

**EXPLANATION OF SIGNIFICANT
DIFFERENCES
(ESD)**

**INDUSTRI-PLEX SUPERFUND SITE
OPERABLE UNIT 2**

WOBURN, MASSACHUSETTS



**U.S. ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION 1
5 POST OFFICE SQUARE
BOSTON, MA 02109-3912**

U.S. EPA Region 1
Explanation of Significant Differences (ESD)
Industri-Plex Superfund Site, Operable Unit 2
September 2014

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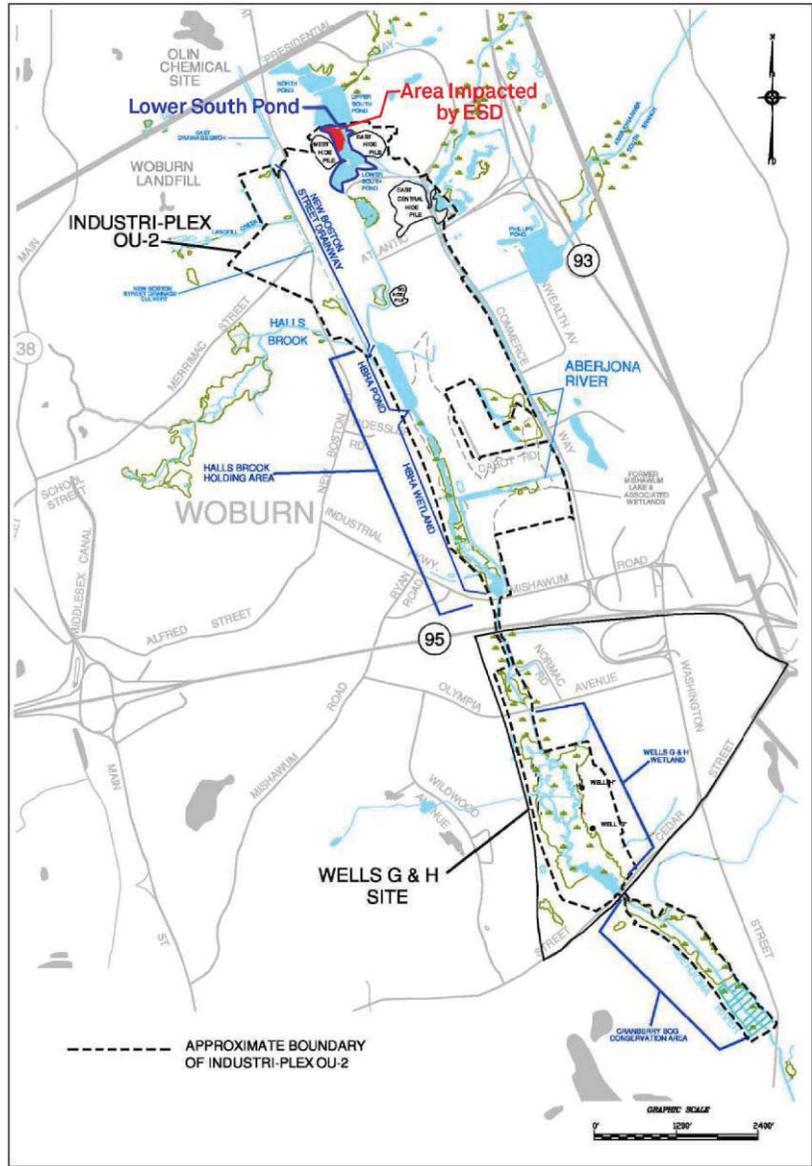
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I. INTRODUCTION

A. SITE NAME & LOCATION

Site Name: Industri-Plex Superfund Site, Operable Unit 2 (OU2)

Site Location: Woburn, Middlesex County, Massachusetts



Industri-Plex Superfund Site, OU2

B. LEAD & SUPPORT AGENCIES

Lead Agency: United States Environmental Protection Agency (EPA)

- *Contact: Joseph LeMay, EPA Remedial Project Manager, (617) 918-1323*

Support Agency: Massachusetts Department of Environmental Protection (MassDEP)

- *Contact: Jay Naparstek, MassDEP Deputy Division Director, (617) 292 -5697*

C. LEGAL AUTHORITY FOR ESD

This Explanation of Significant Differences (ESD) for the Industri-Plex Superfund Site, Operable Unit 2 (Site), documents differences in certain components of the remedy as originally set forth in the January 31, 2006 Record of Decision (ROD).

This ESD has been prepared to provide the public with an explanation of and an opportunity to comment on an EPA modification of the selected remedy for Operable Unit 2 (OU2) of the Site. The United States Environmental Protection Agency (EPA) is required to publish this ESD by Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and the rule at 40 C.F.R. § 300.435(c)(2)(i). EPA sought public comment on this ESD pursuant to 40 C.F.R. § 300.825(b).

Under Section 117(c) of CERCLA, 42 U.S.C. § 9617(c), the rule at 40 C.F.R. 300.435(c)(2)(i), and EPA guidance (Office of Solid Waste and Emergency Response [OSWER] Directive 9200.1-23P), if the EPA determines that differences in the remedial action significantly change but do not fundamentally alter the remedy selected in the ROD, with respect to scope, performance, or cost, the EPA shall publish an ESD to describe the differences between the remedial action being undertaken and the remedial action set forth in the ROD, and the reasons such changes are being made. EPA has determined that the adjustments to the ROD provided in this ESD are significant, but do not fundamentally alter the overall remedy for the Industri-Plex Superfund Site, Operable Unit 2, with respect to scope, performance, or cost. Therefore, this ESD is properly issued.

D. SUMMARY OF CIRCUMSTANCES NECESSITATING THIS ESD

1. The January 2006 ROD for Industri-Plex Superfund Site, OU2 requires the dredging and off-site disposal of contaminated sediments in the southern portion of the Halls Brook Holding Area (HBHA) Pond; dredging and off-site disposal of contaminated near shore sediments at the Wells G&H Wetland and Cranberry Bog Conservation Area; and restoration of all disturbed areas (Figure 1). This component of the ROD will address sediments posing unacceptable human health risks for near shore sediments and unacceptable ecological risks for the southern portion of HBHA Pond.

Pursuant to the ROD, groundwater, surface water and sediments near the West Hide Pile (WHP) were investigated during the pre-design activities. Benzene concentrations in sediments of the Lower South Pond (LSP) adjacent to the WHP were found to be elevated above levels that would contribute to a potential ecological risk. See Figure 2 for approximate sediment sample locations in LSP and Table 1 for data summary. The pre-design data indicates that the benzene is strongly sorbed to organic silt layer in the sediments and the organic silt has a low hydraulic conductivity. The pre-design data also suggests the organic silt containing benzene may have been associated with historical deposition (e.g. when the WHP was formed in the 1970s).

