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**RIPDES Remediation General Permit Application  
Lincoln Lace & Braid Remediation Project  
55-61 Ponagansett Street  
Providence, Rhode Island**

*Prepared for*

Providence Parks Department  
Dalrymple Boathouse – Roger Williams Park  
Providence, Rhode Island 02905

*Prepared by*

EA Engineering, Science, and Technology  
2350 Post Road  
Warwick, Rhode Island 02886  
(401) 736-3440

June 2010  
FINAL  
EA Project No.: 61891.05

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## LIST OF ACRONYMS

cfs	Cubic feet per second
EA	EA Engineering, Science, and Technology, Inc.
I/CDEC	(RIDEM) Industrial/Commercial Direct Exposure Criteria
LDI	Limited design investigation
NOI	(RIPDES General Remediation Permit) Notice of Intent
PAH	Polycyclic aromatic hydrocarbon
RAWP	Remedial Action Work Plan
RDEC	(RIDEM) Residential Direct Exposure Criteria
RIDEM	Rhode Island Department of Environmental Protection
RIPDES	Rhode Island Pollutant Discharge Elimination System
TPH	Total petroleum hydrocarbon

## 1. INTRODUCTION

On behalf of the City of Providence, EA Engineering, Science, and Technology, Inc. (EA) has prepared this Rhode Island Pollutant Discharge Elimination System (RIPDES) Remediation General Permit Application for the Lincoln Lace & Braid Remediation Project in Providence, Rhode Island (the Site). This Site is located to the north of Barbara Street and to the south of RI Route 6. This permit application package is being submitted in support of a remedial action proposed for the Lincoln Lace & Braid property. A Revised Remedial Action Work Plan (RAWP) has been submitted to the Rhode Island Department of Environmental Management (RIDEM) Office of Waste Management and is currently under review, and a completed RIPDES Remediation General Permit Notice of Intent (NOI) is attached as Appendix C.

The remediation of the site represents an important step in the further development of Providence's Woonasquatucket River Greenway and bike trail project. Completion of the Greenway project will help restore the Woonasquatucket River to its former grandeur and revitalize the neighborhoods of Olneyville, Hartford, and Manton. The project's main goals are to increase the recreational and green space available to local residents, promote river conservation and environmental action, stimulate economic development, and increase awareness of local history and river ecology.

## 2. EXISTING CONDITIONS

### 2.1 SITE DESCRIPTION

The former Lincoln Lace & Braid complex is located at 55-61 Ponagansett Street in Providence, Rhode Island. The Site is located on approximately 6 acres of land adjacent to the Woonasquatucket River in the Hartford section of Providence, designated on the City of Providence Tax Assessor's Map as Plat 113, Lots 305 and 429. Figure 1 provides a Site Locus Map. An Existing Conditions Plan is provided on Sheet 2 of the Bid Plans, provided in Appendix A.

The lot slopes down from south to north, towards the Woonasquatucket River. Access from Ponagansett Avenue to the west is via a steep asphalt driveway (circa 1950) that begins at the east end of the street, traverses the embankment on a south-north trajectory, and then swings sharply to the east across the now-filled headrace to reach the former building locations.

The embankment has been graded into three distinct terraces, with retaining walls constructed of random and split stone and concrete masonry that step then slope down from south to north. A stepped, course, split masonry, and concrete wall lines the east wall of the tailrace immediately south of the location of the former Wheel House. The remainder of the tailrace has earthen embankments that suggest its original appearance as a flood channel. No traces of other mill buildings remain except for rubble piles, concrete slabs, and large split rectangular blocks scattered across the lot.

The Woonasquatucket River's north-south trajectory defines the eastern edge of the mill site and holds the remains of the 1918 dam in its channel near the north end of the lot. Concrete and rubblestone masonry dam abutments are located on both riverbanks and retain cast imprints and wood fragments of the spillway's timber cribbing. Remains of both a late 19<sup>th</sup> century and an early 20<sup>th</sup> century railroad bridge are located in the river channel approximately 240 ft downstream of the dam remains.

The former Ponagansett Avenue Landfill abuts the west end of the Site and is accessed by the same driveway as the subject site. This facility has been remediated in preparation for its potential conversion to a public park (DEM Case No. 2001-024).

### 2.2 HISTORICAL CONTEXT

The Lincoln Lace & Braid site was established in 1812 as Merino Mill. By 1870, there were mill villages on the Johnston and North Providence sides of the river at Olneyville, Dyerville, Manton Village, Lyman's Mill, Allendale, Centerdale, and Graniteville. Within Providence, mills included Union Cotton, Delaine, Lyman Manufacturing, and the Valley Bleachery. Local manufacturers formed a company to build reservoirs upstream to store water for use during the dry months. A reservoir was constructed west of the site (i.e. the Ponagansett Avenue Landfill). This was the first such water management system of its kind and was replicated on industrial rivers throughout the world (Beers 1870; Greenwood n.d.; RIHPHC 1976b, 1981, 1986). In 1994, the main building of the mill complex was destroyed by fire. Subsequent remediation efforts have removed the building debris, petroleum, and petroleum-contaminated soil from the Site. Only portions of the ruins of the former Merino Mill and its associated waterpower infrastructure are currently visible.





### 3. PREVIOUS INVESTIGATIONS

Previous investigations included soil and groundwater sampling (Cyn Environmental, October 1996). Further removal actions were conducted in November 1998. The 1996 removal action and investigation included the collection of soil and groundwater samples and the excavation and disposal of impacted soil and petroleum from an underground storage tank (UST). Soil and groundwater samples were collected from a total of 21 test pits, resulting in the subsequent (1998) removal of contaminated soil in areas identified during the 1996 investigation.

In May 1996, a RIDEM contractor collected 6 sediment samples within the sluiceway to determine if sediments were impacted. Analytical results indicate that the sediments are impacted with lead and arsenic in concentrations exceeding the RIDEM Residential Direct Exposure Criteria (RDEC) and/or Industrial/Commercial Direct Exposure Criteria (I/CDEC) for soil (no sediment standards are currently promulgated by RIDEM).

In August 2000, Fuss & O'Neill completed a limited design investigation (LDI) that concluded that anoxic conditions occur in the groundwater at the Site. The LDI stated that this condition allows iron to be released into a groundwater solution. When groundwater is exposed to oxygen (*i.e.*, in the tailrace), the iron precipitates out of solution and deposits on the bed of the former tailrace.

#### 3.1 CURRENT GOALS/OBJECTIVES

The primary contaminants of concern at the Site are the presence of elevated metal and polycyclic aromatic hydrocarbon (PAH) concentrations previously observed in soil and sediment samples throughout the Site above the RIDEM RDEC. Exceedances of the RDEC for arsenic, beryllium, lead, mercury, ethylbenzene, trichloroethene, tetrachloroethene, xylene, and total petroleum hydrocarbons (TPHs) were found in some soil samples.

The Revised RAWP includes details on the remedial objectives and proposed remedy for the former Lincoln Lace & Braid Site. The implementation and completion of the remedial actions proposed in the Revised RAWP will bring the Site into compliance with the RIDEM *Remediation Regulations*, as well as improve the aesthetic value of existing wetlands to provide valuable green space to the area.

#### 3.2 OCTOBER 2009 INVESTIGATION

In October 2009, EA collected 8 sediment samples from the sluiceway to determine if previous remediation attempts were successful in the lower reaches of the sluiceway. Analytical results indicate that sediments on the downstream reaches of the sluiceway are not impacted with arsenic and lead at concentrations exceeding the RIDEM RDEC. Analytical results are tabulated below, in Table 1.

TABLE 1 SEDIMENT SAMPLING ANALYTICAL RESULTS

Target Analyte	SED-01	SED-02	SED-03	SED-04	SED-05	SED-06	SED-07	SED-08	RIDEM RDEC <sup>1</sup>	RIDEM I/CDEC <sup>1</sup>
Total Arsenic (mg/kg)	<1.84	<1.69	2.82	3.09	<1.84	3.55	3.97	7.71	7.0	7.0
Total Iron (mg/kg)	24,900	4,880	13,200	10,200	10,400	11,600	30,300	105,000	None	None
Total Lead (mg/kg)	21.3	<6.8	72.1	69.4	24.6	48.8	<b>1,270</b>	398	150	500
TPH (mg/kg)	<49.4	<45.6	<62.5	<53.3	<46.6	<59.6	158	370	500	2,500

Notes:

1. Direct Exposure Criteria as provided in Table 1 of Section 8.02 of the RIDEM *Remediation Regulations*, February 2004.
2. "<" indicates analyte not detected above laboratory method reporting limits.
3. **Bold** value indicates an exceedance of RDEC.
4. Shaded value indicates an exceedance of I/CDEC

Surface water samples were also collected to determine if the sluiceway is adversely impacting the Woonasquatucket River. One surface water sample was collected from the sluiceway, one sample was collected from the river upstream of the sluiceway, and one sample was collected from the river downstream of the sluiceway. Analytical results are tabulated below in Table 2.

Laboratory analytical results indicate that the sluiceway is not negatively impacting the Woonasquatucket River. The Supplemental Sampling Analytical Report, which summarizes this October 2009 investigation and provides full analytical reports, is attached as Appendix B.

TABLE 2 SURFACE WATER SAMPLING ANALYTICAL RESULTS

Target Analyte	SW Upstream	SW Downstream	SW Sluiceway	RIDEM Water Quality Criteria <sup>5</sup>
Temperature (°C) <sup>1</sup>	13.93	13.86	10.78	None
Conductivity (µS/cm) <sup>1</sup>	314	307	533	None
Dissolved Oxygen (mg/L) <sup>1</sup>	8.04	8.72	5.54	5.0
pH <sup>1</sup>	7.66	7.31	6.96	6.5-9.0 <sup>6</sup>
Oxidation Reduction Potential <sup>1</sup>	64.1	61.9	6.8	None
Dissolved Iron (mg/L) <sup>2</sup>	0.282	0.232	4.07	None
Total Iron (mg/L)	0.430	0.394	7.00	None
Dissolved Arsenic (mg/L) <sup>2</sup>	<.0025	<.0025	<.0025	0.00018 <sup>7</sup>
Total Arsenic (mg/L)	<.0025	<.0025	<.0025	None
Dissolved Lead (mg/L) <sup>2</sup>	<b>0.0008</b>	<b>0.0010</b>	<0.0004	0.000540 <sup>8</sup>
Total Lead (mg/L)	<0.010	<0.010	<0.010	None

Notes:

1. Measurements obtained in field using YSI 600XL.
2. Samples laboratory-filtered by ESS Laboratory.
3. "<" indicates analyte not detected above laboratory method reporting limit provided.
4. **Bold** value indicates an exceedance of regulatory criteria.
5. Rhode Island Water Quality Regulations Amended May 2009.
6. Criteria provided in Table 1, Page 16.
7. Criteria provided in Table 1, Page B7 (Human Health Criteria for Consumption of Water and Aquatic Organisms).
8. Criteria calculated using an assumed water hardness of 25 mg/l (conservative estimate); Table 2, page B-14 (Chronic). Increases in the assumed water hardness value increases the calculated regulatory criteria value.

## 4. PROPOSED ACTION

The proposed project involves the construction of an engineered barrier across the Site, construction of an engineered barrier within the sluiceway, and the installation of a series of check dams in the sluiceway. The engineered barriers are proposed to prevent direct exposure to the contaminated soils and sediments located across the site. The check dams are proposed to aerate the surface water to increase the precipitation of the metals out of the dissolved phase and to prevent downstream migration of the iron flocculent. The installation of the series of check dams will include limited grading of sediment, dewatering, and construction within regulated resource areas. Sheet 5 of Appendix A depicts proposed remediation within the sluiceway. Sheet 6 of Appendix A, Construction Management Plan, shows erosion controls and proposed locations of stockpiles, access roads, and fractionalization tanks.

### 4.1 DESCRIPTION OF PROPOSED ACTION

#### 4.1.1 Check Dam Construction

The proposed action involves construction of a series of check dams. The five check dams will consist of large stones (approximately 2 x 2 x 2 ft) set in the sluiceway. The stones will be surrounded with Class II riprap ( $D_{50} = 18$  in.) on the upstream and downstream sides. The riprap will not only provide additional stabilization for the stones but also collect the iron flocculent to prevent downstream migration. Furthermore, the water will flow along the rough surface of the riprap after flowing over the check dams, thereby further aerating the water. Check dam #4 will be unique in that a riffle will be created on the downstream face of the dam, as illustrated on Sheet 5 of Appendix A, Proposed Sluiceway. Riprap will extend to the crest of check dam #4 to prevent the waterfall effect that will be implemented on the other check dams. The construction of the riffle will deter children from curiously exploring this area of the Site.

To facilitate construction, cofferdams will be installed upstream and downstream of the location of each check dam prior to and during their construction. The area of construction for the five check dams is approximately 4,000 sf. Sandbag cofferdams will be constructed after installation of the engineered barrier in the upstream reaches of the sluiceway. Surface water will be diverted downstream and discharged into the Woonasquatucket River. Best Management Practices will be followed to avoid and minimize adverse impacts to sensitive receptors, including the placement of silt fences and hay bales around the entire construction area.

#### 4.1.2 Handling of Contaminated Soil and Water

Grading and check dam construction will be conducted within the sluiceway as part of the remedial action at the Site. A cell will be created with two sandbag cofferdams for either the entire work area or for construction of each check dam, as determined by the contractor. The cell will then be dewatered to accommodate standard construction equipment (i.e., work "in the dry"). The water will be removed by installing a perforated pipe several feet into the base of the sluiceway (i.e., a sump). A pump will be utilized to dewater the cell as required. Additionally, water in the upstream reaches of the sluiceway will be treated and discharged to the Woonasquatucket River on an as-needed basis. All water removed from the sluiceway will be

pumped into a series of fractionalization tanks prior to being pumped through a sand filter unit and silt bag. The effluent will then be discharged to an energy dissipation area along the Woonasquatucket River. The treatment system will be operated on an as-needed basis for the duration of the sluiceway grading and check dam construction components of the remediation project.

The riprap check dam is currently impounding water in the sluiceway and acting as a weir. The flow rate of water exiting the sluiceway has been conservatively estimated to be 11.5 cubic feet per second (cfs) when modeled as a broad-crested weir.

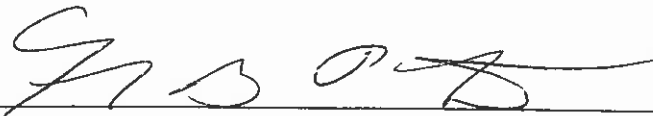
The contractor will utilize two 15,000-gal fractionalization tanks for settlement of solids within the evacuated water to treat the sluiceway water when bypass is required. Dissolved metals within the evacuated water will precipitate out into solid form as air is entrained into the system during pumping. Effluent from the tanks will be pumped through a 25 mm filter bag and then discharged to an energy dissipation area consisting of riprap along the sluiceway.

Effluent will be sampled prior to discharge to determine concentrations of total iron, arsenic, lead, total suspended solids, and polycyclic aromatic hydrocarbons. The effluent will not be analyzed for volatile organic compounds as they are "believed absent."

EA utilized the Dilution Determination worksheet provided with the RIPDES Remediation General Permit to determine effluent maximum standards for metal concentrations. These calculations, provided as part of Appendix C, indicate that a dilution factor of 13.2 is appropriate for this water treatment activity. Therefore, EA will utilize the 10 to 20 dilution range standards (Part II.E of the RIPDES Remediation General Permit). This indicates a maximum effluent iron concentration of 8.0 mg/L, which is greater than the iron concentration observed in the surface water sample collected from the sluiceway in October 2009. Therefore, EA believes the proposed treatment system is adequate to meet the Remediation General Permit goals.

### 5. CERTIFICATIONS

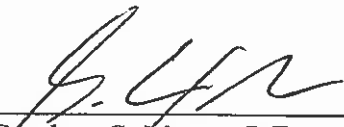
The undersigned certify that this RAWP is a complete and accurate representation of the contaminated site and contains all known facts to the best of their knowledge.



6/4/10

Frank B. Postma, LSP, LEP, PG  
Senior Project Manager  
EA Engineering, Science, and Technology, Inc.

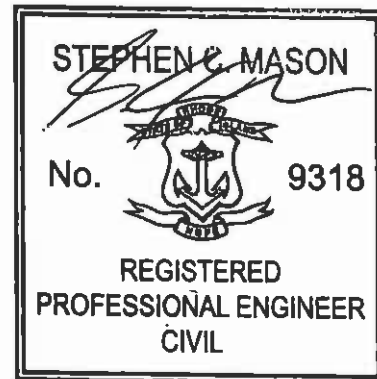
Date



6/4/10

Stephen C. Mason, P.E.  
Project Engineer  
EA Engineering, Science, and Technology, Inc.

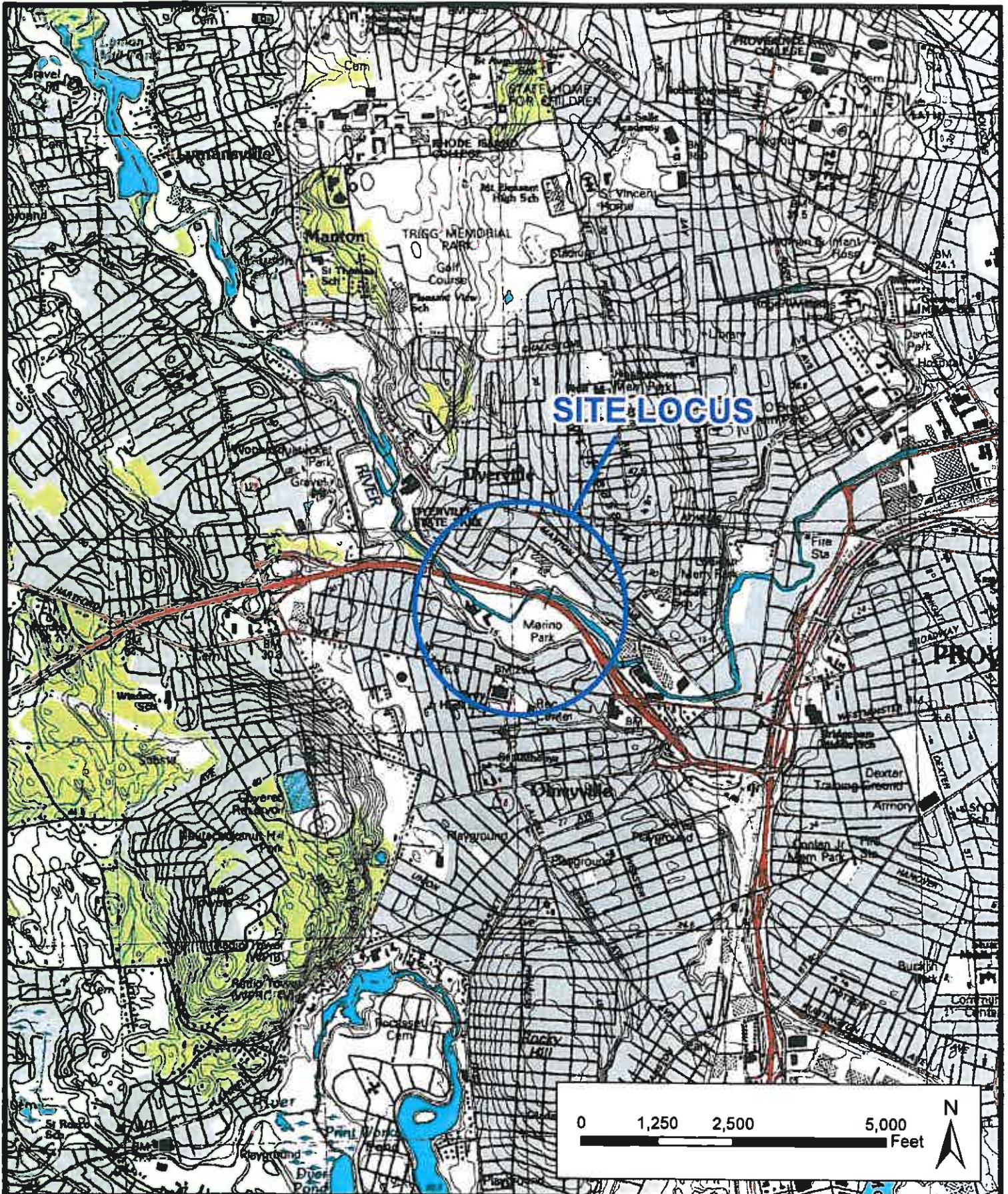
Date



6/4/10

# ***FIGURES***





LINCOLN LACE & BRAID  
 55 PONAGANSETT STREET  
 PROVIDENCE, RI

FIGURE 1  
 SITE LOCUS

PROJECT MGR: FBP	DESIGNED BY: RM	CREATED BY: PT	CHECKED BY: FBP	SCALE: AS SHOWN	DATE: APRIL 2010	PROJECT NO: 61891.05	FILE NO: LLB_LOCUS MXD
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# ***APPENDIX A***

## ***Bid Plans***



***APPENDIX B***

***Supplemental Sampling  
Analytical Report***



EA Engineering, Science, and Technology, Inc.

