe, location of pipe, etc. will all follow the same set of Standards and Specifications stipulated by Nationalgrid Company. If design plans call for gas pipes to be exposed and supported (sheeting methods not used), then at the time of backfill, all disturbed material below the invert of the gas pipe shall be removed and replaced with suitable roadway or trench excavation material or bedding material. The contractor will not be allowed to replace this disturbed material with the same existing material if it has now been mixed with adjacent silty subsoil (clays) and fines. Well-graded gravel and sands will be used to replace the unsuitable material when no excess suitable material is available on site. Soils with high humus or mineral content should not be used to for backfill because they can promote electrolytic or bacterial attack.

Backfilling the gas pipe should begin immediately after the work in that location is complete. The region within 6" alongside and on top of the gas pipe shall be backfilled with padding sand (free of cinders, ash, and rock). In no case shall the material used for backfilling in this region contain any stones. Backfill shall consist of suitable materials (medium to coarse sands with little or no silts) placed in layers of not more than 8" to 12" after compaction.

Trench spoil material shall be suitable for backfilling above the padding material as long as rocks with a diameter larger than 3" are removed. The layers shall be mechanically compacted to the industry standard of 95% or until a density comparable to the unexcavated material is achieved. In some instances, flooding with water is an acceptable method of compaction but only if the back-fill material is clean, coarse, and adequate drainage is existent. The above specified backfill material is essential in order to attain the degree of compaction necessary to avoid future settlement.

Tracing Wire, if necessary, shall be installed 2" to 6" below Plastic gas pipes.

Warning Tape shall be installed approximately 12" above the gas pipe.

A minimum of 2" temporary pavement shall be applied over the trench as soon as possible.



10/01/12

Guidelines for Working Around Gas Utilities

Notification of Construction

National Grid requests at least six week advanced notification prior to the start of construction to perform scheduled work in the proposed project area. Be aware that some gas work cannot be performed during the normal heating season.

Support and Protect

Contractor must call Dig Safe to have the gas mains and services marked out before construction. Care must be exercised when saw cutting over any gas infrastructure, especially services, which are more shallow than the main. Depth of gas mains vary. Contractor shall dig test pits in order to ascertain exact locations, cover and invert elevations, clearances, alignment and operating status of existing gas facilities. Contractor shall exercise extreme caution when excavating in the vicinity of any gas facility. Hand excavation shall be performed to locate all gas facilities and whenever digging within 24" of gas facilities. If cover over gas piping is removed the required cover must be replaced, or if not feasible, National Grid must be notified for review of the issue. Undermined gas pipe must be adequately supported and protected from damage. Contact National Grid engineer for guidelines regarding proper pipe support. Significant vibration from pile driving and such may negatively impact gas facilities, particularly cast iron mains and regulator station vaults. Contact National Grid engineer prior to performing such activities as well as operations which may undermine gas facilities such as micro-tunneling, jacking, directional drilling, etc.

Gas Leaks

For any gas leak please call the appropriate number immediately.

Greater Boston - 800-233-5325

Other Massachusetts – 800-548-8000

Rhode Island – 800-640-1595

Types of Gas Facilities

Gas mains and services are made of several different materials and contain a wide range of pressures. Typical materials used for buried gas pipe includes bare steel, coated steel, plastic, cast iron, wrought iron, ductile iron, and copper. Never assume that a pipe is not gas. At times gas lines are inserted into older lines to save excavation cost.

Exposure of Gas Facilities

If any gas mains or services become exposed, National Grid must be notified to inspect the line before backfilling. Also any damage that may have been made to the pipe or pipe coating will need to be repaired by National Grid before backfilling. Contact our Dispatch office at (877) 304-1203 for inspection. It is important that even minor damage or scrapes be reported to National Grid. Backfill shall be 6" of sand around the gas line and clean compacted fill above.



Regulator Stations

Gas regulator stations are particularly critical facilities and National Grid must be notified whenever work is to take place within 200 feet of a station. Regulator stations are typically in buried vaults accessed through either manhole covers or aluminum doors. **ONLY AUTHORIZED NATIONAL GRID EMPLOYEES SHALL OPEN A REGULATOR STATION VAULT.** Be aware that a complex nest of piping and valves often exists in the vicinity outside the vaults.

Blasting

National Grid must be notified of any blasting that will take place within 200 feet of a gas utility. National Grid must be supplied with a detailed blast plan for blasting in the vicinity of gas facilities. The evaluation of the blast plan by a National Grid engineer may take some time, therefore, blast plan data should be submitted at least two weeks prior to the planned blasting. As a general rule blasting will not be permitted within 10 feet of a gas line and PPV at the nearest gas pipe shall not exceed 5 in/sec. PPV at the nearest gas main shall be monitored.

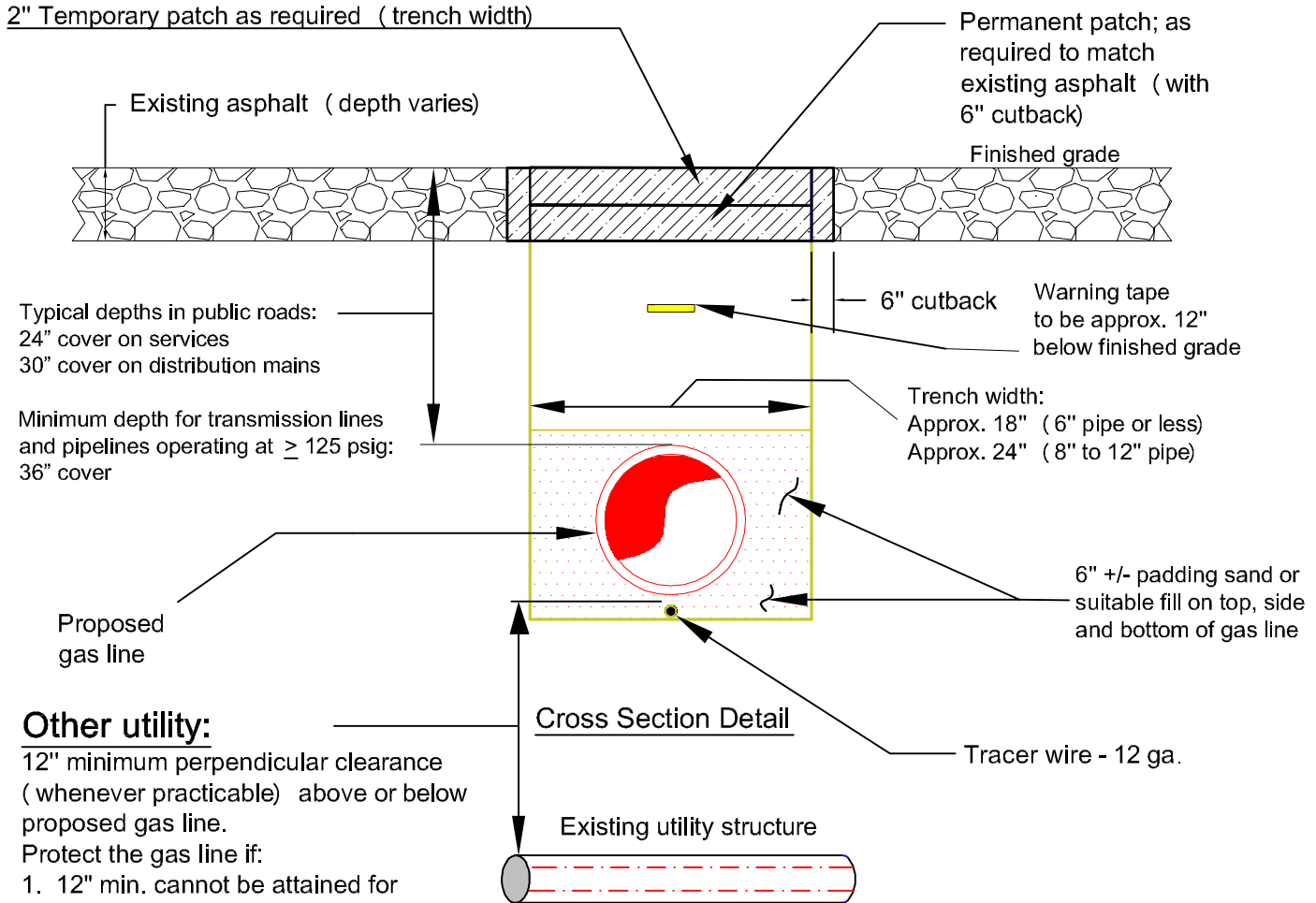
Valves

Access to gas valves must be maintained throughout construction and left at grade at the end of construction. Should valve boxes be damaged and need to be replaced National Grid will supply replacements upon request. **NEVER OPERATE A GAS VALVE. ONLY NATIONAL GRID SHALL OPERATE GAS VALVES.**

Clearance

Adequate clearance must be provided when installing other utilities, foundations, structures, etc. Contact National Grid engineer for guidance.

Typical Utility Crossing and Trench Guidelines



Other utility:

12" minimum perpendicular clearance (whenever practicable) above or below proposed gas line.

Protect the gas line if:

1. 12" min. cannot be attained for gas transmission lines and pipelines operating at ≥ 125 psig.
2. 6" min. cannot be attained for distribution mains.
3. 4" min. cannot be attained for services.

Minimum clearance when protection is provided against damage is 2" for all gas lines.

Pipeline backfill will consist of suitable materials (medium to coarse sands with little or no silts) placed in layers of no more than 8" to 12" after compaction. Trench spoil materials suitable for backfilling will be mechanically compacted to the industry standards of 95% (as measured by Drop-Cone Penetrometer method) or until a density comparable to the unexcavated material is achieved.

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TYPICAL UTILITY CROSSING AND TRENCH GUIDELINES

DATE: 09/15/2014

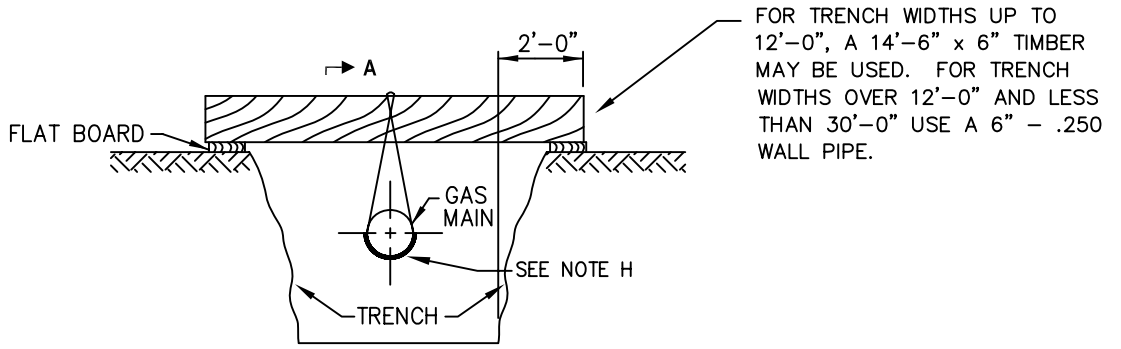
EFFECTIVE DATE: 09/15/2014

DESIGN: N. COSTANZO

STD. DWG. NO.

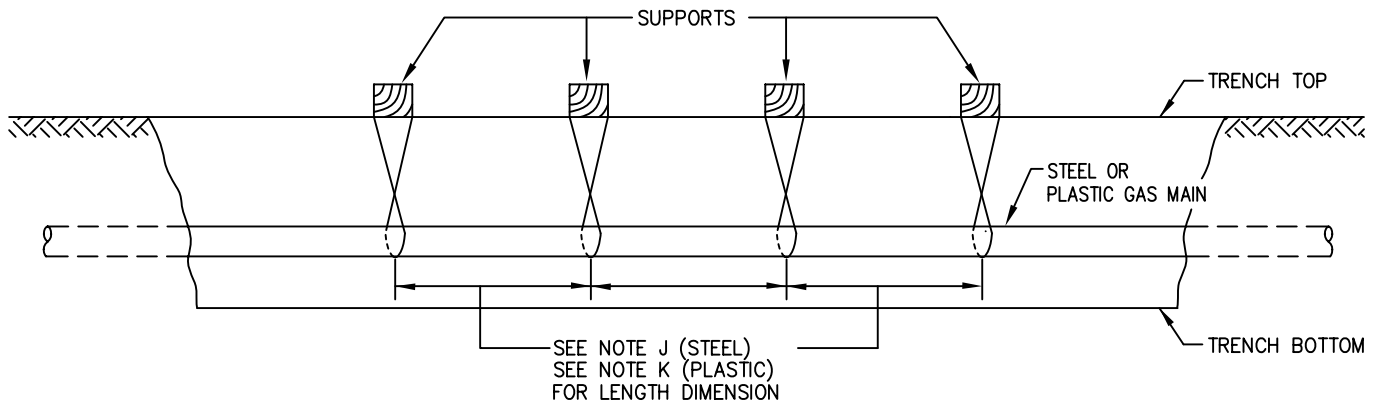
DRAWN: N. COSTANZO

CS-CNST002

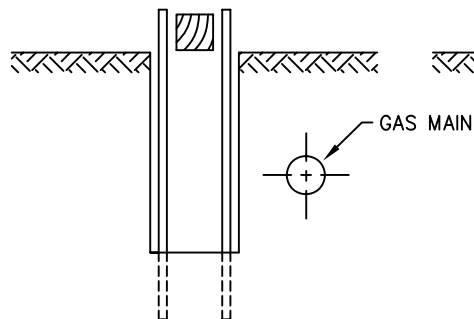


FOR TRENCH WIDTHS UP TO 12'-0", A 14'-6" x 6" TIMBER MAY BE USED. FOR TRENCH WIDTHS OVER 12'-0" AND LESS THAN 30'-0" USE A 6" - .250 WALL PIPE.

EXPOSED SUPPORT

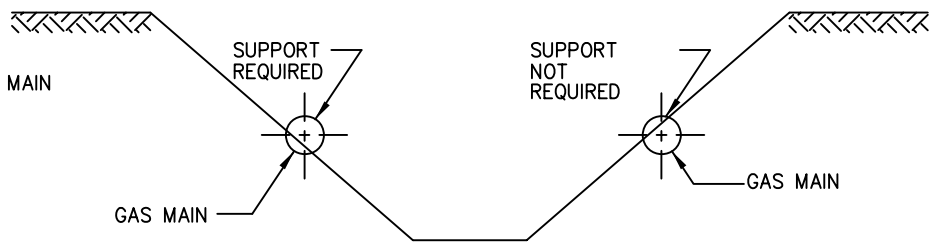


SUPPORTED LENGTH A-A



ADEQUATELY SHORED TRENCH

DETAIL A
SEE NOTE B



INADEQUATELY SHORED OR UNSHORED TRENCH

DETAIL B
SEE NOTE B

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LI-MA-NH-NYC

SUPPORT REQUIREMENTS FOR EXPOSED & UNDERMINED STEEL OR PLASTIC GAS FACILITIES

REVISIONS CLARIFIED NOTES B & C ADDED NOTE N.

DATE: 07/01/2003

DESIGN: A. GIULIANI

DRAWN: P. DIMAIO

EFFECTIVE DATE: 03/24/2006

STD. DWG. NO.

CNST-6045

NOTES:

- A. THIS CONSTRUCTION STANDARD SHALL BE USED TO SUPPORT PLASTIC OR STEEL GAS FACILITIES WHICH ARE UNDERMINED AND EXPOSED BY CONSTRUCTION ACTIVITY.
- B. IF AN EXCAVATION IS MADE **AT ANY DISTANCE** PARALLEL TO THE GAS FACILITY WITH ADEQUATE **OSHA** STRUCTURAL SHORING, AS SHOWN IN DETAIL "A", OR IF A STABLE SOIL CONDITION WITH **SUFFICIENT COVER ABOVE THE PIPE'S CENTERLINE EXISTS**, AS SHOWN IN DETAIL "B", THEN SUPPORTS ARE NOT REQUIRED. **UNSTABLE SOIL IS DEFINED AS A SOIL WHICH CAN CAUSE "SOIL RUN OUT" FROM BENEATH THE PIPE (e.g., WASHOUT, SOFT CLAY, etc.) OR CAN SHIFT DUE TO CONSTRUCTION ACTIVITY, VIBRATIONS, etc.; AND CAUSE A SOIL SCENARIO TO OCCUR AS SHOWN IN DETAIL "B" TO REQUIRE PIPE SUPPORT.**
- C. IF AN EXCAVATION CROSSES OR RUNS PARALLEL TO A GAS FACILITY, SUPPORTS MAY NOT BE REQUIRED IF THE EXPOSED SECTION OF PLASTIC PIPES IS 3' OR LESS AND STEEL PIPES 7' OR LESS.
- D. ALL EXCAVATIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE **ONE CALL DIG SAFE PROGRAM** USING THE APPROPRIATE MARK OUT, TEST HOLES AND EXCAVATION TO AVOID DAMAGE TO PIPE OR PIPE COATINGS:
 - NEW YORK STATE CODE RULE 753
 - MA CHAPTER 82 - SECTION 40, GENERAL LAWS, REGULATING NOTICE REQUIREMENTS FOR EXCAVATION IN PUBLIC WAYS
 - NH DIG SAFE LAW, RSA 374 – REGULATING UNDERGROUND UTILITY DAMAGE PREVENTION SYSTEM
- E. USE OF THIS CONSTRUCTION STANDARD DOES NOT RELIEVE THE CONSTRUCTION AGENCY OR AUTHORITY OR THEIR RESPECTIVE CONTRACTORS OF RESPONSIBILITY FOR DAMAGES. ALL DAMAGES WILL BE REPAIRED IN ACCORDANCE WITH EXISTING STANDARDS AND THE APPROPRIATE PARTY SHALL BE BILLED FOR ALL EXPENSES.
- F. GAS FACILITIES SHOULD NOT BE UNDERMINED WITHOUT ADEQUATE SUPPORT (DETAIL A). ALL SUPPORT LINES SHALL BE TENSIONED SO THAT NO DEFLECTION WILL OCCUR WHEN THE FACILITY IS UNDERMINED. THIS TENSION SHALL BE CHECKED AT THE START AND END OF EACH DAY AND ADJUSTED AS NECESSARY.
- G. WHERE A COUPLING, GAS SERVICE, CLAMP, VALVE, DRIP LINE OR OTHER APPURTENANCE EXISTS ON THE EXPOSED SECTION OF MAIN, AN ADDITIONAL SUPPORT SHALL BE INSTALLED AT THE LOCATION.
- H. WHEN SUPPORTING AN EXPOSED FACILITY, THE PIPE COATING SHALL BE PROTECTED WITH ROCK SHIELD (ITEM ID 00301097), OR OTHER LIKE MATERIAL CUT TO A MINIMUM WIDTH OF ½ THE SUPPORTED PIPE DIAMETER. SUPPORT LINES SHALL BE A MINIMUM OF ¾" POLYPROPYLENE OR BETTER.
- I. SUPPORTS FOR GAS TRANSMISSION FACILITIES SHALL BE REVIEWED WITH GAS ENGINEERING PRIOR TO INSTALLATION.
- J. THE MAXIMUM SPACING BETWEEN SUPPORTS FOR STEEL FACILITIES SHALL BE AS FOLLOWS:
 - 7' SPACING FOR ¾" AND 1 ¼" STEEL
 - 10' SPACING FOR 2" STEEL
 - 15' SPACING FOR 3" AND 4" STEEL
 - 20' SPACING FOR 6" AND LARGER STEEL
- K. THE MAXIMUM SPACING BETWEEN SUPPORTS FOR PLASTIC FACILITIES SHALL BE AS FOLLOWS :
 - 3' SPACING FOR 2" AND SMALLER PLASTIC
 - 6' SPACING FOR 4" AND LARGER PLASTIC
- L. VIBRATING MACHINES ARE ALLOWED OVER STEEL OR PLASTIC FACILITIES WITH 24" OR GREATER COVER. HAND HELD MECHANICAL TAMPER IS ACCEPTABLE OVER ANY FACILITY WITH 12" OR GREATER COVER.
- M. WHEN CONSTRUCTION ACTIVITY IS COMPLETED, CLEAN FILL SHALL BE COMPACTED AROUND AND UNDER THE GAS FACILITY BEFORE REMOVING SUPPORTS.
- N. **SEE REGIONAL PBWK5010 PROCEDURES FOR REPLACEMENT REQUIREMENTS OF CAST IRON PIPE.**

No.	ITEM	CODE No.
BILL OF MATERIAL		

GUIDELINES FOR BACKFILL AND COMPACTION AROUND GAS PIPES

PERMANENT BACKFILL AND COMPACTION

DESCRIPTION

This work shall consist of backfilling and compacting all disturbed material at and around existing gas pipes and facilities. Size of pipe, material, length of exposed pipe, location of pipe, etc. will all follow the same set of Standards and Specifications stipulated by Nationalgrid Company. If design plans call for gas pipes to be exposed and supported (sheeting methods not used), then at the time of backfill, all disturbed material below the invert of the gas pipe shall be removed and replaced with suitable roadway or trench excavation material or bedding material. The contractor will not be allowed to replace this disturbed material with the same existing material if it has now been mixed with adjacent silty subsoil (clays) and fines. Well-graded gravel and sands will be used to replace the unsuitable material when no excess suitable material is available on site. Soils with high humus or mineral content should not be used to for backfill because they can promote electrolytic or bacterial attack.

Backfilling the gas pipe should begin immediately after the work in that location is complete. The region within 6" alongside and on top of the gas pipe shall be backfilled with padding sand (free of cinders, ash, and rock). In no case shall the material used for backfilling in this region contain any stones. Backfill shall consist of suitable materials (medium to coarse sands with little or no silts) placed in layers of not more than 8" to 12" after compaction.

Trench spoil material shall be suitable for backfilling above the padding material as long as rocks with a diameter larger than 3" are removed. The layers shall be mechanically compacted to the industry standard of 95% or until a density comparable to the unexcavated material is achieved. In some instances, flooding with water is an acceptable method of compaction but only if the back-fill material is clean, coarse, and adequate drainage is existent. The above specified backfill material is essential in order to attain the degree of compaction necessary to avoid future settlement.

Tracing Wire, if necessary, shall be installed 2" to 6" below Plastic gas pipes.

Warning Tape shall be installed approximately 12" above the gas pipe.

A minimum of 2" temporary pavement shall be applied over the trench as soon as possible.



10/01/12

Guidelines for Working Around Gas Utilities

Notification of Construction

National Grid requests at least six week advanced notification prior to the start of construction to perform scheduled work in the proposed project area. Be aware that some gas work cannot be performed during the normal heating season.

Support and Protect

Contractor must call Dig Safe to have the gas mains and services marked out before construction. Care must be exercised when saw cutting over any gas infrastructure, especially services, which are more shallow than the main. Depth of gas mains vary. Contractor shall dig test pits in order to ascertain exact locations, cover and invert elevations, clearances, alignment and operating status of existing gas facilities. Contractor shall exercise extreme caution when excavating in the vicinity of any gas facility. Hand excavation shall be performed to locate all gas facilities and whenever digging within 24" of gas facilities. If cover over gas piping is removed the required cover must be replaced, or if not feasible, National Grid must be notified for review of the issue. Undermined gas pipe must be adequately supported and protected from damage. Contact National Grid engineer for guidelines regarding proper pipe support. Significant vibration from pile driving and such may negatively impact gas facilities, particularly cast iron mains and regulator station vaults. Contact National Grid engineer prior to performing such activities as well as operations which may undermine gas facilities such as micro-tunneling, jacking, directional drilling, etc.

Gas Leaks

For any gas leak please call the appropriate number immediately.

Greater Boston - 800-233-5325

Other Massachusetts – 800-548-8000

Rhode Island – 800-640-1595

Types of Gas Facilities

Gas mains and services are made of several different materials and contain a wide range of pressures. Typical materials used for buried gas pipe includes bare steel, coated steel, plastic, cast iron, wrought iron, ductile iron, and copper. Never assume that a pipe is not gas. At times gas lines are inserted into older lines to save excavation cost.

Exposure of Gas Facilities

If any gas mains or services become exposed, National Grid must be notified to inspect the line before backfilling. Also any damage that may have been made to the pipe or pipe coating will need to be repaired by National Grid before backfilling. Contact our Dispatch office at (877) 304-1203 for inspection. It is important that even minor damage or scrapes be reported to National Grid. Backfill shall be 6" of sand around the gas line and clean compacted fill above.



Regulator Stations

Gas regulator stations are particularly critical facilities and National Grid must be notified whenever work is to take place within 200 feet of a station. Regulator stations are typically in buried vaults accessed through either manhole covers or aluminum doors. **ONLY AUTHORIZED NATIONAL GRID EMPLOYEES SHALL OPEN A REGULATOR STATION VAULT.** Be aware that a complex nest of piping and valves often exists in the vicinity outside the vaults.

Blasting

National Grid must be notified of any blasting that will take place within 200 feet of a gas utility. National Grid must be supplied with a detailed blast plan for blasting in the vicinity of gas facilities. The evaluation of the blast plan by a National Grid engineer may take some time, therefore, blast plan data should be submitted at least two weeks prior to the planned blasting. As a general rule blasting will not be permitted within 10 feet of a gas line and PPV at the nearest gas pipe shall not exceed 5 in/sec. PPV at the nearest gas main shall be monitored.

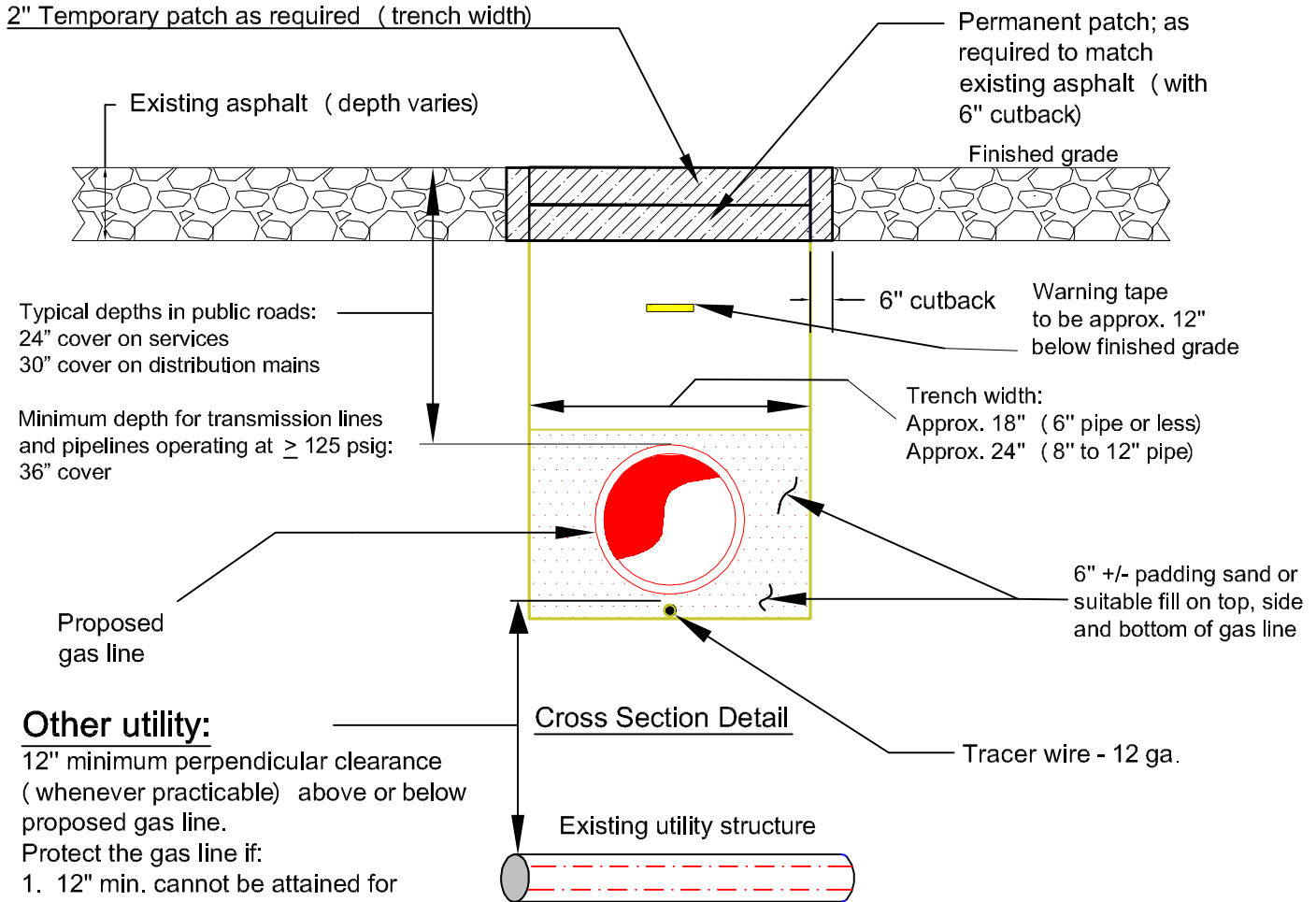
Valves

Access to gas valves must be maintained throughout construction and left at grade at the end of construction. Should valve boxes be damaged and need to be replaced National Grid will supply replacements upon request. **NEVER OPERATE A GAS VALVE. ONLY NATIONAL GRID SHALL OPERATE GAS VALVES.**

Clearance

Adequate clearance must be provided when installing other utilities, foundations, structures, etc. Contact National Grid engineer for guidance.