One purpose of this ESD is to add to the OU2 remedy an ecological Remediation Goal (RG) for benzene in sediments of the LSP adjacent to the WHP at 1.290 mg/kg based on data for benzene toxicity in freshwater as detailed in Attachment 1. This RG will serve as a new cleanup level for sediments in the LSP adjacent to the WHP. The sediments above the benzene cleanup standard will be dredged and disposed off-site, and all disturbed areas will be restored to a native wetland habitat. The estimated volume of sediments contaminated with benzene above the 1.290 mg/kg cleanup standard is approximately 900 cubic yards (see Figure 2). ARARs that address the additional statutory and regulatory requirements for this remedial work and which will be incorporated into the OU2 remedy are cited in Attachment 2.

This remedial approach is consistent with the sediment remedial approach described in the ROD for dredging, off-site disposal and restoration of all disturbed areas for the Southern Portion of the HBHA Pond, Wells G&H Wetland and Cranberry Bog Conservation Area. This remedial approach also includes post-excavation sediment confirmation sampling and monitoring of the wetland restoration measures. Long-term groundwater, surface water and sediment monitoring of the area will be ongoing as part of this ESD and the OU2 monitoring requirements for the adjacent WHP.

2. This ESD also updates a number of federal and state ARARs cited in the 2006 ROD that either have been eliminated, modified or otherwise changed from when the 2006 ROD was issued. The revised ARARs tables also cite a number of additional standards not identified in the 2006 ROD, including federal wetland, floodplain, and stormwater standards (Attachment 3). These changes to the ARARs are necessary to ensure that the remedy is protective of human health and the environment, in accordance with 40 CFR § 300.430(f)(1)(ii)(B)(1). None of these changes fundamentally alters the selected remedy.
3. The supporting documentation for this ESD, and the Administrative Record are available to the public at the following locations and may be reviewed at the times listed:

U.S. Environmental Protection Agency
Records Center
5 Post Office Square, Suite 100
Boston, MA 02109

617-918-1440
Monday-Friday: 9:00 am - 5:00 pm
Saturday and Sunday: Closed

Woburn Public Library (summer hours)
45 Pleasant Street
Woburn, MA 01801
781-933-0148
Monday-Thursday: 9:00 am – 9:00 pm
Friday: 9:00 am – 5:30 pm
Saturday & Sunday: Closed

II. SUMMARY OF SITE HISTORY, CONTAMINATION AND SELECTED REMEDY

A. SITE HISTORY, CONTAMINATION AND SITE RISKS

Various chemical and glue manufacturing facilities operated on the Industri-plex Superfund Site from 1853 to 1969. EPA established a 1986 Record of Decision for the first phase of cleanup at Industri-plex (known as Operable Unit 1 or OU1), which included the construction of protective caps over approximately 110 acres of soils contaminated with heavy metals and animal wastes (permeable cap over approximately 105 acres, impermeable cap over approximately 5 acres) to prevent people from coming into contact with the contamination. The construction of OU1 was completed in 1998.

EPA established a January 2006 ROD for the final phase of cleanup at the Industri-plex Superfund Site, (OU2 ROD). The January 2006 Industri-plex Superfund Site OU2 ROD addressed contamination originating from Industri-plex OU1 and downstream migration of OU1 contamination via groundwater discharges. Ingestion of, dermal contact with, and inhalation of volatile compounds released from extracted groundwater within this aquifer poses a potential future risk to human health because EPA's acceptable risk range is exceeded. The ROD also addresses the contamination of soils and sediments. Ingestion of and dermal contact with these soils and sediments poses a potential current and/or future risk to humans because EPA's acceptable risk range is exceeded. Exposure to these sediments also poses an unacceptable ecological risk to benthic communities in these areas. Finally, the ROD addresses the contamination of surface water. Exposure to these surface waters poses an unacceptable ecological risk to aquatic life.

The ROD addresses the threats at Industri-plex OU2 through interception, treatment and sequestration of contaminated groundwater plumes at the northern portion of the HBHA Pond (primary and secondary treatment cells) and the WHP (enhanced in-situ bioremediation), periodic removal of sediments accumulating at the northern portion of the HBHA Pond, sediment removal and restoration at the southern portion of the HBHA Pond and near shore sediment areas, capping (impermeable) stream channels impacted by contaminated groundwater plumes discharge (including New Boston Street Drainway), capping contaminated soils adjacent to the HBHA Pond, establishing institutional controls for groundwater, soils, and sediments to prevent exposures to contamination above cleanup

standards (outlined in Section L of Industri-plex OU2 ROD) and protect the remedy, compensation for any wetland function and value losses nearby in the watershed, and long-term monitoring of groundwater, surface water, and sediments. On November 24, 2008, EPA entered into a Consent Decree with two Settling Defendants to perform the Industri-plex OU2 Remedial Design/Remedial Action consistent with the ROD. On March 24, 2011, EPA approved the Remedial Design Work Plan consistent with the ROD.

Additional details regarding history, contamination and risks can be found in the ROD and its Administrative Record.

B. SUMMARY OF THE OU2 ROD SELECTED REMEDY

The selected remedy is a comprehensive approach for Industri-plex OU2 that addresses all current and potential future risks caused by contaminated groundwater, soil, sediment, and surface water. Specifically, this remedial action addresses contamination in:

Groundwater originating at Industri-plex OU1 and extending to the HBHA Pond;

Sediments in the HBHA Pond, HBHA Wetlands, Wells G&H Wetland, and Cranberry Bog Conservation Area;

Surface and subsurface soil in the vicinity of the former (now buried) Mishawum Lake; and

Surface water in the HBHA Pond.

The remedial measures will prevent future unacceptable risks from sediments and soils, and untreated groundwater and surface water, and will allow for restoration of Industri-plex OU2 to beneficial uses. Institutional controls will be required to prevent unacceptable exposures to hazardous substances and contaminated materials in groundwater, soils, and deeper wetland sediments in the future. Also, long-term monitoring, operation and maintenance, and periodic five-year remedy reviews will be performed.

The major components of this remedy are:

- Dredging and off-site disposal of contaminated sediments in the southern portion of the HBHA Pond; dredging and off-site disposal of contaminated near shore sediments at the Wells G&H Wetland and Cranberry Bog Conservation Area; and restoration of all disturbed areas. This component will address sediments posing unacceptable human health risks for near shore sediments and unacceptable ecological risks for the southern portion of HBHA Pond. Identified contaminants sediments which were identified as Contaminants of Concern in the ROD were: Arsenic and Benzo(a)pyrene.
- Use of the northern portion of HBHA Pond as a sediment retention area (primary and secondary treatment cells) that will intercept contaminated groundwater plumes (including arsenic, benzene, ammonia, 1,2-dichloroethane, trichloroethene, naphthalene) from Industri-plex OU1, treat/sequester contaminants of concern (including arsenic, benzene, ammonia), and minimize downstream migration of contaminants (including arsenic, benzene, ammonia). The primary treatment cell will intercept the contaminated groundwater plumes discharging in the HBHA Pond. The effluent from northern portion of

the HBHA Pond (secondary treatment cell outlet) will serve as the surface water compliance boundary, and achieve National Recommended Water Quality Criteria (NRWQC). Sediments which accumulate in the northern portion of the HBHA Pond will be periodically dredged and sent off-site for disposal. Portions of storm water from Halls Brook, which may interfere with the natural treatment processes occurring within the northern portion of the HBHA Pond, will be diverted to the southern portion of HBHA Pond.