Airport Professional Park  
2350 Post Road  
Warwick, Rhode Island 02886  
Telephone: 401-736-3440  
Fax: 401-736-3423  
www.eaesl.com

30 November 2009

Mr. Timothy Fluery  
RI Department of Environmental Management  
Office of Waste Management  
235 Promenade Street  
Providence, RI 02908

RE: Supplemental Sampling Analytical Results  
Lincoln Lace and Braid Sluiceway Investigation  
Ponagansett Avenue; Providence, Rhode Island  
EA Project No. 61891.05.0008

Dear Mr. Fluery:

EA Engineering, Science, and Technology, Inc. (EA), on behalf of the City of Providence (the City), is providing this letter report to summarize the collection of surface water, sediment, and iron floc samples to more adequately characterize the sluiceway at the former Lincoln Lace and Braid property located at 55 Ponagansett Street, Providence, RI (the "Site"). Previous site investigation reports have indicated that sediments within the sluiceway were not impacted by contaminants above the Rhode Island Department of Environmental Management (RIDEM) applicable standards. However, previously unknown investigation reports found during a recent file review at RIDEM, conducted by EA on behalf of the City and at RIDEM's direction, document the collection and analysis of six sediment samples collected from within the sluiceway. These historical reports indicate that the sluiceway was impacted with lead, arsenic, and petroleum hydrocarbons at concentrations exceeding applicable regulatory standards. EA proposed in a document titled "Sampling and Analysis Plan and Site-Specific Quality Assurance Project Plan for Supplemental Sediment and Surface Water Sampling" (SAP/QAPP) dated August 2009 to collect additional sediment, surface water, and iron floc samples to more adequately characterize the sluiceway and determine if there is an impact to the surface water of the Woonasquatucket River.

## **SURFACE WATER CHARACTERIZATION AND RESULTS**

The subject site is adjacent to the Woonasquatucket River, immediately southwest of Glenbridge Avenue. According to the *RIDEM Water Quality Regulations, Amended May 2009*, surface water quality in the Woonasquatucket River immediately south of Glenbridge Avenue is designated as Freshwater Class "B1 {a}" (RI Water Body ID RI0002007R-10D). "Class B1 {a} water is designated for primary and secondary contact recreational activities and fish and wildlife habitat. They shall be suitable for compatible industrial processes and cooling, hydropower, aquaculture use, navigation, and irrigation and other agriculture uses. These waters shall have good aesthetic value. Primary contact recreational activities must be impacted due to pathogens from approved wastewater discharges. However, all Class B criteria must be met...The {a} designation indicates a partial use designation due to impacts from combined sewer outfalls (CSOs)."

On 2 October 2009, EA collected the sediment, surface water, and iron floc samples at the Site in accordance with the above-referenced SAP/QAPP. Sampling commenced with the collection of



three surface water grab samples. The surface water was characterized using a YSI 600XL to provide pH, conductivity, dissolved oxygen, and oxidation reduction potential measurements. The results are provided in Table 1. Two surface water samples were collected from the Woonasquatucket River, one 20 ft upstream and one 20 ft downstream from the confluence of the sluiceway and the River. Additionally, one sample was collected from within the sluiceway, 20 ft upstream of the confluence of the sluiceway and the River. Analytical results indicate the presence of iron in all surface water samples collected. Note that there is no RIDEM Water Quality Criterion for iron. Iron was detected at similar concentrations in the two surface water samples collected from the Woonasquatucket River. The sample collected from the sluiceway contained much higher concentrations of iron than the two River samples.

The analytical laboratory did not detect arsenic (total and dissolved) or lead (total) above method detection limits. The laboratory was unable to meet the regulatory criteria with the analysis of these metals reportedly due to "interferences" with other metals; therefore, the detection values exceed the regulatory criteria. Dissolved lead was detected above the applicable regulatory criterion in both the up and downstream samples collected but was not detected in the sluiceway sample above regulatory criterion.

Laboratory analytical results indicate that the sluiceway is not negatively impacting the Woonasquatucket River. Surface water analytical laboratory results are summarized in Table 1 and provided in Appendix A.

Target Analyte	SW Upstream	SW Downstream	SW Sluiceway	RIDEM Water Quality Criteria <sup>5</sup>
Temperature (°C) <sup>1</sup>	13.93	13.86	10.78	None
Conductivity (µS/cm) <sup>1</sup>	314	307	533	None
Dissolved Oxygen (mg/L) <sup>1</sup>	8.04	8.72	5.54	5.0
pH <sup>1</sup>	7.66	7.31	6.96	6.5-9.0 <sup>6</sup>
Oxidation Reduction Potential <sup>1</sup>	64.1	61.9	6.8	None
Dissolved Iron (mg/L) <sup>2</sup>	0.282	0.232	4.07	None
Total Iron (mg/L)	0.430	0.394	7.00	None
Dissolved Arsenic (mg/L) <sup>2</sup>	<.0025	<.0025	<.0025	0.00018 <sup>7</sup>
Total Arsenic (mg/L)	<.0025	<.0025	<.0025	None
Dissolved Lead (mg/L) <sup>2</sup>	0.0008	0.0010	<0.0004	0.000540 <sup>8</sup>
Total Lead (mg/L)	<0.010	<0.010	<0.010	None

Notes:

1. Measurements obtained in field using YSI 600XL.
2. Samples laboratory filtered by ESS Laboratory.
3. "<" indicates analyte not detected above laboratory method reporting limit provided.
4. **Bold value indicates an exceedence of regulatory criteria.**
5. Rhode Island Water Quality Regulations Amended May 2009.
6. Criteria provided in Table 1, Page 16.
7. Criteria provided in Table 1, Page B7 (Human Health Criteria for Consumption of Water and Aquatic Organisms).
8. Criteria calculated using an assumed water hardness of 25 mg/l (conservative estimate); Table 2, page B-14 (Chronic). Increases in the assumed water hardness value increases the calculated regulatory criteria value.



## SEDIMENT CHARACTERIZATION AND RESULTS

Sediment samples were collected using a hand auger at locations along the sluiceway as depicted on Figure 1. Any visible iron floc (orange material) was removed prior to containerizing the sediment samples. The sediment encountered consisted of medium- to coarse-grain sands at the downstream end. The material encountered upstream was finer-grained. The auger samples collected furthest upstream also contained some glass and plastics. Analytical results indicate that the two sediment samples collected furthest upstream, SED-07 and SED-08, are impacted by lead and arsenic, respectively, at concentrations exceeding the RIDEM Residential Direct Exposure Criteria (RDEC) and Industrial/Commercial Direct Exposure Criteria (ICDEC). Additionally, lead was detected in the SED-08 sample above the RDEC. Iron concentrations of all sediment samples were elevated, with the highest concentration detected in sample SED-08 (105,000 mg/kg). All other samples contain concentrations of arsenic and lead below the RIDEM RDEC and ICDEC. Analytical results are summarized in Table 2 below and are provided as Appendix B.

Table 2 – Sediment Sampling Analytical Results

Target Analyte	SED-01	SED-02	SED-03	SED-04	SED-05	SED-06	SED-07	SED-08	RIDEM RDEC <sup>1</sup>	RIDEM ICDEC <sup>1</sup>
Total Arsenic (mg/kg)	<1.84	<1.69	2.82	3.09	<1.84	3.55	3.97	7.71	7.0	7.0
Total Iron (mg/kg)	24,900	4,880	13,200	10,200	10,400	11,600	30,300	105,000	None	None
Total Lead (mg/kg)	21.3	<6.8	72.1	69.4	24.6	48.8	1,270	398	150	500
TPH (mg/kg)	<49.4	<45.6	<62.5	<53.3	<46.6	<59.6	158	370	500	2,500

Notes:

1. Direct Exposure Criteria as provided in Table 1 of Section 8.02 of the RIDEM *Remediation Regulations*, February 2004.
2. "<" indicates analyte not detected above laboratory method reporting limits.
3. **Bold** value indicates an exceedence of RDEC.
4. Shaded value indicates an exceedence of ICDEC

## IRON FLOC CHARACTERIZATION AND RESULTS

Iron floc samples were collected from two discrete locations, as depicted on Figure 1. Floc-01 was collected from the upstream side of the stone check dam located near the confluence of the sluiceway and the Woonasquatucket River. Floc-02 was collected at the approximate location of SED-05, where a significant amount of iron floc was observed. The floc was entrained in the surface water within the sluiceway but was also immiscible. Total arsenic and lead were not detected above laboratory method reporting limits in either floc sample. For comparison purposes only, the total arsenic and lead detection limits were compared with the RIDEM soil RDEC. No soil RDEC was exceeded by the floc detection limits. There is no regulatory criterion for floc. Analytical results are summarized below in Table 3 and provided as Attachment B.

Table 3 – Iron Floc Sampling Analytical Results

Target Analyte	Floc-01	Floc-02
Total Arsenic (mg/kg)	<2.40	<2.15
Total Lead (mg/kg)	<9.7	<8.7

Notes:

1. "<" indicates analyte not detected above laboratory method reporting limits



Results of this supplemental investigation of the sluiceway at the former Lincoln Lace and Braid property indicate sediment is the only matrix significantly impacted by arsenic and lead. This information will be utilized in determining the most appropriate remedial alternative for the sluiceway.

If you have any questions or require additional information, please contact me at (401) 736-3440, Ext. 202.

Sincerely,

EA ENGINEERING, SCIENCE,  
AND TECHNOLOGY, INC.

A handwritten signature in black ink that reads "Mark K. Speer". The signature is written in a cursive, flowing style.

Mark K. Speer, P.E.  
Senior Engineer

**Attachments**

- Attachment A: Surface Water Analytical Reports
- Attachment B: Sediment and Iron Flocc Analytical Report

**Figures**

- Figure 1: Site Plan w/ Sampling Locations

- cc: Robert McMahon, Providence Parks Department  
Alan Peterson, U.S. Environmental Protection Agency  
Frank Postma, PG, LEP, LSP, EA Engineering, Science, and Technology, Inc.  
Sam Whitin, EA Engineering, Science, and Technology, Inc.

**Figure 1**  
**Site Plan with Sampling Locations**



Attachment A  
Surface Water Analytical Reports  
9 October 2009





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

## PROJECT NARRATIVE

Ron Mack  
EA Engineering, Science, and Technology  
2530 Post Road  
Warwick, RI 02886

**RE: Lincoln Lace & Braid Site**  
**ESS Laboratory Work Order Number: 0910039**

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 Project Narrative, the entire report has been paginated. The ESS Laboratory Certifications sheet is the final report page. 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



Digitally signed by Melissa Pagliarini  
Date: 2009.10.09 17:01:57 -04'00'

### 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 may be used instead of automated integration because it produces more accurate results. All ICP Metals were analyzed using the established linear dynamic range to determine acceptable analytical results.

ESS Laboratory certifies that the test results meet the requirements of NELAC and A2LA, except where noted within this project narrative.

### Sample Receipt

The following sample(s) were received on October 02, 2009 for the analyses specified on the enclosed Chain of Custody Record.

Laboratory ID	Matrix	Client SampleID
0910039-01	Surface Water	SW - US
0910039-02	Surface Water	SW - DS
0910039-03	Surface Water	SW - SL
0910039-04	Aqueous	Trip Blank



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Luce & Braid Site

ESS Laboratory Work Order: 0910039

## PROJECT NARRATIVE

### 8260B Volatile Organic Compounds

BJ90610-BS1 **Blank Spike recovery is above upper control limit.**  
1,4-Dioxane - Screen

BJ90610-MS1 **Matrix Spike recovery is below lower control limit.**  
Bromomethane, Naphthalene

BJ90610-MSD1 **Matrix Spike recovery is below lower control limit.**  
Bromomethane

BSJ0035-CCV1 **Continuing Calibration recovery is below lower control limit.**  
1,4-Dioxane - Screen

### 8270C Semi-Volatile Organic Compounds

BJ90727-BS1 **Blank Spike recovery is below lower control limit.**  
Benzoic Acid

BJ90727-BSD1 **Blank Spike recovery is below lower control limit.**  
Benzoic Acid

BJ90727-BSD1 **Relative percent difference for duplicate is outside of criteria.**  
1,4-Dichlorobenzene, 2,4-Dinitrophenol, Aniline, Benzoic Acid, Hexachlorobutadiene, Hexachloroethane,  
N-Nitrosodimethylamine

### 8270C(SIM) Semi-Volatile Organic Compounds

BJ90825-BSD1 **Relative percent difference for duplicate is outside of criteria.**  
Hexachlorobenzene

BSJ0057-CCV1 **Calibration required quadratic regression.**  
Pentachlorophenol

BSJ0057-CCV2 **Calibration required quadratic regression.**  
Pentachlorophenol

No other observations noted.

End of Project Narrative.



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SW - U S  
Date Sampled: 10/02/09 09:00  
Percent Solids: N/A

ESS Laboratory Work Order: 0910039  
ESS Laboratory Sample ID: 0910039-01  
Sample Matrix: Surface Water

### 3005A/6000/7000 Dissolved Metals

RI - GA

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	ND	mg/L	0.0025	7060A	0.01	1	JP	10/08/09 15:46	100	50
Iron	0.282	mg/L	0.050	6010B		1	SVD	10/06/09 19:40	100	50
Lead	ND	mg/L	0.010	6010B	0.015	1	SVD	10/06/09 19:40	100	50



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SW - U S  
Date Sampled: 10/02/09 09:00  
Percent Solids: N/A

ESS Laboratory Work Order: 0910039  
ESS Laboratory Sample ID: 0910039-01  
Sample Matrix: Surface Water

### 3005A/6000/7000 Total Metals

R1 - GA

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	ND	mg/L	0.0025	7060A	0.01	1	JP	10/08/09 15:28	100	50
Iron	0.430	mg/L	0.050	6010B		1	SVD	10/06/09 19:27	100	50
Lead	ND	mg/L	0.010	6010B	0.015	1	SVD	10/06/09 19:27	100	50



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SW - D S  
 Date Sampled: 10/02/09 09:15  
 Percent Solids: N/A

ESS Laboratory Work Order: 0910039  
 ESS Laboratory Sample ID: 0910039-02  
 Sample Matrix: Surface Water

### 3005A/6000/7000 Dissolved Metals

RI - GA

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	ND	mg/L	0.0025	7060A	0.01	1	JP	10/08/09 15:52	100	50
Iron	0.232	mg/L	0.050	6010B		1	SVD	10/06/09 19:52	100	50
Lead	ND	mg/L	0.010	6010B	0.015	1	SVD	10/06/09 19:52	100	50



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SW - D S  
 Date Sampled: 10/02/09 09:15  
 Percent Solids: N/A

ESS Laboratory Work Order: 0910039  
 ESS Laboratory Sample ID: 0910039-02  
 Sample Matrix: Surface Water

### 3005A/6000/7000 Total Metals

R1 - GA

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	ND	mg/L	0.0025	7060A	0.01	1	JP	10/08/09 15:34	100	50
Iron	0.394	mg/L	0.050	6010B		1	SVD	10/06/09 19:31	100	50
Lead	ND	mg/L	0.010	6010B	0.015	1	SVD	10/06/09 19:31	100	50



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SW - S L  
Date Sampled: 10/02/09 09:35  
Percent Solids: N/A

ESS Laboratory Work Order: 0910039  
ESS Laboratory Sample ID: 0910039-03  
Sample Matrix: Surface Water

### 3005A/6000/7000 Dissolved Metals

RI - GA

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	ND	mg/L	0.0025	7060A	0.01	1	JP	10/08/09 15:58	100	50
Iron	4.07	mg/L	0.050	6010B		1	SVD	10/06/09 19:57	100	50
Lead	ND	mg/L	0.010	6010B	0.015	1	SVD	10/06/09 19:57	100	50



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SW - S L  
Date Sampled: 10/02/09 09:35  
Percent Solids: N/A

ESS Laboratory Work Order: 0910039  
ESS Laboratory Sample ID: 0910039-03  
Sample Matrix: Surface Water

### 3005A/6000/7000 Total Metals

RI - GA

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	ND	mg/L	0.0025	7060A	0.01	1	JP	10/08/09 15:40	100	50
Iron	7.00	mg/L	0.050	6010B		1	SVD	10/06/09 19:35	100	50
Lead	ND	mg/L	0.010	6010B	0.015	1	SVD	10/06/09 19:35	100	50





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SW - S L  
 Date Sampled: 10/02/09 09:35  
 Percent Solids: N/A  
 Initial Volume: 10  
 Final Volume: 10  
 Extraction Method: 5030B

ESS Laboratory Work Order: 0910039  
 ESS Laboratory Sample ID: 0910039-03  
 Sample Matrix: Surface Water  
 Analyst: MD

### 8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>RI - GA</u>		<u>Analyzed</u>
				<u>Limit</u>	<u>DF</u>	
1,1,1,2-Tetrachloroethane	ND	mg/L	0.0010		1	10/06/09 13:10
1,1,1-Trichloroethane	ND	mg/L	0.0010	0.2	1	10/06/09 13:10
1,1,2,2-Tetrachloroethane	ND	mg/L	0.0005		1	10/06/09 13:10
1,1,2-Trichloroethane	ND	mg/L	0.0010	0.005	1	10/06/09 13:10
1,1-Dichloroethane	ND	mg/L	0.0010		1	10/06/09 13:10
1,1-Dichloroethene	ND	mg/L	0.0010	0.007	1	10/06/09 13:10
1,1-Dichloropropene	ND	mg/L	0.0020		1	10/06/09 13:10
1,2,3-Trichlorobenzene	ND	mg/L	0.0010		1	10/06/09 13:10
1,2,3-Trichloropropane	ND	mg/L	0.0010		1	10/06/09 13:10
1,2,4-Trichlorobenzene	ND	mg/L	0.0010	0.07	1	10/06/09 13:10
1,2,4-Trimethylbenzene	ND	mg/L	0.0010		1	10/06/09 13:10
1,2-Dibromo-3-Chloropropane	ND	mg/L	0.0050	0.0002	1	10/06/09 13:10
1,2-Dibromoethane	ND	mg/L	0.0010	0.00005	1	10/06/09 13:10
1,2-Dichlorobenzene	ND	mg/L	0.0010	0.6	1	10/06/09 13:10
1,2-Dichloroethane	ND	mg/L	0.0010	0.005	1	10/06/09 13:10
1,2-Dichloropropane	ND	mg/L	0.0010	0.005	1	10/06/09 13:10
1,3,5-Trimethylbenzene	ND	mg/L	0.0010		1	10/06/09 13:10
1,3-Dichlorobenzene	ND	mg/L	0.0010	0.6	1	10/06/09 13:10
1,3-Dichloropropane	ND	mg/L	0.0010		1	10/06/09 13:10
1,4-Dichlorobenzene	ND	mg/L	0.0010	0.075	1	10/06/09 13:10
1,4-Dioxane - Screen	ND	mg/L	0.500		1	10/06/09 13:10
1-Chlorohexane	ND	mg/L	0.0010		1	10/06/09 13:10
2,2-Dichloropropane	ND	mg/L	0.0010		1	10/06/09 13:10
2-Butanone	ND	mg/L	0.0250		1	10/06/09 13:10
2-Chlorotoluene	ND	mg/L	0.0010		1	10/06/09 13:10
2-Hexanone	ND	mg/L	0.0100		1	10/06/09 13:10
4-Chlorotoluene	ND	mg/L	0.0010		1	10/06/09 13:10
4-Isopropyltoluene	ND	mg/L	0.0010		1	10/06/09 13:10
4-Methyl-2-Pentanone	ND	mg/L	0.0250		1	10/06/09 13:10
Acetone	ND	mg/L	0.0250		1	10/06/09 13:10
Benzene	ND	mg/L	0.0010	0.005	1	10/06/09 13:10
Bromobenzene	ND	mg/L	0.0020		1	10/06/09 13:10
Bromochloromethane	ND	mg/L	0.0010		1	10/06/09 13:10
Bromodichloromethane	ND	mg/L	0.0006		1	10/06/09 13:10
Bromoform	ND	mg/L	0.0010		1	10/06/09 13:10