Typical Utility Crossing and Trench Guidelines



Other utility:

12" minimum perpendicular clearance (whenever practicable) above or below proposed gas line.

Protect the gas line if:

1. 12" min. cannot be attained for gas transmission lines and pipelines operating at ≥ 125 psig.
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3. 4" min. cannot be attained for services.

Minimum clearance when protection is provided against damage is 2" for all gas lines.

Pipeline backfill will consist of suitable materials (medium to coarse sands with little or no silts) placed in layers of no more than 8" to 12" after compaction. Trench spoil materials suitable for backfilling will be mechanically compacted to the industry standards of 95% (as measured by Drop-Cone Penetrometer method) or until a density comparable to the unexcavated material is achieved.

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TYPICAL UTILITY CROSSING AND TRENCH GUIDELINES

Key Changes:

DATE: 09/15/2014

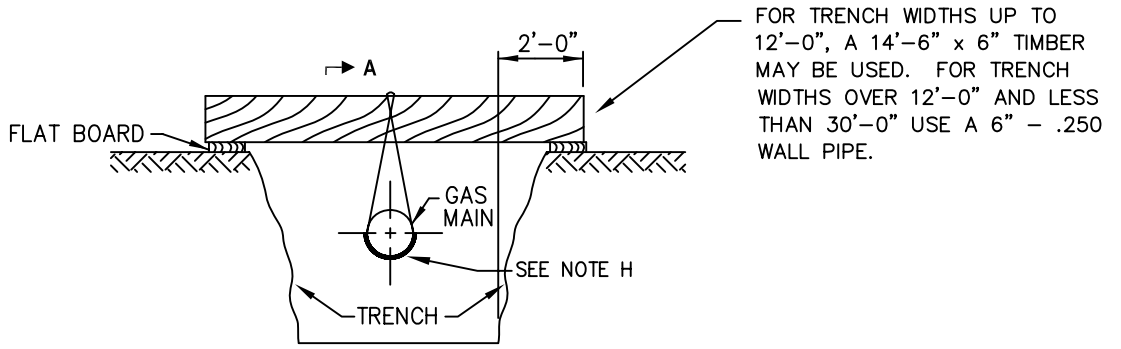
EFFECTIVE DATE: 09/15/2014

DESIGN: N. COSTANZO

STD. DWG. NO.

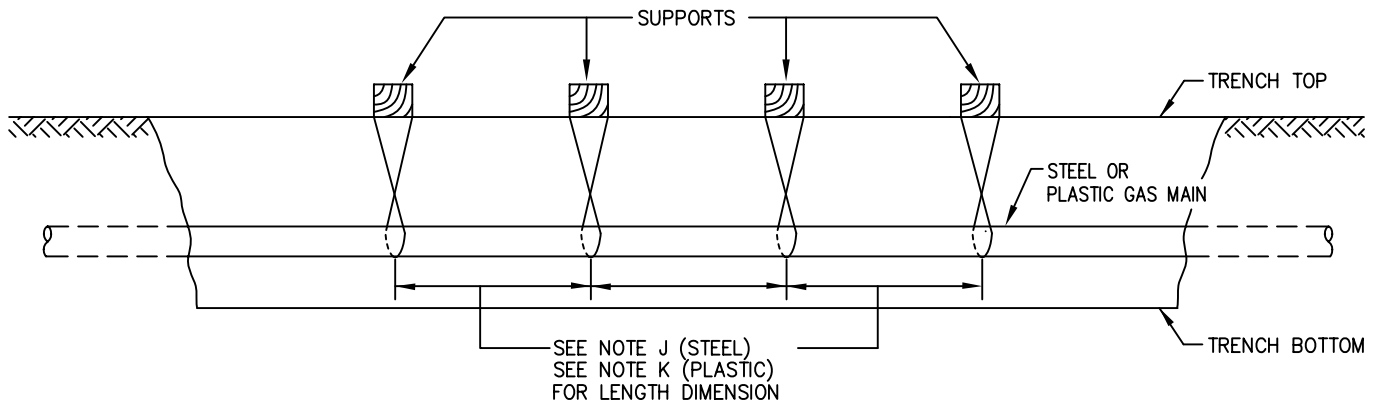
DRAWN: N. COSTANZO

CS-CNST002

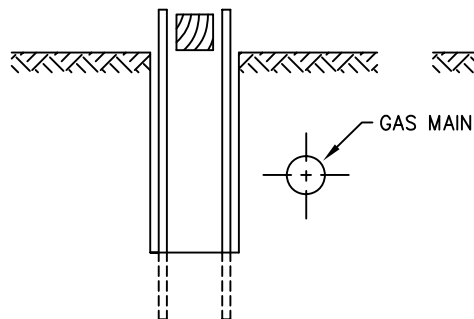


FOR TRENCH WIDTHS UP TO 12'-0", A 14'-6" x 6" TIMBER MAY BE USED. FOR TRENCH WIDTHS OVER 12'-0" AND LESS THAN 30'-0" USE A 6" - .250 WALL PIPE.

EXPOSED SUPPORT

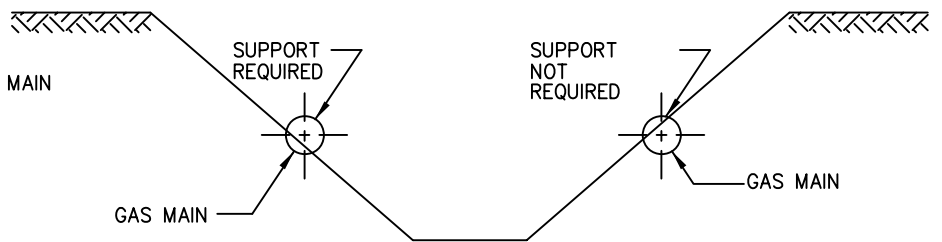


SUPPORTED LENGTH A-A



ADEQUATELY SHORED TRENCH

DETAIL A
SEE NOTE B



INADEQUATELY SHORED OR UNSHORED TRENCH

DETAIL B
SEE NOTE B

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LI-MA-NH-NYC

SUPPORT REQUIREMENTS FOR EXPOSED & UNDERMINED STEEL OR PLASTIC GAS FACILITIES

REVISIONS CLARIFIED NOTES B & C ADDED NOTE N.

DATE: 07/01/2003

EFFECTIVE DATE: 03/24/2006

DESIGN: A. GIULIANI

STD. DWG.

DRAWN: P. DIMAIO

NO.

CNST-6045

NOTES:

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 - NEW YORK STATE CODE RULE 753
 - MA CHAPTER 82 - SECTION 40, GENERAL LAWS, REGULATING NOTICE REQUIREMENTS FOR EXCAVATION IN PUBLIC WAYS
 - NH DIG SAFE LAW, RSA 374 – REGULATING UNDERGROUND UTILITY DAMAGE PREVENTION SYSTEM
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- H. WHEN SUPPORTING AN EXPOSED FACILITY, THE PIPE COATING SHALL BE PROTECTED WITH ROCK SHIELD (ITEM ID 00301097), OR OTHER LIKE MATERIAL CUT TO A MINIMUM WIDTH OF ½ THE SUPPORTED PIPE DIAMETER. SUPPORT LINES SHALL BE A MINIMUM OF ¾" POLYPROPYLENE OR BETTER.
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- M. WHEN CONSTRUCTION ACTIVITY IS COMPLETED, CLEAN FILL SHALL BE COMPACTED AROUND AND UNDER THE GAS FACILITY BEFORE REMOVING SUPPORTS.
- N. **SEE REGIONAL PBWK5010 PROCEDURES FOR REPLACEMENT REQUIREMENTS OF CAST IRON PIPE.**

No.	ITEM	CODE No.
BILL OF MATERIAL		

APPENDIX G
RIPDES Stormwater Permit

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CRMC Assent

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APPENDIX I
Soil Erosion and Sediment Control Plan

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DRAFT Soil Erosion and Sediment Control Plan (to be effective 1/1/2022)

For:

NBC Phase III CSO Program: OF-217 Consolidation Conduit
Taft Street, Town Landing, Tidewater Sites - Master Plan Modification (RIR102092)
Pawtucket, RI

54//827, 54//826, 65//662, 65//645

Owner:

Narragansett Bay Commission
Richard Bernier, Director, Construction and Engineering
1 Service Road
Providence, RI 02905
401-461-8848
RBernier@narrabay.com

Operator:

*TO BE DETERMINED UPON
CONTRACT AWARD*

Company Name
Name
Address
City, State, Zip Code
Telephone Number
Email Address

Estimated Project Dates:

Start Date: January, 2022
Completion Date: October, 2023

SESC Plan Prepared By:

BETA Group, Inc
Chris Cronin, P.E.
701 George Washington Highway
Lincoln, RI 02865
401-333-2382
ccronin@beta-inc

NBC Phase III CSO Program: OF-217 Consolidation Conduit
Taft Street, Town Landing, Tidewater Sites - Master Plan Modification (RIR102092)

PE REG No. 8509

SESC Plan
Preparation Date: July 2021

SESC Plan Revision
Date:

Revision Date: 10/24/2016

NBC Phase III CSO Program: OF-217 Consolidation Conduit
Taft Street, Town Landing, Tidewater Sites - Master Plan Modification (RIR102092)

(this will be located on the Single App)

NBC Phase III CSO Program: OF-217 Consolidation Conduit

Taft Street, Town Landing, Tidewater Sites - Master Plan Modification (RIR102092)

OPERATOR CERTIFICATION

Upon contract award, the OPERATOR must sign this certification statement before construction may begin.

I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I am aware that it is the responsibility of the owner/operator to implement and amend the Soil Erosion and Sediment Control Plan as appropriate in accordance with the requirements of the RIPDES Construction General Permit.

Operator Signature:

Date

Contractor Representative: Name

Contractor Title: Title

Contractor Company Name: Company Name (if applicable)

Address: Mailing Address

Phone Number: Phone Number

Email Address: Email

NBC Phase III CSO Program: OF-217 Consolidation Conduit

Taft Street, Town Landing, Tidewater Sites - Master Plan Modification (RIR102092)

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NBC Phase III CSO Program: OF-217 Consolidation Conduit

Taft Street, Town Landing, Tidewater Sites - Master Plan Modification (RIR102092)

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Soil Erosion and Sediment Control Plan
NBC Phase III CSO Program: OF-217 Consolidation Conduit
Taft Street, Town Landing, Tidewater Sites - Master Plan Modification (RIR102092)

INTRODUCTION

This Construction Site Soil Erosion and Sediment Control Plan (SESC Plan) has been prepared for the NBC Phase III CSO Program: Project IIIA-5, OF-217 Consolidation Conduit Taft Street, Town Landing, Tidewater Sites Master Plan Modification (RIR102092). In accordance with the RIDEM Rhode Island Pollutant Discharge Elimination System (RIPDES) General Permit for Stormwater Discharge Associated with Construction Activity (RIPDES Construction General Permit ("CGP")), projects that disturb one (1) or more acres require the preparation of a SESC Plan. This SESC Plan provides guidance for complying with the terms and conditions of the RIPDES Construction General Permit and Minimum Standard 10 of the RI Stormwater Design and Installation Standards Manual. In addition, this SESC Plan is also consistent with Part D of the *RI SESC Handbook* entitled "Soil Erosion and Sediment Control Plans". This document does not negate or eliminate the need to understand and adhere to all applicable RIPDES regulations.

The purpose of erosion, runoff, and sedimentation control measures is to prevent pollutants from leaving the construction site and entering waterways or environmentally sensitive areas during and after construction. This SESC Plan has been prepared prior to the initiation of construction activities to address anticipated worksite conditions. The control measures depicted on the site plan and described in this narrative should be considered the minimum measures required to control erosion, sedimentation, and stormwater runoff at the site. Since construction is a dynamic process with changing site conditions, it is the operator's responsibility to manage the site during each construction phase so as to prevent pollutants from leaving the site. This may require the operator to revise and amend the SESC Plan during construction to address varying site and/or weather conditions, such as by adding or realigning erosion or sediment controls to ensure the SESC Plan remains compliant with the RIPDES Construction General Permit. Records of these changes must be added to the amendment log attached to the SESC Plan, and to the site plans as "red-lined" drawings. Please Note: **Even if practices are correctly installed on a site according to the approved plan, the site is only in compliance when erosion, runoff, and sedimentation are effectively controlled throughout the entire site.**

It is the responsibility of the site owner and the site operator to maintain the SESC Plan at the site, including all attachments, amendments and inspection records, and to make all records available for inspection by RIDEM during and after construction. (RIPDES CGP - Part III.G)

The site owner, the site operator, and the designated site inspector are required to review the SESC Plan and sign the Party Certification pages (Section 8). The primary contractor (if different) and all subcontractors (if applicable) involved in earthwork or exterior construction activities are also required to review the SESC Plan and sign the certification pages before construction begins.

Any questions regarding the SESC Plan, control measures, inspection requirements, or any other facet of this document may be addressed to the RIDEM Office of Water Resources, at 401-222-4700 or via email: water@dem.ri.gov.

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ADDITIONAL RESOURCES

Rhode Island Department of Environmental Management
Office of Water Resources
235 Promenade Street
Providence, RI 02908-5767
phone: 401-222-4700
email: water@dem.ri.gov

RIDEM *RI Stormwater Design and Installation Standards Manual* (RISDISM) (as amended)
<http://www.dem.ri.gov/pubs/regs/regs/water/swmanual15.pdf>

RI Soil Erosion and Sediment Control Handbook <http://www.dem.ri.gov/soilerosion2014final.pdf>
RIDEM 2013 RIPDES Construction General Permit
<http://www.dem.ri.gov/pubs/regs/regs/water/ripdesca.pdf>
Rhode Island Department of Transportation
Standard Specifications for Road and Bridge Design and Other Specifications and *Standard Details*
<http://www.dot.ri.gov/business/bluebook.php>

RIDEM Office of Water Resources Coordinated Stormwater Permitting website
<http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/coordinated-stormwater-permitting.php>
RIDEM RIPDES Stormwater website
<http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/>
RIDEM Water Quality website (for 303(d) and TMDL listings)
<http://www.dem.ri.gov/programs/water/quality/>

RIDEM Rhode Island Natural Heritage Program <mailto:plan@dem.ri.gov>

RIDEM Geographic Data Viewer – Environmental Resource Map
<http://www.dem.ri.gov/maps/>

Natural Resources Conservation Service - Rhode Island Soil Survey Program
<http://www.ri.nrcs.usda.gov/technical/soils.html>

Note:

The *Soil Survey of Rhode Island*, issued in 1980 is no longer available or supported. More information on site-specific soil data and maps for Rhode Island is available from the Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture through the Web Soil Survey. This information is available online at: <http://websoilsurvey.nrcs.usda.gov>.

EPA NPDES – Stormwater Discharges from Construction Activities webpage:
<http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Discharges-From-Construction-Activities.cfm>

EPA Construction Site Stormwater Runoff Control BMP Menu
<http://water.epa.gov/polwaste/npdes/swbmp/Construction-Site-Stormwater-Run-Off-Control>.

SECTION 1: SITE DESCRIPTION

1.1 Project/Site Information

Project/Site Name: **NBC Phase III CSO Program - Contract IIIA-5**

- Construction of the consolidation conduit for OF-217 and the relocation of OF-217 are the subject of this SESC. Consolidation conduits are relief sewers designed to convey wet weather flow (up to the peak hourly flow from a 2-year storm event) to downstream gate and screening structures and drop shafts. Diversion structures are installed over existing CSO pipes to direct flow to the consolidation conduits. The drop shafts bring the flow from the surface to the tunnel for storage. The consolidation conduits are designed to fully drain into the Pawtucket Tunnel (Tunnel) following each storm event.
- This current work will be tied into other program components that will be subject to future permit modifications.
- OF-217 and the proposed diversion structure are located on property commonly referred to as “Tidewater” and is owned by National Grid. The property is the site of a former coal gas manufacturing facility and is well documented to have residual soil and groundwater contamination. Routing of the consolidation conduit through the Tidewater property and a portion of the City’s Town Landing property is necessary to intercept OF-217 flow and convey such flow to the DS-213 location.
- The OF-217 Contract includes construction of approximately 1,900-feet of 48-inch diameter consolidation conduit, the OF-217 Diversion Structure, a connection/tie-in structure and approximately 450-feet of 48-inch diameter pipe for the relocation of outfall OF-217, to be located approximately 450 feet north of the current discharge point.
- Additionally, the OF-217 outfall is to be relocated as part of this contract. A significant portion of the existing OF-217 outfall currently runs directly beneath and within the secured confines of the existing National Grid Electrical Substation located at the end of Tidewater Street. Under this Contract, the OF-217 outfall pipe will be intercepted prior to the Substation and redirected to a discharge point to the Seekonk River just north of the Substation.
- The consolidation conduit is recommended to be installed using a combination of trenchless construction and traditional open-cut excavation techniques. Microtunneling is the preferred and recommended trenchless method to be used for installing the consolidation conduits through the Tidewater site and towards the northern limit of the project in the vicinity of the City of Pawtucket’s Town Landing Boat Ramp, approximately 1,500 linear feet. Approximately 400-feet of the total 1,500-feet will be installed adjacent to Tidewater Street within the Tidewater property and approximately 1,100-feet will be within and parallel to Taft Street. Pipeline installation using open-cut trenching methods are proposed within the Tidewater property, however only in those limited areas where abandoned subsurface foundations, and potentially demolition rubble, are known and expected to be encountered. These areas of open-cut trenching are relatively shallow and will provide an acceptable means to remove underground obstructions that exist and are problematic and/or non-conductive to trenchless techniques (whether by size, composition or amount). The segment of consolidation conduit to be constructed with open-cut trenching methods is approximately 300-feet. For the same reasons stated above, the relocated OF-217 outfall pipe shall also be constructed using traditional open-cut trenching techniques within the Tidewater property.

- INSERT GENERAL LOCATION MAP HERE

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Provide construction site estimates of the total area of the site and the total area of the site that is expected to undergo soil disturbance.

The following are estimates of the construction site area:

- Total Project Area 2.7 acres
- Total Project Area to be Disturbed 2.7 acres

1.3 Natural Heritage Area Information

RIPDES CGP - Part III.H

Each project authorized under the RIPDES Construction General Permit must determine if the site is within or directly discharges to a Natural Heritage Area (NHA). DEM Natural Heritage Areas include known occurrences of state and federal rare, threatened and endangered species. Review RIDEM NHA maps to determine if there are natural heritage areas on or near the construction site that may be impacted during construction. (See also the RIDEM Notice of Intent instructions which can be found at the following link:

<http://www.dem.ri.gov/programs/benviron/water/permits/swcoord/pdf/maptutor.pdf>

Are there any Natural Heritage Areas being disturbed by the construction activity or will discharges be directed to the Natural Heritage Area as a result of the construction activity?

Yes No

If yes, describe or refer to documentation which determines the likelihood of an impact on this area and the steps that will be taken to address any impacts.

- Not Applicable

1.4 Historic Preservation/Cultural Resources

The National Historic Preservation Act, and any state, local, and tribal historic preservation laws apply to construction activities. As with endangered species, some permits may specifically require you to assess the potential impact of your stormwater discharges on historic properties. However, whether or not this is stated as a condition for permit coverage, the National Historic Preservation Act and any applicable state or tribal laws apply to you. Contact the Rhode Island Historic Preservation Officer (<http://www.preservation.ri.gov/>) or your Tribal Historic Preservation Officer (http://grants.cr.nps.gov/THPO_Review/index.cfm) for more information.

Are there any historic properties, historic cemeteries or cultural resources on or near the construction site?

Yes No

Describe how this determination was made and summarize state or tribal review comments:

- NBC has coordinated extensively with the Rhode Island Historic Preservation and Heritage Commission (HPHC) for the entire Phase III CSO Program and has a Programmatic Agreement in place with HPHC dating back to Phase I of the CSO Program. The HPHC has determined that no historic or cultural resources were identified in the project area.

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If yes, describe or refer to documentation which determines the likelihood of an impact on this historic property, historic cemetery or cultural resource and the steps taken to address that impact including any conditions or mitigation measures that were approved by other parties.

- Not Applicable

SECTION 2: EROSION, RUNOFF, AND SEDIMENT CONTROL

RIPDES Construction General Permit – Part III.J.1

The purpose of erosion controls is to prevent sediment from being detached and moved by wind or the action of raindrop, sheet, rill, gully, and channel erosion. Properly installed and maintained erosion controls are the primary defense against sediment pollution.

Runoff controls are used to slow the velocity of concentrated water flows. By intercepting and diverting stormwater runoff to a stabilized outlet or treatment practice or by converting concentrated flows to sheet flow erosion and sedimentation are reduced.

Sediment controls are the last line of defense against moving sediment. The purpose is to prevent sediment from leaving the construction site and entering environmentally sensitive areas.

This section describes the set of control measures that will be installed before and during the construction project to avoid, mitigate, and reduce impacts associated with construction activity. Specific control measures and their applicability are contained in Section Four: Erosion Control Measures, Section Five: Runoff Control Measures, and Section Six: Sediment Control Measures of the *RI SESC Handbook*. The *RI SESC Handbook* can be found at the following address:

<http://www.dem.ri.gov/soilerosion2014final.pdf>

2.1 Avoid and Protect Sensitive Areas and Natural Features

Per RI Stormwater Design and Installation Standards Manual 3.3.7.1:

Areas of existing and remaining vegetation and areas that are to be protected as identified in the Section 1.6 of the SESC Plan must be clearly identified on the SESC Site Plans for each Phase of Construction. Prior to any land disturbance activities commencing on the site, the Contractor shall physically mark limits of disturbance (LOD) on the site and any areas to be protected within the site, so that workers can clearly identify the areas to be protected.

*Constraints are identified to ensure a comprehensive understanding of the project and surrounding areas. The first goal in the low impact development (LID) site planning and design process is to avoid disturbance of natural features. This includes identification and preservation of natural areas that can be used in the protection of water resources. It is important to understand that minimizing the hydrologic alteration of a site is just as important as stormwater treatment for resource protection. Therefore, describe all site features and sensitive resources that exist at the site such as, view barriers, steep slopes (>15%) that if disturbed will require additional erosion controls, areas with the potential to receive run-on from off-site areas, wetlands, surface waters, and their riparian buffers, specimen trees, natural vegetation, forest areas, stream crossings, historic properties, historic cemeteries or cultural resources that are to be preserved. **This includes those site features that should be avoided within the designated limits of disturbance.** These areas are often identified on a constraints map or in a separate constraints report. For additional discussion on this topic refer to Appendix F. Site Constraint Map of the *RI SESC Handbook*.*

Note:

The *Soil Survey of Rhode Island*, issued in 1980 is no longer available or supported. More information on site-specific soil data and maps for Rhode Island is available

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from the Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture through the Web Soil Survey. This information is available online at: <http://websoilsurvey.nrcs.usda.gov>.

Describe and illustrate on SESC Site Plans Sensitive Areas and Natural Features and how each will be protected during construction activity. Examples of areas to be protected include vegetated buffers, forests, stands of trees on the perimeter and within the site, large diameter trees, areas designated for infiltration (QPAs), bioretention, rain gardens, and OWTS leachfields. Protection for stands of trees and individual trees to be preserved must be specified and such protection must comply with the RI SESC Handbook and extend to the drip line.

*Describe and illustrate on SESC Site Plans based on Constraints Map, the areas that will be disturbed with each phase of construction and the control measures (signs, fences, etc.) that will be used to protect those areas that should not be disturbed. **This includes marking for limits of disturbance at the perimeter and areas within the limits of disturbance.** Acceptable measures include but are not limited to construction fencing (plastic mesh, snow fence, chain link fence etc.) appropriate for the site, boundary markers using construction tape, flagged stakes, etc. for low density use, sediment barriers such as silt fence, compost socks with flagging where also required for sediment control, and signage. The narrative portion of the plan and SESC Site Plans must highlight measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPAs) and infiltration practices to protect infiltration capacity.*

The following measures will be taken to minimize disturbed areas and protect natural features and soil:

- Paved areas to be excavated will be sawcut, when necessary, prior to excavation, and the sawcut lines shall serve as defined limits of disturbance within the paved areas;
- Sedimentation & erosion control measures, where installed, shall serve as the limit of disturbance in those locations;
- The limit of disturbance in all other locations without either sawcuts or sedimentation & erosion control measures shall be delineated with clearly marked and highly visible indicators and/or barriers (stakes, flagging, snow fence or other measures as appropriate) for the duration of the work;
- Long-term material stockpiles will be placed in defined locations within the project area, and shall be protected as described herein and as shown in the construction details;
- Majority of Construction is taking place on a parcel that has been previously disturbed. The Tidewater Property, in particular, is an active development site. Development is being completed outside the proposed project presented here-in.
- Vegetation (trees, shrubs, etc.) within and/or in close proximity to work areas will be protected from damage during construction, unless specifically designated for removal or limited trimming/limbing.

Feature Requiring Protection	Construction Phase #	Method of Protection	Sheet #
Seekonk River	N/A	Compost Filter Sock, and Catch Basin Sediment Control Device	C-1-C-8

2.2 Minimize Area of Disturbance

Per RI Stormwater Design and Installation Standards Manual 3.3.7.2:

Will >5 acres be disturbed in order to complete this project?

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4. *Upon commencement of site construction activities, the operator shall initiate appropriate stabilization practices on all disturbed areas as soon as possible, but not more than fourteen (14) days after the construction activity in that area has temporarily or permanently ceased. Such temporary or permanent soil stabilization measures must be installed prior to initiating land disturbance in subsequent phases.*
5. *Routine inspection and maintenance and/or modification of erosion, runoff, and sediment controls and temporary pollution prevention measures while earthwork is ongoing is required.*
6. *Final site stabilization of any disturbed areas after earthwork has been completed and removal of temporary erosion, runoff, and sediment controls and temporary pollution prevention measures.*
7. *Activation of post-construction stormwater treatment conveyances and practices.*

Include narrative discussion of the construction sequence for this phase here.

2.3 Minimize the Disturbance of Steep Slopes

Per RI Stormwater Design and Installation Standards Manual 3.3.7.3:

Are steep slopes (>15%) present within the proposed project area?

Yes No

If yes, steep slopes must be identified on SESC Site Plans.

If yes, also list the specific control measures that will be used to control surface runoff and reduce erosion potential on steep slopes during construction including references to SESC Site Plans where the locations of such control measures are shown. Examples include limiting the number of steep slopes that are disturbed at one time, implementing land grading techniques such as reverse slope benches, diversions, stair steps, and terraced landforms, installation of retaining walls for stabilization of challenging slopes, prevention of soil movement, and slope protection, applying materials for temporary and permanent protection of slopes to prevent erosion such as stone aggregates, rip-rap, erosion control blankets, appropriate spacing of sediment barriers as a function of barrier size, slope, and slope length, geotextile, cellular confinement systems, mattresses (gabions and others), and articulating blocks.