- If necessary, In-situ Enhanced Bioremediation of contaminated groundwater plumes (e.g., benzene) at the WHP.
- Construction of an impermeable cap to line stream channels (e.g. New Boston Street Drainway), and to prevent the discharge of contaminated groundwater plumes, contamination of stream sediments, downstream migration of contaminants of concern, and potential impacts to other components of the selected remedy.
- Construction of a permeable cap to prevent contaminated soil erosion (e.g. Area A6), downstream migration of contaminants of concern, and potential impacts to other components of the selected remedy.
- Establishing institutional controls to restrict contact with soils, groundwater, or deeper interior wetland sediments with concentrations above cleanup standards and protect the remedy.
- Construction of compensatory wetlands for any loss of wetland functions and values associated with the selected remedy (e.g. northern portion of HBHA Pond, Halls Brook storm water by-pass, capped stream channels) nearby in the watershed.
- Long-term monitoring of the groundwater, surface water, and sediments, and periodic Five-year Reviews of the remedy.

III. BASIS FOR THE DOCUMENT

This ESD is an expansion of the ROD and documents an ecological Remediation Goal (RG) for benzene in sediments of the LSP adjacent to the WHP at 1.290 mg/kg based on data for benzene toxicity to aquatic organisms as detailed in an attached benzene “*PRG Summary Explanation of Significant Differences (ESD) Industri-Plex Superfund Site, Operable Unit 2 (Revised August 11, 2014)*” (PRG Summary) (Attachment 1). This RG will serve as the remediation goal and new cleanup standard for sediments in the LSP adjacent to the WHP. The sediments above the benzene cleanup standard will be dredged, dewatered, and disposed off-site, and all disturbed areas will be restored. A portadam/cofferdam will be installed and a small portion of the LSP (approximately 0.5 acres) will be dewatered so that the sediments may be mechanically dredged. Once dredged the contaminated sediments will be further dewatered by gravity and/or amendments, placed in containers, and shipped off-site to an approved disposal facility. All dewatered water will be contained, sampled/treated, and discharged to the surface water in compliance with ARARs. The estimated volume of sediments contaminated with benzene above the 1.290 mg/kg cleanup standard is approximately 900 cubic yards over an area of approximately 4,800 square feet (0.11 acres) (see Figure 2). Once this contaminated sediment is removed and the wetland restored, no further sediment remediation will be required in this area.

This remedial approach is consistent with the sediment remedial approach described in the ROD for dredging, off-site disposal and restoration of all disturbed areas for the Southern Portion of the HBHA Pond, Wells G&H Wetland and Cranberry Bog Conservation Area. This remedial approach also includes post-excavation sediment confirmation sampling and monitoring of wetland mitigation measures. Long-term groundwater, surface water and sediment monitoring of the area will continue as part of OU2 monitoring requirements for the adjacent WHP. No further action for the LSP sediments will be required through the OU2 remedy.

All other soil, sediment and groundwater components of the remedy documented in the ROD are unchanged and are not impacted by this ESD.

This ESD also updates a number of federal and state ARARs cited in the 2006 ROD that either have been eliminated, modified or otherwise changed from when the 2006 ROD was issued. The revised ARARs tables also cite a number of additional standards not identified in the 2006 ROD, including federal wetland, floodplain, and stormwater standards (Attachment 3). None of these changes fundamentally alters the selected remedy.

IV. DESCRIPTION OF SIGNIFICANT DIFFERENCES

A. Addition of LSP Sediment Cleanup Standards

For the LSP sediment, sediment cleanup standard for benzene has been established through this ESD for ecological protection in the portions of the pond (e.g. adjacent to the WHP) where significant adverse impacts are anticipated from high exposures to benzene in sediments. The cleanup standard for benzene in the LSP sediment is 1.290 mg/kg. The review of available toxicity data resulted in the calculation of a sediment benchmark values and potential PRG value based on site-specific sediment organic carbon content of 3.5%. A recommended RG for benzene of 1.290 mg/kg was calculated using a conservative water quality guideline for the protection of sensitive aquatic organisms and an equilibrium partitioning method (Attachment 1).

Sediment cleanup standard for LSP is summarized below.

SUMMARY OF SEDIMENT CLEANUP STANDARD	
Lower South Pond (ecological)	
Benzene	1.290 mg/kg

All other cleanup standards documented in the ROD are unchanged and are not impacted by this ESD.

B. Remediation of LSP Sediments

This ESD adds cleanup of contaminated sediments in the LSP wetland to the OU2 remedial action. Sediments exceeding benzene cleanup standards will be dredged [or excavated], dewatered, and sent for disposal in an off-site licensed disposal facility. The sediment removal/disposal process was previously described and analyzed under criteria established under the National Contingency Plan (40 C.F.R. Part 300) in the OU2 ROD. EPA has determined that the removal and off-site disposal, along with restoration of altered wetlands is the Least Environmentally Damaging Practicable Alternative under Section 404 of the federal Clean Water Act.

Specifically, the cleanup plan proposed by EPA includes activities that would impact wetlands (dredging, dewatering, handling, and off-site disposal of contaminated sediments). Before EPA can select a cleanup plan that would impact wetlands, federal statutes and regulations (found in Appendix 3) require EPA to make a determination that there is no practicable alternative to conducting work that will impact wetlands and that the cleanup activities conducted are the Least Environmentally Damaging Practicable Alternative (LEDPA), as defined by Section 404(b) of the Clean Water Act and regulations promulgated under the Act at 40 C.F.R. Part 230, 231 and 33 C.F.R. Parts 320-323. Protection of Wetlands regulations at 44 C.F.R. Section 9 require EPA to solicit public comment regarding proposed alterations to wetland resources, which was done through the Draft ESD, with a public comment period from August 19, 2014 through September 3, 2014. To the extent that any of these federal statutes and regulations apply, EPA has determined: that because significant levels of contamination exist in wetlands within the cleanup areas, there is no practicable alternative to conducting work in these wetlands; and that the proposed cleanup activities that impact wetlands are the LEDPA. Wetlands will be restored and/or replicated consistent with the requirements of federal and state wetlands protection standards. No negative comments were received during the Draft ESD public comment period concerning EPA's LEDPA finding or EPA's plan to work in federally-regulated wetlands.