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SW - S L  
 Date Sampled: 10/02/09 09:35  
 Percent Solids: N/A  
 Initial Volume: 10  
 Final Volume: 10  
 Extraction Method: 5030B

ESS Laboratory Work Order: 0910039  
 ESS Laboratory Sample ID: 0910039-03  
 Sample Matrix: Surface Water  
 Analyst: MD

### 8260B Volatile Organic Compounds

Bromomethane	ND	mg/L	0.0020		1	10/06/09 13:10
Carbon Disulfide	ND	mg/L	0.0010		1	10/06/09 13:10
Carbon Tetrachloride	ND	mg/L	0.0010	0.005	1	10/06/09 13:10
Chlorobenzene	ND	mg/L	0.0010	0.1	1	10/06/09 13:10
Chloroethane	ND	mg/L	0.0020		1	10/06/09 13:10
Chloroform	ND	mg/L	0.0010		1	10/06/09 13:10
Chloromethane	ND	mg/L	0.0020		1	10/06/09 13:10
cis-1,2-Dichloroethene	ND	mg/L	0.0010	0.07	1	10/06/09 13:10
cis-1,3-Dichloropropene	ND	mg/L	0.0004		1	10/06/09 13:10
Dibromochloromethane	ND	mg/L	0.0010		1	10/06/09 13:10
Dibromomethane	ND	mg/L	0.0010		1	10/06/09 13:10
Dichlorodifluoromethane	ND	mg/L	0.0020		1	10/06/09 13:10
Diethyl Ether	ND	mg/L	0.0010		1	10/06/09 13:10
Di-isopropyl ether	ND	mg/L	0.0010		1	10/06/09 13:10
Ethyl tertiary-butyl ether	ND	mg/L	0.0010		1	10/06/09 13:10
Ethylbenzene	ND	mg/L	0.0010	0.7	1	10/06/09 13:10
Hexachlorobutadiene	ND	mg/L	0.0006		1	10/06/09 13:10
Hexachloroethane	ND	mg/L	0.0010		1	10/06/09 13:10
Isopropylbenzene	ND	mg/L	0.0010		1	10/06/09 13:10
Methyl tert-Butyl Ether	ND	mg/L	0.0010	0.04	1	10/06/09 13:10
Methylene Chloride	ND	mg/L	0.0040	0.005	1	10/06/09 13:10
Naphthalene	ND	mg/L	0.0010	0.02	1	10/06/09 13:10
n-Butylbenzene	ND	mg/L	0.0010		1	10/06/09 13:10
n-Propylbenzene	ND	mg/L	0.0010		1	10/06/09 13:10
sec-Butylbenzene	ND	mg/L	0.0010		1	10/06/09 13:10
Styrene	ND	mg/L	0.0010	0.1	1	10/06/09 13:10
tert-Butylbenzene	ND	mg/L	0.0010		1	10/06/09 13:10
Tertiary-amyl methyl ether	ND	mg/L	0.0010		1	10/06/09 13:10
Tetrachloroethene	ND	mg/L	0.0010	0.005	1	10/06/09 13:10
Tetrahydrofuran	ND	mg/L	0.0050		1	10/06/09 13:10
Toluene	ND	mg/L	0.0010	1	1	10/06/09 13:10
trans-1,2-Dichloroethene	ND	mg/L	0.0010	0.1	1	10/06/09 13:10
trans-1,3-Dichloropropene	ND	mg/L	0.0004		1	10/06/09 13:10
Trichloroethene	ND	mg/L	0.0010	0.005	1	10/06/09 13:10
Trichlorofluoromethane	ND	mg/L	0.0010		1	10/06/09 13:10
Vinyl Acetate	ND	mg/L	0.0050		1	10/06/09 13:10



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SW - S L  
 Date Sampled: 10/02/09 09:35  
 Percent Solids: N/A  
 Initial Volume: 10  
 Final Volume: 10  
 Extraction Method: 5030B

ESS Laboratory Work Order: 0910039  
 ESS Laboratory Sample ID: 0910039-03  
 Sample Matrix: Surface Water  
 Analyst: MD

### 8260B Volatile Organic Compounds

Vinyl Chloride	ND	mg/L	0.0010	0.002	1	10/06/09 13:10
Xylene O	ND	mg/L	0.0010	10	1	10/06/09 13:10
Xylene P,M	ND	mg/L	0.0020	10	1	10/06/09 13:10
Xylenes (Total)	ND	mg/L	0.0030	10	1	10/06/09 13:10
Trihalomethanes (Total)	ND	mg/L	0.0036	0.1		10/06/09 13:10

	%Recovery	Qualifier	Limits
Surrogate 1,2-Dichloroethane-d4	112 %		70-130
Surrogate 4-Bromofluorobenzene	109 %		70-130
Surrogate Dibromofluoromethane	110 %		70-130
Surrogate Toluene-d8	113 %		70-130



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SW - S L  
 Date Sampled: 10/02/09 09:35  
 Percent Solids: N/A  
 Initial Volume: 1000  
 Final Volume: 1  
 Extraction Method: 3520C

ESS Laboratory Work Order: 0910039  
 ESS Laboratory Sample ID: 0910039-03  
 Sample Matrix: Surface Water  
 Analyst: IBM  
 Prepared: 10/7/09 20:00

### 8270C Semi-Volatile Organic Compounds

RI - GA

Analyte	Results	Units	MRL	Limit	DF	Analyzed
1,1-Biphenyl	ND	mg/L	0.010		1	10/08/09 18:05
1,2,4-Trichlorobenzene	ND	mg/L	0.010	0.07	1	10/08/09 18:05
1,2-Dichlorobenzene	ND	mg/L	0.010	0.6	1	10/08/09 18:05
1,3-Dichlorobenzene	ND	mg/L	0.010	0.6	1	10/08/09 18:05
1,4-Dichlorobenzene	ND	mg/L	0.010	0.075	1	10/08/09 18:05
2,3,4,6-Tetrachlorophenol	ND	mg/L	0.050		1	10/08/09 18:05
2,4,5-Trichlorophenol	ND	mg/L	0.010		1	10/08/09 18:05
2,4,6-Trichlorophenol	ND	mg/L	0.010		1	10/08/09 18:05
2,4-Dichlorophenol	ND	mg/L	0.010		1	10/08/09 18:05
2,4-Dimethylphenol	ND	mg/L	0.050		1	10/08/09 18:05
2,4-Dinitrophenol	ND	mg/L	0.050		1	10/08/09 18:05
2,4-Dinitrotoluene	ND	mg/L	0.010		1	10/08/09 18:05
2,6-Dinitrotoluene	ND	mg/L	0.010		1	10/08/09 18:05
2-Chloronaphthalene	ND	mg/L	0.010		1	10/08/09 18:05
2-Chlorophenol	ND	mg/L	0.010		1	10/08/09 18:05
2-Methylphenol	ND	mg/L	0.010		1	10/08/09 18:05
2-Nitroaniline	ND	mg/L	0.010		1	10/08/09 18:05
2-Nitrophenol	ND	mg/L	0.010		1	10/08/09 18:05
3,3'-Dichlorobenzidine	ND	mg/L	0.020		1	10/08/09 18:05
3-4-Methylphenol	ND	mg/L	0.020		1	10/08/09 18:05
3-Nitroaniline	ND	mg/L	0.010		1	10/08/09 18:05
4,6-Dinitro-2-Methylphenol	ND	mg/L	0.050		1	10/08/09 18:05
4-Bromophenyl-phenylether	ND	mg/L	0.010		1	10/08/09 18:05
4-Chloro-3-Methylphenol	ND	mg/L	0.010		1	10/08/09 18:05
4-Chloroaniline	ND	mg/L	0.020		1	10/08/09 18:05
4-Chloro-phenyl-phenyl ether	ND	mg/L	0.010		1	10/08/09 18:05
4-Nitroaniline	ND	mg/L	0.010		1	10/08/09 18:05
4-Nitrophenol	ND	mg/L	0.050		1	10/08/09 18:05
Acetophenone	ND	mg/L	0.010		1	10/08/09 18:05
Aniline	ND	mg/L	0.010		1	10/08/09 18:05
Azobenzene	ND	mg/L	0.020		1	10/08/09 18:05
Benzoic Acid	ND	mg/L	0.100		1	10/08/09 18:05
Benzyl Alcohol	ND	mg/L	0.010		1	10/08/09 18:05
bis(2-Chloroethoxy)methane	ND	mg/L	0.010		1	10/08/09 18:05
bis(2-Chloroethyl)ether	ND	mg/L	0.010		1	10/08/09 18:05



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SW - S L  
 Date Sampled: 10/02/09 09:35  
 Percent Solids: N/A  
 Initial Volume: 1000  
 Final Volume: 1  
 Extraction Method: 3520C

ESS Laboratory Work Order: 0910039  
 ESS Laboratory Sample ID: 0910039-03  
 Sample Matrix: Surface Water  
 Analyst: IBM  
 Prepared: 10/7/09 20:00

### 8270C Semi-Volatile Organic Compounds

bis(2-chloroisopropyl)Ether	ND	mg/L	0.010		1	10/08/09 18:05
bis(2-Ethylhexyl)phthalate	ND	mg/L	0.006	0.006	1	10/08/09 18:05
Butylbenzylphthalate	ND	mg/L	0.010		1	10/08/09 18:05
Carbazole	ND	mg/L	0.010		1	10/08/09 18:05
Dibenzofuran	ND	mg/L	0.010		1	10/08/09 18:05
Diethylphthalate	ND	mg/L	0.010		1	10/08/09 18:05
Dimethylphthalate	ND	mg/L	0.010		1	10/08/09 18:05
Di-n-butylphthalate	ND	mg/L	0.010		1	10/08/09 18:05
Di-n-octylphthalate	ND	mg/L	0.010		1	10/08/09 18:05
Hexachlorobutadiene	ND	mg/L	0.010		1	10/08/09 18:05
Hexachlorocyclopentadiene	ND	mg/L	0.025		1	10/08/09 18:05
Hexachloroethane	ND	mg/L	0.005		1	10/08/09 18:05
Isophorone	ND	mg/L	0.010		1	10/08/09 18:05
Nitrobenzene	ND	mg/L	0.010		1	10/08/09 18:05
N-Nitrosodimethylamine	ND	mg/L	0.010		1	10/08/09 18:05
N-Nitroso-Di-n-Propylamine	ND	mg/L	0.010		1	10/08/09 18:05
N-nitrosodiphenylamine	ND	mg/L	0.010		1	10/08/09 18:05
Phenol	ND	mg/L	0.010		1	10/08/09 18:05
Pyridine	ND	mg/L	0.100		1	10/08/09 18:05

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	79 %		30-130
Surrogate: 2,4,6-Tribromophenol	89 %		15-110
Surrogate: 2-Chlorophenol-d4	66 %		15-110
Surrogate: 2-Fluorobiphenyl	85 %		30-130
Surrogate: 2-Fluorophenol	51 %		15-110
Surrogate: Nitrobenzene-d5	79 %		30-130
Surrogate: Phenol-d6	63 %		15-110
Surrogate: p-Terphenyl-d14	86 %		30-130



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SW - S L  
 Date Sampled: 10/02/09 09:35  
 Percent Solids: N/A  
 Initial Volume: 1000  
 Final Volume: 0.25  
 Extraction Method: 3510C

ESS Laboratory Work Order: 0910039  
 ESS Laboratory Sample ID: 0910039-03  
 Sample Matrix: Surface Water  
 Analyst: IBM  
 Prepared: 10/8/09 15:00

### 8270C(SIM) Semi-Volatile Organic Compounds

Analyte	Results	Units	MRL	RI - GA		Analyzed
				Limit	DF	
2-Methylnaphthalene	ND	mg/L	0.00020		1	10/09/09 1:18
Acenaphthene	ND	mg/L	0.00020		1	10/09/09 1:18
Acenaphthylene	ND	mg/L	0.00020		1	10/09/09 1:18
Anthracene	ND	mg/L	0.00020		1	10/09/09 1:18
Benzo(a)anthracene	ND	mg/L	0.00005		1	10/09/09 1:18
Benzo(a)pyrene	ND	mg/L	0.00005	0.0002	1	10/09/09 1:18
Benzo(b)fluoranthene	ND	mg/L	0.00005		1	10/09/09 1:18
Benzo(g,h,i)perylene	ND	mg/L	0.00020		1	10/09/09 1:18
Benzo(k)fluoranthene	ND	mg/L	0.00005		1	10/09/09 1:18
Chrysene	ND	mg/L	0.00005		1	10/09/09 1:18
Dibenzo(a,h)Anthracene	ND	mg/L	0.00005		1	10/09/09 1:18
Fluoranthene	ND	mg/L	0.00020		1	10/09/09 1:18
Fluorene	ND	mg/L	0.00020		1	10/09/09 1:18
Hexachlorobenzene	ND	mg/L	0.00020	0.001	1	10/09/09 1:18
Indeno(1,2,3-cd)Pyrene	ND	mg/L	0.00005		1	10/09/09 1:18
Naphthalene	ND	mg/L	0.00020	0.02	1	10/09/09 1:18
Pentachlorophenol	ND	mg/L	0.00100	0.001	1	10/09/09 1:18
Phenanthrene	ND	mg/L	0.00020		1	10/09/09 1:18
Pyrene	ND	mg/L	0.00020		1	10/09/09 1:18

	% Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	56 %		30-130
Surrogate: 2,4,6-Tribromophenol	77 %		15-110
Surrogate: 2-Fluorobiphenyl	56 %		30-130
Surrogate: Nitrobenzene-d5	58 %		30-130
Surrogate: p-Terphenyl-d14	89 %		30-130



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: Trip Blank  
 Date Sampled: 10/02/09 00:00  
 Percent Solids: N/A  
 Initial Volume: 10  
 Final Volume: 10  
 Extraction Method: 5030B

ESS Laboratory Work Order: 0910039  
 ESS Laboratory Sample ID: 0910039-04  
 Sample Matrix: Aqueous  
 Analyst: MD

### 8260B Volatile Organic Compounds

Analyte	Results	Units	MRL	RI - GA		Analyzed
				Limit	DF	
1,1,1,2-Tetrachloroethane	ND	mg/L	0.0010		1	10/06/09 12:38
1,1,1-Trichloroethane	ND	mg/L	0.0010		1	10/06/09 12:38
1,1,2,2-Tetrachloroethane	ND	mg/L	0.0005		1	10/06/09 12:38
1,1,2-Trichloroethane	ND	mg/L	0.0010		1	10/06/09 12:38
1,1-Dichloroethane	ND	mg/L	0.0010		1	10/06/09 12:38
1,1-Dichloroethene	ND	mg/L	0.0010		1	10/06/09 12:38
1,1-Dichloropropene	ND	mg/L	0.0020		1	10/06/09 12:38
1,2,3-Trichlorobenzene	ND	mg/L	0.0010		1	10/06/09 12:38
1,2,3-Trichloropropane	ND	mg/L	0.0010		1	10/06/09 12:38
1,2,4-Trichlorobenzene	ND	mg/L	0.0010		1	10/06/09 12:38
1,2,4-Trimethylbenzene	ND	mg/L	0.0010		1	10/06/09 12:38
1,2-Dibromo-3-Chloropropane	ND	mg/L	0.0050		1	10/06/09 12:38
1,2-Dibromoethane	ND	mg/L	0.0010		1	10/06/09 12:38
1,2-Dichlorobenzene	ND	mg/L	0.0010		1	10/06/09 12:38
1,2-Dichloroethane	ND	mg/L	0.0010		1	10/06/09 12:38
1,2-Dichloropropane	ND	mg/L	0.0010		1	10/06/09 12:38
1,3,5-Trimethylbenzene	ND	mg/L	0.0010		1	10/06/09 12:38
1,3-Dichlorobenzene	ND	mg/L	0.0010		1	10/06/09 12:38
1,3-Dichloropropane	ND	mg/L	0.0010		1	10/06/09 12:38
1,4-Dichlorobenzene	ND	mg/L	0.0010		1	10/06/09 12:38
1,4-Dioxane - Screen	ND	mg/L	0.500		1	10/06/09 12:38
1-Chlorohexane	ND	mg/L	0.0010		1	10/06/09 12:38
2,2-Dichloropropane	ND	mg/L	0.0010		1	10/06/09 12:38
2-Butanone	ND	mg/L	0.0250		1	10/06/09 12:38
2-Chlorotoluene	ND	mg/L	0.0010		1	10/06/09 12:38
2-Hexanone	ND	mg/L	0.0100		1	10/06/09 12:38
4-Chlorotoluene	ND	mg/L	0.0010		1	10/06/09 12:38
4-Isopropyltoluene	ND	mg/L	0.0010		1	10/06/09 12:38
4-Methyl-2-Pentanone	ND	mg/L	0.0250		1	10/06/09 12:38
Acetone	ND	mg/L	0.0250		1	10/06/09 12:38
Benzene	ND	mg/L	0.0010		1	10/06/09 12:38
Bromobenzene	ND	mg/L	0.0020		1	10/06/09 12:38
Bromochloromethane	ND	mg/L	0.0010		1	10/06/09 12:38
Bromodichloromethane	ND	mg/L	0.0006		1	10/06/09 12:38
Bromoform	ND	mg/L	0.0010		1	10/06/09 12:38



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: Trip Blank  
Date Sampled: 10/02/09 00:00  
Percent Solids: N/A  
Initial Volume: 10  
Final Volume: 10  
Extraction Method: 5030B

ESS Laboratory Work Order: 0910039  
ESS Laboratory Sample ID: 0910039-04  
Sample Matrix: Aqueous  
Analyst: MD