Existing slopes are present and within the proposed work areas. Vegetation in these areas have previously been removed as part of a closure plan being implemented by National Grid and for future development by a separate entity. The area is a proposed fill area and there are no steep slopes within the proposed project area.

2.4 Preserve Topsoil

Per RI Stormwater Design and Installation Standards Manual 3.3.7.4:

Site owners and operators must preserve existing topsoil on the construction site to the maximum extent feasible and as necessary to support healthy vegetation, promote soil stabilization, and increase stormwater infiltration rates in the post-construction phase of the project.

Will existing topsoil be preserved at the site?

Yes No

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If Yes, describe how topsoil will be preserved at the site by describing the techniques that will be implemented to achieve appropriate depths of topsoil (4 inch minimum) and identify the locations where topsoil will be restored on SESC Site Plans.

Topsoil will be stockpiled separately within a perimeter of compost filter sock and silt fence; polyethylene sheeting will be placed underneath the stockpile and the stockpile will be covered at the end of the workday. Soil Disturbance will be limited to identified construction areas.

Soil compaction must be minimized by maintaining limits of disturbance throughout construction. In instances where site soils are compacted the site owner and operator must restore infiltration capacity of the compacted soils by tilling or scarifying compacted soils and amending soils as necessary to ensure a minimum depth of topsoil is available in these areas. In areas where infiltrating stormwater treatment practices are located compacted soils must be amended such that they will comply the design infiltration rates established in the *RI Stormwater Design and Installation Standards Manual*.

Identify the methods that will be used to restore and amend topsoil at the site. Include references to plan notes and SESC Site Plan sheet numbers where this information is made available for the site operator.

Soil Stockpile Locations/Details – Sheet C-17

The Town Landing and Tidewater parcels are currently part of a development proposal called “Tidewater Landing”. The proposed improvements on these parcels include mixed use development, a new athletic field and stadium and other significant infrastructure upgrades. Construction of the “Tidewater Landing” improvements is planned to occur concurrently with the pipeline construction and restoration of disturbed areas on these parcels will be completed as part of the development project, not part of the pipeline project.

Contractor will be responsible to loam and seed designated disturbed areas on Town Landing Property no later than 14 days after the conclusion of construction activities in the area.

2.5 Stabilize Soils

Per RI Stormwater Design and Installation Standards Manual 3.3.7.5:

Upon completion and acceptance of site preparation and initial installation of erosion, runoff, and sediment controls and temporary pollution prevention measures, the operator shall initiate appropriate temporary or permanent stabilization practices during all phases of construction on all disturbed areas as soon as possible, but not more than fourteen (14) days after the construction activity in that area has temporarily or permanently ceased.

Any disturbed areas that will not have active construction activity occurring within 14 days must be stabilized using the control measures depicted in the SESC Site Plans, in accordance with the *RI SESC Handbook*, and per manufacturer product specifications.

Only areas that can be reasonably expected to have active construction work being performed within 14 days of disturbance will be cleared/grubbed at any one time. It is NOT acceptable to clear and grub the entire construction site if portions will not be active within the 14-day time frame. Proper phasing of clearing and grubbing activities shall include temporary stabilization techniques for areas cleared and grubbed that will not be active within the 14-day time frame.

All disturbed soils exposed prior to October 15 of any calendar year shall be seeded by that date if vegetative measures are the intended soil stabilization method. Any such areas that do not have adequate vegetative stabilization, as determined by the site operator or designated inspector, by November 15, must be stabilized through the use of non-vegetative erosion control measures. If work continues within any of these areas during the period from October 15 through April 15, care must be taken to ensure that only the

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area required for that day's work is exposed, and all erodible soil must be restabilized within 5 working days. In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed (i.e. construction of a motocross track).

Describe controls (i.e., temporary seeding with native vegetation, hydroseeding, mulching, application of rolled erosion control products, etc.) including design specifications and details that will be implemented to stabilize exposed soils where construction activities have temporarily or permanently ceased.

Temporary Vegetative Control Measures

- Temporary Seeding will be used as needed.

Temporary Non-Vegetative Control Measures

- Controls that may be utilized include compost filter socks, silt fence, catch basin erosion control devices, and water for dust control

Permanent Vegetative Control Measures

- A development project will be occurring on the Town Landing and Tidewater Properties. Permanent vegetative stabilization will not be required by the Contractor for the work presented here-in except where noted on the Plans. Permanent Stabilization is to be completed by the Developer in all other locations

Permanent Non-Vegetative Control Measures

- No Permanent Non-Vegetative Control Measures will be implemented

2.6 Protect Storm Drain Outlets

Per RI Stormwater Design and Installation Standards Manual 3.3.7.7:

Temporary or permanent outlet protection must be used to prevent scour and erosion at discharge points through the protection of the soil surface, reduction in discharge velocities, and through the promotion of infiltration. Outlets often have high velocity, high volume flows, and require strong materials that will withstand the forces of stormwater. Storm drain outlet control measures also offer a last line of protection against sediment entering environmentally sensitive areas.

All stormwater outlets that may discharge sediment-laden stormwater flow from the construction site must be protected using the control practices depicted on the approved plan set and in accordance with the *RI SESC Handbook*.

Describe controls, including design specifications and details, which will be implemented to protect outlets discharging stormwater from the project.

Will temporary or permanent point source discharges be generated at the site as the result of construction of sediment traps or basins, diversions, and conveyance channels?

Yes No

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If No, discuss rationale for not including these elements in the SESC Plan.

Inlet protection will be installed within catch basins along the limits of work

A new OF-217 outfall pipe will discharge to the Seekonk River onto riprap previously installed by others. No additional outlet protection is proposed for this project.

2.7 Establish Temporary Controls for the Protection of Post-Construction Stormwater Treatment Practices

Per RI Stormwater Design and Installation Standards Manual 3.3.7.8:

Temporary measures shall be installed to protect permanent or long-term stormwater control and treatment measures as they are installed and throughout the construction phase of the project so that they will function properly when they are brought online.

Examples of temporary control measures that can be used to protect permanent stormwater control measures include: establishing temporary sediment barriers around infiltrating practices, ensuring proper material staging areas and equipment routing (i.e. do not allow construction equipment to compact areas where infiltrating practices will be installed), and by conducting final cleaning of structural long term practices after construction is completed.

List and describe all post-construction stormwater treatment practices that will be installed during the construction process. Next, outline how these measures will be protected during the construction phase of the project to ensure that they will function appropriately once they are brought online.

Will long-term stormwater treatment practices be installed at the site?

Yes No

If No, discuss rationale for not including these elements in the SESC Plan.

Not a part of the project proposed here-in

The Town Landing and Tidewater parcels are currently part of a development proposal called "Tidewater Landing". The proposed improvements on these parcels include mixed use development, a new athletic field and stadium and other significant infrastructure upgrades. Construction of the "Tidewater Landing" improvements is planned to occur concurrently with the pipeline construction and restoration of disturbed areas on these parcels will be completed as part of the development project, not part of the pipeline project.

2.8 Divert or Manage Run-on from Up-gradient Areas

Per RI Stormwater Design and Installation Standards Manual 3.3.7.10:

Is stormwater from off-site areas anticipated to flow onto the project area or onto areas where soils will be disturbed?

Yes No

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Pre-Construction and Construction sub-watershed maps are included for each phase in this SESC Plan submittal.

Structural control measures will be used to limit stormwater flow from coming onto the project area, and to divert and slow on-site stormwater flow that is expected to impact exposed soils for the purpose of minimizing erosion, runoff, and the discharge of pollutants from the site.

Control measures shall be installed as depicted on the approved plan set and in accordance with the <i>RI SESC Handbook</i> or the <i>RI Department of Transportation Standard Specifications for Road and Bridge Construction</i> . Run-on and Run-off Management				
Construction Phase #	On-site or Off-site Run-on?	Control measure	Identified on Sheet #	Detail(s) is/are on Sheet #

If No, discuss rationale for not including these elements in the SESC Plan.

Stormwater from off-site location is not expected within project area.

2.9 Retain Sediment Onsite through Structural and Non-Structural Practices

Per RI Stormwater Design and Installation Standards Manual 3.3.7.12:

Once the erosion control measures and the run-on diversions are identified and located on the plans, the next step to site planning is sediment control and sediment management. Sediment barriers, inlet protection, construction entrances, stockpile containment, temporary sediment traps, and temporary sediment basins must be integrated into the SESC Plan if applicable. Refer to the RI SESC Handbook Section Six: Sediment Control Measures for additional guidance.

Per RI Stormwater Design and Installation Standards Manual 3.3.7.9:

SEDIMENT BARRIERS must be installed along the perimeter areas of the site that will receive stormwater from disturbed areas. This also may include the use of sediment barriers along the contour of disturbed slopes to maintain sheet flow and minimize rill and gully erosion during construction. Installation and maintenance of sediment barriers must be completed in accordance with the maintenance requirements specified by the product manufacturer or the *RI SESC Handbook*.

Will sediment barriers be utilized at the toe of slopes and other downgradient areas subject to stormwater impacts and erosion during construction?

Yes No

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If Yes, Describe the rationale for selecting control measures to serve as sediment barriers at the toe of slopes and other down gradient areas subject to stormwater impacts during construction. Describe the specific sediment barriers that will be used at the site in the table provided.

- Sediment barriers will be used at the limits of work and at the toe of stockpiles to protect adjacent areas.
- The structural soil & erosion control BMP's shall include compost filter sock along the downgradient limits of work, as depicted on the plans.
- The contractor shall provide any alternative structural practices that will be used on this project, if it is determined that any are required during construction.

Describe rationale for whether or sediment barriers are required at regular intervals along slopes in order to minimize the creation of concentrated flow paths (i.e. rilling, gully erosion) and to encourage sheet flow. Keep in mind that sediment barriers can be placed at the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow. The description of the selected control measures must focus on sediment barrier spacing as a function of slope length and steepness. Refer to the RI SESC Handbook, Section Six: Sediment Control Measure, Straw Wattles, Compost Tubes, and Fiber Rolls Control Measure for additional information on acceptable spacing distances.

Will sediment barriers be utilized along the contour of slopes to maintain sheet flow and minimize rill and gully erosion during construction?

Yes No

If Yes, list the specific sediment barriers that will be used at the site in the table provided. Describe the rationale for the locations and spacing frequency selected by the designer based on slope length and steepness. For additional guidance refer to the RI SESC Handbook or sediment barrier manufacturer's specifications.

The project site is sloped towards the Seekonk River and sediment control will be placed along the downgradient side of construction work areas to prevent any silt laden runoff from leaving the work limits or reaching sensitive areas.

SEDIMENT BARRIERS			
Construction Phase #	Sediment Barrier Type	Sediment Barrier is Labeled on Sheet #	Detail is on Sheet #
N/A	Compost Filter Sock	C-1,C-2	C-16

Per RI Stormwater Design and Installation Standards Manual 3.3.7.6:

INLET PROTECTION will be utilized to prevent soil and debris from entering storm drain inlets. These measures are usually temporary and are implemented before a site is disturbed. ALL stormwater inlets &/or catch basins that are operational during construction and have the potential to receive sediment-laden stormwater flow from the construction site must be protected using control measures outlined in the *RI SESC Handbook*.

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For more information on inlet protection refer to the *RI SESC Handbook*, Inlet Protection control measure.

Maintenance

The operator must clean, or remove and replace the inlet protection measures as sediment accumulates, the filter becomes clogged, and/or as performance is compromised. Accumulated sediment adjacent to the inlet protection measures should be removed by the end of the same work day in which it is found or by the end of the following work day if removal by the same work day is not feasible.

Describe controls, including design specifications and details, which will be implemented to protect all inlets receiving stormwater from the project during the entire duration of the project. For more information on inlet protection refer to the RI SESC Handbook Inlet Protection control measure.

Do inlets exist adjacent to or within the project area that require temporary protection?

Yes No

If Yes, describe the method(s) of inlet protection, including maintenance requirements and complete the table provided.

The following lists the proposed storm drain inlet types selected from Section Six of the *RI SESC Handbook*. Each row is unique for each phase and inlet protection type.

INLET PROTECTION			
Construction Phase #	Inlet Protection Type	Inlet Protection is labeled on Sheet #	Detail(s) is/are on Sheet #
N/A	Catch Basin Sediment Control Device	C-3 to C-8	C-17

Catch Basin Sediment Control Devices will be used during construction to prevent soil and debris from entering storm drain inlets and pipes. Inserts are cone-shaped, made from a high strength, high flow, woven geotextile which retains sediments while allowing water to pass through. Inserts must be cleaned and maintained regularly to avoid sedimentation build-up which blocks the flow of runoff into the catch basin.

CONSTRUCTION ENTRANCES will be used in conjunction with the stabilization of construction roads to reduce the amount of sediment tracking off the project. This project has avoided placing construction entrances on poorly drained soils where possible. Where poorly drained soils could not be eliminated, the detail includes subsurface drainage.

Any construction site access point must employ the control measures on the approved SESC site plans and in accordance with the *RI SESC Handbook*. Construction entrances shall be used in conjunction with the stabilization of construction roads to reduce the amount of mud picked up by construction vehicles. All construction access roads shall be constructed prior to any roadway accepting construction traffic.

The site owner and operator must:

1. Restrict vehicle use to properly designated exit points.
2. Use properly designed and constructed construction entrances at all points that exit onto paved roads so that sediment removal occurs prior to vehicle exit.

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3. When and where necessary, use additional controls to remove sediment from vehicle tires prior to exit (i.e. wheel washing racks, rumble strips, and rattle plates).
4. Where sediment has been tracked out from the construction site onto the surface of off-site streets, other paved areas, and sidewalks, the deposited sediment must be removed by the end of the same work day in which the track out occurs. Track-out must be removed by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal.

Will construction entrances be utilized at the proposed construction site?

Yes No

If Yes, indicate location(s) of vehicle entrance(s) and exit(s), and stabilization practices used to prevent sediment from being tracked off-site in the table provided. See also RI SESC Handbook, Section Six, Construction Entrances Measure.

CONSTRUCTION ENTRANCE			
Construction Phase #	Soil Type at the Entrance	Entrance is located on Sheet #	Detail is on Sheet #
N/A	12" Min. of Processed Gravel with geotextile Fabric underneath	C-1,C-2	C-16

STOCKPILE CONTAINMENT will be used onsite to minimize or eliminate the discharge of soil, topsoil, base material or rubble, from entering drainage systems or surface waters. All stockpiles must be located within the limit of disturbance, protected from run-on with the use of temporary sediment barriers and provided with cover or stabilization to avoid contact with precipitation and wind where and when practical.

Stock pile management consists of procedures and practices designed to minimize or eliminate the discharge of stockpiled material (soil, topsoil, base material, rubble) from entering drainage systems or surface waters.

For any stockpiles or land clearing debris composed, in whole or in part, of sediment or soil, you must comply with the following requirements:

1. Locate piles within the designated limits of disturbance.
2. Protect from contact with stormwater (including run-on) using a temporary perimeter sediment barrier.
3. Where practicable, provide cover or appropriate temporary vegetative or structural stabilization to avoid direct contact with precipitation or to minimize sediment discharge.
4. **NEVER** hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or surface water.
5. To the maximum extent practicable, contain and securely protect from wind.

Describe materials expected to be stockpiled or stored on-site and procedures for storage of materials to minimize exposure of the materials to stormwater and to eliminate the discharge of stockpiled material from

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entering drainage systems and surface waters. Refer to the RI SESC Handbook, Stockpile and Staging Area Management Control Measure for additional guidance. Complete the table provided.

Temporary soil stockpile materials will be stone for pipe bedding, surplus soils from open cut excavation and spoils from the microtunnel operations. A range of soil material properties are anticipated including sand and gravel materials as well as clay materials. Stockpiled materials on the Tidewater Site will be maintained on a layer of poly sheeting and covered with the same and surrounded by compost filter sock. Stockpiled soil materials off the Tidewater property will be surrounded by compost filter sock and stockpiles to be maintained for greater than 14 days will be stabilized with RIDOT STD M.18.10.5 Seed mix. Stockpiled materials will either be used as backfill material on site or sampled and loaded onto trucks for off-site disposal.

STOCKPILE CONTAINMENT				
Construction Phase #	Run-on measures necessary? (yes/no)	Stabilization or Cover Type	Stockpile Containment Measure	Sheet #
N/A	No	10 mil Polyethylene Sheeting or stabilized with seed	12" Min.Compost Filter Sock	Areas TBD by Contractor – Detail C-17

2.10 Properly Design Constructed Stormwater Conveyance Channels

Conveyances are required to be designed for inlets to temporary sediment basins. The construction site planner must use best professional judgment to determine if additional conveyance design is required for run-on control or in any other location where velocity control is required.

Are temporary stormwater conveyance practices required in order to properly manage runoff within the proposed construction project?

Yes No

The conveyance will be maintained as depicted on SESC Site Plans and in accordance with the *RI SESC Handbook* and if applicable.

If No, discuss rationale for not including conveyance measures in the SESC Plan.

Sediment Basins are not required for the Project Area and therefore conveyance practices will not be utilized. Sediment Controls will still be installed on site to prevent sediment from leaving the site or entering sensitive areas.

2.11 Erosion, Runoff, and Sediment Control Measure List

Complete the following table for each Phase of construction where Erosion, Runoff, and Sediment Control Measures are located. This table is to be used as part of the SESC Plan Inspection Report – please fill out accordingly.

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It is expected that this table and corresponding Inspection Reports will be amended as needed throughout the construction project as control measures are added or modified.

Construction Site Work		
Location/Station	Control Measure Description/Reference	Maintenance Requirement
Perimeter	Compost Filter Sock	<p>Inspection should be made after each storm event and repair or replacement should be made promptly as needed.</p> <p>Cleanout of accumulated sediment behind the filter sock if sediment accumulates to at least ½ of the original height of the barrier becomes filled with sediment.</p> <p>Compost filter sock should be inspected regularly, and sediment shall be cleared often to prevent buildup or damages.</p>
All Catch Basins	Inlet Protection: Erosion Control Devices	<p>Inlet protection devices shall remain installed below the grates until the contributing area is stabilized. Sediment shall be removed from the silt sack when the sediment has accumulated to half (1/2) of the depth of the silt sack. The sediment that is removed shall be disposed in an approved area.</p>
Construction Entrances	Stone Stabilized Construction Access	<p>Site entrances shall be maintained in a condition which will prevent tracking or flowing of sediment onto paved surfaces.</p> <p>Provide periodic top dressing with additional stone or additional length as conditions demand. Roads adjacent to entrance shall be clean at the end of each day.</p> <p>If maintenance alone is not enough to prevent excessive track out, increase length of entrance, modify construction access road surface, or install washrack or mudrack.</p>
Designated Areas TBD by Contractor	Stockpiles	<p>Stockpile Areas should have a sediment barrier around the perimeter and specific to the Tidewater site, should have bottom layer of polyethylene sheeting (20 mils Thickness). Sediment barriers should be inspected twice weekly and sediment should be cleared often to prevent buildup or damages.</p> <p>Stockpiles on the Tidewater site are to be covered in polyethylene sheeting (10 mils</p>

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		<p>thickness) at the end of each workday. Off Tidewater property, stockpiles maintained greater than 14 days are to be stabilized with seed mix.</p> <p>Inspections should be made weekly during the rainy season and bi-monthly during the non-rainy season.</p>
Water/Foam for Dust Control	Not Applicable	<p>Real-time dust monitoring will occur during excavation activities and if levels exceed 20% of ambient levels dust control measures will be implemented. Short-duration and long-duration foam will be applied to soil to control odors and vapor emissions. Water will be applied to soil prior to excavation to limit the amount of dust created.</p>

SECTION 3: CONSTRUCTION ACTIVITY POLLUTION PREVENTION

Per RI Stormwater Design and Installation Standards Manual 3.3.7.14:

The purpose of construction activity pollution prevention is to prevent day to day construction activities from causing pollution.

This section describes the key pollution prevention measures that must be implemented to avoid and reduce the discharge of pollutants in stormwater. Example control measures include the proper management of waste, material handling and storage, and equipment/vehicle fueling/washing/maintenance operations.

Where applicable, include *RI SESC Handbook* or the *RI Department of Transportation Standard Specifications for Road and Bridge Construction* (as amended) specifications.

3.1 Existing Data of Known Discharges from Site

Per RIPDES Construction General Permit – Part III.I:

List and provide existing data (if available) on the quality of any known discharges from the site. Examples include discharges from existing stormwater collection systems, discharges from industrial areas of the site, etc.

Are there known discharges from the project area?

Yes No

Describe how this determination was made:

- There is an existing CSO that discharges from the Tidewater Site and will be relocated as part of this project. The existing CSO outfall will be capped at the relocation structure identified on the

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plans; however, the drain downstream of the relocation structure will remain active for existing stormwater services downstream of the structure. The existing outfall is located outside of the identified work area for this project.

If yes, list discharges and locations:

- OF-217 Outfall, Outside Project Area

Is there existing data on the quality of the known discharges?

Yes No

If yes, provide data:

- Not Applicable

3.2 Prohibited Discharges

Per RI SESC Handbook – Part D

The following discharges are prohibited at the construction site:

- Contaminated groundwater, unless specifically authorized by the DEM. These types of discharges may only be authorized under a separate DEM RIPDES permit.
- Wastewater from washout of concrete, unless the discharge is contained and managed by appropriate control measures.
- Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials.
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance. Proper storage and spill prevention practices must be utilized at all construction sites.
- Soaps or solvents used in vehicle and equipment washing.
- Toxic or hazardous substances from a spill or other release.

All types of waste generated at the site shall be disposed of in a manner consistent with State Law and/or regulations.

Will any of the above listed prohibited discharges be generated at the site?

Yes No

If Yes, provide a list of those that will be generated at the site and provide a discussion of how they will be managed, including references to the specific SESC Site Plans where such control measures are specified.

Groundwater will be generated at the site by excavation dewatering activities. Groundwater will be managed through an on-site Groundwater Treatment System that will discharge to the City Sanitary Sewer System via the Manhole Identified on Sheet C-1. Treated Groundwater will be monitored for compliance with the NBC Bucklin Point Pretreatment Standards

A concrete washout area is proposed for the site. Refer to Sheet C-1 for the anticipated location. The contractor shall designate any additional locations, if necessary, of concrete washout areas and amend this document accordingly. Under no circumstances will concrete washout areas be located where the discharge from same will create a nuisance or hazard (i.e. excavated areas, roadways, private property, etc.); furthermore, the Contractor shall immediately adjust the location or configuration of any concrete washout areas which are found to create a nuisance or hazard. All concrete washouts shall be discharged to a facility that will contain liquid and concrete waste generated by the washout operations. The concrete

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washout facility shall adhere to the requirements of the revised Rhode Island Soil Erosion and Sediment Control Handbook.

3.3 Proper Waste Disposal

Per RI SESC Handbook – Part D

Building materials and other construction site wastes must be properly managed and disposed of in a manner consistent with State Law and/or regulations.

- A waste collection area shall be designated on the site that does not receive a substantial amount of runoff from upland areas and does not drain directly to a waterbody or storm drain.
- All waste containers shall be covered to avoid contact with wind and precipitation.
- Waste collection shall be scheduled frequently enough to prevent containers from overflowing.
- All construction site wastes shall be collected, removed, and disposed of in accordance with applicable regulatory requirements and only at authorized disposal sites.
- Equipment and containers shall be checked for leaks, corrosion, support or foundation failure, or other signs of deterioration. Those that are found to be defective shall be immediately repaired or replaced.

Is waste disposal a significant element of the proposed project?

Yes No

If Yes, identify potential building materials and other construction wastes and document how these wastes will be properly managed and disposed of at the construction site (i.e., trash disposal, sanitary wastes, recycling, and proper material handling). Include references to the specific SESC Site Plans where such control measures are specified.

- **Waste Materials** – All construction-generated waste materials will be collected and stored in a metal dumpster which shall meet all local City and any State solid waste management regulations. All Trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied as needed, and the trash will be hauled off site. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer, and the individual who manages the day-to-day site operations will be responsible for ensuring that these procedures are followed.
- **Hazardous Waste** – Hazardous waste materials, if encountered, will be disposed of in the manner specified by local or State regulation or by the manufacturer. Site personnel will be instructed in these practices and the individual, who manages day-to-day site operations, will be responsible for seeing that these practices are followed.
- **Sanitary Waste** – All Sanitary waste will be collected from the portable units a minimum of once a week by a licensed sanitary waste management contractor, as required by local regulations
- **Contaminated Soil** – Specific to the Tidewater Property, National Grid is in the process of closing the facility with a cap system. It is National Grid’s intention to, to

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the extent possible, maintain excess soils on site to be incorporated into materials beneath the cap. National grid will identify these locations during construction. Cap construction is anticipated to be coincident with the pipeline construction. Excess materials to be disposed off-site will be stockpiled on polyethylene sheeting and covered with polyethylene sheeting. The material will be sampled and disposed of at a National Grid approved landfill. The Contractor will be responsible for maintaining the stockpile and for loading and hauling to the disposal location.

Specific to work within the right-of way and easement locations on City property, excess soils will be stockpiled on polyethylene sheeting and covered with polyethylene sheeting. The material will be sampled and disposed of at an approved landfill. The Contractor will be responsible for maintaining the stockpile and for loading and hauling to the disposal location.

3.4 Spill Prevention and Control

Per RI SESC Handbook – Part D

All chemicals and/or hazardous waste material must be stored properly and legally in covered areas, with containment systems constructed in or around the storage areas. Areas must be designated for materials delivery and storage. All areas where potential spills can occur and their accompanying drainage points must be described. The owner and operator must establish spill prevention and control measures to reduce the chance of spills, stop the source of spills, contain and clean-up spills, and dispose of materials contaminated by spills. The operator must establish and make highly visible location(s) for the storage of spill prevention and control equipment and provide training for personnel responsible for spill prevention and control on the construction site.

Are spill prevention and control measures required for this particular project?

Yes No

If Yes, describe all areas where potential spills can occur, and their accompanying drainage points, and describe the spill prevention and control plan to reduce the chance of spills, stop the source of spills, contain and clean up spills, dispose of materials contaminated by spills, and train personnel responsible for spill prevention and control. Provide the method of establishing and making highly visible the location(s) for the storage of spill prevention equipment. Refer to the RI SESC Handbook, Spill Prevention and Control Plan for guidance.

Spill prevention and control measures will be provided during construction. It is not anticipated that chemicals and/or hazardous waste materials will be stored on site. However, if spills occur during construction activities, the contractor will implement the following spill prevention / mitigation measures.

- A spill can potentially occur anywhere within the project site.
- The following good housekeeping practices will be followed onsite during the construction project:
 - An effort will be made to store on-site only enough products and materials required to perform the anticipated work
 - All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure
 - Products will be kept in their original containers with the original manufacturer's label
 - Substances will not be mixed with one another unless recommended by the manufacturer

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- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed
- The site superintendent will inspect daily to ensure proper use and disposal of materials onsite
- These practices shall be used to reduce the risks associated with hazardous materials
 - Products will be kept in original containers unless they are not re-sealable
 - Original Labels and materials safety data will be retained; they contain important product information
 - If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.
- In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices shall be followed for spill prevention and cleanup:
 - Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
 - Materials and equipment necessary for spill cleanup will be kept in a storage area onsite. Equipment and materials will include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
 - All spills will be cleaned up immediately after discovery
 - The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
 - Spills of toxic or hazardous materials will be reported to the appropriate State or local government agency, regardless of the size.
 - The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.
 - The site superintendent responsible for the day-to-day site operations will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. The individual will each become responsible for a particular stage of prevention and cleanup. The names of responsible spill personnel will be posted in the office trailer onsite.