Also, the cleanup plan proposed by EPA includes activities that result in the temporary occupancy of the floodplain during remedial activities. Before selecting a cleanup alternative, federal Floodplain Management regulations at 44 C.F.R. Section 9 require EPA to make a determination that there is no practicable alternative to the proposed actions within floodplains and to solicit public comment, regarding proposed alterations to floodplain resources. EPA solicited comments regarding its proposed temporary occupancy of federally-regulated floodplain through the Draft ESD. To the extent that any of these federal statutes and regulations apply, EPA has determined there is no practicable alternative to occupancy and/or modification of portions of the floodplain within the area to be remediated and any areas needed for access or for staging remedial operations. EPA will conduct necessary mitigation measures to protect downstream receptors in the floodplain. No negative comments were received during the Draft ESD public comment period concerning EPA's plan to work in federally-regulated floodplain.

C. Updating the ARARs

This ESD also updates a number of federal and state ARARs cited in the 2006 ROD that either have been eliminated, modified or otherwise changed from when the 2006 ROD was issued. The revised ARARs tables also cite a number of additional standards not identified in the 2006 ROD, including federal wetland, floodplain, and stormwater standards (Attachment 3). These changes to the ARARs are necessary to ensure that the remedy is protective of human health and the environment, in accordance with 40 CFR § 300.430(f)(1)(ii)(B)(1). None of these changes fundamentally alters the selected remedy.

D. Summary of Costs

Based on an estimated volume of benzene impacted sediment of approximately 900 cubic yards in the LSP adjacent to the WHP, the estimated additional capital cost to dredging, off-site disposal, and restoration of all disturbed areas would be approximately \$1.3 million (Attachment 4). This modification to the ROD serves to increase the total approximate cost of the remedy from \$25.7 Million to \$27.0 Million which represents an approximate increase of 5%.

V. SUPPORTING AGENCY COMMENTS

The State of Massachusetts has reviewed the ESD and provided their letter of support (Attachment 5 - MassDEP ESD Letter of Support).

VI. STATUTORY DETERMINATIONS

This ESD documents EPA's modification of the ROD to establish a benzene cleanup standard for sediments of 1.290 mg/kg in the LSP adjacent to the WHP. Sediments above this benzene cleanup standard will be dredged and disposed off-site, and all disturbed areas will be restored. EPA has made a determination that the removal and off-site disposal, along with restoration of altered wetlands is the Least Environmentally Damaging Practicable Alternative under Section 404 of the federal Clean Water Act. EPA believes that the modified remedy as stated in this ESD remains protective of human health and the environment, complies with all Federal and State requirements that are applicable or relevant and appropriate to this remedial action, meets the remedial action objectives specified in the ROD, and is cost-effective.

VII. PUBLIC PARTICIPATION COMPLIANCE

EPA provided a public comment period on the Draft ESD from August 19, 2014 through September 3, 2014. Notice of availability for review of the Draft ESD and the Administrative Record was published in the Woburn Daily Times Chronicle newspaper on August 19, 2014 encouraging the public to submit comments on the Draft ESD. EPA placed copies of the Notice and the Draft ESD and Administrative Record on its

Industri-plex Superfund Site web page (<http://www.epa.gov/region1/superfund/sites/industriplex>), and mailed copies of the Draft ESD and Administrative Record to the OU2 Settling Defendants Project Coordinator, Aberjona Study Coalition, City of Woburn and MassPort Authority. During the public comment period, EPA received various comments on the Draft ESD. EPA has reviewed the comments, prepared a responsiveness summary (Attachment 6 – Responsiveness Summary), determined the proposed remedial action is necessary, and issued this final ESD. In accordance with Section 117(d) of CERCLA and Section 300.825(a) of the National Contingency Plan (NCP), this final ESD and supporting documentation shall become part of the Administrative Record for the Site.


James T. Owens III, Director
Office of Site Remediation and Restoration

09/11/14
date

Figures

Tables

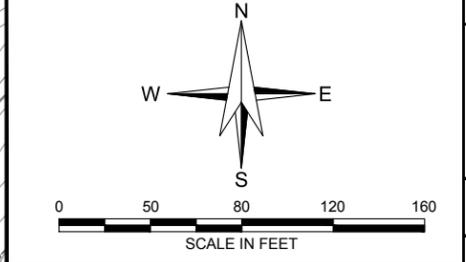
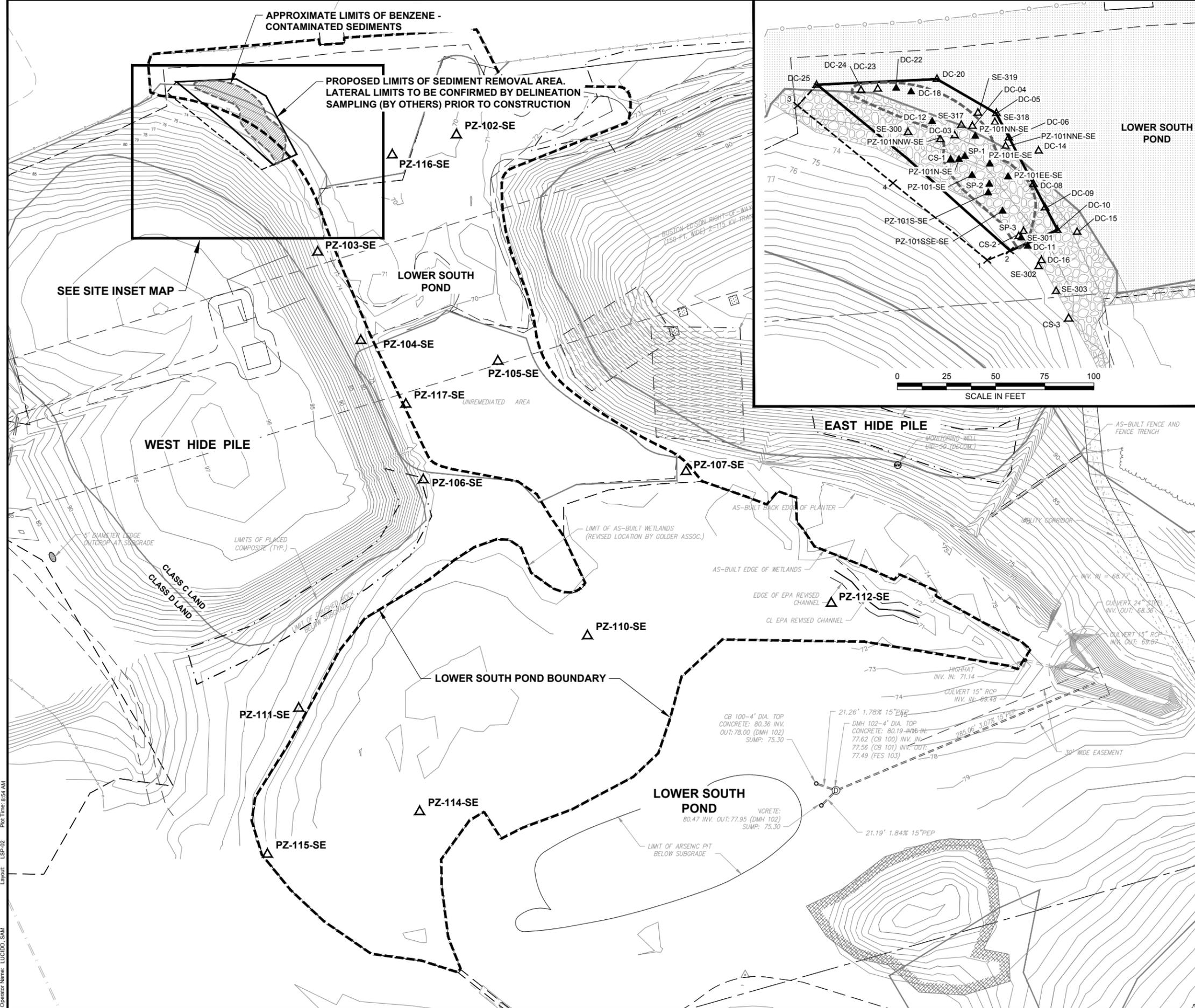
- Attachment 1 – Preliminary Remediation Goal Summary
- Attachment 2 – ARARs for Lower South Pond Sediment Dredging and Off-Site Disposal, and Restoration of all Disturbed Areas
- Attachment 3 – Tables of Revised Applicable and Relevant and Appropriate Standards (ARARs)
- Attachment 4 – Cost Evaluation
- Attachment 5 – MassDEP ESD Letter of Support
- Attachment 6 – Responsiveness Summary