### 8260B Volatile Organic Compounds

Bromomethane	ND	mg/L	0.0020	1	10/06/09 12:38
Carbon Disulfide	ND	mg/L	0.0010	1	10/06/09 12:38
Carbon Tetrachloride	ND	mg/L	0.0010	1	10/06/09 12:38
Chlorobenzene	ND	mg/L	0.0010	1	10/06/09 12:38
Chloroethane	ND	mg/L	0.0020	1	10/06/09 12:38
Chloroform	ND	mg/L	0.0010	1	10/06/09 12:38
Chloromethane	ND	mg/L	0.0020	1	10/06/09 12:38
cis-1,2-Dichloroethene	ND	mg/L	0.0010	1	10/06/09 12:38
cis-1,3-Dichloropropene	ND	mg/L	0.0004	1	10/06/09 12:38
Dibromochloromethane	ND	mg/L	0.0010	1	10/06/09 12:38
Dibromomethane	ND	mg/L	0.0010	1	10/06/09 12:38
Dichlorodifluoromethane	ND	mg/L	0.0020	1	10/06/09 12:38
Diethyl Ether	ND	mg/L	0.0010	1	10/06/09 12:38
Di-isopropyl ether	ND	mg/L	0.0010	1	10/06/09 12:38
Ethyl tertiary-butyl ether	ND	mg/L	0.0010	1	10/06/09 12:38
Ethylbenzene	ND	mg/L	0.0010	1	10/06/09 12:38
Hexachlorobutadiene	ND	mg/L	0.0006	1	10/06/09 12:38
Hexachloroethane	ND	mg/L	0.0010	1	10/06/09 12:38
Isopropylbenzene	ND	mg/L	0.0010	1	10/06/09 12:38
Methyl tert-Butyl Ether	ND	mg/L	0.0010	1	10/06/09 12:38
Methylene Chloride	ND	mg/L	0.0040	1	10/06/09 12:38
Naphthalene	ND	mg/L	0.0010	1	10/06/09 12:38
n-Butylbenzene	ND	mg/L	0.0010	1	10/06/09 12:38
n-Propylbenzene	ND	mg/L	0.0010	1	10/06/09 12:38
sec-Butylbenzene	ND	mg/L	0.0010	1	10/06/09 12:38
Styrene	ND	mg/L	0.0010	1	10/06/09 12:38
tert-Butylbenzene	ND	mg/L	0.0010	1	10/06/09 12:38
Tertiary-amyl methyl ether	ND	mg/L	0.0010	1	10/06/09 12:38
Tetrachloroethene	ND	mg/L	0.0010	1	10/06/09 12:38
Tetrahydrofuran	ND	mg/L	0.0050	1	10/06/09 12:38
Toluene	ND	mg/L	0.0010	1	10/06/09 12:38
trans-1,2-Dichloroethene	ND	mg/L	0.0010	1	10/06/09 12:38
trans-1,3-Dichloropropene	ND	mg/L	0.0005	1	10/06/09 12:38
Trichloroethene	ND	mg/L	0.0010	1	10/06/09 12:38
Trichlorofluoromethane	ND	mg/L	0.0010	1	10/06/09 12:38
Vinyl Acetate	ND	mg/L	0.0050	1	10/06/09 12:38





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: Trip Blank  
Date Sampled: 10/02/09 00:00  
Percent Solids: N/A  
Initial Volume: 10  
Final Volume: 10  
Extraction Method: 5030B

ESS Laboratory Work Order: 0910039  
ESS Laboratory Sample ID: 0910039-04  
Sample Matrix: Aqueous  
Analyst: MD

### 8260B Volatile Organic Compounds

Vinyl Chloride	ND	mg/L	0.0010	1	10/06/09 12:38
Xylene O	ND	mg/L	0.0010	1	10/06/09 12:38
Xylene P,M	ND	mg/L	0.0020	1	10/06/09 12:38

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	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichloroethane-d4	114 %		70-130
Surrogate: 4-Bromofluorobenzene	110 %		70-130
Surrogate: Dibromofluoromethane	110 %		70-130
Surrogate: Toluene-d8	114 %		70-130



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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#### 3005A/6000/7000 Dissolved Metals

Batch BJ90604 - 3005A

Blank										
Arsenic	ND	0.0025	mg/L							
Iron	ND	0.050	mg/L							
Lead	ND	0.010	mg/L							
LCS										
Iron	1.28	0.050	mg/L	1.250		102	80-120			
Lead	0.255	0.010	mg/L	0.2500		102	80-120			
LCS										
Arsenic	0.0108	0.0025	mg/L	0.01000		108	80-120			
LCS Dup										
Iron	1.29	0.050	mg/L	1.250		103	80-120	0.5	20	
Lead	0.258	0.010	mg/L	0.2500		103	80-120	1	20	
LCS Dup										
Arsenic	0.0104	0.0025	mg/L	0.01000		104	80-120	4	20	

#### 3005A/6000/7000 Total Metals

Batch BJ90604 - 3005A

Blank										
Arsenic	ND	0.0025	mg/L							
Iron	ND	0.050	mg/L							
Lead	ND	0.010	mg/L							
LCS										
Iron	1.28	0.050	mg/L	1.250		102	80-120			
Lead	0.255	0.010	mg/L	0.2500		102	80-120			
LCS										
Arsenic	0.0108	0.0025	mg/L	0.01000		108	80-120			
LCS Dup										
Iron	1.29	0.050	mg/L	1.250		103	80-120	0.5	20	
Lead	0.258	0.010	mg/L	0.2500		103	80-120	1	20	
LCS Dup										
Arsenic	0.0104	0.0025	mg/L	0.01000		104	80-120	4	20	

#### 8260B Volatile Organic Compounds

Batch BJ90610 - 9030B

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							



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8260B Volatile Organic Compounds										
Batch B390610 - 50308										
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							
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	0.0250	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	0.0250	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							



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lacc & Braid Site

ESS Laboratory Work Order: 0910039

### 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 B390610 - 50308

Methyl Tert-Butyl Ether	ND	0.0010	mg/L							
Methylene Chloride	ND	0.0040	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-amy methyl ether	ND	0.0010	mg/L							
Tetrachloroethene	ND	0.0010	mg/L							
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							
Surrogate: 1,2-Dichloroethane-d4	0.0294		mg/L	0.02500		118	70-130			
Surrogate: 4-Bromofluorobenzene	0.0267		mg/L	0.02500		107	70-130			
Surrogate: Dibromofluoromethane	0.0277		mg/L	0.02500		111	70-130			
Surrogate: Toluene-d8	0.0282		mg/L	0.02500		113	70-130			
LCS										
1,1,1,2-Tetrachloroethane	9.09		ug/L	10.00		91	70-130			
1,1,1-Trichloroethane	10.0		ug/L	10.00		100	70-130			
1,1,2,2-Tetrachloroethane	10.1		ug/L	10.00		101	70-130			
1,1,2-Trichloroethane	9.95		ug/L	10.00		100	70-130			
1,1-Dichloroethane	10.5		ug/L	10.00		105	70-130			
1,1-Dichloroethene	9.96		ug/L	10.00		100	70-130			
1,1-Dichloropropene	9.48		ug/L	10.00		95	70-130			
1,2,3-Trichlorobenzene	11.2		ug/L	10.00		112	70-130			
1,2,3-Trichloropropane	10.2		ug/L	10.00		102	70-130			
1,2,4-Trichlorobenzene	9.94		ug/L	10.00		99	70-130			
1,2,4-Trimethylbenzene	9.50		ug/L	10.00		95	70-130			
1,2-Dibromo-3-Chloropropane	10.1		ug/L	10.00		101	70-130			
1,2-Dibromoethane	8.57		ug/L	10.00		86	70-130			
1,2-Dichlorobenzene	9.83		ug/L	10.00		98	70-130			
1,2-Dichloroethane	9.81		ug/L	10.00		98	70-130			
1,2-Dichloropropane	10.2		ug/L	10.00		102	70-130			
1,3,5-Trimethylbenzene	9.31		ug/L	10.00		93	70-130			
1,3-Dichlorobenzene	10.0		ug/L	10.00		100	70-130			
1,3-Dichloropropane	9.25		ug/L	10.00		92	70-130			
1,4-Dichlorobenzene	9.87		ug/L	10.00		98	70-130			
1,4-Dioxane - Screen	754		ug/L	200.0		377	0-332			B+



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>8260B Volatile Organic Compounds</b>										
Batch B390610 - 50308										
1-Chlorohexane	7.61		ug/L	10.00		76	70-130			
2,2-Dichloropropane	9.59		ug/L	10.00		96	70-130			
2-Butanone	50.1		ug/L	50.00		100	70-130			
2-Chlorotoluene	9.91		ug/L	10.00		99	70-130			
2-Hexanone	47.8		ug/L	50.00		96	70-130			
4-Chlorotoluene	9.53		ug/L	10.00		95	70-130			
4-Isopropyltoluene	9.19		ug/L	10.00		92	70-130			
4-Methyl-2-Pentanone	48.4		ug/L	50.00		97	70-130			
Acetone	54.8		ug/L	50.00		110	70-130			
Benzene	10.0		ug/L	10.00		100	70-130			
Bromobenzene	9.84		ug/L	10.00		98	70-130			
Bromochloromethane	9.90		ug/L	10.00		99	70-130			
Bromodichloromethane	9.97		ug/L	10.00		100	70-130			
Bromoform	8.59		ug/L	10.00		86	70-130			
Bromomethane	8.65		ug/L	10.00		86	70-130			
Carbon Disulfide	10.8		ug/L	10.00		108	70-130			
Carbon Tetrachloride	9.37		ug/L	10.00		94	70-130			
Chlorobenzene	8.92		ug/L	10.00		89	70-130			
Chloroethane	11.2		ug/L	10.00		112	70-130			
Chloroform	10.0		ug/L	10.00		100	70-130			
Chloromethane	10.5		ug/L	10.00		105	70-130			
cis-1,2-Dichloroethene	10.0		ug/L	10.00		100	70-130			
cis-1,3-Dichloropropene	9.85		ug/L	10.00		98	70-130			
Dibromochloromethane	8.87		ug/L	10.00		89	70-130			
Dibromomethane	9.70		ug/L	10.00		97	70-130			
Dichlorodifluoromethane	9.57		ug/L	10.00		96	70-130			
Diethyl Ether	10.1		ug/L	10.00		101	70-130			
Di-isopropyl ether	9.82		ug/L	10.00		98	70-130			
Ethyl tertiary-butyl ether	11.2		ug/L	10.00		112	70-130			
Ethylbenzene	8.45		ug/L	10.00		84	70-130			
Hexachlorobutadiene	10.2		ug/L	10.00		102	70-130			
Hexachloroethane	9.03		ug/L	10.00		90	70-130			
Isopropylbenzene	7.56		ug/L	10.00		76	70-130			
Methyl tert-Butyl Ether	10.0		ug/L	10.00		100	70-130			
Methylene Chloride	10.5		ug/L	10.00		105	70-130			
Naphthalene	9.05		ug/L	10.00		90	70-130			
n-Butylbenzene	9.46		ug/L	10.00		95	70-130			
n-Propylbenzene	8.87		ug/L	10.00		89	70-130			
sec-Butylbenzene	9.71		ug/L	10.00		97	70-130			
Styrene	8.11		ug/L	10.00		81	70-130			
tert-Butylbenzene	9.05		ug/L	10.00		90	70-130			
Tertiary-amy methyl ether	12.0		ug/L	10.00		120	70-130			
Tetrachloroethene	8.95		ug/L	10.00		90	70-130			
Tetrahydrofuran	10.1		ug/L	10.00		101	70-130			
Toluene	9.90		ug/L	10.00		99	70-130			
trans-1,2-Dichloroethene	10.4		ug/L	10.00		104	70-130			



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lacc & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>8260B Volatile Organic Compounds</b>										
<b>Batch B190610 - 50308</b>										
trans-1,3-Dichloropropene	8.74		ug/L	10.00		87	70-130			
Trichloroethene	9.86		ug/L	10.00		99	70-130			
Trichlorofluoromethane	8.66		ug/L	10.00		87	70-130			
Vinyl Acetate	10.3		ug/L	10.00		103	70-130			
Vinyl Chloride	10.1		ug/L	10.00		101	70-130			
Xylene O	8.63		ug/L	10.00		86	70-130			
Xylene P,M	17.3		ug/L	20.00		86	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0288		mg/L	0.02500		115	70-130			
Surrogate: 4-Bromofluorobenzene	0.0254		mg/L	0.02500		102	70-130			
Surrogate: Dibromofluoromethane	0.0285		mg/L	0.02500		114	70-130			
Surrogate: Toluene-d8	0.0264		mg/L	0.02500		106	70-130			
<b>LCS Dup</b>										
1,1,1,2-Tetrachloroethane	9.60		ug/L	10.00		96	70-130	5	25	
1,1,1-Trichloroethane	9.64		ug/L	10.00		96	70-130	4	25	
1,1,2,2-Tetrachloroethane	10.2		ug/L	10.00		102	70-130	1	25	
1,1,2-Trichloroethane	9.80		ug/L	10.00		98	70-130	2	25	
1,1-Dichloroethane	9.83		ug/L	10.00		98	70-130	7	25	
1,1-Dichloroethene	9.74		ug/L	10.00		97	70-130	2	25	
1,1-Dichloropropene	9.12		ug/L	10.00		91	70-130	4	25	
1,2,3-Trichlorobenzene	10.0		ug/L	10.00		100	70-130	11	25	
1,2,3-Trichloropropane	9.94		ug/L	10.00		99	70-130	2	25	
1,2,4-Trichlorobenzene	9.30		ug/L	10.00		93	70-130	7	25	
1,2,4-Trimethylbenzene	9.41		ug/L	10.00		94	70-130	1	25	
1,2-Dibromo-3-Chloropropane	10.7		ug/L	10.00		107	70-130	6	25	
1,2-Dibromoethane	9.34		ug/L	10.00		93	70-130	9	25	
1,2-Dichlorobenzene	9.71		ug/L	10.00		97	70-130	1	25	
1,2-Dichloroethane	9.68		ug/L	10.00		97	70-130	1	25	
1,2-Dichloropropane	9.98		ug/L	10.00		100	70-130	2	25	
1,3,5-Trimethylbenzene	9.40		ug/L	10.00		94	70-130	1	25	
1,3-Dichlorobenzene	9.75		ug/L	10.00		98	70-130	3	25	
1,3-Dichloropropane	10.0		ug/L	10.00		100	70-130	8	25	
1,4-Dichlorobenzene	9.69		ug/L	10.00		97	70-130	1	25	
1,4-Dioxane - Screen	438		ug/L	200.0		219	0-332	53	200	
1-Chlorohexane	8.32		ug/L	10.00		83	70-130	9	25	
2,2-Dichloropropane	9.27		ug/L	10.00		93	70-130	3	25	
2-Butanone	53.9		ug/L	50.00		108	70-130	7	25	
2-Chlorotoluene	9.64		ug/L	10.00		96	70-130	3	25	
2-Hexanone	53.2		ug/L	50.00		106	70-130	11	25	
4-Chlorotoluene	9.29		ug/L	10.00		93	70-130	3	25	
4-Isopropyltoluene	8.89		ug/L	10.00		89	70-130	3	25	
4-Methyl-2-Pentanone	50.8		ug/L	50.00		102	70-130	5	25	
Acetone	58.5		ug/L	50.00		117	70-130	7	25	
Benzene	9.57		ug/L	10.00		96	70-130	4	25	
Bromobenzene	9.54		ug/L	10.00		95	70-130	3	25	
Bromochloromethane	9.37		ug/L	10.00		94	70-130	6	25	
Bromodichloromethane	9.78		ug/L	10.00		98	70-130	2	25	



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### 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 B290610 - 50308

Bromoform	9.11		ug/L	10.00		91	70-130	6	25	
Bromomethane	8.07		ug/L	10.00		81	70-130	7	25	
Carbon Disulfide	10.7		ug/L	10.00		107	70-130	2	25	
Carbon Tetrachloride	9.19		ug/L	10.00		92	70-130	2	25	
Chlorobenzene	9.59		ug/L	10.00		96	70-130	7	25	
Chloroethane	10.6		ug/L	10.00		106	70-130	5	25	
Chloroform	9.63		ug/L	10.00		96	70-130	4	25	
Chloromethane	10.1		ug/L	10.00		101	70-130	4	25	
cis-1,2-Dichloroethene	9.61		ug/L	10.00		96	70-130	4	25	
cis-1,3-Dichloropropene	9.41		ug/L	10.00		94	70-130	5	25	
Dibromochloromethane	9.57		ug/L	10.00		96	70-130	8	25	
Dibromomethane	9.47		ug/L	10.00		95	70-130	2	25	
Dichlorodifluoromethane	9.52		ug/L	10.00		95	70-130	0.5	25	
Diethyl Ether	10.1		ug/L	10.00		101	70-130	0	25	
Di-isopropyl ether	9.92		ug/L	10.00		99	70-130	1	25	
Ethyl tertiary-butyl ether	11.0		ug/L	10.00		110	70-130	2	25	
Ethylbenzene	9.20		ug/L	10.00		92	70-130	8	25	
Hexachlorobutadiene	9.85		ug/L	10.00		98	70-130	3	25	
Hexachloroethane	9.03		ug/L	10.00		90	70-130	0	25	
Isopropylbenzene	7.51		ug/L	10.00		75	70-130	0.7	25	
Methyl tert-Butyl Ether	9.93		ug/L	10.00		99	70-130	1	25	
Methylene Chloride	10.4		ug/L	10.00		104	70-130	1	25	
Naphthalene	8.35		ug/L	10.00		84	70-130	8	25	
n-Butylbenzene	9.15		ug/L	10.00		92	70-130	3	25	
n-Propylbenzene	8.72		ug/L	10.00		87	70-130	2	25	
sec-Butylbenzene	9.51		ug/L	10.00		95	70-130	2	25	
Styrene	8.78		ug/L	10.00		88	70-130	8	25	
tert-Butylbenzene	9.01		ug/L	10.00		90	70-130	0.4	25	
Tertiary-amyl methyl ether	12.0		ug/L	10.00		120	70-130	0.08	25	
Tetrachloroethene	9.57		ug/L	10.00		96	70-130	7	25	
Tetrahydrofuran	11.1		ug/L	10.00		111	70-130	10	25	
Toluene	9.78		ug/L	10.00		98	70-130	1	25	
trans-1,2-Dichloroethene	9.85		ug/L	10.00		98	70-130	6	25	
trans-1,3-Dichloropropene	8.53		ug/L	10.00		85	70-130	2	25	
Trichloroethene	9.69		ug/L	10.00		97	70-130	2	25	
Trichlorofluoromethane	8.71		ug/L	10.00		87	70-130	0.6	25	
Vinyl Acetate	10.5		ug/L	10.00		105	70-130	2	25	
Vinyl Chloride	9.89		ug/L	10.00		99	70-130	2	25	
Xylene O	9.34		ug/L	10.00		93	70-130	8	25	
Xylene P,M	18.8		ug/L	20.00		94	70-130	8	25	
Surrogate: 1,2-Dichloroethane-d4	0.0287		mg/L	0.02500		115	70-130			
Surrogate: 4-Bromofluorobenzene	0.0277		mg/L	0.02500		111	70-130			
Surrogate: Dibromofluoromethane	0.0282		mg/L	0.02500		113	70-130			
Surrogate: Toluene-d8	0.0291		mg/L	0.02500		116	70-130			
Matrix Spike		Source: 0910039-03								
1,1,1,2-Tetrachloroethane	9.67		ug/L	10.00	ND	97	70-130			



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### 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 BJ90610 - 50308