3.5 Control of Allowable Non-Stormwater Discharges

Per RIPDES Construction General Permit – Part III.J.2.e:

Discharges not comprised of stormwater are allowed under the RIPDES Construction General Permit but are limited to the following: discharges which result from the washdown of vehicles where no detergents are used; external building wash-down where no detergents are used; the use of water to control dust; firefighting activities; fire hydrant flushing; natural springs; uncontaminated groundwater; lawn watering; potable water sources including waterline flushing; irrigation drainage; pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled materials have been removed) and where detergents are not used; and foundation or footing drains where flows are not contaminated with

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process materials such as solvents, or contaminated by contact with soils where spills or leaks of toxic or hazardous materials has occurred. If any of these discharges may reasonably be expected to be present and to be mixed with stormwater discharges, they must be specifically listed here.

Are there allowable non-Stormwater discharges present on or near the project area?

Yes No

If yes, list the sources of allowable non-Stormwater discharge(s) associated with construction activity. For each of the allowable non-stormwater discharge(s) identified, describe the controls and measures that will be implemented at those locations to minimize pollutant contamination of these discharges and to separate them from temporary discharges of stormwater during construction.

List of allowable non-stormwater discharge(s) and the associated control measure(s):

- Water to Control Dust – Dust level monitoring will occur on site during excavation and if levels exceed ambient levels by more than 20% dust control measures will need to be applied.
- Water from Vehicle/Equipment Washdown – A decontamination area will be established by the contractor for vehicles and equipment prior to leaving the site. Vehicles and equipment will be cleaned with high temperature, high pressure water to remove all excess soil and debris to keep contamination limited to the site.
- Hydrant Flushing/Waterline Flushing – As part of the project a portion of the water main located on Tidewater Street will need to be replaced and will need to be flushed at the completion of testing.

If any existing or proposed discharges consist of contaminated groundwater, such discharges are not authorized under the RIPDES Construction General Permit. These discharges must be permitted separately by seeking coverage to treat and discharge under a separate RIPDES individual permit or under the RIPDES Remediation General Permit. Contact the RIDEM Office of Water Resources RIPDES Permitting Program at 401-222-4700 for application requirements and additional information.

Are there any known or proposed contaminated discharges, including anticipated contaminated dewatering operations, planned on or near the project area?

Yes No

If yes, list the discharge types and the RIPDES individual permit number(s) or RIPDES Remediation General Permit Authorization number(s) associated with these discharges.

- Groundwater encountered during construction will be treated and discharged to the City Sanitary Sewer System. Treated Groundwater will be monitored for compliance with the NBC Bucklin Point Pretreatment Standards

3.6 Control Dewatering Practices

Per RI SESC Handbook – Part D

Site owners and operators are prohibited from discharging groundwater or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, unless such waters are first effectively managed by appropriate control measures.

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Examples of appropriate control measures include, but are not limited to, temporary sediment basins or sediment traps, sediment socks, dewatering tanks and bags, or filtration systems (e.g. bag or sand filters) that are designed to remove sediment. Uncontaminated, non-turbid dewatering water can be discharged without being routed to a control.

At a minimum the following discharge requirements must be met for dewatering activities:

1. Do not discharge visible floating solids or foam.
2. To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. In no case will surface waters be considered part of the treatment area.
3. At all points where dewatering water is discharged, utilize velocity dissipation devices.
4. With filter backwash water, either haul it away for disposal or return it to the beginning of the treatment process.
5. Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.
6. Dewatering practices must involve the implementation of appropriate control measures as applicable (i.e. containment areas for dewatering earth materials, portable sediment tanks and bags, pumping settling basins, and pump intake protection.)

Is it at all likely that the site operator will need to implement construction dewatering in order to complete the proposed project?

Yes No

If Yes, describe all areas where construction dewatering may be required and the proposed control measures that will be used to treat and manage dewatering fluids including all proposed discharge points. Proposed control measures must comply with the RI SESC Handbook. Include references to all relevant SESC Site Plans.

- Construction Dewatering may need to be implemented on the Town Landing and Tidewater properties. Groundwater encountered will be pumped to a treatment system designed by the Contractor. Treated groundwater will be monitored for compliance with the NBC Bucklin Point Pretreatment Standards.

3.7 Establish Proper Building Material Staging Areas

Per RI SESC Handbook – Part D

All construction materials that have the potential to contaminate stormwater must be stored properly and legally in covered areas, with containment systems constructed in or around the storage areas. Areas must be designated for materials delivery and storage. Designated areas shall be approved by the site owner/engineer. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in the discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

Describe construction materials expected to be stored on-site and procedures for storage of materials to minimize exposure of the materials to stormwater. Include references to all relevant SESC Site Plans.

The following materials or substances will potentially be present on-site during construction:

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- Petroleum Based Products (Gasoline, Diesel Fuel, Motor Oil, Grease)
- Cleaning Solvents
- Bituminous Concrete Asphalt
- Cement Concrete
- Detergents
- Wood
- Bentonite, Drilling Fluids
- Lime, CKD

3.8 Minimize Dust

Per RI SESC Handbook – Part D

Dust control procedures and practices shall be used to suppress dust on a construction site during the construction process, as applicable. Precipitation, temperature, humidity, wind velocity and direction will determine amount and frequency of applications. However, the best method of controlling dust is to prevent dust production. This can best be accomplished by limiting the amount of bare soil exposed at one time. Dust Control measures outlined in the *RI SESC Handbook* shall be followed. Other dust control methods include watering, chemical application, surface roughening, wind barriers, walls, and covers.

Describe dust control practices that will be used to suppress dust and limit its generation (i.e. applying water, limiting the amount of bare soil exposed at one time etc.).

Water or foam for dust control will be applied prior to or during high wind conditions (forecasted or actual wind conditions of 20 mph or greater) to all areas of exposed erodible soil. Water shall be spray-applied to avoid ponding or erosion. Additionally, the Contractor will wet areas to be excavated prior to excavation to limit the amount of dust.

3.9 Designate Washout Areas

Per RI SESC Handbook – Part D

At no time shall any material (concrete, paint, chemicals) be washed into storm drains, open ditches, streets, streams, wetlands, or any environmentally sensitive area. The site operator must ensure that construction waste is properly disposed of, to avoid exposure to precipitation, at the end of each working day.

Will washout areas be required for the proposed project?

- Yes No

If Yes, describe location(s) and control measures that will be used to minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, washout areas for concrete mixers, paint, stucco, etc. The recommended location(s) of washout areas should be identified, or at a minimum the locations where these washout areas should not be sited should be called out.

The anticipated locations of concrete washout areas are shown on Sheet C-1. Under no circumstances will concrete washout areas be located where the discharge from same will create a nuisance or hazard (i.e. excavated areas, roadways, private property wetland resource areas, etc.); furthermore, the Contractor

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shall immediately adjust the location or configuration of any concrete washout areas which are found to create a nuisance or hazard.

3.10 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

Per RI SESC Handbook – Part D

Vehicle fueling shall not take place within regulated wetlands or buffer zone areas, or within 50-feet of the storm drain system. Designated areas shall be depicted on the SESC Site Plans, or shall be approved by the site owner.

Vehicle maintenance and washing shall occur off-site, or in designated areas depicted on the SESC Site Plans or approved of by the site owner. Maintenance or washing areas shall not be within regulated wetlands or buffer zone areas, or within 50-feet of the storm drain system. Maintenance areas shall be clearly designated, and barriers shall be used around the perimeter of the maintenance area to prevent stormwater contamination.

Construction vehicles shall be inspected frequently for leaks. Repairs shall take place immediately. Disposal of all used oil, antifreeze, solvents and other automotive-related chemicals shall be according to applicable regulations; at no time shall any material be washed down the storm drain or in to any environmentally sensitive area.

Describe equipment/vehicle fueling and maintenance practices that will be implemented to prevent pollutants from mixing with stormwater (e.g., secondary containment, drip pans, spill kits, etc.) Provide recommended location(s) of fueling/maintenance areas, or, at minimum, locations where fueling/maintenance should be avoided.

- Fueling and Maintenance areas for equipment will be required during construction. These areas will be located outside of any known resource or buffer areas.
- All onsite vehicles shall be monitored for leaks, and shall receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.
- The Contractor shall determine locations, if any, for vehicle fueling and maintenance activities, provided that said locations are more than fifty (50) feet from any storm drainage inlet structure and outside of any known resource or buffer area.

3.11 Chemical Treatment for Erosion and Sediment Control

Per RI SESC Handbook – Appendix J

Chemical stabilizers, polymers, and flocculants are readily available on the market and can be easily applied to construction sites for the purposes of enhancing the control of erosion, runoff, and sedimentation. The following guidelines should be adhered to for construction sites that plan to use treatment chemicals as part of their overall erosion, runoff, and sedimentation control strategy.

The U.S. Environmental Protection Agency has conducted research into the relative toxicity of chemicals commonly used for the treatment of construction stormwater discharges. The research conducted by the EPA focused on different formulations of chitosan, a cationic compound, and both cationic and anionic polyacrylamide (PAM). In summary, the studies found significant toxicity resulting from the use of chitosan and cationic PAM in laboratory conditions, and significantly less toxicity associated with using anionic PAM.

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EPA's research has led to the conclusion that the use of treatment chemicals for erosion, runoff, and sedimentation control requires proper operator training and appropriate usage to avoid risk to aquatic species. In the case of cationic treatment chemicals additional safeguards may be necessary.

Application/Installation Minimum Requirements

If a site operator plans to use polymers, flocculants, or other treatment chemicals during construction the SESC plan must address the following:

1. Treatment chemicals shall not be applied directly to or within 100 feet of any surface water body, wetland, or storm drain inlet.
2. Use conventional erosion, runoff, and sedimentation controls prior to and after the application of treatment chemicals. Use conventional erosion, runoff, and sedimentation controls prior to chemical addition to ensure effective treatment. Chemicals may only be applied where treated stormwater is directed to a sediment control (e.g. temporary sediment basin, temporary sediment trap or sediment barrier) prior to discharge.
3. Sites shall be stabilized as soon as possible using conventional measures to minimize the need to use chemical treatment.
4. Select appropriate treatment chemicals. Chemicals must be selected that are appropriately suited to the types of soils likely to be exposed during construction and to the expected turbidity, pH, and flow rate of stormwater flowing into the chemical treatment system or treatment area. **Soil testing is essential. Using the wrong form of chemical treatment will result in some form of performance failure and unnecessary environmental risk.**
5. Minimize discharge risk from stored chemicals. Store all treatment chemicals in leak-proof containers that are kept under storm-resistant cover and surrounded by secondary containment structures (e.g., spill berms, decks, spill containment pallets), or provide equivalent measures, designed and maintained to minimize the potential discharge of treatment chemicals in stormwater or by any other means (e.g., storing chemicals in covered areas or having a spill kit available on site).
6. Use chemicals in accordance with good engineering practices and specifications of the chemical provider/supplier. You must also use treatment chemicals and chemical treatment systems in accordance with good engineering practices, and with dosing specifications and sediment removal design specifications provided by the supplier of the applicable chemicals, or document specific departures from these practices or specifications and how they reflect good engineering practice.

Will chemical stabilizers, polymers, flocculants or other treatment chemicals be utilized on the proposed construction project?

Yes No

If Yes, create a Treatment Chemical Application Plan and describe how the owner or SESC Plan preparer/designer intends to educate the designated operator prior to the application of such treatment chemicals.

Treatment Chemical Application Plan Required Elements

Insert information listed below:

1. *List Manufacturer's name and product name for each treatment chemical proposed for use at the site.*

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2. *Attach a copy of applicable Material Safety Data Sheets (MSDSs) or Safety Data Sheets (SDS) for each proposed treatment chemical.*
 3. *Provide the results of third party toxicity testing of the materials proposed for use at the site.*
 4. *Provide a certification from the site owner and operator that all proposed treatment chemicals are the same as those used in the toxicity tests and will not be altered in any way.*
 5. *Provide an explanation as to why conventional erosion, runoff, and sediment control measures, alone or in combination, will not be sufficient to prevent turbidity impacts and sedimentation in downstream receptors.*
 6. *Provide a plan prepared in consultation with the chemical treatment manufacturer(s) or authorized manufacturer's representative which includes the following:*
 - a. *Identification of the areas of the site where treatment chemicals will be applied and the name, location, and distance to all downstream receptors that have the potential to be impacted from the discharges from the treatment areas.*
 - b. *List the expected start and end dates or specific phases of the project during which each treatment chemical will be applied.*
 - c. *Provide test results for representative soils from the site, and any recommendations from the manufacturer based on the soil tests, indicating the type of treatment chemical and the recommended application rate.*
 - d. *List the frequency, method, and rates of application which are designed to ensure that treatment chemical concentrations will not exceed 50% of the IC25 or NOEC toxicity values, whichever is less, for each treatment chemical proposed.*
 - e. *Provide the frequency of inspection and maintenance of the treatment chemical application system.*
 - f. *List the method proposed for the collection, removal, and disposal or stabilization of settled particles to prevent re-suspension.*
 - g. *Describe the training that will be provided to all persons who will handle and use treatment chemicals at the construction site. Training must include appropriate, product-specific training and proper dosing requirements for each product.*
- It Is Not anticipated that a treatment chemical application will be required to control erosion, runoff, and sedimentation
 - The Contractor shall provide a treatment chemical application plan for review and approval, if it is determined that treatment chemicals are required during construction.

Treatment Chemical SESC Plan Weekly Inspection Report Documentation Requirements

1. Document the type and quantity of treatment chemicals applied.
2. List the date, duration of discharge, and estimated discharge rate.
3. Provide an estimate of the volume of water treated.
4. Provide an estimate of the concentration of treatment chemicals in the discharge, with supporting calculations.

3.12 Construction Activity Pollution Prevention Control Measure List

Complete the following table for each Phase of construction where Pollution Prevention Control Measures will be implemented. This table is to be used as part of the SESC Plan Inspection Report – please fill out accordingly.

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It is expected that this table will be amended as needed throughout the construction project.

Phase No. #		
Location/Station	Control Measure Description/Reference	Maintenance Requirement
Construction Entrances	Stone Stabilized Construction Access	Site Entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto paved surfaces. Provide periodic top dressing with additional stone or additional length as conditions demand. Roads adjacent to entrance shall be clean at the end of each day. If maintenance alone is not enough to prevent excessive track out, increase length of entrance, modify construction access road surface, or install washrack or mudrack.
Roads	Public/Private Roads within the construction site shall be clean at the end of each day	Street Sweep if construction site sediment is visible
Site Wide	Pick-up & proper handling and disposal of construction trash and debris	All Loose trash and debris must be disposed of properly at the end of each working day

Insert a new table for each additional construction phase.

SECTION 4: CONTROL MEASURE INSTALLATION, INSPECTION, and MAINTENANCE

4.1 Installation

Per RI SESC Handbook – Part D:

Complete the installation of temporary erosion, runoff, sediment, and pollution prevention control measures by the time each phase of earth-disturbance has begun. All stormwater control measures must be installed in accordance with good judgment, including applicable design and manufacturer specifications. Installation techniques and maintenance requirements may be found in manufacturer specifications and/or the *RI SESC Handbook*.

Include references to SESC Site Plans where installation requirements are located.

The erosion control details and installation location are depicted on plans C-1 through C-7, C-15 and C-16 of the plan set. The Contractor shall amend this section if there are any departures from the specifications or any previous section in this document.

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4.2 **Monitoring Weather Conditions**

Per RI SESC Handbook – Part D:

Anticipating Weather Events - Care will be taken to the best of the operator's ability to avoid disturbing large areas prior to anticipated precipitation events. Weather forecasts must be routinely checked, and in the case of an expected precipitation event of over 0.25-inches over a 24-hour period, it is highly recommended that all control measures should be evaluated and maintained as necessary, prior to the weather event. In the case of an extreme weather forecast (greater than one-inch of rain over a 24-hour period), additional erosion/sediment controls may need to be installed.

Storm Event Monitoring For Inspections - At a minimum, storm events must be monitored and tracked in order to determine when post-storm event inspections must be conducted. Inspections must be conducted and documented at least once every seven (7) calendar days and within twenty-four (24) hours after any storm event, which generates at least 0.25 inches of rainfall per twenty-four (24) hour period and/or after a significant amount of runoff or snowmelt.

In order for an operator to successfully satisfy this requirement list the weather gauge station that will be utilized to monitor weather conditions on the construction site. See www.wunderground.com or www.weather.gov for available stations.

The weather gauge station and website that will be utilized to monitor weather conditions on the construction site is as follows:

There is a weather gauge station in Pawtucket (Quality Hill – KRIPAWTU30) that may be used to monitor weather conditions. The station can be found on:

www.wunderground.com

4.3 **Inspections**

Per RI SESC Handbook – Part D:

Minimum Frequency - Each of the following areas must be inspected by or under the supervision of the owner and operator at least once every seven (7) calendar days and within twenty-four (24) hours after any storm event, which generates at least 0.25 inches of rainfall per twenty-four (24) hour period and/or after a significant amount of runoff or snowmelt:

- a. All areas that have been cleared, graded, or excavated and where permanent stabilization has not been achieved;
- b. All stormwater erosion, runoff, and sediment control measures (including pollution prevention control measures) installed at the site;
- c. Construction material, unstabilized soil stockpiles, waste, borrow, or equipment storage, and maintenance areas that are covered by this permit and are exposed to precipitation;
- d. All areas where stormwater typically flows within the site, including temporary drainage ways designed to divert, convey, and/or treat stormwater;
- e. All points of discharge from the site;
- f. All locations where temporary soil stabilization measures have been implemented;
- g. All locations where vehicles enter or exit the site.

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Reductions in Inspection Frequency - If earth disturbing activities are suspended due to frozen conditions, inspections may be reduced to a frequency of once per month. The owner and operator must document the beginning and ending dates of these periods in an inspection report.

Qualified Personnel – The site owner and operator are responsible for designating personnel to conduct inspections and for ensuring that the personnel who are responsible for conducting the inspections are “qualified” to do so. A “qualified person” is a person knowledgeable in the principles and practices of erosion, runoff, sediment, and pollution prevention controls, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of the permit.

Recordkeeping Requirements - All records of inspections, including records of maintenance and corrective actions must be maintained with the SESC Plan. Inspection records must include the date and time of the inspection, and the inspector’s name, signature, and contact information.

General Notes

- A separate inspection report will be prepared for each inspection.
- The Inspection Reference Number shall be a combination of the RIPDES Construction General Permit No - consecutively numbered inspections. ex/ Inspection reference number for the 4th inspection of a project would be: RIR10####-4
- Each report will be signed and dated by the Inspector and must be kept onsite.
- Each report will be signed and dated by the Site Operator.
- The corrective action log contained in each inspection report must be completed, signed, and dated by the site operator once all necessary repairs have been completed.
- It is the responsibility of the site operator to maintain a copy of the SESC Plan, copies of all completed inspection reports, and amendments as part of the SESC Plan documentation at the site during construction.

Failure to make and provide documentation of inspections and corrective actions under this part constitutes a violation of your permit and enforcement actions under 46-12 of R.I. General Laws may result.

4.4 Maintenance

Per RI SESC Handbook – Part D:

Maintenance procedures for erosion and sedimentation controls and stormwater management structures/facilities are described on the SESC Site Plans and in the *RI SESC Handbook*.

Site owners and operators must ensure that all erosion, runoff, sediment, and pollution prevention controls remain in effective operating condition and are protected from activities that would reduce their effectiveness. Erosion, runoff, sedimentation, and pollution prevention control measures must be maintained throughout the course of the project.

Note: It is recommended that the site operator designates a full-time, on-site contact person responsible for working with the site owner to resolve SESC Plan-related issues.

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4.5 Corrective Actions

Per RI SESC Handbook – Part D:

If, in the opinion of the designated site inspector, corrective action is required, the inspector shall note it on the inspection report and shall inform the site operator that corrective action is necessary. The site operator must make all necessary repairs whenever maintenance of any of the control measures instituted at the site is required.

In accordance with the *RI SESC Handbook*, the site operator shall initiate work to fix the problem immediately after its discovery, and complete such work by the close of the next work day, if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance.

When installation of a new control or a significant repair is needed, site owners and operators must ensure that the new or modified control measure is installed and made operational by no later than seven (7) calendar days from the time of discovery where feasible. If it is infeasible to complete the installation or repair within seven (7) calendar days, the reasons why it is infeasible must be documented in the SESC Plan along with the schedule for installing the control measures and making it operational as soon as practicable after the 7-day timeframe. Such documentation of these maintenance procedures and timeframes should be described in the inspection report in which the issue was first documented. If these actions result in changes to any of the control measures outlined in the SESC Plan, site owners and operators must also modify the SESC Plan accordingly within seven (7) calendar days of completing this work.

SECTION 5: AMENDMENTS

Per RIPDES Construction General Permit – Part III.F:

This SESC Plan is intended to be a working document. It is expected that amendments will be required throughout the active construction phase of the project. **Even if practices are installed on a site according to the approved plan, the site is only in compliance when erosion, runoff, and sedimentation are effectively controlled throughout the entire site for the entire duration of the project.**

The SESC Plan shall be amended within seven (7) days whenever there is a change in design, construction, operation, maintenance or other procedure which has a significant effect on the potential for the discharge of pollutants, or if the SESC Plan proves to be ineffective in achieving its objectives (i.e. the selected control measures are not effective in controlling erosion or sedimentation).

In addition, the SESC Plan shall be amended to identify any new operator that will implement a component of the SESC Plan.

All revisions must be recorded in the Record of Amendments Log Sheet, which is contained in Attachment G of this SESC Plan, and dated red-lined drawings and/or a detailed written description must be appended to the SESC Plan. Inspection Forms must be revised to reflect all amendments. Update the Revision Date and the Version # in the footer of the Report to reflect amendments made.

All SESC Plan Amendments, except minor non-technical revisions, must be approved by the site owner and operator. Any amendments to control measures that involve the practice of engineering must be reviewed, signed, and stamped by a Professional Engineer registered in the State of RI.

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The amended SESC plan must be kept on file at the site while construction is ongoing and any modifications must be documented.

Attach a copy of the Amendment Log.

[Reference RI Model SESC Plan ATTACHMENT G](#)

See Attachment G: Amendment Log

SECTION 6: RECORDKEEPING

RIPDES Construction General Permit – Parts III.D, III.G, III.J.3.b.iii, & V.O

It is the site owner and site operator's responsibility to have the following documents available at the construction site and immediately available for RIDEM review upon request:

- A copy of the fully signed and dated SESC Plan, which includes:
 - A copy of the General Location Map
INCLUDED AS ATTACHMENT A
 - A copy of all SESC Site Plans
INCLUDED AS ATTACHMENT B
 - A copy of the RIPDES Construction General Permit (*To save paper and file space, do not include in DEM/CRMC submittal, for operator copy only*)
INCLUDED AS ATTACHMENT C
 - A copy of any regulatory permits (RIDEM Freshwater Wetlands Permit, CRMC Assent, RIDEM Water Quality Certification, RIDEM Groundwater Discharge Permit, RIDEM RIPDES Construction General Permit authorization letter, etc.)
INCLUDED AS ATTACHMENT D
 - The signed and certified NOI form or permit application form (*if required as part of the application, see RIPDES Construction General Permit for applicability*)
INCLUDED AS ATTACHMENT E
 - Completed Inspection Reports w/Completed Corrective Action Logs
INCLUDED AS ATTACHMENT F
 - SESC Plan Amendment Log
INCLUDED AS ATTACHMENT G

SECTION 7: PARTY CERTIFICATIONS

RIPDES Construction General Permit – Part V.G

All parties working at the project site are required to comply with the Soil Erosion and Sediment Control Plan (SESC Plan including SESC Site Plans) for any work that is performed on-site. The site owner, site operator, contractors and sub-contractors are encouraged to advise all employees working on this project of the requirements of the SESC Plan. A copy of the SESC Plan is available for your review at the following location: TBD, or may be obtained by contacting the site owner or site operator.

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The site owner and site operator and each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement.

I acknowledge that I have read and understand the terms and conditions of the Soil Erosion and Sediment Control (SESC) Plan for the above designated project and agree to follow the control measures described in the SESC Plan and SESC Site Plans.

Site Owner (Project Owner) :

Narragansett Bay Commission
Richard Bernier
1 Service Road
Providence, RI 02905
(401) 461-8848, rbernier@narrabay.com

Signature/Date

Site Operator:

Insert Company or Organization Name
Insert Name & Title
Insert Address
Insert City, State, Zip Code
Insert Telephone Number, Insert Fax/Email

signature/date

Designated Site Inspector:

Insert Company or Organization Name
Insert Name & Title
Insert Address
Insert City, State, Zip Code
Insert Telephone Number, Insert Fax/Email

signature/date

SubContractor SESC Plan Contact:

Insert Company or Organization Name
Insert Name & Title
Insert Address
Insert City, State, Zip Code
Insert Telephone Number, Insert Fax/Email

signature/date

Insert more contact/signature lines as necessary

APPENDIX A: STORMWATER MANAGEMENT PLAN CHECKLIST AND LID PLANNING REPORT – STORMWATER DESIGN SUMMARY

PROJECT NAME: Narragansett Bay Commission Phase IIIA-5 CSO Program – OF-217 Consolidation Conduit

(RIDEM USE ONLY)

STW/WQC File #:

Date Received:

TOWN: Pawtucket

BRIEF PROJECT DESCRIPTION: This submission is for the construction of the OF-217 Consolidation Conduit and Outfall Relocation. This includes the construction of a new Outfall to the Seekonk River, Diversions Structures and Consolidation Conduit that directs combined sewage flow away from the Outfall to a new Drop Shaft and Tunnel structure for storage during storm events. The construction of the Consolidation Conduit will include the installation of erosion controls, construction access pads, open-cut excavation for structure and conduit installation. A signification portion of the project will be performed through microtunneling which will require installation of secant pile supports and excavation for the receiving pits.

Stormwater Management Plan (SMP) Elements – Minimum Standards

When submitting a SMP,¹ submit **four separately bound** documents: Appendix A Checklist; Stormwater Site Planning, Analysis and Design Report with Plan Set/Drawings; Soil Erosion and Sediment Control (SESC) Plan, and Post Construction Operations and Maintenance (O&M) Plan. Please refer to [Suggestions to Promote Brevity](#).

Note: All stormwater construction projects **must create** a Stormwater Management Plan (SMP). However, not every element listed below is required per the [RIDEM Stormwater Rules](#) and the [RIPDES Construction General Permit \(CGP\)](#). This checklist will help identify the required elements to be submitted with an Application for Stormwater Construction Permit & Water Quality Certification.

PART 1. PROJECT AND SITE INFORMATION

PROJECT TYPE (Check all that apply)

- | | | | | |
|---|---|----------------------------------|-----------------------------------|--------------------------------------|
| <input type="checkbox"/> Residential | <input type="checkbox"/> Commercial | <input type="checkbox"/> Federal | <input type="checkbox"/> Retrofit | <input type="checkbox"/> Restoration |
| <input type="checkbox"/> Road | <input checked="" type="checkbox"/> Utility | <input type="checkbox"/> Fill | <input type="checkbox"/> Dredge | <input type="checkbox"/> Mine |
| <input type="checkbox"/> Other (specify): | | | | |

SITE INFORMATION

- Vicinity Map: See SESC Master Plan for Vicinity Map

INITIAL DISCHARGE LOCATION(S): The WQv discharges to: (You may choose more than one answer if several discharge points are associated with the project.)

- | | | |
|---|---|--|
| <input type="checkbox"/> Groundwater | <input checked="" type="checkbox"/> Surface Water | <input type="checkbox"/> MS4 |
| <input type="checkbox"/> GAA | <input type="checkbox"/> Isolated Wetland | <input type="checkbox"/> RIDOT |
| <input type="checkbox"/> GA | <input checked="" type="checkbox"/> Named Waterbody | <input type="checkbox"/> RIDOT Alteration Permit is Approved |
| <input type="checkbox"/> GB | <input type="checkbox"/> Unnamed Waterbody Connected to Named Waterbody | <input type="checkbox"/> Town |
| <input type="checkbox"/> Other (specify): | | |

ULTIMATE RECEIVING WATERBODY LOCATION(S): Include pertinent information that applies to both WQ_v and flow from larger storm events including overflows. Choose all that apply, and repeat table for each waterbody.