LEGEND

- ▲ LOWER SOUTH POND SEDIMENT SAMPLE EXHIBITING BENZENE CONCENTRATIONS IN EXCESS OF EPA SEDIMENT CRITERIA FOR LOWER SOUTH POND
- △ SEDIMENT SAMPLE EXHIBITING BENZENE CONCENTRATIONS BELOW EPA SEDIMENT CRITERIA OF FOR LOWER SOUTH POND

NOTES

1. ALL LOCATIONS, DIMENSIONS, AND AERIAL EXTENTS SHOULD BE CONSIDERED APPROXIMATE.



Project No.:	33020-224
Scale:	AS SHOWN
Date:	14-MAR-2014
Drawn By:	SJL
Designed By:	LB, MK
Checked By:	TJH
Approved By:	
Stamp:	

100% REMEDIAL DESIGN
INDUSTRI-PLEX
SUPERFUND SITE
OPERABLE UNIT 2
WOBURN, MASSACHUSETTS

WEST HIDE PILE DESIGN
SEDIMENT SAMPLE
LOCATIONS AND
APPROXIMATE
LIMITS OF BENZENE
CONTAMINATED
SEDIMENTS

FIGURE 2

CAD File Path: C:\33020\100\CAD\West Hide Pile\33020-224_G-404_LF.dwg
 Drawing Name: LUCDOJ_SMI
 Operator Name: LSP-22
 Plot Time: 8:54 AM