1,1,1-Trichloroethane	9.89		ug/L	10.00	ND	99	70-130			
1,1,2,2-Tetrachloroethane	9.91		ug/L	10.00	ND	99	70-130			
1,1,2-Trichloroethane	9.78		ug/L	10.00	ND	98	70-130			
1,1-Dichloroethane	10.2		ug/L	10.00	ND	102	70-130			
1,1-Dichloroethene	9.90		ug/L	10.00	ND	99	70-130			
1,1-Dichloropropene	9.52		ug/L	10.00	ND	95	70-130			
1,2,3-Trichlorobenzene	8.12		ug/L	10.00	ND	81	70-130			
1,2,3-Trichloropropane	9.88		ug/L	10.00	ND	99	70-130			
1,2,4-Trichlorobenzene	7.79		ug/L	10.00	ND	78	70-130			
1,2,4-Trimethylbenzene	9.29		ug/L	10.00	ND	93	70-130			
1,2-Dibromo-3-Chloropropane	9.50		ug/L	10.00	ND	95	70-130			
1,2-Dibromoethane	9.13		ug/L	10.00	ND	91	70-130			
1,2-Dichlorobenzene	9.45		ug/L	10.00	ND	94	70-130			
1,2-Dichloroethane	9.77		ug/L	10.00	ND	98	70-130			
1,2-Dichloropropane	9.98		ug/L	10.00	ND	100	70-130			
1,3,5-Trimethylbenzene	9.16		ug/L	10.00	ND	92	70-130			
1,3-Dichlorobenzene	9.56		ug/L	10.00	ND	96	70-130			
1,3-Dichloropropane	10.1		ug/L	10.00	ND	101	70-130			
1,4-Dichlorobenzene	9.87		ug/L	10.00	0.130	97	70-130			
1,4-Dioxane - Screen	131		ug/L	200.0	ND	65	0-332			
1-Chlorohexane	8.21		ug/L	10.00	ND	82	70-130			
2,2-Dichloropropane	8.86		ug/L	10.00	ND	89	70-130			
2-Butanone	51.5		ug/L	50.00	ND	103	70-130			
2-Chlorotoluene	9.71		ug/L	10.00	ND	97	70-130			
2-Hexanone	51.2		ug/L	50.00	ND	102	70-130			
4-Chlorotoluene	9.45		ug/L	10.00	ND	94	70-130			
4-Isopropyltoluene	8.92		ug/L	10.00	ND	89	70-130			
4-Methyl-2-Pentanone	46.9		ug/L	50.00	ND	94	70-130			
Acetone	54.4		ug/L	50.00	ND	109	70-130			
Benzene	9.97		ug/L	10.00	ND	100	70-130			
Bromobenzene	9.50		ug/L	10.00	ND	95	70-130			
Bromochloromethane	9.46		ug/L	10.00	ND	95	70-130			
Bromodichloromethane	9.99		ug/L	10.00	ND	100	70-130			
Bromoform	8.81		ug/L	10.00	ND	88	70-130			
Bromomethane	6.20		ug/L	10.00	ND	62	70-130			M-
Carbon Disulfide	10.9		ug/L	10.00	ND	109	70-130			
Carbon Tetrachloride	9.68		ug/L	10.00	ND	97	70-130			
Chlorobenzene	9.70		ug/L	10.00	ND	97	70-130			
Chloroethane	11.3		ug/L	10.00	ND	113	70-130			
Chloroform	9.96		ug/L	10.00	ND	100	70-130			
Chloromethane	9.86		ug/L	10.00	ND	99	70-130			
cis-1,2-Dichloroethene	10.1		ug/L	10.00	0.400	97	70-130			
cis-1,3-Dichloropropene	9.34		ug/L	10.00	ND	93	70-130			
Dibromochloromethane	9.39		ug/L	10.00	ND	94	70-130			
Dibromomethane	9.58		ug/L	10.00	ND	96	70-130			
Dichlorodifluoromethane	9.83		ug/L	10.00	ND	98	70-130			





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>B260B Volatile Organic Compounds</b>										
<b>Batch BJ90610 - 50308</b>										
Diethyl Ether	9.88		ug/L	10.00	ND	99	70-130			
Di-isopropyl ether	9.63		ug/L	10.00	ND	96	70-130			
Ethyl tertiary-butyl ether	10.4		ug/L	10.00	ND	104	70-130			
Ethylbenzene	9.29		ug/L	10.00	ND	93	70-130			
Hexachlorobutadiene	8.54		ug/L	10.00	ND	85	70-130			
Hexachloroethane	8.92		ug/L	10.00	ND	89	70-130			
Isopropylbenzene	7.60		ug/L	10.00	ND	76	70-130			
Methyl tert-Butyl Ether	9.68		ug/L	10.00	0.170	95	70-130			
Methylene Chloride	10.2		ug/L	10.00	ND	102	70-130			
Naphthalene	6.73		ug/L	10.00	ND	67	70-130			M-
n-Butylbenzene	8.86		ug/L	10.00	ND	89	70-130			
n-Propylbenzene	8.80		ug/L	10.00	ND	88	70-130			
sec-Butylbenzene	9.42		ug/L	10.00	ND	94	70-130			
Styrene	8.64		ug/L	10.00	ND	86	70-130			
tert-Butylbenzene	8.88		ug/L	10.00	ND	89	70-130			
Tertiary-aryl methyl ether	10.8		ug/L	10.00	ND	108	70-130			
Tetrachloroethene	9.70		ug/L	10.00	ND	97	70-130			
Tetrahydrofuran	9.01		ug/L	10.00	ND	90	70-130			
Toluene	9.72		ug/L	10.00	ND	97	70-130			
trans-1,2-Dichloroethene	10.3		ug/L	10.00	ND	103	70-130			
trans-1,3-Dichloropropene	8.09		ug/L	10.00	ND	81	70-130			
Trichloroethene	10.4		ug/L	10.00	0.140	103	70-130			
Trichlorofluoromethane	8.83		ug/L	10.00	ND	88	70-130			
Vinyl Acetate	9.06		ug/L	10.00	ND	91	70-130			
Vinyl Chloride	9.84		ug/L	10.00	ND	98	70-130			
Xylene O	9.61		ug/L	10.00	ND	96	70-130			
Xylene P,M	18.9		ug/L	20.00	ND	95	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0286		mg/L	0.02500		114	70-130			
Surrogate: 4-Bromofluorobenzene	0.0275		mg/L	0.02500		110	70-130			
Surrogate: Dibromofluoromethane	0.0279		mg/L	0.02500		112	70-130			
Surrogate: Toluene-d8	0.0286		mg/L	0.02500		114	70-130			
<b>Matrix Spike Dup Source: 0910039-03</b>										
1,1,1,2-Tetrachloroethane	9.76		ug/L	10.00	ND	98	70-130	0.9	30	
1,1,1-Trichloroethane	9.84		ug/L	10.00	ND	98	70-130	0.5	30	
1,1,2,2-Tetrachloroethane	9.94		ug/L	10.00	ND	99	70-130	0.3	30	
1,1,2-Trichloroethane	10.0		ug/L	10.00	ND	100	70-130	2	30	
1,1-Dichloroethane	10.3		ug/L	10.00	ND	103	70-130	1	30	
1,1-Dichloroethene	10.1		ug/L	10.00	ND	101	70-130	2	30	
1,1-Dichloropropene	9.53		ug/L	10.00	ND	95	70-130	0.1	30	
1,2,3-Trichlorobenzene	9.26		ug/L	10.00	ND	93	70-130	13	30	
1,2,3-Trichloropropane	9.78		ug/L	10.00	ND	98	70-130	1	30	
1,2,4-Trichlorobenzene	8.66		ug/L	10.00	ND	87	70-130	11	30	
1,2,4-Trimethylbenzene	9.26		ug/L	10.00	ND	93	70-130	0.3	30	
1,2-Dibromo-3-Chloropropane	10.2		ug/L	10.00	ND	102	70-130	7	30	
1,2-Dibromoethane	9.57		ug/L	10.00	ND	96	70-130	5	30	
1,2-Dichlorobenzene	9.51		ug/L	10.00	ND	95	70-130	0.6	30	



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>8260B Volatile Organic Compounds</b>										
<b>Batch BJ90610 - 5030B</b>										
1,2-Dichloroethane	10.0		ug/L	10.00	ND	100	70-130	3	30	
1,2-Dichloropropane	9.97		ug/L	10.00	ND	100	70-130	0.1	30	
1,3,5-Trimethylbenzene	9.07		ug/L	10.00	ND	91	70-130	1	30	
1,3-Dichlorobenzene	9.68		ug/L	10.00	ND	97	70-130	1	30	
1,3-Dichloropropane	10.5		ug/L	10.00	ND	105	70-130	4	30	
1,4-Dichlorobenzene	9.99		ug/L	10.00	0.130	99	70-130	1	30	
1,4-Dioxane - Screen	344		ug/L	200.0	ND	172	0-332	90	200	
1-Chlorohexane	8.33		ug/L	10.00	ND	83	70-130	1	30	
2,2-Dichloropropane	8.84		ug/L	10.00	ND	88	70-130	0.2	30	
2-Butanone	51.9		ug/L	50.00	ND	104	70-130	0.8	30	
2-Chlorotoluene	9.62		ug/L	10.00	ND	96	70-130	0.9	30	
2-Hexanone	53.9		ug/L	50.00	ND	108	70-130	5	30	
4-Chlorotoluene	9.36		ug/L	10.00	ND	94	70-130	1	30	
4-Isopropyltoluene	9.02		ug/L	10.00	ND	90	70-130	1	30	
4-Methyl-2-Pentanone	50.0		ug/L	50.00	ND	100	70-130	6	30	
Acetone	57.5		ug/L	50.00	ND	115	70-130	6	30	
Benzene	9.93		ug/L	10.00	ND	99	70-130	0.4	30	
Bromobenzene	9.41		ug/L	10.00	ND	94	70-130	1	30	
Bromochloromethane	9.58		ug/L	10.00	ND	96	70-130	1	30	
Bromodichloromethane	10.0		ug/L	10.00	ND	100	70-130	0.5	30	
Bromoform	9.14		ug/L	10.00	ND	91	70-130	4	30	
Bromomethane	6.75		ug/L	10.00	ND	68	70-130	8	30	M
Carbon Disulfide	11.0		ug/L	10.00	ND	110	70-130	0.09	30	
Carbon Tetrachloride	9.41		ug/L	10.00	ND	94	70-130	3	30	
Chlorobenzene	9.79		ug/L	10.00	ND	98	70-130	0.9	30	
Chloroethane	11.8		ug/L	10.00	ND	118	70-130	5	30	
Chloroform	9.81		ug/L	10.00	ND	98	70-130	2	30	
Chloromethane	10.2		ug/L	10.00	ND	102	70-130	4	30	
cis-1,2-Dichloroethene	10.2		ug/L	10.00	0.400	98	70-130	0.9	30	
cis-1,3-Dichloropropene	9.57		ug/L	10.00	ND	96	70-130	2	30	
Dibromochloromethane	10.0		ug/L	10.00	ND	100	70-130	6	30	
Dibromomethane	9.74		ug/L	10.00	ND	97	70-130	2	30	
Dichlorodifluoromethane	10.1		ug/L	10.00	ND	101	70-130	3	30	
Diethyl Ether	10.2		ug/L	10.00	ND	102	70-130	3	30	
Di-Isopropyl ether	9.64		ug/L	10.00	ND	96	70-130	0.1	30	
Ethyl tert-butyl ether	10.6		ug/L	10.00	ND	106	70-130	2	30	
Ethylbenzene	9.43		ug/L	10.00	ND	94	70-130	1	30	
Hexachlorobutadiene	9.11		ug/L	10.00	ND	91	70-130	6	30	
Hexachloroethane	9.00		ug/L	10.00	ND	90	70-130	0.9	30	
Isopropylbenzene	7.50		ug/L	10.00	ND	75	70-130	1	30	
Methyl tert-Butyl Ether	9.80		ug/L	10.00	0.170	96	70-130	1	30	
Methylene Chloride	10.6		ug/L	10.00	ND	106	70-130	4	30	
Naphthalene	7.67		ug/L	10.00	ND	77	70-130	13	30	
n-Butylbenzene	9.44		ug/L	10.00	ND	94	70-130	6	30	
n-Propylbenzene	8.76		ug/L	10.00	ND	88	70-130	0.5	30	
sec-Butylbenzene	9.48		ug/L	10.00	ND	95	70-130	0.6	30	



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>8260B Volatile Organic Compounds</b>										
<b>Batch EJ90610 - 50308</b>										
Styrene	8.72		ug/L	10.00	ND	87	70-130	0.9	30	
tert-Butylbenzene	9.00		ug/L	10.00	ND	90	70-130	1	30	
Tertiary-aryl methyl ether	11.1		ug/L	10.00	ND	111	70-130	2	30	
Tetrachloroethene	9.98		ug/L	10.00	ND	100	70-130	3	30	
Tetrahydrofuran	9.55		ug/L	10.00	ND	96	70-130	6	30	
Toluene	9.85		ug/L	10.00	ND	98	70-130	1	30	
trans-1,2-Dichloroethene	10.2		ug/L	10.00	ND	102	70-130	0.7	30	
trans-1,3-Dichloropropene	8.23		ug/L	10.00	ND	82	70-130	2	30	
Trichloroethene	10.3		ug/L	10.00	0.140	101	70-130	2	30	
Trichlorofluoromethane	9.03		ug/L	10.00	ND	90	70-130	2	30	
Vinyl Acetate	9.75		ug/L	10.00	ND	98	70-130	7	30	
Vinyl Chloride	10.2		ug/L	10.00	ND	102	70-130	3	30	
Xylene O	9.73		ug/L	10.00	ND	97	70-130	1	30	
Xylene P,M	19.2		ug/L	20.00	ND	96	70-130	1	30	
Surrogate: 1,2-Dichloroethane-d4	0.0283		mg/L	0.02500		113	70-130			
Surrogate: 4-Bromofluorobenzene	0.0281		mg/L	0.02500		112	70-130			
Surrogate: Dibromofluoromethane	0.0280		mg/L	0.02500		112	70-130			
Surrogate: Toluene-d8	0.0289		mg/L	0.02500		116	70-130			

### 8270C Semi-Volatile Organic Compounds

Batch EJ90727 - 3520C

<b>Blank</b>			
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
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



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Luce & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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#### 8270C Semi-Volatile Organic Compounds

Batch BJ90727 - 3520C

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							
Azabenzene	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							
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	0.0693		mg/L	0.1000		69	30-130			
Surrogate 2,4,6-Trinitrophenol	0.108		mg/L	0.1500		72	15-110			
Surrogate 2-Chlorophenol-d4	0.0967		mg/L	0.1500		64	15-110			
Surrogate 2-Fluorobiphenyl	0.0778		mg/L	0.1000		78	30-130			
Surrogate 2-Fluorophenol	0.0822		mg/L	0.1500		55	15-110			
Surrogate Nitrobenzene-d5	0.0809		mg/L	0.1000		81	30-130			
Surrogate Phenol-d6	0.0989		mg/L	0.1500		66	15-110			
Surrogate p-Terphenyl-d14	0.0858		mg/L	0.1000		85	30-130			
LCS										
1,1-Biphenyl	0.071	0.010	mg/L	0.1000		71	40-140			
1,2,4-Trichlorobenzene	0.061	0.010	mg/L	0.1000		61	40-140			
1,2-Dichlorobenzene	0.054	0.010	mg/L	0.1000		54	40-140			
1,3-Dichlorobenzene	0.053	0.010	mg/L	0.1000		53	40-140			
1,4-Dichlorobenzene	0.048	0.010	mg/L	0.1000		48	40-140			
2,3,4,6-Tetrachlorophenol	0.088	0.050	mg/L	0.1000		88	40-140			



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lacc & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270C Semi-Volatile Organic Compounds										
Batch B290717 - 3520C										
2,4,5-Trichlorophenol	0.080	0.010	mg/L	0.1000		80	30-130			
2,4,6-Trichlorophenol	0.074	0.010	mg/L	0.1000		74	30-130			
2,4-Dichlorophenol	0.068	0.010	mg/L	0.1000		68	30-130			
2,4-Dimethylphenol	0.069	0.050	mg/L	0.1000		69	30-130			
2,4-Dinitrophenol	0.049	0.050	mg/L	0.1000		49	30-130			
2,4-Dinitrotoluene	0.087	0.010	mg/L	0.1000		87	40-140			
2,6-Dinitrotoluene	0.082	0.010	mg/L	0.1000		82	40-140			
2-Chloronaphthalene	0.059	0.010	mg/L	0.1000		59	40-140			
2-Chlorophenol	0.056	0.010	mg/L	0.1000		56	30-130			
2-Methylphenol	0.061	0.010	mg/L	0.1000		61	30-130			
2-Nitroaniline	0.081	0.010	mg/L	0.1000		81	40-140			
2-Nitrophenol	0.067	0.010	mg/L	0.1000		67	30-130			
3,3'-Dichlorobenzidine	0.087	0.020	mg/L	0.1000		87	40-140			
3+4-Methylphenol	0.106	0.020	mg/L	0.2000		53	30-130			
3-Nitroaniline	0.080	0.010	mg/L	0.1000		80	40-140			
4,6-Dinitro-2-Methylphenol	0.082	0.050	mg/L	0.1000		82	30-130			
4-Bromophenyl-phenylether	0.083	0.010	mg/L	0.1000		83	40-140			
4-Chloro-3-Methylphenol	0.076	0.010	mg/L	0.1000		76	30-130			
4-Chloroaniline	0.063	0.020	mg/L	0.1000		63	40-140			
4-Chloro-phenyl-phenyl ether	0.081	0.010	mg/L	0.1000		81	40-140			
4-Nitroaniline	0.078	0.010	mg/L	0.1000		78	40-140			
4-Nitrophenol	0.103	0.050	mg/L	0.1000		103	30-130			
Acetophenone	0.058	0.010	mg/L	0.1000		58	40-140			
Aniline	0.041	0.010	mg/L	0.1000		41	40-140			
Azobenzene	0.068	0.020	mg/L	0.1000		68	40-140			
Benzoic Acid	ND	0.100	mg/L	0.1000			40-140			B-
Benzyl Alcohol	0.063	0.010	mg/L	0.1000		63	40-140			
bis(2-Chloroethoxy)methane	0.064	0.010	mg/L	0.1000		64	40-140			
bis(2-Chloroethyl)ether	0.055	0.010	mg/L	0.1000		55	40-140			
bis(2-chloroisopropyl)Ether	0.048	0.010	mg/L	0.1000		48	40-140			
bis(2-Ethylhexyl)phthalate	0.083	0.006	mg/L	0.1000		83	40-140			
Butylbenzylphthalate	0.083	0.010	mg/L	0.1000		83	40-140			
Carbazole	0.085	0.010	mg/L	0.1000		85	40-140			
Dibenzofuran	0.075	0.010	mg/L	0.1000		75	40-140			
Diethylphthalate	0.085	0.010	mg/L	0.1000		85	40-140			
Dimethylphthalate	0.080	0.010	mg/L	0.1000		80	40-140			
Di-n-butylphthalate	0.082	0.010	mg/L	0.1000		82	40-140			
Di-n-octylphthalate	0.082	0.010	mg/L	0.1000		82	40-140			
Hexachlorobutadiene	0.063	0.010	mg/L	0.1000		63	40-140			
Hexachlorocyclopentadiene	0.058	0.025	mg/L	0.1000		58	40-140			
Hexachloroethane	0.052	0.005	mg/L	0.1000		52	40-140			
Isophorone	0.053	0.010	mg/L	0.1000		53	40-140			
Nitrobenzene	0.062	0.010	mg/L	0.1000		62	40-140			
N-Nitrosodimethylamine	0.064	0.010	mg/L	0.1000		64	40-140			
N-Nitroso-Di-n-Propylamine	0.059	0.010	mg/L	0.1000		59	40-140			
N-nitrosodiphenylamine	0.090	0.010	mg/L	0.1000		90	40-140			