- | | |
|---|---|
| <input type="checkbox"/> Groundwater or Disconnected Wetland | <input type="checkbox"/> SRWP |
| <input checked="" type="checkbox"/> Waterbody Name: Seekonk River | <input type="checkbox"/> Coldwater <input type="checkbox"/> Warmwater <input type="checkbox"/> Unassessed |
| <input checked="" type="checkbox"/> Waterbody ID: RI0007019E-01 | <input checked="" type="checkbox"/> 4 th order stream of pond 50 acres or more |

¹ Applications for a Construction General Permit that do not require any other permits from RIDEM and will disturb less than 5 acres over the entire course of the project do not need to submit a SMP. The Appendix A checklist must still be submitted.

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<input checked="" type="checkbox"/> TMDL for: Fecal Coliform, DO, TN	<input type="checkbox"/> Watershed of flood prone river (e.g., Pocasset River)
<input type="checkbox"/> Contributes to a priority outfall listed in the TMDL	<input type="checkbox"/> Contributes stormwater to a public beach
<input type="checkbox"/> 303(d) list – Impairment(s) for:	<input type="checkbox"/> Contributes to shellfishing grounds

PROJECT HISTORY

<input checked="" type="checkbox"/> RIDEM Pre- Application Meeting	Meeting Date: 6/19/2019	<input checked="" type="checkbox"/> Minutes Attached
<input type="checkbox"/> Municipal Master Plan Approval	Approval Date:	<input type="checkbox"/> Minutes Attached
<input type="checkbox"/> Subdivision Suitability Required	Approval #:	
<input type="checkbox"/> Previous Enforcement Action has been taken on the property	Enforcement #:	

FLOODPLAIN & FLOODWAY See [Guidance Pertaining to Floodplain and Floodways](#)

<input checked="" type="checkbox"/> Riverine 100-year floodplain: FEMA FLOODPLAIN FIRMETTE has been reviewed and the 100-year floodplain is on site	
<input checked="" type="checkbox"/> Delineated from FEMA Maps	
NOTE: Per Rule 250-RICR-150-10-8-1.1(B)(5)(d)(3), provide volumetric floodplain compensation calculations for cut and fill/displacement calculated by qualified professional	
<input type="checkbox"/> Calculated by Professional Engineer	
<input type="checkbox"/> Calculations are provided for cut vs. fill/displacement volumes proposed within the 100-year floodplain	Amount of Fill (CY):
	Amount of Cut (CY):
<input type="checkbox"/> Restrictions or modifications are proposed to the flow path or velocities in a floodway	
<input type="checkbox"/> Floodplain storage capacity is impacted	
<input type="checkbox"/> Project area is not within 100-year floodplain as defined by RIDEM	

CRMC JURISDICTION

<input checked="" type="checkbox"/> CRMC Assent required
<input checked="" type="checkbox"/> Property subject to a Special Area Management Plan (SAMP). If so, specify which SAMP: Metro Bay SAMP
<input checked="" type="checkbox"/> Sea level rise mitigation has been designed into this project

LUHPPL IDENTIFICATION - MINIMUM STANDARD 8:

1. OFFICE OF Land Revitalization and Sustainable Materials Management (OLRSMM)

<input type="checkbox"/> Known or suspected releases of HAZARDOUS MATERIAL are present at the site (Hazardous Material is defined in Rule 1.4(A)(33) of 250-140-30-1 of the RIDEM Rules and Regulations for Investigation and Remediation of Hazardous Materials (the Remediation Regulations))	RIDEM CONTACT:
<input type="checkbox"/> Known or suspected releases of PETROLEUM PRODUCT are present at the site (Petroleum Product as defined in Rule 1.5(A)(84) of 250-140-25-1 of the RIDEM Rules and Regulations for Underground Storage Facilities Used for Regulated Substances and Hazardous Materials)	
<input checked="" type="checkbox"/> This site is identified on the RIDEM Environmental Resources Map as one of the following regulated facilities	SITE ID#:
<input checked="" type="checkbox"/> CERCLIS/Superfund (NPL)	110009310290
<input type="checkbox"/> State Hazardous Waste Site (SHWS)	
<input type="checkbox"/> Environmental Land Usage Restriction (ELUR)	
<input type="checkbox"/> Leaking Underground Storage Tank (LUST)	
<input type="checkbox"/> Closed Landfill	

Note: If any boxes in 1 above are checked, the applicant must contact the RIDEM OLRSM Project Manager associated with the Site to determine if subsurface infiltration of stormwater is allowable for the project. Indicate if the infiltration corresponds to “Red,” “Yellow” or “Green” as described in Section 3.2.8 of the RISDISM Guidance (Subsurface Contamination Guidance). Also, note and reference approval in PART 3, Minimum Standard 2: Groundwater Recharge/Infiltration.

2. PER MINIMUM STANDARD 8 of RICR 8.14.C.1-6 “LUHPPLS,” THE SITE IS/HAS:

<input type="checkbox"/> Industrial Site with RIPDES MSGP, except where No Exposure Certification exists. http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php
<input type="checkbox"/> Auto Fueling Facility (e.g., gas station)
<input type="checkbox"/> Exterior Vehicles Service, Maintenance, or Equipment Cleaning Area

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<input type="checkbox"/>	Road Salt Storage and Loading Areas (exposed to rainwater)	
<input type="checkbox"/>	Outdoor Storage and Loading/Unloading of Hazardous Substances	
3. STORMWATER INDUSTRIAL PERMITTING		
<input type="checkbox"/>	The site is associated with existing or proposed activities that are considered Land Uses with Higher Potential Pollutant Loads (LUHPPLS) (see RICR 8.14.C)	Activities: Sector:
<input type="checkbox"/>	Construction is proposed on a site that is subject to THE MULTI-SECTOR GENERAL PERMIT (MSGP) UNDER RULE 31(B)15 OF THE RIPDES REGULATIONS.	MSGP permit #
<input type="checkbox"/>	Additional stormwater treatment is required by the MSGP Explain:	

REDEVELOPMENT STANDARD – MINIMUM STANDARD 6		
<input checked="" type="checkbox"/> Pre Construction Impervious Area		
<input checked="" type="checkbox"/>	Total Pre-Construction Impervious Area (TIA) = 0.9 acres	
<input checked="" type="checkbox"/>	Total Site Area (TSA) = 2.7 acres	
<input checked="" type="checkbox"/>	Jurisdictional Wetlands (JW) = 1.0 acres	
<input checked="" type="checkbox"/>	Conservation Land (CL) = 0.1 acres	
<input checked="" type="checkbox"/> Calculate the Site Size (defined as contiguous properties under same ownership)		
<input checked="" type="checkbox"/>	Site Size (SS) = (TSA) – (JW) – (CL) = 1.5 acres	
<input checked="" type="checkbox"/>	(TIA) / (SS) = 0.58	<input checked="" type="checkbox"/> (TIA) / (SS) >0.4?
<input checked="" type="checkbox"/> YES, Redevelopment		

PART 2. LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1
(NOT REQUIRED FOR REDEVELOPMENT OR RETROFITS)
This section may be deleted if not required.

<p>Note: A written description must be provided specifying why each method is not being used or is not applicable at the Site. Appropriate answers may include:</p> <ul style="list-style-type: none"> • Town requires ... (state the specific local requirement) • Meets Town’s dimensional requirement of ... • Not practical for site because ... • Applying for waiver/variance to achieve this (pending/approved/denied) • Applying for wavier/variance to seek relief from this (pending/approved/denied) 	
<p>A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS, AND FLOODPLAINS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Sensitive resource areas and site constraints are identified (required) <input type="checkbox"/> Local development regulations have been reviewed (required) <input type="checkbox"/> All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction <input type="checkbox"/> Conservation Development or another site design technique has been incorporated to protect open space and pre-development hydrology. Note: If Conservation Development has been used, check box and skip to Subpart C <input type="checkbox"/> As much natural vegetation and pre-development hydrology as possible has been maintained 	<p>IF NOT IMPLEMENTED, EXPLAIN HERE Redevelopment Project: Minimum Standard 1 is not required</p>

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<p>B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies <input type="checkbox"/> Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B) <input type="checkbox"/> Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's) <input type="checkbox"/> Development sites and building envelopes have been positioned outside of floodplains <input type="checkbox"/> Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features <input type="checkbox"/> Development sites and building envelopes have been located to minimize impacts to steep slopes ($\geq 15\%$) <input type="checkbox"/> Other (describe): 	<p>Redevelopment Project: Minimum Standard 1 is not required</p>
<p>C) MINIMIZE CLEARING AND GRADING</p> <ul style="list-style-type: none"> <input type="checkbox"/> Site clearing has been restricted to <u>minimum area needed</u> for building footprints, development activities, construction access, and safety. <input type="checkbox"/> Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities) <input type="checkbox"/> Protection for stands of trees and individual trees and their root zones to be preserved has been specified, and such protection extends at least to the tree canopy drip line(s) <input type="checkbox"/> Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent 	<p>Redevelopment Project: Minimum Standard 1 is not required</p>
<p>D) REDUCE IMPERVIOUS COVER</p> <ul style="list-style-type: none"> <input type="checkbox"/> Reduced roadway widths (≤ 22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400 - 2,000) <input type="checkbox"/> Reduced driveway areas (length minimized via reduced ROW width (≤ 45 ft.) and/or reduced (or absolute minimum) front yard setback; width minimized to ≤ 9 ft. wide one lane; ≤ 18 ft. wide two lanes; shared driveways; pervious surface) <input type="checkbox"/> Reduced building footprint: Explain approach: <input type="checkbox"/> Reduced sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface) <input type="checkbox"/> Reduced cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around) <input type="checkbox"/> Reduced parking lot area: Explain approach <input type="checkbox"/> Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc. <input type="checkbox"/> Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance) <input type="checkbox"/> Other (describe): 	<p>Redevelopment Project: Minimum Standard 1 is not required</p>
<p>E) DISCONNECT IMPERVIOUS AREA</p> <ul style="list-style-type: none"> <input type="checkbox"/> Impervious surfaces have been disconnected, and runoff has been diverted to QPAs to the maximum extent possible <input type="checkbox"/> Residential street edges allow side-of-the-road drainage into vegetated open swales <input type="checkbox"/> Parking lot landscaping breaks up impervious expanse AND accepts runoff <input type="checkbox"/> Other (describe): 	<p>Redevelopment Project: Minimum Standard 1 is not required</p>
<p>F) MITIGATE RUNOFF AT THE POINT OF GENERATION</p> <ul style="list-style-type: none"> <input type="checkbox"/> Small-scale BMPs have been designated to treat runoff as close as possible to the source 	<p>Redevelopment Project: Minimum Standard 1 is not required</p>

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<p>G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION</p> <p><input type="checkbox"/> Low-maintenance landscaping has been proposed using native species and cultivars</p> <p><input type="checkbox"/> Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on site plan</p> <p><input type="checkbox"/> Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots</p>	<p>Redevelopment Project: Minimum Standard 1 is not required</p>
<p>H) RESTORE STREAMS/WETLANDS</p> <p><input type="checkbox"/> Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands</p> <p><input type="checkbox"/> Removal of invasive species</p> <p><input type="checkbox"/> Other</p>	<p>Redevelopment Project: Minimum Standard 1 is not required</p>

PART 3. SUMMARY OF REMAINING STANDARDS

GROUNDWATER RECHARGE – MINIMUM STANDARD 2		
YES	NO	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project has been designed to meet the groundwater recharge standard.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	If “No,” the justification for groundwater recharge criterion waiver has been explained in the Narrative (e.g., threat of groundwater contamination or physical limitation), if applicable (see RICR 8.8.D);
<input type="checkbox"/>	<input type="checkbox"/>	Your waiver request has been explained in the Narrative, if applicable.
<input type="checkbox"/>	<input type="checkbox"/>	Is this site identified as a Regulated Facility in Part 1, Minimum Standard 8: LUHPPL Identification?
<input type="checkbox"/>	<input type="checkbox"/>	If “Yes,” has approval for infiltration by the OLRSM Site Project Manager, per Part 1, Minimum Standard 8, been requested?

TABLE 2-1: Summary of Recharge (see RISDISM Section 3.3.2)
(Add or Subtract Rows as Necessary)

Design Point	Impervious Area Treated (sq ft)	Total Re _v Required (cu ft)	LID Stormwater Credits (see RISDISM Section 4.6.1)	Recharge Required by Remaining BMPs (cu ft)	Recharge Provided by BMPs (cu ft)
			Portion of Re _v directed to a QPA (cu ft)		
DP-1:					
DP-2:					
DP-3:					
DP-4:					
TOTALS:					
<p><u>Notes:</u></p> <p>1. Only BMPs listed in RISDISM Table 3-5 “List of BMPs Acceptable for Recharge” may be used to meet the recharge requirement.</p> <p>2. Recharge requirement must be satisfied for each waterbody ID.</p>					
<p><input checked="" type="checkbox"/> Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.): Construction is generally taking place on a parcel that has already been stripped to erodible soil and is part of a larger development project not associated with the pipeline project. Pipeline Construction related stormwater treatment practices are focused on controlling erosion and sediment.</p>					

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WATER QUALITY – MINIMUM STANDARD 3		
YES	NO	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Does this project meet or exceed the required water quality volume WQv (see RICR 8.9.E-I)?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is the proposed final impervious cover greater than 20% of the disturbed area (see RICR 8.9.E-I)?
<input type="checkbox"/>	<input type="checkbox"/>	If “Yes,” either the Modified Curve Number Method or the Split Pervious/Impervious method in Hydro-CAD was used to calculate WQv; or,
<input type="checkbox"/>	<input type="checkbox"/>	If “Yes,” either TR-55 or TR-20 was used to calculate WQv; and,
<input type="checkbox"/>	<input type="checkbox"/>	If “No,” the project meets the minimum WQv of 0.2 watershed inches over the entire disturbed area.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not Applicable
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Does this project meet or exceed the ability to treat required water quality flow WQf (see RICR 8.9.I.1-3)?
<input type="checkbox"/>	<input type="checkbox"/>	Does this project propose an increase of impervious cover to a receiving water body with impairments? If “Yes,” please indicate below the method that was used to address the water quality requirements of no further degradation to a low-quality water.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	RICR 8.36. A Pollutant Loading Analysis is needed and has been completed.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	The Water Quality Guidance Document (Water Quality Goals and Pollutant Loading Analysis Guidance for Discharges to Impaired Waters) has been followed as applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	BMPs are proposed that are on the approved technology list . If “Yes,” please provide all required worksheets from the manufacturer.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Additional pollutant-specific requirements and/or pollutant removal efficiencies are applicable to the site as the result of a TMDL, SAMP, or other watershed-specific requirements. If “Yes,” please describe:

TABLE 3-1: Summary of Water Quality (see RICR 8.9)					
Design Point and WB ID	Impervious area treated (sq ft)	Total WQv Required (cu ft)	LID Stormwater Credits (see RICR 8.18)	Water Quality Treatment Remaining (cu ft)	Water Quality Provided by BMPs (cu ft)
			WQv directed to a QPA (cu ft)		
DP-1:					
DP-2:					
DP-3:					
DP-4:					
TOTALS:					
<u>Notes:</u>					
1. Only BMPs listed in RICR 8.20 and 8.25 or the Approved Technologies List of BMPs is Acceptable for Water Quality treatment.					
2. For each Design Point, the Water Quality Volume Standard must be met for each Waterbody ID.					
<input type="checkbox"/> YES	This project has met the setback requirements for each BMP.				
<input checked="" type="checkbox"/> NO	If “No,” please explain:				
<input checked="" type="checkbox"/>	Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.): Construction is generally taking place on a parcel that has already been stripped to erodible soil and is part of a larger development project not associated with the pipeline project. Pipeline Construction related stormwater treatment practices are focused on controlling erosion and sediment.				

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CONVEYANCE AND NATURAL CHANNEL PROTECTION (RICR 8.10) – MINIMUM STANDARD 4		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is this standard waived? If “Yes,” please indicate one or more of the reasons below:
		<input checked="" type="checkbox"/> The project directs discharge to a large river (i.e., 4th-order stream or larger. See RISDISM Appendix I for State-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters. <input type="checkbox"/> The project is a small facility with impervious cover of less than or equal to 1 acre. <input type="checkbox"/> The project has a post-development peak discharge rate from the facility that is less than 2 cfs for the 1-year, 24-hour Type III design storm event (prior to any attenuation). (<u>Note</u> : LID design strategies can greatly reduce the peak discharge rate).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Conveyance and natural channel protection for the site have been met. If “No,” explain why: This standard is waived, the project directs discharge to a large river

TABLE 4-1: Summary of Channel Protection Volumes (see RICR 8.10)					
Design Point	Receiving Water Body Name	Coldwater Fishery? (Y/N)	Total CPv Required (cu ft)	Total CPv Provided (cu ft)	Average Release Rate Modeled in the 1-yr storm (cfs)
DP-1:					
DP-2:					
DP-3:					
DP-4:					
TOTALS:					
<u>Note</u> : The Channel Protection Volume Standard must be met in each waterbody ID.					
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	The CPv is released at roughly a uniform rate over a 24-hour duration (see examples of sizing calculations in Appendix D of the RISDISM).				
<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Do additional design restrictions apply resulting from any discharge to cold-water fisheries; If “Yes,” please indicate restrictions and solutions below.				
<input checked="" type="checkbox"/> Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.). This standard is waived, the project directs discharge to a large river					

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OVERBANK FLOOD PROTECTION (RICR 8.11) AND OTHER POTENTIAL HIGH FLOWS – MINIMUM STANDARD 5		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is this standard waived? If yes, please indicate one or more of the reasons below:
	<input checked="" type="checkbox"/>	The project directs discharge to a large river (i.e., 4th-order stream or larger. See Appendix I for state-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters.
	<input type="checkbox"/>	A Downstream Analysis (see RICR 8.11.D and E) indicates that peak discharge control would not be beneficial or would exacerbate peak flows in a downstream tributary of a particular site (e.g., through coincident peaks).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Does the project flow to an MS4 system or subject to other stormwater requirements? If “Yes,” indicate as follows:
	<input type="checkbox"/>	RIDOT
	<input type="checkbox"/>	Other (specify):
<p>Note: The project could be approved by RIDEM but not meet RIDOT or Town standards. RIDOT’s regulations indicate that post-volumes must be less than pre-volumes for the 10-yr storm at the design point entering the RIDOT system. If you have not already received approval for the discharge to an MS4, please explain below your strategy to comply with RIDEM and the MS4.</p>		
		Indicate below which model was used for your analysis. <input type="checkbox"/> TR-55 <input type="checkbox"/> TR-20 <input type="checkbox"/> HydroCAD <input type="checkbox"/> Bentley/Haestad <input type="checkbox"/> Intellisolve <input type="checkbox"/> Other (Specify):
YES	NO	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Does the drainage design demonstrate that flows from the 100-year storm event through a BMP will safely manage and convey the 100-year storm? If “No,” please explain briefly below and reference where in the application further documentation can be found (i.e., name of report/document, page numbers, appendices, etc.): Construction is generally taking place on a parcel that has already been stripped to erodible soil and is part of a larger development project not associated with the pipeline project. Pipeline Construction related stormwater treatment practices are focused on controlling erosion and sediment. Erosion and sediment controls proposed to be utilized are permitted under CRMC Assent No. 2020-02-043
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Do off-site areas contribute to the sub-watersheds and design points? If “Yes,”
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are the areas modeled as “present condition” for both pre- and post-development analysis?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are the off-site areas shown on the subwatershed maps?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does the drainage design confirm safe passage of the 100-year flow through the site for off-site runoff?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is a Downstream Analysis required (see RICR 8.11.E.1)?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Calculate the following:
	<input type="checkbox"/>	Area of disturbance within the sub-watershed (areas)
	<input type="checkbox"/>	Impervious cover (%)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is a dam breach analysis required (earthen embankments over six (6) feet in height, or a capacity of 15 acre-feet or more, and contributes to a significant or high hazard dam)?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Does this project meet the overbank flood protection standard? This standard is waived, the project directs discharge to a large river

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Table 5-1 Hydraulic Analysis Summary								
Subwatershed (Design Point)	1.2" Peak Flow (cfs) **		1-yr Peak Flow (cfs)		10-yr Peak Flow (cfs)		100-yr Peak Flow (cfs)	
	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
DP-1:	Construction is generally taking place on a parcel that has already been stripped to erodible soil and is part of a larger development project not associated with the pipeline project. Pipeline Construction related stormwater treatment practices are focused on controlling erosion and sediment.							
DP-2:								
DP-3:								
DP-4:								
TOTALS:								
** Utilize modified curve number method or split pervious /impervious method in HydroCAD. <u>Note:</u> The hydraulic analysis must demonstrate no impact to each individual subwatershed DP unless each DP discharges to the same wetland or water resource.								
Indicate as follows where the pertinent calculations and/or information for the items above are provided						Name of report/document, page numbers, appendices, etc.		
Existing conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, and water surface elevations showing methodologies used and supporting calculations.						Not Applicable		
Proposed conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, water surface elevations, and routing showing the methodologies used and supporting calculations.						Not Applicable		
Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration.						Not Applicable		
Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities).						Not Applicable		

Table 5-2 Summary of Best Management Practices											
BMP ID	DP #	BMP Type (e.g., bioretention, tree filter)	BMP Functions					Bypass Type External (E) Internal (I) or NA	Horizontal Setback Criteria are met per RICR 8.21.B.10, 8.22.D.11, and 8.35.B.4		
			Pre-Treatment (Y/N/NA)	Re _v	WQ _v	CP _v (Y/N/NA)	Overbank Flood Reduction (Y/N/NA)		Yes/No	Technical Justification (Design Report page number)	Distance Provided
		TOTALS:									

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Table 5.3 Summary of Soils to Evaluate Each BMP									
DP #	BMP ID	BMP Type (e.g., bioretention, tree filter)	Soils Analysis for Each BMP						
			Test Pit ID# and Ground Elevation		SHWT Elevation (ft)	Bottom of Practice Elevation* (ft)	Separation Distance Provided (ft)	Hydrologic Soil Group (A, B, C, D)	Exfiltration Rate Applied (in/hr)
			Primary	Secondary					
		TOTALS:							

* For underground infiltration systems (UICs) bottom equals bottom of stone, for surface infiltration basins bottom equals bottom of basin, for filters bottom equals interface of storage and top of filter layer

LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8			
YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Are these activities already covered under an MSGP? If “No,” please explain if you have applied for an MSGP or intend to do so?
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in RISDISM Table 3-3, “Acceptable BMPs for Use at LUHPPLs.” Please list BMPs:
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Additional BMPs, or additional pretreatment BMP’s if any, that meet RIPDES MSGP requirements; Please list BMPs:
			Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).

ILLICIT DISCHARGES – MINIMUM STANDARD 9			
Illicit discharges are defined as unpermitted discharges to Waters of the State that do not consist entirely of stormwater or uncontaminated groundwater, except for certain discharges identified in the RIPDES Phase II Stormwater General Permit.			
YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Have you checked for illicit discharges? Combined system
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Have any been found and/or corrected? If “Yes,” please identify.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)?

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SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10		
YES	NO	N/A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<p>Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set?</p> <p>Have you provided a separately-bound document based upon the SESC Template? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed).</p> <p>If “No,” include a document with your submittal that addresses the following elements of an SESC Plan:</p>
		<input type="checkbox"/> Soil Erosion and Sediment Control Plan Project Narrative, including a description of how the fifteen (15) Performance Criteria have been met:
		<input type="checkbox"/> Provide Natural Buffers and Maintain Existing Vegetation
		<input type="checkbox"/> Minimize Area of Disturbance
		<input type="checkbox"/> Minimize the Disturbance of Steep Slopes
		<input type="checkbox"/> Preserve Topsoil
		<input type="checkbox"/> Stabilize Soils
		<input type="checkbox"/> Protect Storm Drain Inlets
		<input type="checkbox"/> Protect Storm Drain Outlets
		<input type="checkbox"/> Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures
		<input type="checkbox"/> Establish Perimeter Controls and Sediment Barriers
		<input type="checkbox"/> Divert or Manage Run-On from Up-Gradient Areas
		<input type="checkbox"/> Properly Design Constructed Stormwater Conveyance Channels
		<input type="checkbox"/> Retain Sediment On-Site
		<input type="checkbox"/> Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows
		<input type="checkbox"/> Apply Construction Activity Pollution Prevention Control Measures
		<input type="checkbox"/> Install, Inspect, and Maintain Control Measures and Take Corrective Actions
		<input type="checkbox"/> Qualified SESC Plan Preparer’s Information and Certification
		<input type="checkbox"/> Operator’s Information and Certification; if not known at the time of application, the Operator must certify the SESC Plan upon selection and prior to initiating site activities
		<input type="checkbox"/> Description of Control Measures, such as Temporary Sediment Trapping and Conveyance Practices, including design calculations and supporting documentation, as required

STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9		
Operation and Maintenance Section		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Have you provided a separately-bound Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If “No,” why not? Construction is generally taking place on a parcel that has already been stripped to erodible soil and is part of a larger development project not associated with the pipeline project. Pipeline Construction related stormwater treatment practices are focused on controlling erosion and sediment.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is the property owner or homeowner’s association responsible for the stormwater maintenance of all BMP’s? If “No,” you must provide a legally binding and enforceable maintenance agreement (see RISDISM Appendix E, page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Indicate where this agreement can be found in your report (i.e., name of report/document, page numbers, appendices, etc.). Construction is generally taking place on a parcel that has already been stripped to erodible soil and is part of a larger development project not associated with the pipeline project. Pipeline Construction related stormwater treatment practices are focused on controlling erosion and sediment.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, covenants, or ELUR per the Remediation Regulations). If “Yes,” have you obtained them? Or please explain your plan to obtain them:

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<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is stormwater being directed from public areas to private property? If "Yes," note the following: <u>Note:</u> This is not allowed unless a funding mechanism is in place to provide the finances for the long-term maintenance of the BMP and drainage, or a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner.
Pollution Prevention Section		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Designated snow stockpile locations?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Asphalt-only based sealants?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Pet waste stations? (<u>Note:</u> If a receiving water has a bacterial impairment, and the project involves housing units, then this could be an important part of your pollution prevention plan).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Regular sweeping? Please describe: As required by site conditions. Dust suppression techniques shall be employed at all times during soil disturbance
<input type="checkbox"/>	<input checked="" type="checkbox"/>	De-icing specifications, in accordance with RISDISM Appendix G. (NOTE: If the groundwater is GAA, or this area contributes to a drinking water supply, then this could be an important part of your pollution prevention plan).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	A prohibition of phosphate-based fertilizers? (Note: If the site discharges to a phosphorus impaired waterbody, then this could be an important part of your pollution prevention plan).