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	CS-1	CS-1	CS-1	CS-2
Sample ID	CS-1-SE-01-060412	CS-1-SE-04-060412	CS-1-SE-05-060412	CS-2-SE-0
Sample Date	6/4/2012	6/4/2012 9:20	6/4/2012 9:30	6/4/2012 11
Sample Depth	0' - 0.5'	2.5' - 3.5'	3.5' - 4.5'	0' -
Lab Sample ID	L1209866-01	L1209866-02	L1209866-03	L12098
Benzene (ug/kg)	23000	14000	100J	3.8U
Notes:				
1. " ' " : Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	CS-2	CS-2	CS-2	
Sample ID	CS-2-SE-02-060412	CS-2-SE-03-060412	CS-2-SE-04-060412	CS-3-SE-0
Sample Date	6/4/2012 11:08	6/4/2012 11:10	6/4/2012 11:12	6/4/
Sample Depth	0.5' - 1.5'	1.5' - 2.4'	2.4' - 3'	
Lab Sample ID	L1209866-05	L1209866-06	L1209866-07	L120
Benzene (ug/kg)	3.8R	8.7J	160	
Notes:				
1. " ' ": Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	CS-3	PZ-101EE-SE	PZ-101E-SE	PZ-10
Sample ID	CS-3-SE-02-060412	PZ-101EE-SE-01-092211	PZ-101E-SE-081811	PZ-101N
Sample Date	6/4/2012 12:05	9/22/2011 14:00	8/18/2011 9:10	9/22
Sample Depth	0.5' - 1.3'	0' - 0.5'	0' - 0.5'	
Lab Sample ID	L1209866-09	L1115141-03	L1112788-04	L1
Benzene (ug/kg)	1.1U	14000J	36000	
Notes:				
1. " ' ": Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	PZ-101NN-SE	PZ-101NNW-SE	PZ-101N-SE	
Sample ID	PZ-101NN-SE-01-092211	PZ-101NNW-SE-01-092211	PZ-101N-SE-081811	22
Sample Date	9/22/2011 13:30	9/22/2011 14:35	8/18/2011 9:25	
Sample Depth	0' - 0.5'	0' - 0.5'	0' - 0.5'	
Lab Sample ID	L1115141-01	L1115141-04	L1112788-03	
Benzene (ug/kg)	2100J	99J	3300	
Notes:				
1. " ' " : Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	PZ-101-SE	PZ-101S-SE	PZ-101SSE-SE	PZ-1
Sample ID	PZ-101-SE-01-062811	PZ-101S-SE-081811	PZ-101SSE-SE-01-092211	PZ-102-S
Sample Date	6/28/2011 14:39	8/18/2011 9:00	9/22/2011 14:50	6/27
Sample Depth	0' - 0.5'	0' - 0.5'	0' - 0.5'	
Lab Sample ID	L1109541-10	L1112788-02	L1115141-05	L1
Benzene (ug/kg)	30000J	62000	380000J	
Notes:				
1. " ' " : Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	PZ-103-SE	PZ-104-SE	PZ-105-SE	PZ-106-S
Sample ID	PZ-103-SE-01-062811	PZ-104-SE-01-062811	PZ-105-SE-01-062711	PZ-106-SE-01-
Sample Date	6/28/2011 14:10	6/28/2011 12:08	6/27/2011 11:20	6/28/201
Sample Depth	0' - 0.5'	0' - 0.5'	0' - 0.25'	0' -
Lab Sample ID	L1109541-09	L1109541-08	L1109441-04	L11095
Benzene (ug/kg)	2.4U	3.1U	2.3U	1.4U
Notes:				
1. " ' ": Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	PZ-107-SE	PZ-110-SE	PZ-111-SE	PZ-1
Sample ID	PZ-107-SE-01-062711	PZ-110-SE-01-062711	PZ-111-SE-01-062811	PZ-112-SE-
Sample Date	6/27/2011 10:24	6/27/2011 14:44	6/28/2011 10:05	6/27/201
Sample Depth	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' -
Lab Sample ID	L1109441-03	L1109441-08	L1109541-05	L11094
Benzene (ug/kg)	2.7	1.9U	1.6U	2.1U
Notes:				
1. " ' " : Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	PZ-114-SE	PZ-115-SE	PZ-116-SE	PZ-117-S
Sample ID	PZ-114-SE-01-062811	PZ-115-SE-01-062811	PZ-116-SE-01-070811	PZ-117-SE-
Sample Date	6/28/2011 8:50	6/28/2011 9:35	7/8/2011 11:45	7/1/2011 12
Sample Depth	0' - 0.5'	0' - 0.5'	0' - 0.5'	0'
Lab Sample ID	L1109541-03	L1109541-04	L1110149-04	L11098
Benzene (ug/kg)	2.4U	1.7U	10U	17U
Notes:				
1. " ' ": Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	SE-300	SE-301	SE-302	SE-303
Sample ID	SE-300-SE-01-092211	SE-301-SE-01-092211	SE-302-SE-01-103111	SE-303-SE-01
Sample Date	9/22/2011 14:15	9/22/2011 15:10	10/31/2011 13:10	10/31/2011
Sample Depth	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'
Lab Sample ID	L1115141-06	L1115141-07	L1118011-01	L1118011-
Benzene (ug/kg)	32J	120000J	3.7U	2.6U
Notes:				
1. " ' " : Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	SE-317	SE-318	SE-319	SP-1
Sample ID	SE-317-SE-01-100212	SE-318-SE-01-100212	SE-319-SE-01-100212	SP-1-SE-01-10
Sample Date	10/2/2012 10:10	10/2/2012 9:30	10/2/2012 10:00	10/18/2012
Sample Depth	0' - 0.5'	0' - 0.5'	0' - 0.5'	0.5' - 1'
Lab Sample ID	L1217676-01	L1217676-02	L1217676-03	L1218828-
Benzene (ug/kg)	13	22UR	12UR	4800
Notes:				
1. " ' " : Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	SP-1	SP-1	SP-2	SP-2
Sample ID	SP-1-SE-02-101812	SP-1-SE-03-101812	SP-2-SE-01-101812	SP-2-SE-02-
Sample Date	10/18/2012 13:10	10/18/2012 13:15	10/18/2012 13:50	10/18/2012
Sample Depth	1.5' - 2'	2.5' - 3'	0.5' - 1'	1.5' -
Lab Sample ID	L1218828-02	L1218828-03	L1218828-04	L1218828-
Benzene (ug/kg)	29000	28000	940000	110000
Notes:				
1. " ' ": Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	SP-2	SP-3	SP-3	SP-3
Sample ID	SP-2-SE-03-101812	SP-3-SE-01-101812	SP-3-SE-02-101812	SP-3-SE-03-
Sample Date	10/18/2012 14:00	10/18/2012 14:30	10/18/2012 14:35	10/18/2012
Sample Depth	2.5' - 3'	0.5' - 1'	1.5' - 2'	2.5' -
Lab Sample ID	L1218828-06	L1218828-07	L1218828-08	L1218828-
Benzene (ug/kg)	460000J	11UJR	180J	52
Notes:				
1. " ' " : Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	DC-03	DC-03	DC-04	
Sample ID	DC-3-SE-01-040914-1100	DC-3-SE-02-040914-1105	DC-4-SE-01-040914-1120	DC-4-SE-
Sample Date	4/9/2014 11:00	4/9/2014 11:05	4/9/2014 11:20	
Sample Depth	0.0' - 0.5'	2.5' - 3.5'	0.0' - 0.5'	
Lab Sample ID	L1407363-11	L1407363-12	L1407363-13	
Benzene (ug/kg)	980	770	18	
Notes:				
1. " ' " : Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	DC-05	DC-05	DC-06
Sample ID	DC-05-SE-01-041014-0840	DC-05-SE-02-041014-0845	DC-06-SE-01-041014-0910
Sample Date	4/10/2014 8:40	4/10/2014 8:45	4/10/2014 9:10
Sample Depth	0.0' - 0.5'	1.0' - 2.3'	0.0' - 0.5'
Lab Sample ID	L1407532-01	L1407532-02, R1	L1407532-03, R1
Benzene (ug/kg)	12U	18U	10U
Notes:			
1. " ' ": Foot.			
2. "U": Analyte undetected, value shown is equal to reporting limit.			
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.			
4. "R": Data rejected due to low total solids and high water content.			
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.			

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	DC-06	DC-06	
Sample ID	DC-06-SE-02-041014-0915	2287-FD-01-041014(DC-06-SE-02-041014-0915)	DC-08-SE-0
Sample Date	4/10/2014 9:15	4/10/2014	4/10
Sample Depth	1.0' - 2.7'		0.0' -
Lab Sample ID	L1407532-04, R1	L1407532-09, R1	L140
Benzene (ug/kg)	6.2U	9.6U	
Notes:			
1. " ' ": Foot.			
2. "U": Analyte undetected, value shown is equal to reporting limit.			
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.			
4. "R": Data rejected due to low total solids and high water content.			
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.			

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	DC-08	DC-09	DC-09
Sample ID	DC-08-SE-02-041014-1055	DC-9-SE-01-040914-1440	DC-9-SE-02-040914-1445
Sample Date	4/10/2014 10:55	4/9/2014 14:40	4/9/2014 14:45
Sample Depth	2.0' - 3.5'	0.0' - 0.5'	1.0' - 1.5'
Lab Sample ID	L1407532-08, R1	L1407363-04	L1407363-05
Benzene (ug/kg)	17U	13U	20U
Notes:			
1. " ' ": Foot.			
2. "U": Analyte undetected, value shown is equal to reporting limit.			
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.			
4. "R": Data rejected due to low total solids and high water content.			
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.			

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	DC-10	DC-10	
Sample ID	DC-10-SE-01-040914-1400	2287-FD-01-040914(DC-10-SE-01-040914-1400)	DC-10-S
Sample Date	4/9/2014 14:00	4/9/2014	4/
Sample Depth	0.0' - 0.5'		
Lab Sample ID	L1407363-02	L1407363-06	L1
Benzene (ug/kg)	14U	18U	
Notes:			
1. " ' ": Foot.			
2. "U": Analyte undetected, value shown is equal to reporting limit.			
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.			
4. "R": Data rejected due to low total solids and high water content.			
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.			