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270C Semi-Volatile Organic Compounds										
Batch BJ90727 - 3520C										
Phenol	0.054	0.010	mg/L	0.1000		54	30-130			
Pyridine	0.044	0.100	mg/L	0.1000		44	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	0.0641		mg/L	0.1000		64	30-130			
Surrogate: 2,4,6-Tribromophenol	0.146		mg/L	0.1500		97	15-110			
Surrogate: 2-Chlorophenol-d4	0.0679		mg/L	0.1500		59	15-110			
Surrogate: 2-Fluorobiphenyl	0.0743		mg/L	0.1000		74	30-130			
Surrogate: 2-Fluorophenol	0.0752		mg/L	0.1500		50	15-110			
Surrogate: Nitrobenzene-d5	0.0692		mg/L	0.1000		69	30-130			
Surrogate: Phenol-d6	0.0856		mg/L	0.1500		57	15-110			
Surrogate: p-Terphenyl-d14	0.0958		mg/L	0.1000		96	30-130			
LCS Dup										
1,1-Biphenyl	0.080	0.010	mg/L	0.1000		80	40-140	11	20	
1,2,4-Trichlorobenzene	0.074	0.010	mg/L	0.1000		74	40-140	19	20	
1,2-Dichlorobenzene	0.065	0.010	mg/L	0.1000		65	40-140	19	20	
1,3-Dichlorobenzene	0.065	0.010	mg/L	0.1000		65	40-140	20	20	
1,4-Dichlorobenzene	0.060	0.010	mg/L	0.1000		60	40-140	22	20	D+
2,3,4,6-Tetrachlorophenol	0.092	0.050	mg/L	0.1000		92	40-140	5	20	
2,4,5-Trichlorophenol	0.089	0.010	mg/L	0.1000		89	30-130	10	20	
2,4,6-Trichlorophenol	0.084	0.010	mg/L	0.1000		84	30-130	13	20	
2,4-Dichlorophenol	0.082	0.010	mg/L	0.1000		82	30-130	18	20	
2,4-Dimethylphenol	0.081	0.050	mg/L	0.1000		81	30-130	16	20	
2,4-Dinitrophenol	0.070	0.050	mg/L	0.1000		70	30-130	36	20	D+
2,4-Dinitrotoluene	0.091	0.010	mg/L	0.1000		91	40-140	5	20	
2,6-Dinitrotoluene	0.086	0.010	mg/L	0.1000		86	40-140	5	20	
2-Chloronaphthalene	0.067	0.010	mg/L	0.1000		67	40-140	13	20	
2-Chlorophenol	0.067	0.010	mg/L	0.1000		67	30-130	18	20	
2-Methylphenol	0.072	0.010	mg/L	0.1000		72	30-130	16	20	
2-Nitroaniline	0.086	0.010	mg/L	0.1000		86	40-140	6	20	
2-Nitrophenol	0.077	0.010	mg/L	0.1000		77	30-130	13	20	
3,3'-Dichlorobenzidine	0.086	0.020	mg/L	0.1000		86	40-140	1	20	
3-(4-Methylphenol	0.119	0.020	mg/L	0.2000		59	30-130	12	20	
3-Nitroaniline	0.084	0.010	mg/L	0.1000		84	40-140	5	20	
4,6-Dinitro-2-Methylphenol	0.086	0.050	mg/L	0.1000		86	30-130	6	20	
4-Bromophenyl-phenylether	0.067	0.010	mg/L	0.1000		87	40-140	4	20	
4-Chloro-3-Methylphenol	0.082	0.010	mg/L	0.1000		82	30-130	7	20	
4-Chloroaniline	0.070	0.020	mg/L	0.1000		70	40-140	10	20	
4-Chloro-phenyl-phenyl ether	0.081	0.010	mg/L	0.1000		81	40-140	0.8	20	
4-Nitroaniline	0.082	0.010	mg/L	0.1000		82	40-140	4	20	
4-Nitrophenol	0.109	0.050	mg/L	0.1000		109	30-130	6	20	
Acetophenone	0.063	0.010	mg/L	0.1000		63	40-140	9	20	
Aniline	0.059	0.010	mg/L	0.1000		59	40-140	36	20	D+
Azobenzene	0.068	0.020	mg/L	0.1000		68	40-140	0.7	20	
Benzoic Acid	0.023	0.100	mg/L	0.1000		23	40-140		20	B+, D+
Benzyl Alcohol	0.076	0.010	mg/L	0.1000		76	40-140	19	20	
bis(2-Chloroethoxy)methane	0.072	0.010	mg/L	0.1000		72	40-140	11	20	
bis(2-Chloroethyl)ether	0.064	0.010	mg/L	0.1000		64	40-140	15	20	



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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#### 8270C Semi-Volatile Organic Compounds

Batch B090727 - 3520C

bis(2-chloroisopropyl)Ether	0.054	0.010	mg/L	0.1000		54	40-140	11	20	
bis(2-Ethylhexyl)phthalate	0.082	0.006	mg/L	0.1000		82	40-140	0.4	20	
Butylbenzylphthalate	0.084	0.010	mg/L	0.1000		84	40-140	1	20	
Carbazole	0.079	0.010	mg/L	0.1000		79	40-140	7	20	
Dibenzofuran	0.081	0.010	mg/L	0.1000		81	40-140	7	20	
Diethylphthalate	0.088	0.010	mg/L	0.1000		88	40-140	3	20	
Dimethylphthalate	0.085	0.010	mg/L	0.1000		85	40-140	5	20	
Di-n-butylphthalate	0.081	0.010	mg/L	0.1000		81	40-140	1	20	
Di-n-octylphthalate	0.082	0.010	mg/L	0.1000		82	40-140	0.2	20	
Hexachlorobutadiene	0.080	0.010	mg/L	0.1000		80	40-140	23	20	D+
Hexachlorocyclopentadiene	0.071	0.025	mg/L	0.1000		71	40-140	20	20	
Hexachloroethane	0.066	0.005	mg/L	0.1000		66	40-140	24	20	D+
Isophorone	0.062	0.010	mg/L	0.1000		62	40-140	15	20	
Nitrobenzene	0.072	0.010	mg/L	0.1000		72	40-140	14	20	
N-N-trosodimethylamine	0.081	0.010	mg/L	0.1000		81	40-140	24	20	D+
N-Nitroso-Di-n-Propylamine	0.068	0.010	mg/L	0.1000		68	40-140	14	20	
N-nitrosodiphenylamine	0.093	0.010	mg/L	0.1000		93	40-140	3	20	
Phenol	0.062	0.010	mg/L	0.1000		62	30-130	14	20	
Pyridine	0.046	0.100	mg/L	0.1000		46	40-140	5	20	
Surrogate: 1,2-Dichlorobenzene-d4	0.0786		mg/L	0.1000		79	30-130			
Surrogate: 2,4,6-Tribromophenol	0.153		mg/L	0.1500		102	15-110			
Surrogate: 2-Chlorophenol-d4	0.102		mg/L	0.1500		68	15-110			
Surrogate: 2-Fluorobiphenyl	0.0860		mg/L	0.1000		86	30-130			
Surrogate: 2-Fluorophenol	0.0832		mg/L	0.1500		55	15-110			
Surrogate: Nitrobenzene-d5	0.0788		mg/L	0.1000		79	30-130			
Surrogate: Phenol-d6	0.0978		mg/L	0.1500		65	15-110			
Surrogate: p-Terphenyl-d14	0.0966		mg/L	0.1000		97	30-130			

#### 8270C(SIM) Semi-Volatile Organic Compounds

Batch B090825 - 3510C

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							



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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#### 8270C(SIM) Semi-Volatile Organic Compounds

Batch BJ90825 - 3510C

Indeno(1,2,3-cd)Pyrene	ND	0.00005	mg/L							
Naphthalene	ND	0.00020	mg/L							
Pentachlorophenol	ND	0.00100	mg/L							
Phenanthrene	ND	0.00020	mg/L							
Pyrene	ND	0.00020	mg/L							
Surrogate: 1,2-Dichlorobenzene-d4	0.000602		mg/L	0.0006250		96	30-130			
Surrogate: 2,4,6-Tribromophenol	0.000682		mg/L	0.0009375		73	15-110			
Surrogate: 2-Fluorobiphenyl	0.000542		mg/L	0.0006250		87	30-130			
Surrogate: Nitrobenzene-d5	0.000572		mg/L	0.0006250		92	30-130			
Surrogate: p-Terphenyl-d14	0.000618		mg/L	0.0006250		99	30-130			
LCS										
2-Methylnaphthalene	0.00045	0.00020	mg/L	0.0005000		90	40-140			
Acenaphthene	0.00047	0.00020	mg/L	0.0005000		94	40-140			
Acenaphthylene	0.00040	0.00020	mg/L	0.0005000		80	40-140			
Anthracene	0.00047	0.00020	mg/L	0.0005000		94	40-140			
Benzo(a)anthracene	0.00047	0.00005	mg/L	0.0005000		94	40-140			
Benzo(a)pyrene	0.00048	0.00005	mg/L	0.0005000		96	40-140			
Benzo(b)fluoranthene	0.00045	0.00005	mg/L	0.0005000		90	40-140			
Benzo(g,h,i)perylene	0.00047	0.00020	mg/L	0.0005000		94	40-140			
Benzo(k)fluoranthene	0.00050	0.00005	mg/L	0.0005000		100	40-140			
Chrysene	0.00047	0.00005	mg/L	0.0005000		94	40-140			
Dibenzo(a,h)Anthracene	0.00047	0.00005	mg/L	0.0005000		94	40-140			
Fluoranthene	0.00042	0.00020	mg/L	0.0005000		84	40-140			
Fluorene	0.00048	0.00020	mg/L	0.0005000		95	40-140			
Hexachlorobenzene	0.00039	0.00020	mg/L	0.0005000		78	40-140			
Indeno(1,2,3-cd)Pyrene	0.00048	0.00005	mg/L	0.0005000		95	40-140			
Naphthalene	0.00042	0.00020	mg/L	0.0005000		84	40-140			
Pentachlorophenol	0.00237	0.00100	mg/L	0.002500		95	30-130			
Phenanthrene	0.00044	0.00020	mg/L	0.0005000		88	40-140			
Pyrene	0.00046	0.00020	mg/L	0.0005000		92	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	0.000622		mg/L	0.0006250		100	30-130			
Surrogate: 2,4,6-Tribromophenol	0.000870		mg/L	0.0009375		93	15-110			
Surrogate: 2-Fluorobiphenyl	0.000590		mg/L	0.0006250		94	30-130			
Surrogate: Nitrobenzene-d5	0.000652		mg/L	0.0006250		104	30-130			
Surrogate: p-Terphenyl-d14	0.000578		mg/L	0.0006250		92	30-130			
LCS Dup										
2-Methylnaphthalene	0.00037	0.00020	mg/L	0.0005000		74	40-140	20	20	
Acenaphthene	0.00040	0.00020	mg/L	0.0005000		81	40-140	15	20	
Acenaphthylene	0.00034	0.00020	mg/L	0.0005000		69	40-140	14	20	
Anthracene	0.00044	0.00020	mg/L	0.0005000		86	40-140	7	20	
Benzo(a)anthracene	0.00043	0.00005	mg/L	0.0005000		86	40-140	9	20	
Benzo(a)pyrene	0.00046	0.00005	mg/L	0.0005000		91	40-140	5	20	
Benzo(b)fluoranthene	0.00044	0.00005	mg/L	0.0005000		87	40-140	3	20	
Benzo(g,h,i)perylene	0.00043	0.00020	mg/L	0.0005000		86	40-140	8	20	
Benzo(k)fluoranthene	0.00048	0.00005	mg/L	0.0005000		95	40-140	6	20	
Chrysene	0.00044	0.00005	mg/L	0.0005000		88	40-140	6	20	





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology

ESS Laboratory Work Order: 0910039

Client Project ID: Lincoln Lace & Braid Site

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Units	RPD	RPD Limit	Qualifier
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8270C(SIM) Semi-Volatile Organic Compounds

Batch B390825 - 3510C

Dibenzo(a,h)Anthracene	0.00045	0.00005	mg/L	0.0005000		90	40-140	5	20	
Fluoranthene	0.00040	0.00020	mg/L	0.0005000		79	40-140	7	20	
Fluorene	0.00042	0.00020	mg/L	0.0005000		84	40-140	13	20	
Hexachlorobenzene	0.00031	0.00020	mg/L	0.0005000		62	40-140	23	20	D+
Indeno(1,2,3-cd)Pyrene	0.00045	0.00005	mg/L	0.0005000		90	40-140	5	20	
Naphthalene	0.00036	0.00020	mg/L	0.0005000		72	40-140	15	20	
Pentachlorophenol	0.00221	0.00100	mg/L	0.002500		88	30-130	7	20	
Phenanthrene	0.00040	0.00020	mg/L	0.0005000		80	40-140	10	20	
Pyrene	0.00042	0.00020	mg/L	0.0005000		85	40-140	8	20	
Surrogate: 1,2-Dichlorobenzene-d4	0.000520		mg/L	0.0006250		83	30-130			
Surrogate: 2,4,6-Tribromophenol	0.000700		mg/L	0.0009375		75	15-110			
Surrogate: 2-Fluorobiphenyl	0.000495		mg/L	0.0006250		79	30-130			
Surrogate: Nitrobenzene-d5	0.000530		mg/L	0.0006250		85	30-130			
Surrogate: p-Terphenyl-d14	0.000560		mg/L	0.0006250		90	30-130			



# ESS Laboratory

*Division of Thielsch Engineering, Inc.*

## *CERTIFICATE OF ANALYSIS*

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lacc & Braid Site

ESS Laboratory Work Order: 0910039

### **Notes and Definitions**

- U Analyte included in the analysis, but not detected
- Q Calibration required quadratic regression.
- M- Matrix Spike recovery is below lower control limit.
- D+ Relative percent difference for duplicate is outside of criteria.
- C- Continuing Calibration recovery is below lower control limit.
- B+ Blank Spike recovery is above upper control limit.
- B- Blank Spike recovery is below lower control limit.
- ND Analyte NOT DETECTED above the detection limit
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- MDL Method Detection Limit
- MRL Method Reporting 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.



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910039

## ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

### ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: A-179

<http://www.health.ri.gov/labs/waterlabs-instate.php>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

[http://www.ct.gov/dph/lib/dph/environmental\\_health/environmental\\_laboratories/pdl/out\\_state.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdl/out_state.pdf)

Maine Potable and Non Potable Water: RI002

[http://www.maine.gov/dcp/blwq/topic/vessel/lab\\_list.pdf](http://www.maine.gov/dcp/blwq/topic/vessel/lab_list.pdf)

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: 242405

<http://www4.c.gov.nh.gov/des/nhclap/namesearch.asp>

New York (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

United States Department of Agriculture Soil Permit: S-54210

Maryland Potable Water: 301

[http://www.mdc.state.md.us/assets/document/WSP\\_labs-2009apr20.pdf](http://www.mdc.state.md.us/assets/document/WSP_labs-2009apr20.pdf)

South Carolina Volatile Organic Compounds in Potable Water: 78003

### CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01

Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)

<http://www.A2LA.org/dirsearchnew/newsearch.cfm>

CPSC ID# 1141

Lead Paint, Lead in Children's Metals Jewelry

<http://www.cpsc.gov/cgi-bin/labapplist.aspx>

# ESS Laboratory

Division of Thielsch Engineering, Inc.  
 185 Frances Avenue, Cranston, RI 02910-2211  
 Tel. (401) 461-7181 Fax (401) 461-4486  
 www.esslaboratory.com

# CHAIN OF CUSTODY

Turn Time:  Standard Other \_\_\_\_\_  
 If faster than 5 days, prior approval by laboratory is required # \_\_\_\_\_  
 State where samples were collected from:  
 MA  CT NH NJ NY ME Other \_\_\_\_\_  
 Is this project for any of the following: USACE Other \_\_\_\_\_  
 MA-MCP Navy

Reporting Limits: PE  
 Electronic Deliverable:  Yes  No  
 Format: Excel Access PDF  Other \_\_\_\_\_  
 ESS LAB PROJECT ID: 0910039

ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (to Client or less)	Code	Number of Containers	Type of Containers	Total As	Total Pb	Total Fe	DISCOVERED As	DISCOVERED Pb	DISCOVERED Fe	VOC	SPEC	TRH	LAB FILTER
1	10/2/09	9:00	X SW			SW-U/S	1	1	1	X	X	X	X	X	X				X LAB FILTER
2		9:15				SW-D/S	1	1	1	X	X	X	X	X	X				
3		9:35				SW-SL	1	1	1	X	X	X	X	X	X				
4		10:30				SED-01	1	1	1	X	X	X	X	X	X				
5		10:40				SED-02	1	1	1	X	X	X	X	X	X				
6		10:50				SED-03	1	1	1	X	X	X	X	X	X				
7		11:05				SED-04	1	1	1	X	X	X	X	X	X				
8		11:20				SED-05	1	1	1	X	X	X	X	X	X				
9		11:35				SED-06	1	1	1	X	X	X	X	X	X				
10		11:50				SED-07	1	1	1	X	X	X	X	X	X				

Project # 02006 Project Name LINCOLN LAKE + BEAD  
 Address 2350 POST ROAD PO# \_\_\_\_\_  
 Email Address smack@quest.com  
 Preservation Code: 1-NP, 2-HCl, 3-H<sub>2</sub>SO<sub>4</sub>, 4-HNO<sub>3</sub>, 5-NaOH, 6-MeOH, 7-A sorbic Acid, 8-ZnAc<sub>2</sub>, 9-  
 Sampled by: RAM: MDR  
 Comments: SEE LAUREL STANDARD RE: FLOC-01 AND FLOC-02  
-CAUTION: GLASS PRESENT IN SOME SED SAMPLES  
 Relinquished by: (Signature) [Signature] Date/Time 10/2/09 12:30  
 Received by: (Signature) [Signature] Date/Time \_\_\_\_\_  
 Relinquished by: (Signature) \_\_\_\_\_ Date/Time \_\_\_\_\_  
 Received by: (Signature) \_\_\_\_\_ Date/Time \_\_\_\_\_





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Ron Mack  
EA Engineering, Science, and Technology  
2530 Post Road  
Warwick, RI 02886

RE: Lincoln Lace & Braid (61891.05)  
ESS Laboratory Work Order Number: 0910276

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.



Digitally signed by Melissa Paglarini  
Date: 2009.10.28 16:55:08 -04'00'

Laurel Stoddard  
Laboratory Director

### 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.

ESS Laboratory certifies that the test results meet the requirements of NELAC and A2LA, except where noted within this project narrative.



# ESS Laboratory

*Division of Thielsch Engineering, Inc.*

## *CERTIFICATE OF ANALYSIS*

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid

ESS Laboratory Work Order: 0910276

## **SAMPLE RECEIPT**

The following samples were received on October 20, 2009 for the analyses specified on the enclosed Chain of Custody Record.

These samples were originally received on October 2, 2009 as ESS Laboratory Sample IDs 0910039-01, 0910039-02 and 0910039-03.

<b>Lab Number</b>	<b>SampleName</b>	<b>Matrix</b>	<b>Analysis</b>
0910276-01	SW-U-S	Surface Water	§
0910276-02	SW-D-S	Surface Water	§
0910276-03	SW-SL	Surface Water	§



# ESS Laboratory

*Division of Thielsch Engineering, Inc.*

## *CERTIFICATE OF ANALYSIS*

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid

ESS Laboratory Work Order: 0910276

## **PROJECT NARRATIVE**

**No unusual observations noted.**

**End of Project Narrative.**

## **DATA USABILITY LINKS**

[Definitions of Quality Control Parameters](#)

[Semivolatile Organics Internal Standard Information](#)

[Semivolatile Organics Surrogate Information](#)

[Volatile Organics Internal Standard Information](#)

[Volatile Organics Surrogate Information](#)

[EPH and VPH Alkane Lists](#)





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid  
Client Sample ID: SW-U-S  
Date Sampled: 10/02/09 09:00

ESS Laboratory Work Order: 0910276  
ESS Laboratory Sample ID: 0910276-01  
Sample Matrix: Surface Water  
Units: §

### 200 Series/SM3113B Dissolved Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Batch</u>
Lead	See Attached						

Environmental Chemistry  
 Site Assessment  
 Quality Assurance Services



Environmental Services  
 Site Sampling  
 Data Auditing

**CERTIFICATE OF ANALYSIS**

Elizabeth Ouk  
 ESS Laboratory  
 185 Frances Avenue  
 Cranston, RI 02910-2211  
 COLLECTED BY: Customer  
 TIME: 9:00  
 LOCATION: 0910276-01

REPORTED: 10/28/2009  
 ORDER #: G0920929  
 SAMPLE DATE: 10/2/2009  
 DATE RECEIVED: 10/22/2009  
 SAMPLE ID: Grab  
 DESCRIPTION: WATER

RESULTS OF ANALYSIS

Parameter	Analytical Method	Date Analyzed	Units	Det Limits*	Result
<b>Test Parameters</b>					
				LAB-ID#: 0920929-01	
Lead (Dissolved)	EPA 200.8	10/27/2009	mg/L	0.0004	0.0008

Due to matrix interference, reproducible arsenic results were unattainable.