PART 4. SUBWATERSHED MAPPING AND SITE-PLAN DETAILS

Existing and Proposed Subwatershed Mapping (REQUIRED)		
YES	NO	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Existing and proposed drainage area delineations Not Applicable. There is no proposed changes to drainage areas
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Locations of all streams and drainage swales
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Drainage flow paths, mapped according to the DEM <i>Guidance for Preparation of Drainage Area Maps</i> (included in RISDISM Appendix K)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mapped seasonal high-water-table test pit locations Not Applicable. Infiltration type BMPs are not proposed
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs Not Applicable. Infiltration type BMPs are not proposed
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mapped locations of the BMPs, with the BMPs consistently identified on the Site Construction Plans
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mapped bedrock outcrops adjacent to any infiltration BMP Not Applicable. Infiltration type BMPs are not proposed
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Soils were logged by a: Not Applicable. Infiltration type BMPs are not proposed
	<input type="checkbox"/>	DEM-licensed Class IV soil evaluator Name:
	<input type="checkbox"/>	RI-registered P.E. Name:

Subwatershed and Impervious Area Summary				
Subwatershed (area to each design point)	First Receiving Water ID or MS4	Area Disturbed (units)	Existing Impervious (units)	Proposed Impervious (units)
DP-1:	Construction is generally taking place on a parcel that has already been stripped to erodible soil and is part of a larger development project not associated with the pipeline project. Pipeline Construction related stormwater treatment practices are focused on controlling erosion and sediment.			
DP-2:				
DP-3:				
DP-4:				
TOTALS:				

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

Site Construction Plans (Indicate that the following applicable specifications are provided)		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed plans (scale not greater than 1" = 40') with North arrow
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed site topography (with 1 or 2-foot contours); 10-foot contours accepted for off-site areas
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Boundaries of existing predominant vegetation and proposed limits of clearing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Site Location clarification
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location and field-verified boundaries of resource protection areas such as: <ul style="list-style-type: none"> ▶ freshwater and coastal wetlands, including lakes and ponds ▶ coastal shoreline features Perennial and intermittent streams, in addition to Areas Subject to Storm Flowage (ASSFs)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	All required setbacks (e.g., buffers, water-supply wells, septic systems)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Representative cross-section and profile drawings, and notes and details of structural stormwater management practices and conveyances (i.e., storm drains, open channels, swales, etc.), which include: <ul style="list-style-type: none"> ▶ Location and size of the stormwater treatment practices (type of practice, depth, area). Stormwater treatment practices (BMPs) must have labels that correspond to RISDISM Table 5-2; ▶ Design water surface elevations (applicable storms); ▶ Structural details of outlet structures, embankments, spillways, stilling basins, grade-control structures, conveyance channels, etc.; ▶ Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.); ▶ Location of floodplain and, if applicable, floodway limits and relationship of site to upstream and downstream properties or drainage that could be affected by work in the floodplain; ▶ Planting plans for structural stormwater BMPs, including species, size, planting methods, and maintenance requirements of proposed planting Not Applicable. Structural BMPs are not proposed
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report and corresponding water tables
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mapping of any OLRSM approved remedial actions/systems (including ELURs)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location of existing and proposed roads, buildings, and other structures including limits of disturbance; <ul style="list-style-type: none"> ▶ Existing and proposed utilities (e.g., water, sewer, gas, electric) and easements; ▶ Location of existing and proposed conveyance systems, such as grass channels, swales, and storm drains, and location(s) of final discharge point(s) (wetland, waterbody, etc.); ▶ Cross sections of roadways, with edge details such as curbs and sidewalks; ▶ Location and dimensions of channel modifications, such as bridge or culvert crossings
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations, cross sections, and profiles of all stream or wetland crossings and their method of stabilization

Phase III CSO Program Meeting Minutes



Meeting Title: RIDEM Water Quality Certification Coordination (June 2019)

Meeting Information:

Date: June 19, 2019 **Location:** RIDEM – 235 Promenade Street, Providence RI
Start Time: 10:00 a.m. **Finish Time:** 10:30 a.m.
Notes By: Brandon Blanchard, Pare Corp. **Activity:** Meeting
Purpose: Update progress of Phase III CSO Program Permitting Requirements

Meeting Participants:

Neal Personeus, RIDEM	Kathryn Kelly, NBC Chris Feeney, Stantec	Briscoe Lang, Pare Corporation Brandon Blanchard, Pare Corporation
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Agenda:

Review RIDEM Water Quality Certification Permitting Requirements for Phase III CSO Program

Meeting Minutes:

- Conceptual-level drawings that depict project sites and conceptual design of Phase III CSO Program facilities were previously provided to Neal. The most significant project site is the tunnel launch shaft and pump station site, which is approximately 10 acres and will be an active construction site for 4+ years. The site is currently the M&G Trucking facility on School Street in Pawtucket. Tunnel muck will be collected and hauled from this site.
- The tunnel will advance from the launch shaft site and take approximately 30 months to construct before breaking ground at the retrieval shaft site, approximately 2 miles upstream at another site in Pawtucket used by RI Trucking Association.
- Four drop shaft sites are proposed along the tunnel alignment, in addition to the launch and retrieval shafts, all of which will have some near surface impacts. Drop shaft sites and construction impacts were reviewed with Neal. Chris provided a description of the typical near-surface impacts at each of these sites.
- An emergency tunnel overflow is currently proposed in the vicinity of one of NBC's existing outfalls, OF-218. The emergency overflow would allow the tunnel to discharge to the surface in the unlikely event that inlet gate structures fail to close, which would allow flow to continue to enter the tunnel and possibly exceed its design capacity. There is a similar emergency overflow on the Providence Tunnel system that has not been activated.
- The emergency overflow at the OF-218 site would discharge into an existing stream, Bucklin Brook, which would require riprap armoring of the banks due to the amount of flow that could be discharged. The channel armor would be considered fill within a waterway and would require a Water Quality Certification from RIDEM. Bucklin Brook flows under School Street through culverts before discharging to the Seekonk River. Bucklin Brook is not tidal in the location where armoring would be necessary.
- Alternate sites are under consideration for the tunnel overflow, but it is currently proposed at OF-218 because this is the low-point of the tunnel and on property already owned by NBC.

- CRMC is the lead permitting agency for wetlands permitting for the entire Phase III CSO Program, as requested by NBC. RIDEM and CRMC have coordinated and agreed to this. CRMC was the single lead permitting agency during previous Program phases.
- CRMC has indicated that permitting of coastal and freshwater wetlands should be done on a Program-wide basis through a Master Plan, in which CRMC will conduct a full-Council review and issue an Assent. The Assent will be modified on a project by project basis at the appropriate design stage for the individual projects.
- CRMC will review permit applications relative to stormwater management and compliance with the RI Stormwater Design and Installation Standards Manual. According to Neal, RIDEM will not independently review stormwater management design but will assist CRMC in their review as necessary.
- Neal will be invited to future meetings with CRMC. We anticipate having one additional meeting with Neal and CRMC before submitting the Master Plan.
- Neal recommended a Master Plan approach to RIPDES permitting. A single RIPDES stormwater submission would be prepared for the entire Program, including individual Soil Erosion and Sediment Control (SECS) plans for each project, and would be submitted for review along with the overall Master Plan. The Program-wide RIPDES authorization would then be amended in the future based on any SESC Plan changes resulting from formal design of the individual projects.
- Neal believes that most of the permitting will be through CRMC. A Water Quality Certification will be required from RIDEM (Neal) for fill in Waters of the State, including the Bucklin Brook if the emergency overflow is proposed at that location.

Phase III CSO Program Sign-In Sheet



Meeting Information:

Meeting Topic: NBC Phase III CSO Program – RIDEM Program Permitting Coordination Meeting

Date: June 19, 2019 **Time:** 10:00 – 11:00

Location: RIDEM Office of Water Resources, 235 Promenade Street, Providence RI

Name	Organization	Email
Brandon Blanchard	Pare Corporation	blanchard@parecorp.com
Chris Feeney	Stantec	christopher.feeney@stantec.com
Kathryn Kelly	NBC	kkelly@narrabay.com
Beiscoe Lang	PARE	BLAN@PARECORP.COM
Neal Parsons	RIDEM	neal.parsons@dem.ni.gov

LIST OF ATTACHMENTS

Attachment A - General Location Map

Attachment B - SESC Site Plans

Attachment C - Copy of RIPDES Construction General Permit and Authorization to Discharge *(To save paper and file space, do not include in DEM/CRMC submittal, for operator copy only)*

Attachment D - Copy of Other Regulatory Permits

Attachment E - Copy of RIPDES NOI *(if required as part of application, see RIPDES Construction General Permit for applicability)*

Attachment F - Inspection Reports w/ Corrective Action Log

Attachment G - SESC Plan Amendment Log

Attachment A – General Location Map

DWG FILE: J:\6412 NBC CSO Consolidation Conduits\Drawing Files\Acad - Misc\PAWT - Misc\PAWT_FIG_III-A-5_LOCATION MAP_SESS.dwg PLOT DATE: 12/22/2020 10:49 AM BY: JAMIE PAYNE



SCALE 1"=200'	NBC CONTRACT NO 308.05C	SHEET
	CIVIL	FIG. 1-1
	III-A-5 GENERAL LOCATION MAP	

Attachment B – SESC Plan Site Maps

The project design plans shall serve as the SESCO site maps, and are included under separate cover.

Attachment C – Copy of RIPDES Construction General Permit

A hard copy of the RIPDES CGP is not included herein.

Upon receipt The RIPDES Construction General Permit may be accessed, viewed and printed from the RIDEM web site, at the following address:

<http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/pdfs/>

Attachment D – Copy of Regulatory Permits

Attachment E – Copy of RIPDES NOI

Attachment F – Inspection Reports and Corrective Action Log

This appendix contains copies of all project stormwater inspection reports and corrective action logs performed in accordance with Section 5 – Maintenance and Inspection of this SESCO. Reports are presented in chronological order from most recent to oldest.



SESC Plan Inspection Report Instructions

For all projects subject to the requirements of the *RI Stormwater Design and Installation Standards Manual* or the *RIPDES Construction General Permit* the site owner and operator are required to develop and comply with a site specific Soil Erosion and Sediment Control Plan (SESC Plan) in order to remain in compliance with applicable regulations.

This inspection report template has been provided by RIDEM for use by the site operator and designated inspector to document the adequacy and condition of erosion, runoff, sediment, and pollution prevention control measures specified for use on the construction site. It should be customized for your specific site conditions and consistent with the SESC Plan developed for your site.

Using the Inspection Report

This inspection report is designed to be customized according to the control measures and conditions at the site. On a copy of the applicable SESC Site Plans, number or label all stormwater control measures and areas of the site that will be inspected. Include all control measures (temporary traps, basins, inlet protection measures, etc.) and areas that will be inspected. Also, identify all point source discharges/outfalls, and the priority natural resource areas (i.e. streams, wetlands, mature trees, etc). List each control measure or area to be inspected separately in the site-specific control measure section of the inspection report.

Complete any items that will remain constant, such as the project information and control measure locations and descriptions. Then, print out multiple copies of this customized inspection report to use during the inspections.

When conducting the inspection, walk the site by following the SESC Site Plans and numbered control measure locations for inspection. Also note whether the overall site issues have been addressed. Customize this list according to the conditions at the site.

Minimum Monitoring and Reporting Requirements

Your site must be inspected by or under the supervision of the owner and operator at least once every seven (7) calendar days and within twenty-four (24) hours after any storm event which generates at least 0.25 inches of rainfall per twenty-four (24) hour period and/or after a significant amount of runoff. Read Section 4.2 of your SESC Plan for more information regarding the importance of monitoring weather conditions.

General Notes

- A separate inspection report will be prepared for each inspection.

- The Inspection Reference Number shall be a combination of the RIPDES Permit Authorization Number - consecutively numbered inspections. For example: Inspection reference number for the 4th inspection of a project would be: RIR101000-4
- Each report will be signed and dated by the inspector and forwarded to the site operator within 24 hours of the inspection.
- Each report will be signed and dated by the site operator upon his/her receipt and after completion of all required corrective actions.
- It is the responsibility of the site operator to maintain a copy of the SESC Plan, copies of all completed inspection reports, and amendments as part of the SESC Plan documentation at the site during construction.

Corrective Actions

If the SESC Plan Inspection determines that corrective actions are necessary to install or repair control measures, the resultant actions taken must be documented by the site operator. The actions must be recorded in the Corrective Action Log attached to each SESC Plan inspection form. If the site operator disagrees with the corrective action recommendations, it must be documented, with justifiable reasons, in the Corrective Action Log, as well. **Required timeframes for corrective actions are established by regulation and are discussed in Section 4.5 of your SESC Plan.**

Amendments

All SESC Plan Amendments, except minor non-technical revisions, must be approved by the site owner and site operator. The revision must be recorded in the Record of Amendments Log Sheet within the SESC Plan, and dated red-line drawings and/or a detailed written description of the revision must be appended to the SESC Plan. Inspection forms must be revised to reflect all amendments. Update the *Revision Date* and the *Version #* in the footer of the report to reflect amendments made.

The SESC Plan shall be amended whenever there is a change in design, construction, operation, maintenance or other procedure, which has a significant effect on the potential for the discharge of pollutants, or if the SESC Plan proves to be ineffective in achieving its objectives.

*****Remember that the regulations are performance-oriented. Even if all control measures are installed on a site according to the SESC Plan, the site is only in compliance when erosion, runoff, sedimentation, and pollution are effectively controlled. *****

SESC Plan Inspection Report

Project Information			
Name			
Location			
DEM Permit No.			
Site Owner	Name	Phone	Email
Site Operator	Name	Phone	Email
Inspection Information			
Inspector Name	Name	Phone	Email
Inspection Date		Start/End Time	
Inspection Type <input type="checkbox"/> Weekly <input type="checkbox"/> Pre-storm event <input type="checkbox"/> During storm event <input type="checkbox"/> Post-storm event <input type="checkbox"/> Other			
Weather Information			
Last Rain Event Date: Duration (hrs): Approximate Rainfall (in):			
Rain Gauge Location & Source:			
Weather at time of this inspection:			

Check statement that applies then sign and date below:

I, as the designated Inspector, certify that this site has been inspected as required by regulation and I have determined that maintenance and corrective actions are not required at this time.

I, as the designated Inspector, certify that this site has been inspected as required by regulation and I have made the determination that the site requires corrective actions. The required corrective actions are noted within this inspection report.

Inspector:	Print Name	Signature	Date
<p>The Site Operator acknowledges by his/her signature, the receipt of this SESC Plan inspection report and its findings. He/she acknowledges that all recommended corrective actions must be completed and documentation of all such corrective actions must be made in this inspection report per applicable regulations.</p>			
Operator:	Print Name	Signature	Date

Site-specific Control Measures

Number the structural and non-structural stormwater control measures identified in the SESC Plan and on the SESC Site Plans and list them below (add as necessary). Bring a copy of this inspection form and any applicable SESC Site Plans with you during your inspections. This list will assist you to inspect all control measures at your site.

FILL THIS TABLE USING THE SESC PLAN TABLES 2.11 & 3.12.

	Location/Station	Control Measure Description	Installed & Operating Properly?	Assoc. Photo/ Figure #	Corrective Action Needed (Yes or No; if 'Yes', please detail action required)
1	Example 1: Eastern Parcel – Slope No. 4 Adjacent to I-95. Straw Wattles	Straw Wattle. Section Six, Sediment Control Measures, Straw Wattles, Compost Tubes and Fiber Rolls - <i>RI SESC Handbook</i> .	<input type="checkbox"/> Yes <input type="checkbox"/> No		
2	Example 2: Western Parcel – Green Street Construction Entrance	Stone Stabilized Pad. Section Six: Sediment Control Measures – Construction Entrances – <i>RI SESC Handbook</i> .	<input type="checkbox"/> Yes <input type="checkbox"/> No		
3	Example 3: Hospital Main Footings – Excavation Area – SESC Site Plan Sheet No. 3.	Pump Intake Protection Using Stone Filled Sump with Standpipe. Section Six: Sediment Control Measures, Pump Intake Protection, <i>RI SESC Handbook</i> .	<input type="checkbox"/> Yes <input type="checkbox"/> No		
4	Example 4: Bridge Abutment Construction Southbound Bridge Abutment, Bridge No. 244 – SESC Site Plan Sheet No. 18.	Prefabricated Concrete Washout Container with Ramp. Used to contain concrete washout during concrete pouring operations. Section Three: Pollution Prevention and Good Housekeeping, Concrete Washouts, <i>RI SESC Handbook</i> .	<input type="checkbox"/> Yes <input type="checkbox"/> No		
5	INSERT TEXT	INSERT TEXT	<input type="checkbox"/> Yes <input type="checkbox"/> No		
6	Attention Operator:	You must modify this inspection form as the project progresses, control measure locations change, and amendments to the SESC Plan are instituted in the field.	<input type="checkbox"/> Yes <input type="checkbox"/> No		
7			<input type="checkbox"/> Yes <input type="checkbox"/> No		
8			<input type="checkbox"/> Yes <input type="checkbox"/> No		

PROJECT:

INSPECTION DATE:

	Location/Station	Control Measure Description	Installed & Operating Properly?	Assoc. Photo/ Figure #	Corrective Action Needed (Yes or No; if 'Yes', please detail action required)
9			<input type="checkbox"/> Yes <input type="checkbox"/> No		
10			<input type="checkbox"/> Yes <input type="checkbox"/> No		
11			<input type="checkbox"/> Yes <input type="checkbox"/> No		
12			<input type="checkbox"/> Yes <input type="checkbox"/> No		
13			<input type="checkbox"/> Yes <input type="checkbox"/> No		
14			<input type="checkbox"/> Yes <input type="checkbox"/> No		
15			<input type="checkbox"/> Yes <input type="checkbox"/> No		
16			<input type="checkbox"/> Yes <input type="checkbox"/> No		
17			<input type="checkbox"/> Yes <input type="checkbox"/> No		
18			<input type="checkbox"/> Yes <input type="checkbox"/> No		
19			<input type="checkbox"/> Yes <input type="checkbox"/> No		
20			<input type="checkbox"/> Yes <input type="checkbox"/> No		
21			<input type="checkbox"/> Yes <input type="checkbox"/> No		
22			<input type="checkbox"/> Yes <input type="checkbox"/> No		
23			<input type="checkbox"/> Yes <input type="checkbox"/> No		
24			<input type="checkbox"/> Yes <input type="checkbox"/> No		

PROJECT:

INSPECTION DATE:

	Location/Station	Control Measure Description	Installed & Operating Properly?	Assoc. Photo/ Figure #	Corrective Action Needed (Yes or No; if 'Yes', please detail action required)
25			<input type="checkbox"/> Yes <input type="checkbox"/> No		
26			<input type="checkbox"/> Yes <input type="checkbox"/> No		
27			<input type="checkbox"/> Yes <input type="checkbox"/> No		
28			<input type="checkbox"/> Yes <input type="checkbox"/> No		
29			<input type="checkbox"/> Yes <input type="checkbox"/> No		
30			<input type="checkbox"/> Yes <input type="checkbox"/> No		

(add more as necessary)

General Site Issues

Below are some general site issues that should be assessed during inspections. Please **customize** this list as needed for conditions at the site.

	Compliance Question		Assoc. Photo/ Figure #	Corrective Action Needed (If 'Yes', please detail action required and include location/station)
1	Have all control measures been installed as specified in the RISESC Handbook and prior to any earth disturbing activities?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
2	Are appropriate limits of disturbance (LOD) established?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
3	Are controls that limit runoff from exposed soils by diverting, retaining, or detaining flows (such as check dams, sediment basins, etc.) in place?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
4	Are all temporary conveyance practices installed correctly and functioning as designed?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
5	Has maintenance been performed as required to ensure continued proper function of all temporary conveyances practices?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
6	Were all exposed soils seeded by October 15 th ?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
7	Have soils been stabilized where earth disturbance activities have permanently or temporarily ceased on any portion of the site and will not resume for more than 14 days?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
8	In instances where adequate vegetative stabilization was not established by November 15 th , have non-vegetative erosion control measures must be employed?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
9	If work is to continue from October 15 th through April 15 th , are steps taken to ensure that only the day's work area will be exposed and all erodible soil is stabilized within 5 working days?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
10	Have inlet protection measures (such as fabric drop inlet protection, curb drop inlet protection, etc.) been properly installed?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
11	Has the operator cleaned and maintained inlet protection measures when needed?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
12	Has the operator removed accumulated sediment adjacent to inlet protection measures within 24 hours of detection?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

	Compliance Question		Assoc. Photo/ Figure #	Corrective Action Needed (If 'Yes', please detail action required and include location/station)
13	Has the operator properly installed outlet protection (such as riprap, turf mats, etc.) at all temporary and permanent discharge points?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
14	Are all outlet protection measures functioning properly in order to reduce discharge velocity, promote infiltration, and eliminate scour?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
15	Have all discharge points been inspected to ensure the prevention of scouring and channel erosion?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
16	Have sediment controls been installed along perimeter areas that will receive stormwater from earth disturbing activities?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
17	Is the operator maintaining sediment controls in accordance with the requirements in the <i>RI SESC Handbook</i> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
18	Have temporary sediment barriers been installed around permanent infiltration areas (such as bioretention areas, infiltration basins, etc.)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
19	Have staging areas and equipment routing been implemented to avoid compaction where permanent infiltration areas will be located?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
20	Are surface outlet structures (such as skimmers, siphons, etc.) installed for each temporary sediment basin? [Exception: frozen conditions]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
21	Have all temporary sediment basins or traps been inspected and maintained as required to ensure proper function?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
22	Does the project include the use of polymers, flocculants, or other chemicals to control erosion, sedimentation, or runoff from the site?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
23	Are all chemicals being managed in accordance with Appendix J of the <i>RI SESC Handbook</i> and current best management practices?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
24	Has the site operator taken steps to prohibit the following pollutant discharges on the site?			
a	Contaminated groundwater.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

	Compliance Question		Assoc. Photo/ Figure #	Corrective Action Needed (If 'Yes', please detail action required and include location/station)
b	Wastewater from washout of concrete; unless properly contained, managed, and disposed of.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
c	Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction products.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
d	Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
e	Soaps or solvents used in vehicle and equipment washing.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
f	Toxic or hazardous substances from a spill or other release.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
25	Is the operator using properly constructed entrances/exits to the site so sediment removal occurs prior to vehicles exiting?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
26	If needed, are additional controls (such as rumble strips, rattle plates, etc.) in place to remove sediment from tires prior to exiting?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
27	Is sediment track-out being removed by the end of the same workday in which it occurs (via sweeping, shoveling, or vacuuming)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
28	Are all wastes generated at the site being managed and properly disposed of by the end of each workday?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
29	Are all chemicals and hazardous waste materials stored properly in covered areas and surrounded by containment control systems?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
30	Has the operator established highly visible locations for the storage of spill prevention and control equipment on the construction site?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
31	Are allowable non-stormwater discharges being managed properly with adequate controls?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
32	Is the site operator properly managing groundwater or stormwater that is removed from excavations, trenches, or similar points of accumulation?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
33	Are proper procedures and controls in place for the storage of materials	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

	Compliance Question		Assoc. Photo/ Figure #	Corrective Action Needed (If 'Yes', please detail action required and include location/station)
	that may discharge pollutants if exposed to stormwater?			
	Are stockpiles located within the limits of disturbance?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
	Are stockpiles being protected from contact with stormwater using a temporary sediment barrier?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
	Where needed, has cover or appropriate temporary vegetative or structural stabilization been utilized for stockpiles?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
	Is the operator effectively managing the generation of dust through the use of water, chemicals, or minimization of exposed soil?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
	Are designated washout areas (such as wheel washing stations, washout for concrete, paint, stucco, etc.) clearly marked on the site?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
	Are vehicle fueling and maintenance areas properly located to prevent pollutants from impacting stormwater and sensitive receptors?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
	(Other)			

(add more as necessary)

PROJECT:

INSPECTION DATE:

General Field Comments:

PROJECT:

INSPECTION DATE:

Photos:

(Associated photos – each photo should be dated and have a unique identification # and written description indicating where it is located within the project area. If a close up photo is required, it should be preceded with a photo including both the detail area and some type of visible fixed reference point. Photos should be annotated with Station numbers and other identifying information where needed.)

Photo #: (insert Photo here)	Station:
	Description:

Photo #: (insert Photo here)	Station:
	Description:

Photo #: (insert Photo here)	Station:
	Description:

Photo #: (insert Photo here)	Station:
	Description:

Photo #: (insert Photo here)	Station:
	Description:

Photo #: (insert Photo here)	Station:
	Description:

(add more as necessary)

Corrective Action Log

TO BE FILLED OUT BY SITE OPERATOR

Describe repair, replacement, and maintenance of control measures, actions taken, date completed, and note the person that completed the work.

	Location/Station	Corrective Action	Date Completed	Person Responsible
Operator Signature:				Date:

Attachment G – Amendment Log

This appendix contains the log of all amendments made to the original SESCO during the construction phase of this project, in accordance with Section 6 – Amendments of this SESCO.

PROJECT:

Amendment Log

TO BE FILLED OUT BY SITE OPERATOR

Describe amendment(s) to be made to the SESC Plan, the date, and the person/title making the amendment. ALL amendments must be approved by the Site Owner.

#	Date	Description of Amendment	Amended by: Person/Title	Site Owner Must Initial
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Add more lines/pages as necessary

APPENDIX J
2021 Supplemental Geotechnical Data Package

Memorandum

To:	Christopher R. Cronin, PE BETA Group, Inc.	Project:	NBC Phase III CSO Program IIIA-5 Consolidation Conduits
From:	Tennyson M. Muindi, PE McMillen Jacobs Associates	cc:	File
Prepared by:	Katherine R. O'Hara McMillen Jacobs Associates	Job No.:	5980
Date:	August 17, 2021 (Rev. No. 1)		
Subject:	2021 Supplemental Geotechnical Data Package		

1.0 Introduction

This memorandum presents a summary of the supplemental subsurface investigation program that was conducted by McMillen Jacobs Associates (McMillen Jacobs) for the Narraganset Bay Commission (NBC) Phase III Combined Sewer Overflow (CSO) Consolidation Conduits IIIA-5 Project located in Pawtucket, Rhode Island. This work was performed under our Subconsultant Agreement with BETA Group, Inc (BETA), dated 5 March 2019 and subsequent Amendment No. 1, dated 21 July 2021.

The specific objective of the investigatory work was to conduct supplemental geotechnical subsurface explorations and a laboratory testing program to acquire data on engineering characteristics and properties of the subsurface materials along the IIIA-5 microtunneling alignment and at shafts MH217-6 and MH217-7.

In accordance with the referenced contract, McMillen Jacobs completed the following tasks:

- Provided on site supervision during drilling of the subsurface explorations.
- Arranged for and contracted with a geotechnical testing laboratory (GeoTesting Express, of Acton, Massachusetts) to perform geotechnical rock testing on selected samples obtained from the test borings.
- Compiled, prepared, and submitted this geotechnical data package that documents the results of the subsurface investigation program.

2.0 Investigation Program

Four (4) geotechnical test borings were performed by Geologic Earth Exploration, Inc. (Geologic), Norwood, MA, during the period of 20 July to 28 July 2021 under the on-site supervision by McMillen Jacobs personnel. As drilled survey locations and ground surface elevations were provided by BETA (refer to Table A.1 in Attachment A).

Test borings were designated B-14 through B-17 and were terminated at depths ranging from 39 to 53.5 feet below existing ground surface. Vacuum excavation was performed to a depth ranging from about 4 to 5 feet at test boring and groundwater observation well locations to mitigate the potential for damaging any unidentified existing utilities. Soil and rock samples were obtained using techniques and equipment in general accordance with the American Society for Testing and Materials (ASTM) Standard Specifications. Three (3) groundwater observation wells were installed in offset boreholes adjacent to B-14, B-16, and B-17.

A program of geotechnical laboratory testing was performed on selected rock samples collected during the exploration program. Laboratory testing was performed in generally accordance with ASTM Standard Specifications and included two (2) unconfined compression strength (UCS) tests, two (2) Brazilian tensile strength (splitting tensile strength) tests, one (1) Cerchar Abrasivity Index (CAI) test.

Attached are the following items:

Attachment	Description
Attachment A	Test Boring Logs
Attachment B	Rock Core Photos
Attachment C	Groundwater Monitoring Well Installation Logs
Attachment D	Geotechnical Laboratory Test Results

ATTACHMENTS

ATTACHMENT A
Test Boring Logs

SOIL

Soil description on logs of subsurface explorations are based on Standard Penetration Test (SPT) results, visual-manual examination of exposed soil samples, and the results of laboratory tests on selected samples. The criteria, descriptive terms, and definitions are presented herein. The natural soils are identified and described by visual-manual procedures (ASTM D2488) and in accordance with the United Soil Classification System (USCS) (ASTM D2487) as practiced by McMillen Jacobs Associates. Fill materials may not be classified by USCS criteria.

PENETRATION RESISTANCE

Standard penetration resistance (SPT) (ASTM D1586) - Number of blows required to drive a standard 2 in. O.D. split spoon sampler one foot with a 140 lb. weight falling 30 inches freely downward.