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	DC-11	DC-11	DC-12	
Sample ID	DC-11-SE-01-040914-1250	DC-11-SE-02-040914-1255	DC-12-SE-01-040914-1015	
Sample Date	4/9/2014 12:50	4/9/2014 12:55	4/9/2014 10:15	
Sample Depth	0.0' - 0.5'	1.0' - 2.2'	0.0' - 0.5'	
Lab Sample ID	L1407363-15	L1407363-16	L1407363-09	
Benzene (ug/kg)	2900	12	8.4	
Notes:				
1. " ' " : Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	DC-14	DC-14	DC-15	
Sample ID	DC-14-SE-01-041014-0945	DC-14-SE-02-041014-0950	DC-15-SE-01-041014-1120	DC-1
Sample Date	4/10/2014 9:45	4/10/2014 9:50	4/10/2014 11:20	
Sample Depth	0.0' - 0.5'	1.0' - 3.0'	0.0' - 0.5'	
Lab Sample ID	L1407532-05, R1	L1407532-06, R1	L1407532-11, R1	
Benzene (ug/kg)	11U	18U	9.2U	
Notes:				
1. " ' ": Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	DC-16	DC-16	DC-16
Sample ID	DC-16-SE-01-050814-1125	DC-16-SE-02-050814-1130	0774-FD-050814(DC-16-SE-02-05
Sample Date	5/8/2014 11:25	5/8/2014 11:30	5/11/2014
Sample Depth	0.0' - 0.5'	1.5' - 2.5'	
Lab Sample ID	L1409827-01	L1409827-02	L1409827-06
Benzene (ug/kg)	13	20	38
Notes:			
1. " ' ": Foot.			
2. "U": Analyte undetected, value shown is equal to reporting limit.			
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.			
4. "R": Data rejected due to low total solids and high water content.			
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.			

TABLE 1
Lower South Pond - Sediment Samples
Benzene Summary Data
Industri-plex Superfund Site OU2, Woburn, MA

Location	DC-18	DC-18	DC-20	
Sample ID	DC-18-SE-01-050814-1150	DC-18-SE-01-050814-1155	DC-20-SE-01-050814-1100	DC-2
Sample Date	5/8/2014 11:50	5/8/2014 11:55	5/8/2014 11:50	
Sample Depth	0.0' - 0.5'	1.5' - 2.5'	0.0' - 0.5'	
Lab Sample ID	L1409827-03	L1409827-04	L1409827-05	
Benzene (ug/kg)	6.9	1800	1.7U	
Notes:				
1. " ' ": Foot.				
2. "U": Analyte undetected, value shown is equal to reporting limit.				
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.				
4. "R": Data rejected due to low total solids and high water content.				
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.				

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	DC-22	DC-23	DC-23
Sample ID	DC-22-SE-02-053014-0950	DC-23-SE-01-053014-1035	DC-23-SE-02-053014-1040
Sample Date	5/30/2014 9:50	5/30/2014 10:35	5/30/2014 10:40
Sample Depth	1.0' - 2.0'	0.0' - 0.5'	1.0' - 2.0'
Lab Sample ID	L1411715-02	L1411715-03	L1411715-04
Benzene (ug/kg)	1600	3.4U	130
Notes:			
1. " ' ": Foot.			
2. "U": Analyte undetected, value shown is equal to reporting limit.			
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.			
4. "R": Data rejected due to low total solids and high water content.			
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.			

TABLE 1
Lower South Pond - Sediment Samples
Benzene Summary Data
Industri-plex Superfund Site OU2, Woburn, MA

Location	DC-23	DC-24	DC
Sample ID	5052-FD-01-053014(DC-23-SE-02-053014-1040)	DC-24-SE-01-053014-1110	DC-24-SE-0
Sample Date	5/30/2014	5/30/2014 11:10	5/30/2
Sample Depth		0.0' - 0.5'	0.5' -
Lab Sample ID	L1411715-09	L1411715-05	L141
Benzene (ug/kg)	23	3.6U	
Notes:			
1. " ' ": Foot.			
2. "U": Analyte undetected, value shown is equal to reporting limit.			
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.			
4. "R": Data rejected due to low total solids and high water content.			
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.			

TABLE 1**Lower South Pond - Sediment Samples****Benzene Summary Data****Industri-plex Superfund Site OU2, Woburn, MA**

Location	DC-25	DC-25
Sample ID	DC-25-SE-01-053014-1200	DC-25-SE-02-053014-1205
Sample Date	5/30/2014 12:00:00 AM	5/30/2014 12:05:00 AM
Sample Depth	0.0' - 0.5'	0.5' - 1.5'
Lab Sample ID	L1411715-07	L1411715-08
Benzene (ug/kg)	2.4U	2.8U
Notes:		
1. " ' " : Foot.		
2. "U": Analyte undetected, value shown is equal to reporting limit.		
3. "J": Estimated value. Below the quantitation limit but above one half reporting limit.		
4. "R": Data rejected due to low total solids and high water content.		
5. "UR": Analyte undetected, data rejected due to low total solids and high water content.		

Attachment 1 – PRG Summary
Explanation of Significant Differences (ESD)
Industri-Plex Superfund Site, Operable Unit 2
REVISED AUGUST 11, 2014

Background

This summary provides information to evaluate existing data on benzene toxicity in freshwater sediments and to support the development of a site-specific Preliminary Remediation Goal (PRG) for the sediments in Lower South Pond (LSP) in the vicinity of the West Hide Pile on the Industri-Plex Site, Operable Unit 2 (OU-2), in Woburn, Massachusetts.

Habitat, Receptors and Complete Exposure Pathways

Lower South Pond is a shallow aquatic habitat. Recent site activities during the OU-2 Pre-Design Investigations have focused on characterization of groundwater migration in the vicinity of the West Hide Pile, adjacent to Lower South Pond, and the evaluation of the extent of potential aquatic impacts. The area of interest is located between the East and West Hide Piles in Lower South Pond. The data collected in sediments in as part of the pre-design investigation in 2011 and in subsequent samples have indicated concentrations of benzene in sediments up to 380,000 ug/kg. Benzene was detected in sediment samples collected in shallow cores (0-6 inches) in the surface sediments, in particular along the shore with the West Hide Pile. There have not been any detections of benzene in surface water samples along the shore of the West Hide Pile. Therefore, it is assumed that the surface water exposure pathway of fish and aquatic invertebrates exposed to benzene is likely to be minor. Based on the presence of benzene detected in sediment samples, the primary receptors are those exposed directly to sediments, and those that may be exposed by feeding on organisms in the sediment. The highest exposures are likely to occur to benthic organisms that are exposed to high concentrations of benzene in pore water. These organisms include benthic invertebrates and possibly amphibians that burrow in sediments. Incidental ingestion by sediment-feeding organisms such as fish is also a potential exposure pathway, but exposures would be lower than those of the benthic organisms.

Benzenetoxicity

For non-polar organic chemicals, including benzene, properties such as water solubility, sorption to sediment particles, and toxicity are proportional to hydrophobicity, which is expressed as the octanol-water partition coefficient (K_{ow}). Hydrocarbons are lost from buried sediment layers mainly by dissolution or dispersion in water percolating through sediment layers, or by microbial degradation. In sediment porewater (in solution), benzene is more bioavailable and toxic to sediment-dwelling organisms than when adsorbed to sediment particles. Bioaccumulation of hydrocarbons sorbed to sediments by direct contact with external body surfaces or following ingestion of the particles is thought to involve an intermediate step in which the chemicals desorb from the particle into the water and then are absorbed into an organism (Di Toro et al., 1991; 2000; Hansen et al., 2003).