# ESS Laboratory

*Division of Thielsch Engineering, Inc.*

## *CERTIFICATE OF ANALYSIS*

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid  
Client Sample ID: SW-D-S  
Date Sampled: 10/02/09 09:15

ESS Laboratory Work Order: 0910276  
ESS Laboratory Sample ID: 0910276-02  
Sample Matrix: Surface Water  
Units: §

### 200 Series/SM3113B Dissolved Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Batch</u>
Lead	See Attached						

Environmental Chemistry  
Site Assessment  
Quality Assurance Services



Environmental Services  
Site Sampling  
Data Auditing

Elizabeth Ouk  
ESS Laboratory  
185 Frances Avenue  
Cranston, RI 02910-2211  
COLLECTED BY: Customer  
TIME: 9:15  
LOCATION: 0910276-02

**CERTIFICATE OF ANALYSIS**

REPORTED: 10/28/2009  
ORDER #: G0920929  
SAMPLE DATE: 10/2/2009  
DATE RECEIVED: 10/22/2009  
SAMPLE ID: Grab  
DESCRIPTION: WATER

RESULTS OF ANALYSIS

Parameter	Analytical Method	Date Analyzed	Units	Det Limits*	Result
<i>Test Parameters</i>					LAB-ID#: <u>0920929-02</u>
Lead (Dissolved)	EPA 200.8	10/27/2009	mg/L	0.0004	0.0010

Due to matrix interference, reproducible arsenic results were unattainable.



# ESS Laboratory

*Division of Thielsch Engineering, Inc.*

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid  
Client Sample ID: SW-SL  
Date Sampled: 10/02/09 09:35

ESS Laboratory Work Order: 0910276  
ESS Laboratory Sample ID: 0910276-03  
Sample Matrix: Surface Water  
Units: §

### 200 Series/SM3113B Dissolved Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Batch</u>
Lead	See Attached						

Environmental Chemistry  
Site Assessment  
Quality Assurance Services

Environmental Services  
Site Sampling  
Data Auditing



**CERTIFICATE OF ANALYSIS**

Elizabeth Ouk  
ESS Laboratory  
185 Frances Avenue  
Cranston, RI 02910-2211  
COLLECTED BY: Customer  
TIME: 9:35  
LOCATION: 0910276-03

REPORTED: 10/28/2009  
ORDER #: G0920929  
SAMPLE DATE: 10/2/2009  
DATE RECEIVED: 10/22/2009  
SAMPLE ID: Grab  
DESCRIPTION: WATER

**RESULTS OF ANALYSIS**

Parameter	Analytical Method	Date Analyzed	Units	Det Limits*	Result
<i>Test Parameters</i>					
				LAB-ID#: 0920929-03	
Lead (Dissolved)	EPA 200.8	10/27/2009	mg/L	0.0004	ND

Due to matrix interference, reproducible arsenic results were unattainable.

- NA = Not Applicable
- ND = Not Detected
- < = Less Than
- \* = Detection Limit

Approved By: [Signature] 10/28/09  
Lab Manager / Date



# ESS Laboratory

*Division of Thielsch Engineering, Inc.*

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lacc & Braid

ESS Laboratory Work Order: 0910276

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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# ESS Laboratory

*Division of Thielsch Engineering, Inc.*

## *CERTIFICATE OF ANALYSIS*

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid

ESS Laboratory Work Order: 0910276

### **Notes and Definitions**

Z-08	See Attached
ND	Analyte NOT DETECTED above the detection limit (LOD for DoD Reports)
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
I/V	Initial Volume
F/V	Final Volume
ξ	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
LOD	Limit of Detection
[CALC]	Calculated Analyte





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid

ESS Laboratory Work Order: 0910276

## ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

### ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: A-179

<http://www.health.ri.gov/labs/waterlabs-instate.php>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

[http://www.ct.gov/dph/lib/dph/environmental\\_health/environmental\\_laboratories/pdf/out\\_state.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/out_state.pdf)

Maine Potable and Non Potable Water: R1002

[http://www.maine.gov/den/blwq/topic/vessel/lab\\_list.pdf](http://www.maine.gov/den/blwq/topic/vessel/lab_list.pdf)

Massachusetts Potable and Non Potable Water: M-RI002

<http://public.den.state.ma.us/labcert/labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 242405

<http://www4.egov.nh.gov/des/nhelap/namesearch.asp>

New York (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

United States Department of Agriculture Soil Permit: S-54210

Maryland Potable Water: 301

[http://www.mdc.state.md.us/assets/document/WSP\\_labs-2009apr20.pdf](http://www.mdc.state.md.us/assets/document/WSP_labs-2009apr20.pdf)

South Carolina Volatile Organic Compounds in Potable Water: 78003

### CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01

Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)

<http://www.A2LA.org/dirsearchnew/newsearch.cfm>

CPSC ID# 1141

Lead Paint, Lead in Children's Metals Jewelry

<http://www.epsc.gov/cgi-bin/labapplist.aspx>



**Attachment B**  
**Sediment and Iron Floc Analytical Report**  
**9 October 2009**



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

### PROJECT NARRATIVE

Ron Mack  
EA Engineering, Science, and Technology  
2530 Post Road  
Warwick, RI 02886

**RE: Lincoln Lace & Braid Site**  
**ESS Laboratory Work Order Number: 0910040**

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 Project Narrative, the entire report has been paginated. The ESS Laboratory Certifications sheet is the final report page. 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



Digitally signed by Melissa Pagliarini  
Date: 2009.10.09 16:15:34 -0400

#### 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 may be used instead of automated integration because it produces more accurate results. All ICP Metals were analyzed using the established linear dynamic range to determine acceptable analytical results.

ESS Laboratory certifies that the test results meet the requirements of NELAC and A2LA, except where noted within this project narrative.

#### Sample Receipt

The following sample(s) were received on October 02, 2009 for the analyses specified on the enclosed Chain of Custody Record.

Laboratory ID	Matrix	Client Sample ID
0910040-01	Soil	SED-01
0910040-02	Soil	SED-02
0910040-03	Soil	SED-03
0910040-04	Soil	SED-04
0910040-05	Soil	SED-05
0910040-06	Soil	SED-06
0910040-07	Soil	SED-07
0910040-08	Soil	SED-08
0910040-09	Sludge	Floc-01
0910040-10	Sludge	Floc-02



# ESS Laboratory

*Division of Thielsch Engineering, Inc.*

## *CERTIFICATE OF ANALYSIS*

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910040

## **PROJECT NARRATIVE**

### **3050B/6000/7000 Total Metals**

BJ90724-DUP1     **Relative percent difference for duplicate is outside of criteria.**

Lead

BJ90724-MS1     **Matrix Spike recovery is above upper control limit.**

Iron

BJ90724-MS1     **Matrix Spike recovery is below lower control limit.**

Lead

**No other observations noted.**

**End of Project Narrative.**



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SED-01  
Date Sampled: 10/02/09 10:30  
Percent Solids: 77

ESS Laboratory Work Order: 0910040  
ESS Laboratory Sample ID: 0910040-01  
Sample Matrix: Soil

### 3050B/6000/7000 Total Metals

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	ND	mg/kg dry	1.84	7060A	7	5	JP	10/08/09 17:43	1.75	100
Iron	24900	mg/kg dry	148	6010B		20	JP	10/08/09 23:17	1.75	100
Lead	21.3	mg/kg dry	7.4	6010B	150	1	SVD	10/07/09 22:05	1.75	100



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SED-01  
 Date Sampled: 10/02/09 10:30  
 Percent Solids: 77  
 Initial Volume: 19.7  
 Final Volume: 1  
 Extraction Method: 3546

ESS Laboratory Work Order: 0910040  
 ESS Laboratory Sample ID: 0910040-01  
 Sample Matrix: Soil  
 Analyst: ML  
 Prepared: 10/2/09 12:30

### 8100M Total Petroleum Hydrocarbons

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>
Total Petroleum Hydrocarbons	ND	mg/kg dry	49.4	500	1	10/05/09 16:35

	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>
Surrogate: O-Terphenyl	73 %		40-140



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SED-02  
Date Sampled: 10/02/09 10:40  
Percent Solids: 83

ESS Laboratory Work Order: 0910040  
ESS Laboratory Sample ID: 0910040-02  
Sample Matrix: Soil

### 3050B/6000/7000 Total Metals

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	ND	mg/kg dry	1.69	7060A	7	5	JP	10/08/09 17:49	1.76	100
Iron	4880	mg/kg dry	6.8	6010B		1	SVD	10/07/09 22:18	1.76	100
Lead	ND	mg/kg dry	6.8	6010B	150	1	SVD	10/07/09 22:18	1.76	100





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SED-02  
 Date Sampled: 10/02/09 10:40  
 Percent Solids: 83  
 Initial Volume: 19.8  
 Final Volume: 1  
 Extraction Method: 3546

ESS Laboratory Work Order: 0910040  
 ESS Laboratory Sample ID: 0910040-02  
 Sample Matrix: Soil  
 Analyst: ML  
 Prepared: 10/2/09 12:30

### 8100M Total Petroleum Hydrocarbons

RI - RES DEC

Analyte	Results	Units	MRL	Limit	DF	Analyzed
Total Petroleum Hydrocarbons	ND	mg/kg dry	45.6	500	1	10/05/09 17:10

	%Recovery	Qualifier	Limits
Surrogate: O-Terphenyl	70 %		40-140



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SED-03  
Date Sampled: 10/02/09 10:50  
Percent Solids: 60

ESS Laboratory Work Order: 0910040  
ESS Laboratory Sample ID: 0910040-03  
Sample Matrix: Soil

### 3050B/6000/7000 Total Metals

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	2.82	mg/kg dry	2.30	7060A	7	5	JP	10/08/09 17:55	1.79	100
Iron	13200	mg/kg dry	9.3	6010B		1	SVD	10/07/09 22:22	1.79	100
Lead	72.1	mg/kg dry	9.3	6010B	150	1	SVD	10/07/09 22:22	1.79	100



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SED-03  
 Date Sampled: 10/02/09 10:50  
 Percent Solids: 60  
 Initial Volume: 20  
 Final Volume: 1  
 Extraction Method: 3546

ESS Laboratory Work Order: 0910040  
 ESS Laboratory Sample ID: 0910040-03  
 Sample Matrix: Soil  
 Analyst: ML  
 Prepared: 10/2/09 12:30

### 8100M Total Petroleum Hydrocarbons

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>
Total Petroleum Hydrocarbons	ND	mg/kg dry	62.5	500	1	10/05/09 18.25
<i>Surrogate, O-Terphenyl</i>		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>		
		88 %		40-140		



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SED-04  
Date Sampled: 10/02/09 11:05  
Percent Solids: 68

ESS Laboratory Work Order: 0910040  
ESS Laboratory Sample ID: 0910040-04  
Sample Matrix: Soil

### 3050B/6000/7000 Total Metals

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Llimit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	3.09	mg/kg dry	2.07	7060A	7	5	JP	10/08/09 18:01	1.76	100
Iron	10200	mg/kg dry	8.4	6010B		1	SVD	10/07/09 22:27	1.76	100
Lead	69.4	mg/kg dry	8.4	6010B	150	1	SVD	10/07/09 22:27	1.76	100



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SED-04  
Date Sampled: 10/02/09 11:05  
Percent Solids: 68  
Initial Volume: 20.7  
Final Volume: 1  
Extraction Method: 3546

ESS Laboratory Work Order: 0910040  
ESS Laboratory Sample ID: 0910040-04  
Sample Matrix: Soil  
Analyst: ML  
Prepared: 10/2/09 12:30

### 8100M Total Petroleum Hydrocarbons

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>
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Total Petroleum Hydrocarbons

ND

mg/kg dry

53.3

500

1

10/05/09 19:00

<u>Surrogate: O-Terphenyl</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>
	92 %		40-140



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid Site

Client Sample ID: SED-05

Date Sampled: 10/02/09 11:20

Percent Solids: 77

ESS Laboratory Work Order: 0910040

ESS Laboratory Sample ID: 0910040-05

Sample Matrix: Soil

### 3050B/6000/7000 Total Metals

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>1/V</u>	<u>F/V</u>
Arsenic	ND	mg/kg dry	1.84	7060A	7	5	JP	10/08/09 18:07	1.75	100
Iron	10400	mg/kg dry	7.4	6010B		1	SVD	10/07/09 22:31	1.75	100
Lead	24.6	mg/kg dry	7.4	6010B	150	1	SVD	10/07/09 22:31	1.75	100



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SED-05  
 Date Sampled: 10/02/09 11:20  
 Percent Solids: 77  
 Initial Volume: 20.9  
 Final Volume: 1  
 Extraction Method: 3546

ESS Laboratory Work Order: 0910040  
 ESS Laboratory Sample ID: 0910040-05  
 Sample Matrix: Soil  
 Analyst: ML  
 Prepared: 10/2/09 12:30

### 8100M Total Petroleum Hydrocarbons

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>
Total Petroleum Hydrocarbons	ND	mg/kg dry	46.6	300	1	10/05/09 17:51
<i>Surrogate: O-Terphenyl</i>		<i>78 %</i>	<i>Qualifier</i>	<i>Limits</i>		
				<i>40-140</i>		



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SED-06  
 Date Sampled: 10/02/09 11:35  
 Percent Solids: 62

ESS Laboratory Work Order: 0910040  
 ESS Laboratory Sample ID: 0910040-06  
 Sample Matrix: Soil

### 3050B/6000/7000 Total Metals

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	3.55	mg/kg dry	2.21	7060A	7	5	JP	10/08/09 18:36	1.81	100
Iron	11600	mg/kg dry	8.9	6010B		1	SVD	10/07/09 22:54	1.81	100
Lead	48.8	mg/kg dry	8.9	6010B	150	1	SVD	10/07/09 22:54	1.81	100





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SED-06  
Date Sampled: 10/02/09 11:35  
Percent Solids: 62  
Initial Volume: 20.3  
Final Volume: 1  
Extraction Method: 3546

ESS Laboratory Work Order: 0910040  
ESS Laboratory Sample ID: 0910040-06  
Sample Matrix: Soil  
Analyst: ML  
Prepared: 10/2/09 12:30

### 8100M Total Petroleum Hydrocarbons

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>
Total Petroleum Hydrocarbons	ND	mg/kg dry	59.6	500	1	10/05/09 19:34

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	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>
Surrogate: D-Terphenyl	89 %		40-140



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: SED-07  
Date Sampled: 10/02/09 11:50  
Percent Solids: 71

ESS Laboratory Work Order: 0910040  
ESS Laboratory Sample ID: 0910040-07  
Sample Matrix: Soil

### 3050B/6000/7000 Total Metals

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	3.97	mg/kg dry	1.99	7060A	7	5	JP	10/08/09 18:53	1.75	100
Iron	30300	mg/kg dry	161	6010B		20	JP	10/08/09 23:22	1.75	100
Lead	1270	mg/kg dry	8.1	6010B	150	1	SVD	10/07/09 22:58	1.75	100



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lacc & Braid Site  
 Client Sample ID: SED-07  
 Date Sampled: 10/02/09 11:50  
 Percent Solids: 71  
 Initial Volume: 20.2  
 Final Volume: 1  
 Extraction Method: 3546

ESS Laboratory Work Order: 0910040  
 ESS Laboratory Sample ID: 0910040-07  
 Sample Matrix: Soil  
 Analyst: ML  
 Prepared: 10/2/09 12:30

### 8100M Total Petroleum Hydrocarbons

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>
Total Petroleum Hydrocarbons	158	mg/kg dry	52.3	500	1	10/05/09 20:09

	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>
Surrogate: O-Terphenyl	104 %		40-140



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid Site

Client Sample ID: SED-08

Date Sampled: 10/02/09 12:20

Percent Solids: 57

ESS Laboratory Work Order: 0910040

ESS Laboratory Sample ID: 0910040-08

Sample Matrix: Soil

### 3050B/6000/7000 Total Metals

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	7.71	mg/kg dry	2.40	7060A	7	5	JP	10/08/09 18:59	1.81	100
Iron	105000	mg/kg dry	194	6010B		20	JP	10/08/09 23:34	1.81	100
Lead	398	mg/kg dry	9.7	6010B	150	1	SVD	10/07/09 23:11	1.81	100



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site  
 Client Sample ID: SED-08  
 Date Sampled: 10/02/09 12:20  
 Percent Solids: 57  
 Initial Volume: 20.2  
 Final Volume: 1  
 Extraction Method: 3546

ESS Laboratory Work Order: 0910040  
 ESS Laboratory Sample ID: 0910040-08  
 Sample Matrix: Soil  
 Analyst: ML  
 Prepared: 10/2/09 12:30

### 8100M Total Petroleum Hydrocarbons

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>
Total Petroleum Hydrocarbons	370	mg/kg dry	65.1	500	1	10/05/09 20:44

<u>Surrogate</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Units</u>
O-Terphenyl	105 %		40-140



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: Floc-01  
Date Sampled: 10/02/09 10:20  
Percent Solids: N/A

ESS Laboratory Work Order: 0910040  
ESS Laboratory Sample ID: 0910040-09  
Sample Matrix: Sludge

### 3050B/6000/7000 Total Metals

RI - RES DEC

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
Arsenic	ND	mg/kg wet	2.40	7060A	7	5	JP	10/08/09 19:04	1.03	100
Lead	ND	mg/kg wet	9.7	6010B	150	1	SVD	10/07/09 23:16	1.03	100



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
Client Project ID: Lincoln Lace & Braid Site  
Client Sample ID: Floc-02  
Date Sampled: 10/02/09 12:05  
Percent Solids: N/A

ESS Laboratory Work Order: 0910040  
ESS Laboratory Sample ID: 0910040-10  
Sample Matrix: Sludge

### 3050B/6000/7000 Total Metals

<u>Analyte</u>	<u>Results</u>	<u>Units</u>	<u>MRL</u>	<u>Method</u>	<u>RI - RES DEC</u>		<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>
					<u>Limit</u>	<u>DF</u>				
Arsenic	ND	mg/kg wet	2.15	7060A	7	5	JP	10/08/09 19:10	1.15	100
Lead	ND	mg/kg wet	8.7	6010B	150	1	SVD	10/07/09 23:21	1.15	100



# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910040

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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#### 3050B/6000/7000 Total Metals

Batch BJ90724 - 3050B

Blank										
Arsenic	ND	0.33	mg/kg wet							
Iron	ND	6.7	mg/kg wet							
Lead	ND	6.7	mg/kg wet							
LCS										
Arsenic	37.0	6.60	mg/kg wet	33.33		111	80-120			
Iron	168	6.7	mg/kg wet	166.7		101	80-120			
Lead	33.7	6.7	mg/kg wet	33.33		101	80-120			
LCS Dup										
Arsenic	36.8	6.60	mg/kg wet	33.33		110	80-120	0.8	20	
Iron	167	6.7	mg/kg wet	166.7		100	80-120	0.6	20	
Lead	33.5	6.7	mg/kg wet	33.33		100	80-120	0.6	20	
Duplicate Source: 0910040-05										
Arsenic	0.644	1.79	mg/kg dry		1.35			71	35	
Iron	8170	7.2	mg/kg dry		10400			24	35	
Lead	12.2	7.2	mg/kg dry		24.6			67	35	D+
Matrix Spike Source: 0910040-05										
Arsenic	29.9	7.26	mg/kg dry	36.69	1.35	78	75-125			
Iron	12400	7.3	mg/kg dry	183.4	10400	NR	75-125			M+
Lead	45.1	7.3	mg/kg dry	36.69	24.6	56	75-125			M-
Reference										
Arsenic	180	24.8	mg/kg wet	158.0		114	82-118			
Iron	13900	10.0	mg/kg wet	18600		75	50-149			
Lead	170	10.0	mg/kg wet	172.0		99	79-120			

#### 8100M Total Petroleum Hydrocarbons

Batch BJ90212 - 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: <i>o</i> -Terphenyl	4.23		mg/kg wet	5.000		85	40-140			





# ESS Laboratory

Division of Thielsch Engineering, Inc.