DENSITY / CONSISTENCY

Coarse - Grained Soils	
Apparent Density	SPT Resistance, N (BPF)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

Fine - Grained Soils	
Apparent Consistency	SPT Resistance, N (BPF)
Very Soft	0 - 2
Soft	2 - 4
Medium Stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	>30

Notes: BPF = Blows Per Foot (uncorrected)

WOR = Weight of Rod

COLOR

Basic colors (black, brown, gray, olive, red, and yellow) and combinations (i.e. gray-brown, olive-brown, olive-gray, red-gray, red-brown, yellow-brown, and red-yellow). Modifiers such as light and dark may be used.

SUPPLEMENTAL SOIL DESCRIPTIONS AND STRUCTURE:

- Laminating - 0 to 1/16 in. thick (cohesive)
- Parting - 0 to 1/16 in. thick (granular)
- Seam - 1/16 to 1/2 in. thick
- Layer - 1/2 to 12 in. thick
- Stratum - > 12 in. thick
- Pocket - Small, erratic deposit less than 12 in. size
- Lens - Lenticular deposit larger than a pocket
- Occasional - One or less per 12 in. of thickness
- Frequent - More than one per 12 in. of thickness
- Interbedded - Alternating soil layers of differing composition
- Varved - Alternating thin seams of silt and clay
- Mottled - Variation of color

SAMPLE SYMBOLS

- X SPT Sample 2 in. OD
- X SPT Sample 3 in. OD
- █ Shelby Tube Sample

ADDITIONAL GRAPHIC DESCRIPTIONS

- █ Asphalt
- █ Fill

SOIL IDENTIFICATION AND DESCRIPTION

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS Based on ASTM D2488 & D2487)				
MAJOR DIVISIONS	GROUP/SYMBOL	TYPICAL DESCRIPTION		
GRAVELS (more than 50% retained on No. 4 sieve)	CLEAN GRAVELS (less than 5% fines)	GW	WELL-GRADED GRAVEL	
		GP	POORLY GRADED GRAVEL	
	GRAVELS (with 5 to 12% fines)	GW-GM	WELL-GRADED GRAVEL WITH SILT	
		GW-GC	WELL-GRADED GRAVEL WITH CLAY	
		GP-GM	POORLY GRADED GRAVEL WITH SILT	
		GP-GC	POORLY GRADED GRAVEL WITH CLAY	
	GRAVELS WITH FINES (more than 12% fines)	GM	SILTY GRAVEL	
		GC	CLAYEY GRAVEL	
	COARSE-GRAINED SOILS (50% or more retained on No. 200 sieve)	CLEAN SANDS (less than 5% fines)	SW	WELL-GRADED SAND
			SP	POORLY GRADED SAND
SANDS (with 5 to 12% fines)		SW-SM	WELL-GRADED SAND WITH SILT	
		SW-SC	WELL-GRADED SAND WITH CLAY	
		SP-SM	POORLY GRADED SAND WITH SILT	
		SP-SC	POORLY GRADED SAND WITH CLAY	
SANDS WITH FINES (more than 12% fines)		SM	SILTY SAND	
		SC	CLAYEY SAND	
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)		SILTS & CLAYS (liquid limit less than 40)	ML	SILT
			CL	LEAN CLAY
	SANDS & CLAYS (liquid limit greater than 40)	OL	LOW PLASTICITY ORGANIC CLAY	
		MH	ELASTIC SILT	
	SILTY CLAY (liquid limit between 40 and 60)	CH	FAT CLAY	
		OH	HIGH PLASTICITY ORGANIC CLAY	
	SILT CLAY (liquid limit between 60 and 80)	CL-ML	CLAYEY SILT / SILTY CLAY	
	HIGHLY ORGANIC SOILS	PT	PEAT	

Notes:
1. Dual symbols (symbols separated by a hyphen, e.g. SP-SM, slightly silty fine SAND) are used for soils between 5% and 12% fines or when liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.

ROCK

Rock descriptions noted on logs of subsurface explorations are based on visual-manual examination of exposed rock outcrops and core samples. The criteria, descriptive terms and definitions used are as follows:

FIELD HARDNESS / STRENGTH

- (after ISRM, 1978; CGS, 1985; Marinos & Hoek, 2001)
- Extremely Strong Cannot be scratched with a knife point or sharp pick; can only be chipped with repeated heavy hammer blows.
- Very Strong Cannot be scratched with a knife point or sharp pick; core breaks with repeated heavy hammer blows.
- Strong Can be scratched with a knife or pick; core breaks with heavy hammer blow.
- Moderately Weak Can be grooved 1/16 in. deep by knife or sharp pick; core breaks with light hammer blow.
- Weak Can be grooved easily with a knife or pick; can be scratched with fingernail; core breaks with light pressure.
- Very Weak Can be readily indented; grooved with fingernail or carved with a knife; core breaks with light pressure.

WEATHERING (after ISRM, 1978)

- The action of organic and inorganic chemical and physical processes resulting in alteration of color, texture, and composition
- Fresh No visible sign of alteration, except perhaps slight discoloration on major discontinuity surfaces
- Slight Discoloration of rock material and discontinuity surfaces
- Moderate Less than half the rock material decomposed to soil. Some fresh rock; continuous "framework".
- High More than half the rock material decomposed and/or disintegrated to soil.
- Completely All rock material disintegrated to soil, but mass still intact
- Residual Soil All rock material converted to soil. Material has not been significantly transported.

COLOR:

Basic colors and combinations: gray, light gray, brown, red-brown

TEXTURE

- Size, shape and arrangements of constituents
- Aphanitic Individual grains invisible
- Fine-grained Grains barely visible to the unaided eye, up to 1/16 in. dia.
- Medium Grained Grains between 1/16 and 3/16 in. dia.
- Coarse Grained Grains between 3/16 and 1/4 in. dia.
- Very Coarse Grained Grains larger than 1/4 in. dia.

LITHOLOGY

Rock Classification and modifiers; accepted formation names

DISCONTINUITIES:

- | Type | Definition |
|---------------------|--|
| Joint | A natural fracture along which no displacement has occurred. May occur in parallel groups called sets. |
| Shear | A natural fracture along which displacement has occurred. Surface may be slickensided or striated. |
| Fault | A natural fracture along which displacement has occurred. Usually lined with gouge and slickensides. |
| Shear or Fault Zone | Zone of fractured rock and gouge bordering the displacement plane. |

ORIENTATION / ATTITUDE

Term	Angle (degrees)
Horizontal	0-5
Low Angle	6-35
Moderately Dipping	36-55
High Angle	56-85
Vertical	86-100

SPACING

Term	Inches
Extremely Close	<3/4
Very Close	3/4 - 2-1/2
Close	2-1/2 - 8
Moderate	8 - 24
Wide	24 - 80
Very Wide	80- 20 ft.
Extremely Wide	> 20 ft.

ROUGHNESS OF DISCONTINUITY SURFACE

Term	Abbreviation	Description
Very Rough	VR	Near-vertical steps and ridges
Rough	R	Ridges, side-steps, and asperities evident; abrasive to the touch
Slightly Rough	SR	Asperities can be felt.
Smooth	SM	Smooth to the touch
Slickensided	SL	Smooth glossy finish with visible striations

APERTURE/GAP

Term	MM	INFILLING Material	Abbreviation
Very Tight	< .1	Clay	CL
Tight	0.1 - 0.25	Silt	SI
Partly Open	0.25 - 0.5	Sand	SA
Open	0.5 - 2.5	Serpentine	SE
Moderately Wide	2.5 - 10	Sulfide	SL
Wide	> 10	Calcite	CA
Very Wide	10 - 100	Pyrite	PY
Extremely Wide	100 - 1000	Quartz	QZ
Cavernous	> 1000	Chlorite	CH
		Iron Oxide Staining	FE
		Could not be determined	X

BEDDING

Term	Inches	Term	Inches
Very Thin	< 2.5	Thick	25-36
Thin	2.5 - 8	Very Thick	< 36
Medium	9 - 24		

GENERAL NOTES:

- Logs of subsurface exploration depict soil, rock and groundwater conditions only at the boring locations specified on the dates indicated. Subsurface conditions may vary at other locations and at other times.
- Water levels, where noted on the logs, were measured at the times under the conditions indicated. During test boring drilling, these water levels could have been affected by the introduction of water in to the borehole, extraction of tools or other procedures and thus may not reflect actual groundwater levels at the test boring location. Groundwater level fluctuations may also occur as a results of variations in precipitation, temperature, season, tides, river stage, adjacent construction operations, construction dewatering systems, water supply well pumping, and other conditions.



SUBSURFACE EXPLORATION KEY

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-14

Date(s) Drilled 07/27/2021 - 07/28/2021	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By K. O'Hara
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 45.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 27.5 ft / NGVD 1929	
Location Taft Street	Coordinates 359514.39E,287201.73N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
								Vacuum excavated from about 0 to 4 ft (FILL)	
23		5	4-6	S-1	12/24	3-3-4-6 (N=7)	ML	Moist, medium stiff, gray SILT (ALLUVIUM)	PID = 0
			6-8	S-2	20/24	3-8-7-8 (N=15)	SM	Moist, medium dense, brown, fine SAND, some silt (ALLUVIUM)	PID = 0
18		10	9-11	S-3	2/24	8-9-8-5 (N=17)	ML	Moist, very stiff, brown SILT (ALLUVIUM)	PID = 0
			11-13	S-4	12/24	3-4-3-5 (N=7)	SM	Moist, loose, brown, fine SAND, some silt (ALLUVIUM)	PID = 0
13	∇ 15		14-16	S-5	16/24	4-5-14-13 (N=19)	SP	Moist, medium dense, coarse to fine SAND, little fine gravel (GLACIOFLUVIAL)	PID = 0
8			18-20	S-6	10/24	21-14-10-8 (N=24)	GP	Moist, medium dense, brown, coarse to fine GRAVEL, some sand, trace silt (GLACIOFLUVIAL)	PID = 0



∇ - Water Level at Time of Drilling

Boring B-14

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-14

Date(s) Drilled: 07/27/2021 - 07/28/2021	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: K. O'Hara
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 45.0 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 27.5 ft / NGVD 1929	
Location: Taft Street	Coordinates: 359514.39E,287201.73N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
		26-31	2		C-1	42/70%	7/12%	XXXXXXXXXX								
			2					XXXXXXXXXX		31.5	J	60	SL	9.00	SL	FE
								XXXXXXXXXX		32.0	J	60	SR	1.00	SL	FE
								XXXXXXXXXX		32.2	J	10	R	2.50	SL	FE
			4					XXXXXXXXXX		32.4	HJ	0	SR	1.00	SL	CA
								XXXXXXXXXX		32.5	J	60	SR	1.00	SL	FE
								XXXXXXXXXX		32.7	J	60	R	1.00	SL	FE
								XXXXXXXXXX		32.8	J	50			SL	FE
		31-36	5		C-2	57/95%	38/63%	XXXXXXXXXX	Strong, slightly weathered, dark gray to purple, fine grained SILTSTONE	33.3	J	70	R	2.50	SL	FE
								XXXXXXXXXX		33.8	HJ	0				CA
								XXXXXXXXXX		33.9	HJ	0	SR	9.00	MW	CA
			5					XXXXXXXXXX		34.1	J	70				FE
-7	35							XXXXXXXXXX		34.5	J	70	SR	9.00	MW	FE
			5					XXXXXXXXXX								
		36-39.5	4					XXXXXXXXXX								
			5		C-3	42/100%	0/0%	XXXXXXXXXX	Completely weathered, purple, fine grained SILTSTONE							
								XXXXXXXXXX								
			6					XXXXXXXXXX								
								XXXXXXXXXX								
-12			7					XXXXXXXXXX								




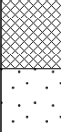







Boring B-14

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-15

Date(s) Drilled 07/23/2021 - 07/26/2021	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By K. O'Hara
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 53.5 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 38.1 ft / NGVD 1929	
Location Taft Street	Coordinates 359561.84E,286954.23N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
34								Vacuum excavated from about 0 to 4 ft (FILL)	
	5	4-6	S-1	12/24	6-13-16-14 (N=29)	SP		Moist, medium dense, brown, coarse to fine SAND, little gravel (FILL)	PID = 0
		6-8	S-2	21/24	19-17-14-9 (N=31)	GP		Moist, dense, brown, coarse to fine GRAVEL, some sand (FILL)	PID = 0
29									
	10	9-11	S-3	12/24	10-6-7-9 (N=13)	SP		Moist, medium dense, brown, coarse to fine SAND with gravel grading to stiff, brown SILT (GLACIOFLUVIAL)	PID = 0
24									
	15	14-16	S-4	12/24	15-21-21-17 (N=42)	GP		Moist, dense, brown, coarse to fine GRAVEL, some sand, trace silt (GLACIOFLUVIAL)	
19									
								Moist, dense, brown, coarse to fine GRAVEL, some sand (GLACIOFLUVIAL)	



∞ - Water Level at Time of Drilling

Boring B-15

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Core Boring B-15

Date(s) Drilled: 07/23/2021 - 07/26/2021	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: M. Macinnis	Checked By: K. O'Hara
Drilling Method/ Rig Type: Mud Rotary/CME 45	Drilling Contractor: Geologic Earth Exploration, Inc.	Total Depth of Borehole: 53.5 ft	
Borehole Diameter: 4.00 in	Core Barrel Type / Size: NX / 2 in	Ground Surface Elevation/Datum: 38.1 ft / NGVD 1929	
Location: Taft Street	Coordinates: 359561.84E,286954.23N	Elevation Source: Field Survey	

ELEV. (FT)	DEPTH (FT)	SAMPLE DEPTH (ft)	DRILL RATE (FT/MIN)	BOX #	RUN #	RECOVERY (in/%)	RQD (in/%)	ROCK TYPE	MATERIAL DESCRIPTION	DEPTH (FT)	DISCONTINUITIES					
											TYPE	DIP	RGH	APT (mm)	WEATHERING	INFILL
									See Test Boring Report for Overburden Details							
4			2					xxxxxx		34.1	J	10	R	2.50	SL	FE
	35		3					xxxxxx		35.6	J	70	SR	1.00	SL	FE
	33.5-38.5	5	3		C-1	55/92%	24/40%	xxxxxx	Moderately weak, moderately weathered, dark gray, fine grained SILTSTONE	36.3	HJ	0	R	2.50	MW	CA
			2					xxxxxx		36.4	J	60	R	1.00	SL	SI
			2					xxxxxx		36.7	J	10	R	1.00	SL	FE
			2					xxxxxx		37.0	J	10	R	2.50	SL	FE
			4					xxxxxx		37.3	J	90	SM	1.00	SL	SI
								xxxxxx		37.4	J	10	SR	1.00	MW	SI
								xxxxxx		37.7	J	10	R	1.00	MW	FE
								xxxxxx		38.1	J	10	R	1.00	SL	SI
								xxxxxx		38.7	J	80	SR	1.00	SL	
-1		38.5-43.5	2		C-2	57/95%	43/72%	xxxxxx	Strong, slightly weathered, fine grained SILTSTONE	39.2	J	70	SR	1.00	SL	CA
								xxxxxx		39.2	HJ	20				CA
								xxxxxx		39.4	HJ	20				CA
								xxxxxx		39.6	HJ	20				CA





Boring B-15

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-16

Date(s) Drilled 07/22/2021 - 07/23/2021	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By K. O'Hara
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 52.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 38.9 ft / NGVD 1929	
Location Taft Street	Coordinates 359562.59E,286745.02N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
								Vacuum excavated from about 0 to 4 ft (FILL)	
34		5	4-6	S-1	10/24	9-18-26-16 (N=44)	SP	Moist, dense, brown, coarse to fine SAND, some gravel (FILL)	PID = 0
			6-8	S-2	18/24	18-14-16-16 (N=30)	SM	Moist, dense, brown, silty fine SAND (ALLUVIUM)	PID = 0
29		10	9-11	S-3	21/24	7-5-4-6 (N=9)	ML	Wet, stiff, brown SILT (ALLUVIUM)	PID = 0
24		15	14-16	S-4	8/24	25-29-32-50 (N=61)	GP	Moist, very dense, brown, coarse to fine GRAVEL, some SAND, rock fragments (GLACIOFLUVIAL)	PID = 0
								Moist, very dense, brown, coarse to fine GRAVEL, some SAND (GLACIOFLUVIAL)	



∞ - Water Level at Time of Drilling

Boring B-16

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-16

Date(s) Drilled 07/22/2021 - 07/23/2021	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By K. O'Hara
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 52.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 38.9 ft / NGVD 1929	
Location Taft Street	Coordinates 359562.59E,286745.02N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
14	∞	19-21	S-5	10/24	18-11-12-13 (N=23)	GP		Moist, very dense, brown, coarse to fine GRAVEL, some SAND (GLACIOFLUVIAL)	PID = 0
		24-26	S-6	18/24	15-41-36-31 (N=77)	GM		Moist, very dense, brown, coarse to fine, silty GRAVEL, little sand (GLACIAL TILL)	PID = 0
		29-31	S-7	17/24	20-28-23-29 (N=51)	GM		Moist, very dense, brown, coarse to fine, silty GRAVEL, little sand, rock fragments (GLACIAL TILL)	possible boulder at 28 ft
		31-33	S-8	24/24	52-51-94-124 (N=145)	GM		Moist, very dense, brown, coarse to fine, silty GRAVEL, little sand, rock fragments (GLACIAL TILL)	PID = 0
		33-33.75	S-9	9/9	34-100/3" (N=100)	GM		Moist, very dense, brown, coarse to fine, silty GRAVEL, little sand, rock fragments (GLACIAL TILL)	PID = 0
		35					GM		Moist, very dense, brown, coarse to fine, silty GRAVEL, little sand, rock fragments (GLACIAL TILL)	Refusal at 37 ft
							Top of Bedrock at 37.0 ft. See Core Boring Report for rock details.		



∞ - Water Level at Time of Drilling

Boring B-16

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-17

Date(s) Drilled 07/20/2021 - 07/21/2021	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By K. O'Hara
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 39.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 24.6 ft / NGVD 1929	
Location Tidewater Site	Coordinates 359691.55E,286290.88N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
20								Vacuum excavated from about 0 to 5 ft (FILL)	
	5	5-7	S-1	16/24	14-20-100 (Refusal)	SP		Wood fragments grading to moist, very dense, brown, coarse to fine SAND, some gravel (FILL)	PID = 0
15		9-11	S-2	0/24	18-13-15-16 (N=28)			No Recovery (FILL)	
	15	14-16	S-3	6/24	7-8-8-8 (N=16)	SP		Moist, medium dense, brown, coarse to fine SAND, trace gravel (GLACIOFLUVIAL)	PID = 0
		16-18	S-4	16/24	7-9-7-8 (N=16)	SP		Moist, medium dense, brown, coarse to fine SAND, trace gravel (GLACIOFLUVIAL)	PID > 1
5		18-20	S-5	12/24	6-83-22-22 (N=105)	SM		Moist, very dense, brown, silty SAND, rock fragments (GLACIAL TILL)	PID = 0



∇ - Water Level at Time of Drilling

Boring B-17

Project: NBC CSO Phase III A-4 and III A-5 Consolidation Conduits
Project Location: Pawtucket, RI
Project Number: 5980.0

Boring B-17

Date(s) Drilled 07/20/2021 - 07/21/2021	Geotechnical Consultant McMillen Jacobs Associates	Logged By M. Macinnis	Checked By K. O'Hara
Drilling Method/ Rig Type Mud Rotary/CME 45	Drilling Contractor Geologic Earth Exploration, Inc.	Total Depth of Borehole 39.0 ft	
Borehole Diameter/ Sampler Diameter 4.00 in I.D. / 2 & 3 in I.D.	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 24.6 ft / NGVD 1929	
Location Tidewater Site	Coordinates 359691.55E,286290.88N	Elevation Source Field Survey	

ELEV. (ft)	WATER LEVEL DEPTH (ft)	SAMPLE DEPTH (ft)	SAMPLE NUMBER	REC (in)/PEN (in)	BLOW COUNTS	USCS	USCS GRAPHIC	MATERIAL DESCRIPTION	REMARKS AND TESTS
		20-22	S-6	12/24	12-39-63-43 (N=102)	SM		Moist, very dense, brown, silty SAND, rock fragments (GLACIAL TILL)	PID = 0
		22-24	S-7	20/24	29-35-17-16 (N=52)	SP		Moist, very dense, brown, coarse to fine SAND, some fine gravel, trace silt (GLACIAL TILL)	PID = 0
0		24-26	S-8	8/24	18-10-18-15 (N=28)	GP		Moist, medium dense, sandy GRAVEL, rock fragments (GLACIAL TILL)	PID = 5
-5		30						Top of Bedrock at 29.0 ft. See Core Boring Report for rock details.	Refusal at 29ft
-10		35							
-15									



∇ - Water Level at Time of Drilling

Boring B-17

Table A.1. Summary of Supplemental Test Borings

Boring ID	Northing	Easting	Ground Surface Elevation	Station (Offset)
B-14	287201.73	359514.39	27.53	3+13 (10.0 ft right)
B-15	286954.23	359561.84	38.07	5+64 (18.5 ft left)
B-16	286745.02	359562.59	38.86	7+72 (3.0 ft left)
B-17	286290.88	359691.55	24.61	12+45 (1.5 ft left)

Notes:

1. This table provided by BETA via email dated 8/16/2021.
2. Horizontal coordinates projected to Rhode Island Mainland State Plane, North American Datum (NAD) 1983.
3. Elevations referenced to the National Geodetic Vertical Datum (NGVD) 1929, in feet.
4. Right offset = right of centerline, looking up station. Left offset = left of centerline, looking up station.

ATTACHMENT B
Rock Core Photos

CORE PHOTOS



Test Boring B-15, Run C-3 & C-4 (43.5 ft to 53.5 ft)
Test Boring B-14, Run C-1 & C-2 (26 ft to 36 ft)

Project

NBC Phase III CSO Program
IIIA-5 Consolidation Conduits

Date

8/13/2021

Figure

B.1

CORE PHOTOS



Test Boring B-14, Run C-3 & C-4 (36 ft to 46 ft)

Project

NBC Phase III CSO Program
IIIA-5 Consolidation Conduits

Date

8/13/2021

Figure

B.2

CORE PHOTOS



Test Boring B-16, Run C-1 & C-2 (42 ft to 52 ft)
 Test Boring B-15, Run C-1 & C-2 (33.5 ft to 43.5 ft)

Project

NBC Phase III CSO Program
 IIIA-5 Consolidation Conduits

Date

8/13/2021

Figure

B.3

CORE PHOTOS



Test Boring B-17, Run C-1 & C-2 (29 ft to 39 ft)
 Test Boring B-16, Run C-1 (37 ft to 47 ft)

Project

NBC Phase III CSO Program
 IIIA-5 Consolidation Conduits

Date

8/13/2021

Figure

B.4

ATTACHMENT C
Groundwater Observation Well Installation Logs



OBSERVATION WELL INSTALLATION LOG

Well No.
B-14 (OW)
Boring No.
B-14

PROJECT	NBC Phase III CSO Program IIIA5 Consolidation Conduit	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	M. MacInnis
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	7/28/2021
DRILLER	Paul Fisher	WATER LEVEL	15 ft bgs

Ground El.	27.14 ft	Location	Taft St	<input type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input checked="" type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Diagram	Type of protective cover/lock	Roadway Box	
0-10': Silt	0-10': Drill Cuttings and Holliston Sand		Height of top of guard pipe above the ground surface	0 ft	
			Height of top of riser pipe above the ground surface	0 ft	
			Type of protective casing:	Roadway Box	
			Length	0.5 ft	
			Inside Diameter	6.0 in	
			Depth of bottom of guard pipe/roadway box	0.5 ft	
			<u>Type of Seals</u>	<u>Top of Seal (ft)</u>	<u>Thickness (ft)</u>
			Bentonite	10.0	2.0
		Type of riser pipe:	Solid PVC		
		Inside diameter of riser pipe	2.0 in		
		Type of backfill around riser	Holliston Sand		
		Diameter of borehole	4.0 in		
		Depth to top of well screen	14.0 ft		
		Type of screen	Slotted PVC Schedule 40		
		Screen gauge or size of openings	0.01 in		
		Diameter of screen	2.0 in		
		Type of backfill around screen	Holliston Sand		
		Depth of bottom of well screen	24.0 ft		
		Bottom of Silt trap	- ft		
		Depth of bottom of borehole	24.0 ft		

(Bottom of Exploration) (Numbers refer to depth from ground surface in feet)	(Not to Scale)	
$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$		

COMMENTS: _____



OBSERVATION WELL INSTALLATION LOG

Well No.
B-16 (OW)
Boring No.
B-16

PROJECT	NBC Phase III CSO Program IIIA5 Consolidation Conduit	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	M. MacInnis
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	7/23/2021
DRILLER	Paul Fisher	WATER LEVEL	22 ft bgs

Ground El.	38.86 ft	Location	South Entry to Taft St Community Garden	<input type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input checked="" type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL	Diagram	Type of protective cover/lock	Roadway Box	
			Height of top of guard pipe above the ground surface	0 ft	
			Height of top of riser pipe above the ground surface	0 ft	
			Type of protective casing:	Roadway Box	
			Length	0.5 ft	
			Inside Diameter	6.0 in	
			Depth of bottom of guard pipe/roadway box	0.5 ft	
			Type of Seals	Top of Seal (ft)	Thickness (ft)
			Bentonite	21.0	2.0
		Type of riser pipe:	Solid PVC		
		Inside diameter of riser pipe	2.0 in		
		Type of backfill around riser	Holliston Sand		
		Diameter of borehole	4.0 in		
		Depth to top of well screen	24.0 ft		
		Type of screen	Slotted PVC Schedule 40		
		Screen gauge or size of openings	0.01 in		
		Diameter of screen	2.0 in		
		Type of backfill around screen	Holliston Sand		
		Depth of bottom of well screen	34.0 ft		
		Bottom of Silt trap	- ft		
		Depth of bottom of borehole	34.0 ft		