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology  
 Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910040

### Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>8100M Total Petroleum Hydrocarbons</b>										
<b>Batch BJ90212 - 3546</b>										
<b>LCS</b>										
Decane (C10)	1.9	0.2	mg/kg wet	2.500		76	40-140			
Docosane (C22)	2.2	0.2	mg/kg wet	2.500		89	40-140			
Dodecane (C12)	2.2	0.2	mg/kg wet	2.500		86	40-140			
Eicosane (C20)	2.2	0.2	mg/kg wet	2.500		89	40-140			
Hexacosane (C26)	2.2	0.2	mg/kg wet	2.500		87	40-140			
Hexadecane (C16)	2.2	0.2	mg/kg wet	2.500		86	40-140			
Nonadecane (C19)	2.4	0.2	mg/kg wet	2.500		94	40-140			
Nonane (C9)	1.6	0.2	mg/kg wet	2.500		66	30-140			
Octacosane (C28)	2.2	0.2	mg/kg wet	2.500		88	40-140			
Octadecane (C18)	2.2	0.2	mg/kg wet	2.500		88	40-140			
Tetracosane (C24)	2.2	0.2	mg/kg wet	2.500		90	40-140			
Tetradecane (C14)	2.1	0.2	mg/kg wet	2.500		84	40-140			
Tricosane (C30)	2.2	0.2	mg/kg wet	2.500		90	40-140			
<i>Surrogate: O-Terphenyl</i>	<i>4.30</i>		<i>mg/kg wet</i>	<i>5.000</i>		<i>86</i>	<i>40-140</i>			
<b>LCS Dup</b>										
Decane (C10)	1.7	0.2	mg/kg wet	2.500		69	40-140	9	50	
Docosane (C22)	2.0	0.2	mg/kg wet	2.500		79	40-140	11	50	
Dodecane (C12)	2.0	0.2	mg/kg wet	2.500		79	40-140	8	50	
Eicosane (C20)	2.0	0.2	mg/kg wet	2.500		79	40-140	11	50	
Hexacosane (C26)	1.9	0.2	mg/kg wet	2.500		78	40-140	11	50	
Hexadecane (C16)	2.0	0.2	mg/kg wet	2.500		79	40-140	9	50	
Nonadecane (C19)	2.1	0.2	mg/kg wet	2.500		85	40-140	10	50	
Nonane (C9)	1.5	0.2	mg/kg wet	2.500		62	30-140	6	50	
Octacosane (C28)	2.0	0.2	mg/kg wet	2.500		78	40-140	11	50	
Octadecane (C18)	2.0	0.2	mg/kg wet	2.500		80	40-140	10	50	
Tetracosane (C24)	2.0	0.2	mg/kg wet	2.500		80	40-140	11	50	
Tetradecane (C14)	1.9	0.2	mg/kg wet	2.500		77	40-140	8	50	
Tricosane (C30)	2.0	0.2	mg/kg wet	2.500		80	40-140	12	50	
<i>Surrogate: O-Terphenyl</i>	<i>3.83</i>		<i>mg/kg wet</i>	<i>5.000</i>		<i>77</i>	<i>40-140</i>			



# ESS Laboratory

*Division of Thielsch Engineering, Inc.*

## *CERTIFICATE OF ANALYSIS*

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910040

### **Notes and Definitions**

U	Analyte included in the analysis, but not detected
M+	Matrix Spike recovery is above upper control limit.
M-	Matrix Spike recovery is below lower control limit.
D+	Relative percent difference for duplicate is outside of criteria.
D	Diluted.
ND	Analyte NOT DETECTED above the detection limit
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting 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.



# ESS Laboratory

*Division of Thielsch Engineering, Inc.*

## CERTIFICATE OF ANALYSIS

Client Name: EA Engineering, Science, and Technology

Client Project ID: Lincoln Lace & Braid Site

ESS Laboratory Work Order: 0910040

## ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

### ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: A-179

<http://www.health.ri.gov/labs/waterlabs-instate.php>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

[http://www.ct.gov/dph/lib/dph/environmental\\_health/environmental\\_laboratories/pdf/out\\_state.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/out_state.pdf)

Maine Potable and Non Potable Water: RI002

[http://www.maine.gov/dep/bj/wq/topic/vessel/lab\\_list.pdf](http://www.maine.gov/dep/bj/wq/topic/vessel/lab_list.pdf)

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: 242405

<http://www4.e.gov.nh.gov/des/nhclap/namesearch.asp>

New York (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

United States Department of Agriculture Soil Permit: S-54210

Maryland Potable Water: 301

[http://www.mdc.state.md.us/assets/document/WSP\\_labs-2009apr20.pdf](http://www.mdc.state.md.us/assets/document/WSP_labs-2009apr20.pdf)

South Carolina Volatile Organic Compounds in Potable Water: 78003

### CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01

Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)

<http://www.A2LA.org/dirsearchnew/newsearch.cfm>

CPSC ID# 1141

Lead Paint, Lead in Children's Metals Jewelry

<http://www.epsc.gov/cgi-bin/labapplist.aspx>





***APPENDIX C***

***RIPDES Remediation General Permit  
Notice of Intent***



**RHODE ISLAND POLLUTANT DISCHARGE  
ELIMINATION SYSTEM (RIPDES)  
REMEDATION GENERAL PERMIT  
NOTICE OF INTENT (NOI)  
(revised 10/09)**

**DEM USE ONLY**  
Date Received  
Amount Received \$  
RIPDES# **RIG**  
Approval Date  
Data Entry Date  
Data Entry Initials

<b>I. OWNER</b>			
Name: <i>City of Providence</i>			
Mailing Address: <i>25 Dorrance Street</i>			
City: <i>Providence</i>	State: <i>RI</i>	Zip: <i>02903</i>	Phone: <i>(401) 785-9450</i>
Contact Person: <i>Robert McMahon</i>		Title: <i>Director, Parks Department</i>	
Email Address of Owner: <i>rmcmahon.c2aq3@providenceri.com</i>			
<b>II. OPERATOR (if different from owner)</b>			
Name:			
Mailing Address:			
City:	State:	Zip:	Phone: ( )
Contact Person:		Title:	
Email Address of Contact Person:			
<b>III. SITE INFORMATION</b>			
a. Please include the following items as part of the NOI: brief history of the site, the source of contamination; a description of the proposed remedial and/or dewatering activity creating the discharge; all available analytical data on impacted groundwater; a site plan showing location of monitoring and recovery wells, discharge point, and receiving waters; and an 8.5" x 11" photocopy of a USGS 1:24,000 topographic map depicting site location.			
Facility/Site Name: <i>Former Lincoln Lace and Braid</i>			
Facility/Site: Longitude: <i>41.820899</i>	Latitude: <i>-71.456517</i>	SIC code(s):	
Facility Address: <i>55-61 Ponagansett Avenue</i>			
City: <i>Providence</i>	State: <i>RI</i>	Zip: <i>02909</i>	
Type of Spill or Release:		Approximate Duration of Project:	
b. Has a prior NPDES permit been granted for the discharge? Yes ___ No <input checked="" type="checkbox"/> if yes number: _____			
c. Has a prior NPDES application (Form 1 & 2C) ever been filed for the discharge? Yes ___ No <input checked="" type="checkbox"/> if yes provide date of application and application number if available.			
d. Is the site/facility covered by any other DEM permit including: 1. multi-sector storm water general permit, 2. phase I or II construction storm water general permit, 3. Individual RIPDES Permit, if so please list them below: <i>No</i>			
e. Is the site/facility subject to any other DEM permitting or other action which is causing the generation of the discharge? Yes ___ or No ___			
If "Yes" please list the applicable permit numbers and DEM contacts here: <i>Case #2009-018</i> <i>Tim Fleury, RIDEM OWM</i>			

#### IV. DISCHARGE INFORMATION

a. Describe the discharge activities for which the owner/applicant is seeking coverage:

*Dewatering of sluiceway for OWM remediation*

b. Provide the following information for each discharge:

Number of Discharge Points: 1

Maximum Flow Rate (cubic feet per second): 0.8 Is the maximum flow a design value? Y  N

Average Flow Rate (cubic feet per second): 0.8

c. Latitude and Longitude of the center of each outfall: pt. 1: long. 41.820476 lat. -71.456003, pt.2 long. \_\_\_\_\_ lat. \_\_\_\_\_, pt.3 long. \_\_\_\_\_ lat. \_\_\_\_\_, pt.4 long. \_\_\_\_\_ lat. \_\_\_\_\_, pt.5 long. \_\_\_\_\_ lat. \_\_\_\_\_, pt. 6 long. \_\_\_\_\_ lat. \_\_\_\_\_.

d. If hydrostatic testing, total volume of the discharge (gallons):

e. Is the discharge intermittent  or seasonal ?

f. Expected dates of discharge (mm/dd/yy): Start: 07 / 01 / 10 End: 10 / 31 / 10

g. Based on the analysis of sample(s) of the untreated influent, the applicant must check the box of the sub-categories that the potential discharge falls within:

- A) Gasoline Only,  B) Fuel Oils (and Other Oils) Sites,  C) Petroleum Sites Containing Other Pollutants  
 D) VOC Only Sites,  E) VOC Sites Containing Other Contaminants  F) Sites Containing Primarily Metals  
 G) Contaminated Construction Dewatering,  
 H) Aquifer Pump Testing, Well Development, or Rehabilitation of Contaminated Wells  
 I) Hydrostatic Testing of Pipelines and Tanks  J) Contaminated Sump Discharge

#### V. TREATMENT SYSTEM INFORMATION

a. Attach a complete description of the treatment system including: a flow schematic depicting all major control points (i.e., alarms, sensors, valves) and treatment units; design calculations on the expected treatment performance (i.e., removal efficiency, carbon consumption calculations) including unit height and surface area; and manufacturers' specifications on major components of the treatment system. Also provide a basis for all design calculations and properly reference all design assumptions in order for calculations to be replicated. Include a discussion on the need for iron treatment to address iron scaling and/or iron bacteria build-up. Plans and specifications on all treatment systems must be signed and certified by a professional engineer registered in the State of Rhode Island.

b. Identify each applicable treatment unit (check all that apply):

- Oil/Water Separator,  Granular Activated Carbon,  Air Stripping,  UV Oxidation,  Iron Treatment,  
 Filtration,  Ion Exchange,  Bag Filter,  Equalization Tanks,  Chlorination,  Dechlorination,  
 Other (please specify): \_\_\_\_\_

If system consists of GAC or Ion Exchange, provide time to carbon or resin exhaustion (days):

If system consists of air stripping, provide air/water ratio:

c. Treatment System Design Flow (gpm): 250

d. Treatment System Maximum System Capacity (gpm): 400

e. Average Flow Rate of Treatment System (gpm): 250

f. Provide a description of chemical additives being used or planned to be used (attach MSDS sheets for each):



**VI. RECEIVING WATER INFORMATION**

a. Identify the discharge pathway:  Direct,  Indirect,  Storm Drain,  River/brook,  Wetlands,

Other (describe): \_\_\_\_\_

b. Provide a narrative description of the discharge pathway, including the names of the receiving waters:  
***Areas of sluiceway will be isolated by cofferdams, and the area will be dewatered by pumping water into the Woonasquatucket River. The sluiceway normally discharges directly into the Woonasquatucket River.***

c. Attach a detailed map(s) indicating the site location and location of the outfall to the receiving water:

1. For multiple discharges, number the discharges sequentially.
2. For indirect discharges, indicate the location of the discharge to the indirect conveyance and the discharge to surface waters. The map should include the location and distance to the nearest sanitary sewer.

d. Provide the Water Quality Classification of the receiving water:   BI(a)  .

e. If the proposed discharge is to freshwaters, provide the reported or calculated seven day-ten year low flow (7Q10) of the receiving water for the point of discharge in cubic feet per second (cfs):  
  9.78 cfs  . Attach any calculation sheets used to support stream flow and dilution calculations.

f. Is the receiving water a listed 303(d) water quality impaired or limited water?  Yes  No. If yes for which pollutant(s)?:

g. Is there a TMDL?  Yes  No If Yes, for which pollutants?

VII. INFLUENT CHARACTERIZATION (attach raw analytical data, include sample date and location)

Pollutant	Believed Absent (Y/N)	Believed Present (Y/N)	Sample Type And Number	Test Method Minimum Level	Average (ug/l)	Max. (ug/l)	Design (ug/l)
Total Suspended Solids	N	Y	-	-	-	-	-
Total Residual Chlorine	N	Y					
Total Petroleum Hydrocarbons	N	Y					
Cyanide	N	Y					
Benzene						20.0010	
Toluene						20.0010	
Ethylbenzene						20.0010	
Total Xylenes (m,p,o)						20.0030	
Total BTEX						20.0060	
Ethylene dibromide						20.0010	
Methyl-t-Butyl Ether (MTBE)						20.0010	
Tert-Butyl Alcohol	N	Y					
Tert-Amyl Methyl Ether	N	Y					
Carbon Tetrachloride						20.0010	
1,4 Dichlorobenzene						20.0010	
1,2 Dichlorobenzene						20.0010	
1,3 Dichlorobenzene						20.0010	
Total Dichlorobenzene						20.0020	
1,1 Dichloroethane						20.0010	
1,2 Dichloroethane						20.0010	
1,1 Dichloroethylene						20.0010	
cis - 1,2 Dichloroethylene						20.0010	
Dichloromethane						20.0010	
Tetrachloroethylene						20.0010	
1,1,1 Trichloroethane						20.0010	
1,1,2 Trichloroethane						20.0010	
Trichloroethylene						20.0010	
Vinyl Chloride						20.0010	
Acetone						20.0250	
1,4 Dioxane						20.500	
Total Phenols						20.010	
Pentachlorophenol						20.00100	
Total Phthalates						20.056	
Bis (2-Ethylhexyl) Phthalate						20.006	
Total Group I PAHs						20.00035	

VII. INFLUENT CHARACTERIZATION (attach raw analytical data, include sample date and location)

Pollutant	Believed Absent (Y/N)	Believed Present (Y/N)	Sample Type And Number	Test Method Minimum Level	Average (ug/l)	Max. (ug/l)	Design (ug/l)
Benzo (a) Anthracene						<0.00005	
Benzo (a) Pyrene						<0.00005	
Benzo (b) Fluoranthene						<0.00005	
Benzo (k) Fluoranthene						<0.00005	
Chrysene						<0.00005	
Dibenzo (a,h) anthracene						<0.00005	
Indeno (1,2,3-cd) Pyrene						<0.00005	
Total Group II PAHs						<0.00180	
Acenaphthene						<0.00020	
Acenaphthylene						<0.00020	
Anthracene						<0.00020	
Benzo (ghi) Perylene						<0.00020	
Fluoranthene						<0.00020	
Fluorene						<0.00020	
Naphthalene						<0.00020	
Phenanthrene						<0.00020	
Pyrene						<0.00020	
Total Polychlorinated Bipheyls	Y						
Antimony	Y						
Arsenic						<2.5	
Cadmium	Y						
Chromium III (trivalent, total recoverable)	Y						
Chromium VI (hexavalent, total recoverable)	Y						
Copper	Y						
Lead (total recoverable)						<10	
Mercury	<del>Y</del> N	Y					
Nickel (total recoverable)	Y						
Selenium	Y						
Silver	Y						
Zinc (total recoverable)	Y						
Iron (total recoverable)						7,000	
Other (describe):							

## Dilution Determination for use with the RIPDES Remediation General Permit

1. Determine the point of discharge. The point of discharge is the location where the effluent first enters a surface water body.
2. Using a USGS map and the gauge station list given in the attached USGS table of 7Q10 Statistics for Rhode Island Stations, locate the gauge station that is closest to the point of discharge. The gauge station must be in the same watershed as the point of discharge.

01114500

3. Find the drainage area of the watershed that is upstream of the gauge station. (Given in the attached table.)

$$DA_{\text{Upstream of Gauge}} = 38.3 \text{ mi}^2$$

4. Find the 7Q10 flow for the gauge station from the attached table.

$$7Q10 \text{ Gauge} = 7.81 \text{ cfs}$$

5. Determine the drainage area of the watershed that is upstream from the point of discharge.

$$DA_{\text{Upstream of Discharge}} = 48 \text{ mi}^2$$

6. Calculate the equivalent 7Q10 flow using the following formula:

$$7Q10 \text{ EQ} = \frac{7Q10 \text{ Gauge}}{DA_{\text{Upstream of Gauge}}} \times DA_{\text{Upstream of Discharge}} = \frac{(7.81 \text{ cfs})}{(38.3 \text{ mi}^2)} \cdot (48.0 \text{ mi}^2) = 9.78 \text{ cfs}$$

7. Calculate the dilution factor using the following formula:

$$\text{Dilution Factor} = \frac{\{ (7Q10 \text{ EQ}) + (\text{System Design Flow}) \}}{\{ \text{System Design Flow} \}} =$$

$$= \frac{(9.78 \text{ cfs}) + 0.8}{0.8} = 13.225$$

**VIII. OWNER/OPERATOR CERTIFICATION**

I certify under penalty of law that I have read and understood all terms and conditions of the above-referenced General Permit. I also certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system design 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 a fine and imprisonment for knowing violations.

Print Owner's Name:           **Robert McMahon**          

Print Owner's Title:           **Director, Providence Parks Dept.**          

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Print Operator's Name: \_\_\_\_\_

Print Operator's Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



R.I. DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
Office of Water Resources



**APPLICATION(S) FEES FORM**

Please complete the information below and **submit this completed form and your check (payable to "R.I. General Treasurer") for the appropriate fee directly to:**

R.I. Department of Environmental Management  
Office of Management Services  
235 Promenade Street  
Providence, RI 02908

**\*\*\* FEES ARE NOT REFUNDABLE \*\*\***

APPLICANT'S NAME: ROBERT McMAHON

OWNER'S NAME: CITY OF PROVIDENCE

SITE LOCATION: LINCOLN LAKE ! BRAID, PROVIDENCE

APPLICATION TYPE (Permit, Order of Approval): **RIPDES General Permit (Remediation)**

**NOTE:** The application and all accompanying documents, including a copy of this fee form and method of payment, should be submitted to the Office of Water Resources, RIPDES Program, 235 Promenade Street, Providence, RI 02908-5767. Application review will be initiated only upon receipt of the complete application and fee.

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**FOR OFFICE USE ONLY**

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OMS Receipt Date: \_\_\_\_\_

Fee Amount Received: \_\_\_\_\_

Processor Initials: \_\_\_\_\_