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

(Not to Scale)

$$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$$

COMMENTS: _____

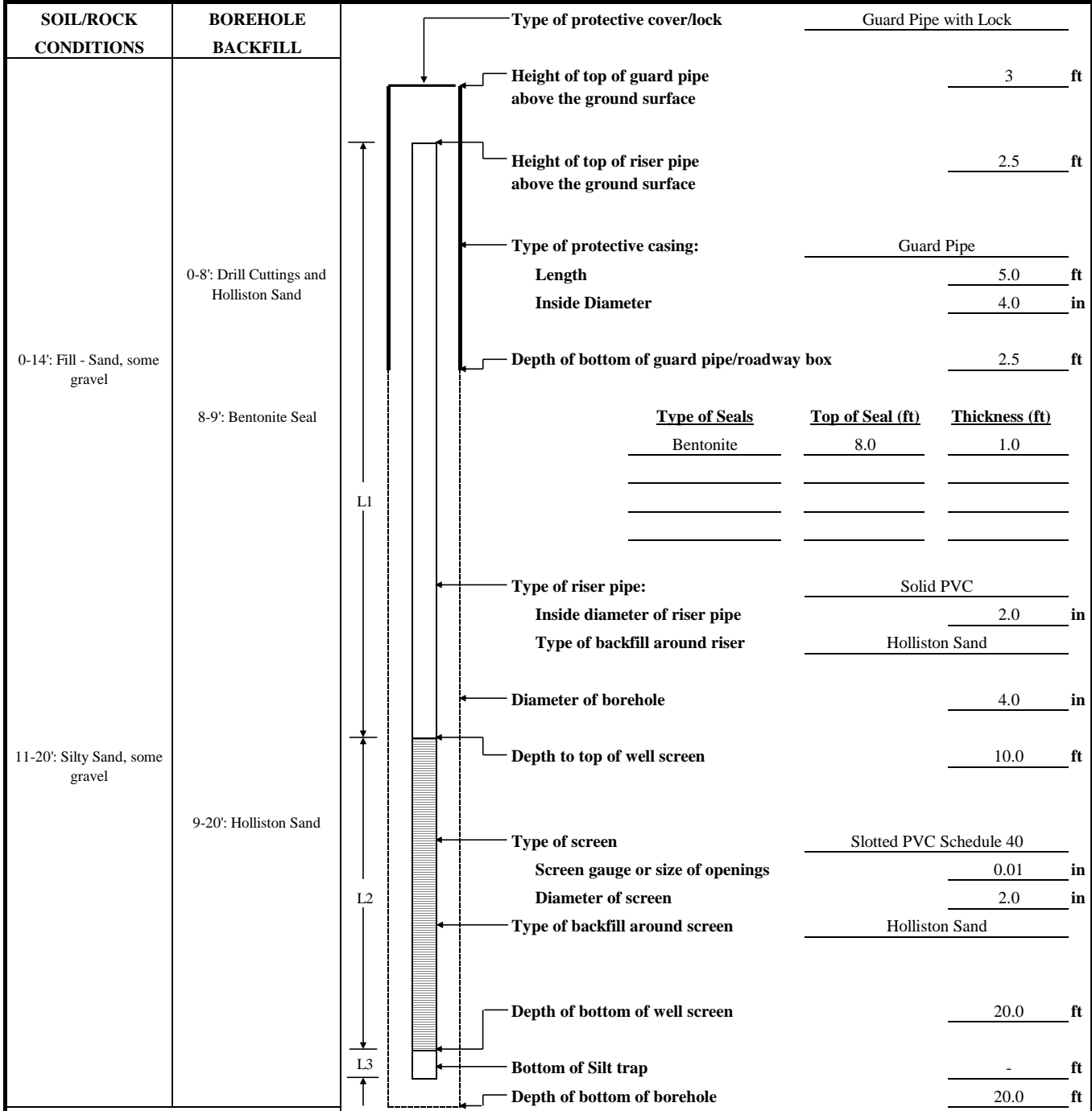


OBSERVATION WELL INSTALLATION LOG

Well No.
B-17 (OW)
Boring No.
B-17

PROJECT	NBC Phase III Consolidation Conduits IIIA-4 and IIIA-5	FILE NO.	5980
LOCATION	Pawtucket, RI	PROJECT MGR.	T. Muindi
CLIENT	NBC	FIELD REP.	M. MacInnis
CONTRACTOR	Geologic Earth Exploration, Inc.	DATE INSTALLED	7/21/2021
DRILLER	Paul Fisher	WATER LEVEL	11.5 ft bgs

Ground El.	27.6 ft	Location	Across Taft St. from charter school on Tidewater Site.	<input checked="" type="checkbox"/>	Guard Pipe
El. Datum	NVGD 29			<input type="checkbox"/>	Roadway Box



(Bottom of Exploration) (Numbers refer to depth from ground surface in feet) (Not to Scale)

$$\text{Riser Pay Length (L1)} \text{ ft} + \text{Length of screen (L2)} \text{ ft} + \text{Length of silt trap (L3)} \text{ ft} = \text{Pay length} \text{ ft}$$

COMMENTS: _____

ATTACHMENT D
Geotechnical Laboratory Test Results



Client:	McMillen Jacobs Associates		Project No:	GTX-314104	
Project:	NBC CSO Ph. III: IIIA-5 Consol. Conduit				
Location:	Providence, RI	Sample Type:	cylinder	Tested By:	tlm
Boring ID:	B-15	Test Date:	08/10/21	Checked By:	smd
Sample ID:	C-1	Test Id:	628170		
Depth :	35-35.5				
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Abrasiveness of Rock Using the Cerchar Method by ASTM D7625

Boring ID	Sample ID	Depth	Stylus No	Reading 1	Reading 2	Average	Comments
B-15	C-1	35.12-35.22 ft	1	0.6	0.3	0.45	
			2	0.6	0.2	0.40	
			3	0.7	0.5	0.60	
			4	0.5	0.2	0.35	
			5	0.1	0.5	0.30	
			Average CAIs			0.42	
			Average CAI *			0.90	
CERCHAR Abrasiveness Index Classification						Low abrasiveness	

Notes

Test Surface: Saw Cut
 Moisture Condition: As Received
 Apparatus Type: Original CERCHAR
 Stylus Hardness: Rockwell Hardness 54/56 HRC
 Stylus Displacement Relative to Rock Fabric:
 Styli 1-3: Normal; Styli 4-5: Parallel
 * CAI = (0.99 * CAIs) + 0.48
 CAIs = CERCHAR index for smooth (saw cut) surface
 CAI = CERCHAR index for natural surface
 Comments:

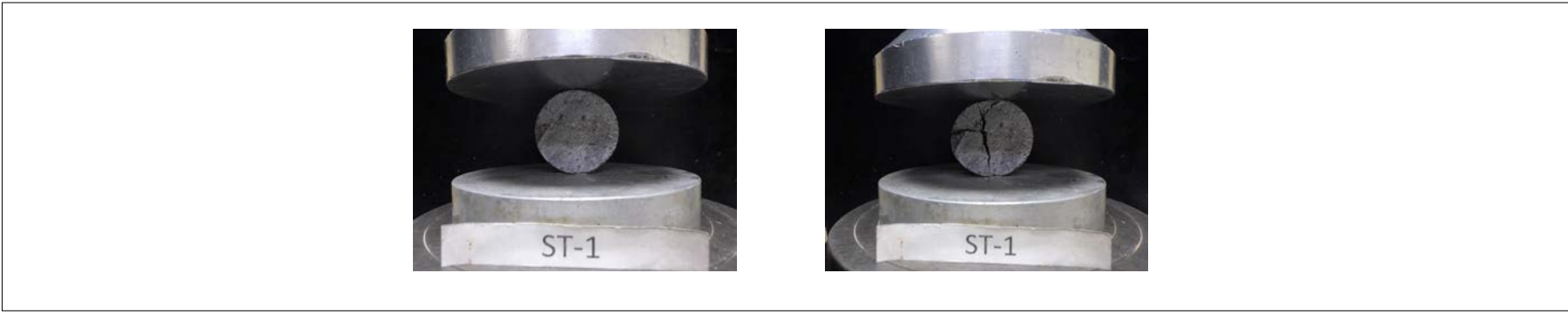




Client:	McMillen Jacobs Associates		Project No:	GTX-314104	
Project:	NBC CSO Ph. III: IIIA-5 Consol. Conduit				
Location:	Providence, RI	Sample Type:	cylinder	Tested By:	tjm
Boring ID:	B-14	Test Date:	08/12/21	Checked By:	smd
Sample ID:	C-1	Test Id:	628166		
Depth :	27.8-28.2				
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
27.84-27.94 ft	ST-1	0.94	1.99	0.47	2,971	1,010	3



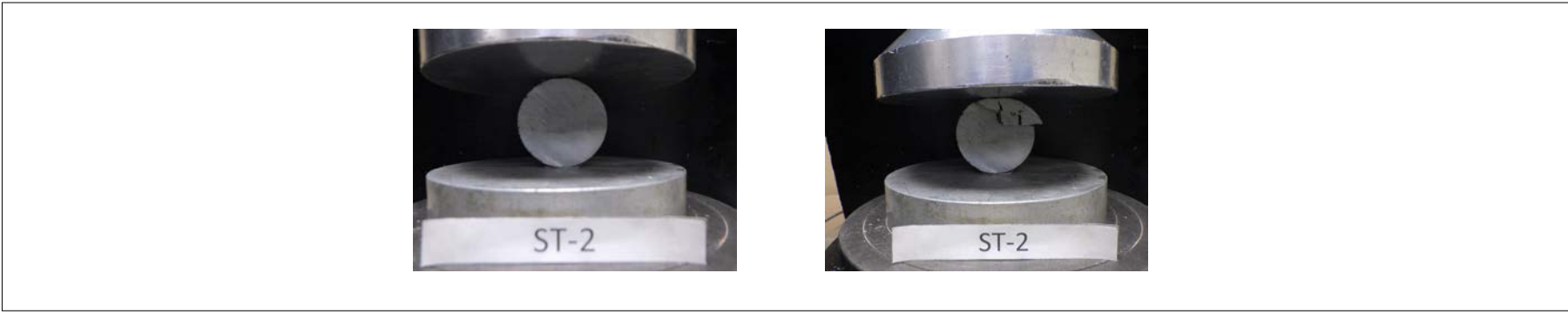
Notes: Strain rate: 2.5%/min.
 ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.
 The reported thickness (L) is the average of three measurements.
 The reported diameter(D) is the average of three measurements.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
 (See attached photographs)



Client:	McMillen Jacobs Associates		Project No:	GTX-314104	
Project:	NBC CSO Ph. III: IIIA-5 Consol. Conduit				
Location:	Providence, RI	Sample Type:	cylinder	Tested By:	tjm
Boring ID:	B-15	Test Date:	08/12/21	Checked By:	smd
Sample ID:	C-1	Test Id:	628167		
Depth :	34-34.8				
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
34-34.8 ft	ST-2	0.98	1.98	0.49	1,065	351	3



Notes: Strain rate: 2.5%/min.
 ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.
 The reported thickness (L) is the average of three measurements.
 The reported diameter(D) is the average of three measurements.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
 (See attached photographs)



Client:	McMillen Jacobs Associates		
Project:	NBC CSO Ph. III: IIIA-5 Consol. Conduit		
Location:	Providence, RI	Project No:	GTX-314104
Boring ID:	---	Sample Type:	---
Sample ID:	---	Test Date:	08/10/21
Depth :	---	Test Id:	628169
		Tested By:	tlm
		Checked By:	smd

**Bulk Density and Compressive Strength
of Rock Core Specimens by ASTM D7012 Method C**

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
B-15	C-1	34-34.8 ft	173	2515	3	No	2, *
B-16	C-1	31.98-32.35 ft	173	1797	3	Yes	---

- Notes: Density determined on core samples by measuring dimensions and weight and then calculating.
 All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.
 The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
 Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure
 (See attached photographs)
- 1: Best effort end preparation. See Tolerance report for details.
 - 2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
 - 3: Specimen L/D < 2.
 - 4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
 - 5: Specimen diameter is less than 10 times maximum particle size.
 - 6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.



Client:	McMillen Jacobs Associates	Test Date:	8/10/2021
Project Name:	NBC CSO Ph. III: IIIA-5 Consol. Conduit	Tested By:	kdp
Project Location:	Providence, RI	Checked By:	smd
GTX #:	314104		
Boring ID:	B-15		
Sample ID:	C-1		
Depth:	34-34.8 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY				DEVIATION FROM STRAIGHTNESS (Procedure S1)			
	1	2	Average	Maximum gap between side of core and reference surface plate: Is the maximum gap \leq 0.02 in.? NO			
Specimen Length, in:	4.39	4.39	4.39	Maximum difference must be $<$ 0.020 in.			
Specimen Diameter, in:	1.97	1.97	1.97	Straightness Tolerance Met? NO			
Specimen Mass, g:	609.4						
Bulk Density, lb/ft ³ :	173						
Length to Diameter Ratio:	2.2	Minimum Diameter Tolerance Met?	YES				
		Length to Diameter Ratio Tolerance Met?	YES				

END FLATNESS AND PARALLELISM (Procedure FP1)															
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00020	0.00020	0.00010	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00020	-0.00030	-0.00030	-0.00040
Diameter 2, in (rotated 90°)	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Difference between max and min readings, in: 0° = 0.00060 90° = 0.00010														
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00070	0.00050	0.00040	0.00030	0.00020	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00020
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010
	Difference between max and min readings, in: 0° = 0.0009 90° = 0.0001 Maximum difference must be $<$ 0.0020 in. Difference = \pm 0.00045														
	Flatness Tolerance Met? YES														

<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p align="center">End 1 Diameter 1 $y = -0.00033x - 0.00005$</p> </div> <div style="width: 45%;"> <p align="center">End 1 Diameter 2 $y = 0.00002x - 0.00001$</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="width: 45%;"> <p align="center">End 2 Diameter 1 $y = -0.00038x + 0.00013$</p> </div> <div style="width: 45%;"> <p align="center">End 2 Diameter 2 $y = -0.00002x - 0.00001$</p> </div> </div>	<p>DIAMETER 1</p> <p>End 1: Slope of Best Fit Line: 0.00033 Angle of Best Fit Line: 0.01883</p> <p>End 2: Slope of Best Fit Line: 0.00038 Angle of Best Fit Line: 0.02177</p> <p>Maximum Angular Difference: 0.00295</p> <p align="right">Parallelism Tolerance Met? YES Spherically Seated</p> <hr/> <p>DIAMETER 2</p> <p>End 1: Slope of Best Fit Line: 0.00002 Angle of Best Fit Line: 0.00115</p> <p>End 2: Slope of Best Fit Line: 0.00002 Angle of Best Fit Line: 0.00115</p> <p>Maximum Angular Difference: 0.00000</p> <p align="right">Parallelism Tolerance Met? YES Spherically Seated</p>
--	---

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						Maximum angle of departure must be \leq 0.25°	
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?		
Diameter 1, in	0.00060	1.970	0.00030	0.017	YES		
Diameter 2, in (rotated 90°)	0.00010	1.970	0.00005	0.003	YES	Perpendicularity Tolerance Met? YES	
END 2							
Diameter 1, in	0.00090	1.970	0.00046	0.026	YES		
Diameter 2, in (rotated 90°)	0.00010	1.970	0.00005	0.003	YES		



Client:	McMillen Jacobs Associates
Project Name:	NBC CSO Ph. III: IIIA-5 Consol. Conduit
Project Location:	Providence, RI
GTX #:	314104
Test Date:	8/10/2021
Tested By:	kdp
Checked By:	smd
Boring ID:	B-15
Sample ID:	C-1
Depth, ft:	34-34.8



After cutting and grinding



After break



Client:	McMillen Jacobs Associates	Test Date:	8/10/2021
Project Name:	NBC CSO Ph. III: IIIA-5 Consol. Conduit	Tested By:	kdp
Project Location:	Providence, RI	Checked By:	smd
GTX #:	314104		
Boring ID:	B-16		
Sample ID:	C-1		
Depth:	31.98-32.35 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY				DEVIATION FROM STRAIGHTNESS (Procedure S1)			
	1	2	Average	Maximum gap between side of core and reference surface plate: Is the maximum gap \leq 0.02 in.? YES			
Specimen Length, in:	4.30	4.30	4.30	Maximum difference must be $<$ 0.020 in.			
Specimen Diameter, in:	1.98	1.98	1.98	Straightness Tolerance Met? YES			
Specimen Mass, g:	603.73						
Bulk Density, lb/ft ³ :	173						
Length to Diameter Ratio:	2.2						
		Minimum Diameter Tolerance Met?	YES				
		Length to Diameter Ratio Tolerance Met?	YES				

END FLATNESS AND PARALLELISM (Procedure FP1)															
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00030	0.00030	0.00020	0.00020	0.00020	0.00020	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00030
													Difference between max and min readings, in: 0° = 0.00030 90° = 0.00060		
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00040	-0.00030	-0.00030	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010	0.00010
													Difference between max and min readings, in: 0° = 0.0001 90° = 0.0005 Maximum difference must be $<$ 0.0020 in. Difference = \pm 0.00030		
													Flatness Tolerance Met? YES		

<p align="center">End 1 Diameter 1 $y = 0.00011x - 0.00004$</p>	<p align="center">End 1 Diameter 2 $y = -0.00030x + 0.00006$</p>	<p>DIAMETER 1</p> <p>End 1: Slope of Best Fit Line: 0.00011 Angle of Best Fit Line: 0.00622</p> <p>End 2: Slope of Best Fit Line: 0.00004 Angle of Best Fit Line: 0.00213</p> <p>Maximum Angular Difference: 0.00409</p> <p align="right">Parallelism Tolerance Met? YES Spherically Seated</p>
<p align="center">End 2 Diameter 1 $y = 0.00004x - 0.00001$</p>	<p align="center">End 2 Diameter 2 $y = 0.00029x - 0.00008$</p>	

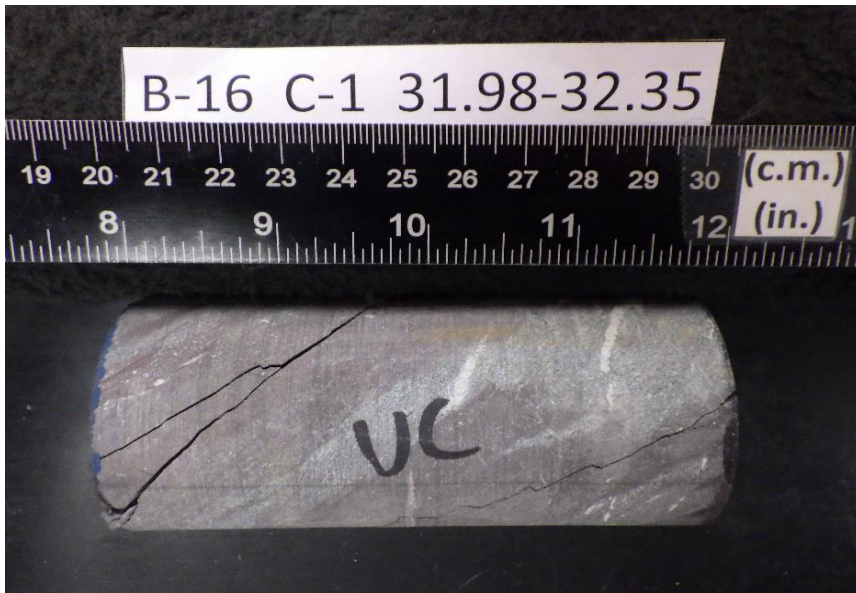
PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?	Maximum angle of departure must be \leq 0.25°
Diameter 1, in	0.00030	1.980	0.00015	0.009	YES	
Diameter 2, in (rotated 90°)	0.00060	1.980	0.00030	0.017	YES	Perpendicularity Tolerance Met? YES
END 2						
Diameter 1, in	0.00010	1.980	0.00005	0.003	YES	
Diameter 2, in (rotated 90°)	0.00050	1.980	0.00025	0.014	YES	



Client:	McMillen Jacobs Associates
Project Name:	NBC CSO Ph. III: IIIA-5 Consol. Conduit
Project Location:	Providence, RI
GTX #:	314104
Test Date:	8/10/2021
Tested By:	kdp
Checked By:	smd
Boring ID:	B-16
Sample ID:	C-1
Depth, ft:	31.98-32.35



After cutting and grinding



After break

ATTACHMENT E
Supplemental Test Boring Locations
B14 thru B17: Figure1, Figure 2

DWG FILE: J:\6412 NBC CSO Consolidation Conduits\Drawings\Files\Civil\Sheet\Set\PAWT_SITE_SUPPLEMENTAL BORINGS_ILIA-681.dwg DATE: Wednesday, September 1, 2021 3:52:06 PM BY: JAMIE PAYNE

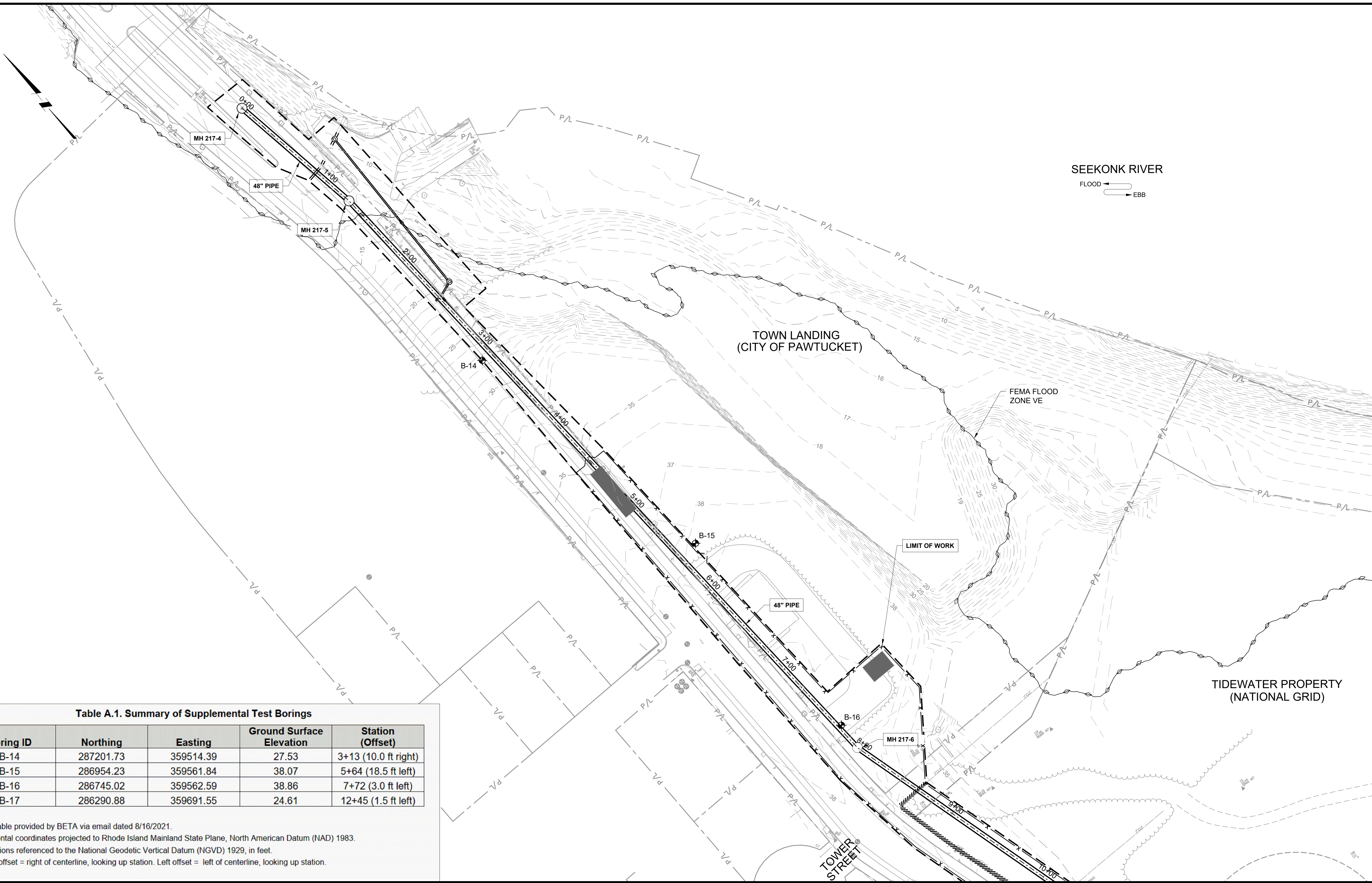


Table A.1. Summary of Supplemental Test Borings

Boring ID	Northing	Easting	Ground Surface Elevation	Station (Offset)
B-14	287201.73	359514.39	27.53	3+13 (10.0 ft right)
B-15	286954.23	359561.84	38.07	5+64 (18.5 ft left)
B-16	286745.02	359562.59	38.86	7+72 (3.0 ft left)
B-17	286290.88	359691.55	24.61	12+45 (1.5 ft left)

- Notes:
1. This table provided by BETA via email dated 8/16/2021.
 2. Horizontal coordinates projected to Rhode Island Mainland State Plane, North American Datum (NAD) 1983.
 3. Elevations referenced to the National Geodetic Vertical Datum (NGVD) 1929, in feet.
 4. Right offset = right of centerline, looking up station. Left offset = left of centerline, looking up station.

REV	DATE	BY	DESCRIPTION

SCALE
1" = 40'

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED C. CRONIN
DRAWN J. PAYNE
CHECKED C. CRONIN



NARRAGANSETT BAY COMMISSION
PHASE III COMBINED SEWER
OVERFLOW PROGRAM

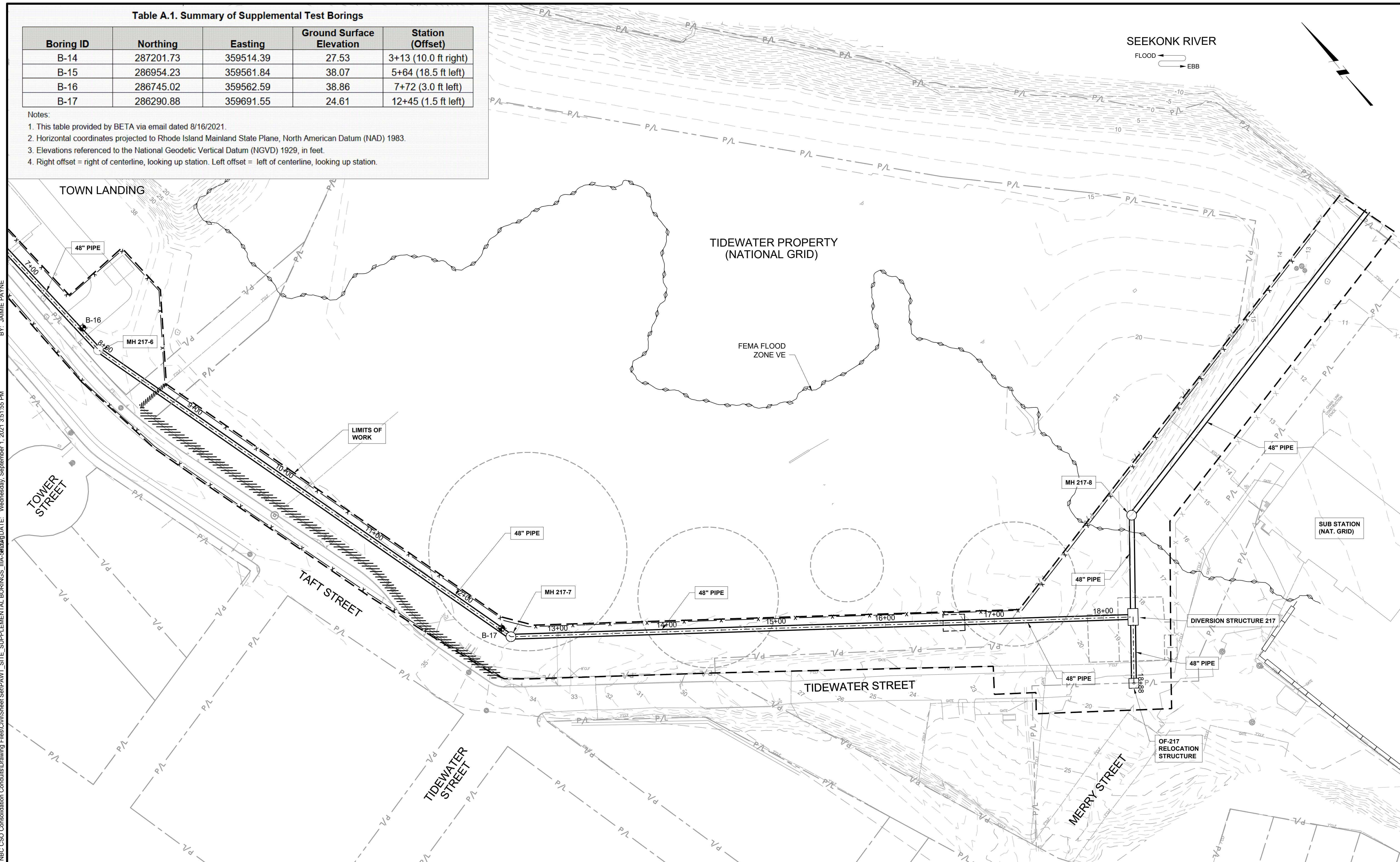
NBC CONTRACT NO 308.05C
CIVIL
ATTACHMENT E
OF-217 CONSOLIDATION CONDUIT
SUPPLEMENTAL TEST BORING LOCATIONS, B-14 THRU B-17

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REV	DATE	BY	DESCRIPTION

SCALE
1" = 40'

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED C. CRONIN
DRAWN J. PAYNE
CHECKED C. CRONIN



NARRAGANSETT BAY COMMISSION
PHASE III COMBINED SEWER
OVERFLOW PROGRAM

Stantec PARE

NBC CONTRACT NO 308.05C
CIVIL
ATTACHMENT E
OF-217 CONSOLIDATION CONDUIT
SUPPLEMENTAL TEST BORING LOCATIONS, B-14 THRU B-17

SHEET
FIG. 2
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