Hydrocarbons associated with sediment particles must partition from the sediment particles into solution before they can move across biological membranes and be taken up by the organism. For low molecular weight hydrocarbons like benzene ($\log K_{ow} = 2.13$) with high solubility, sufficient levels in the porewater allow rapid bioaccumulation across external permeable membranes or across the gut of organisms when sediment and porewater are ingested.

Generally, the best approach for estimating the toxicity of low molecular weight hydrocarbons in sediments to benthic organisms is to estimate the hydrocarbon concentration in sediment porewater and then compare the estimated concentration to water quality criteria for the hydrocarbon as described in USEPA Guidance (Hansen et al., 2003). The dissolved phase of hydrocarbons in sediment porewater can be estimated based on equilibrium partitioning theory (EqP) as described by Hansen et al. (2003). Assumptions and limitations of these calculations are well-documented. The fundamental assumption for this method is that the derived sediment benchmark, based on toxicity of benzene to surface water organisms, is protective of benthic organisms exposed to similar porewater concentrations.

There are a limited number of studies of water column invertebrates, frogs and fish sensitivity to benzene that have led to development of water quality benchmarks. In general these data are available in the ECOTOX database (<http://www.epa.gov/ecotox>). There have never been enough data on benzene toxicity for EPA to calculate a National Ambient Water Quality Criteria (NAWQC) value for benzene. Several sources have used various methods and assumptions to develop water quality benchmarks based on available surface water toxicity data.

Using the EqP approach, water quality benchmark values can be used to derive sediment screening values through equilibrium partitioning.

A sediment benchmark was calculated using the recommended Canadian Water Quality Guideline (surface water value of 370 ug/L), which was based on leopard frog toxicity (CCME, 1999). This Canadian water quality guideline for benzene was derived from a 9-day study of the early life stages of the leopard frog, which was the most sensitive organism represented in the toxicity dataset. The final chronic value was derived by multiplying the endpoint from this study (LC50 = 3.7 mg/L) by a safety factor of 0.1.

The sediment benchmark for benzene was then determined from the Final Chronic Value (FCV), K_{ow} , K_{oc} , and the fraction of organic carbon in sediment (f_{oc}). Site-specific sampling data were collected from Lower South Pond during pre-design investigation in 2011 and 2012 in the vicinity of the West Hide Pile (Table 1). From these data a site-specific TOC was calculated as 3.5% organic carbon (geometric mean, since concentration range is greater than an order of magnitude). This mean TOC value included samples up to 5 ft below the surface. If the data are calculated for shallow sediments only (1 to 2 ft depth), the resulting geometric mean is similar (3.8%).

The Log organic carbon-to-water partitioning coefficient (Log K_{oc}) is related to Log K_{ow} for each hydrocarbon by the following equation (Di Toro et al., 1991):

$$\text{Log } K_{oc} = 0.00028 + 0.938\text{Log } K_{ow}$$

Using the K_{ow} values benzene (log $K_{ow} = 2.13$), the Log K_{oc} from the above equation for benzene is equal to 1.998 and K_{oc} is 99.59.

A Sediment Benchmark is then calculated from the equation:

$$\text{Sediment Benchmark (mg/kg}_{\text{sediment}}) = K_{oc} \times \text{FCV (mg/L)} \times f_{oc} (0.035)$$
 Where f_{oc}

is the assumed site-specific fraction of organic carbon, at 3.5%.

For benzene in sediment, the calculated sediment benchmark is:

Sediment Benchmark (mg/kg_{oc}) = 99.59 x 370 ug/L x 0.001 mg/ug = 36.8 mg/kg_{oc}

or assuming 3.5% organic carbon, the benchmark is 1.290 mg/kg_{sediment} (36.8 mg/kg_{oc} * 0.035 kg_{oc}/kg_{sediment}).

Converting this result to ug/kg_{sediment}, results in a recommended PRG for benzene of **1,290 ug/kg**.

References

Canadian Council of Ministers of the Environment (CCME). 1999. Canadian water quality guidelines for the protection of aquatic life: Benzene. In: Canadian environmental quality, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

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Table 1. Total Organic Carbon Data for Sediments in Lower South Pond

Sample ID	Sampling round ¹	TOC (%)
PZ-101-SE	2011 PDI Data ²	1.67
PZ-103-SE	2011 PDI Data ²	3.64
CS-1 (1')	2012 PDI Followup Data ³	2.8
CS-1 (4')	2012 PDI Followup Data ³	0.522
CS-1 (5')	2012 PDI Followup Data ³	11
CS-2 (1')	2012 PDI Followup Data ³	4.06
CS-2 (2')	2012 PDI Followup Data ³	11.6
CS-2 (3')	2012 PDI Followup Data ³	12.3
CS-2 (4')	2012 PDI Followup Data ³	1.28
Average		5.4
Geometric Mean		3.5
Median		3.6
Minimum		0.5
Maximum		12.3

Notes:

1) Samples include all data along West Hide Pile, near elevated benzene (PZ-101, PZ-103, CS-1, CS-2)

PDI - Pre-Design Investigation

TOC - Total Organic Carbon content measured in sediment samples

2) Haley and Aldrich, 2012. 30% Remedial Design Report, Appendix A

3) Haley and Aldrich, 2012. Sediment: Total Organic Carbon Results, June 2012. Provided via email from Russell Schuck June 26, 2012.

Attachment 2

ARARs for Lower South Pond Sediment Dredging and
Off-Site Disposal, and Restoration of all Disturbed Areas

**ATTACHMENT 2 –LOWER SOUTH POND (LSP) SEDIMENTS DREDGING AND OFF-SITE
AND RESTORATION OF ALL DISTURBED AREAS**

ACTION-SPECIFIC ARARs

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTIONS TO BE TAKEN TO
Federal Regulatory Requirements	RCRA Identification and Listing of Hazardous Wastes, 40 C.F.R. 261.3	Applicable	Criteria for determining if a waste or contaminated media is a hazardous waste subject to regulation. If a contaminated media exhibits the characteristics of a hazardous waste, RCRA hazardous waste regulations are applicable.	EPA will assess the co criteria to determine w as hazardous waste.
	RCRA Hazardous Waste Regulations (Storage and Disposal of Hazardous Waste) 40 C.F.R. Part 262, Subpart A, 40 C.F.R. Part 264, Subparts I and J.	Relevant and Appropriate	Subparts I and J of Part 264 identify design, operating, monitoring, closure, and post-closure care requirements for RCRA hazardous waste in containers and tank systems, respectively. However, Section 262.34(a) allows accumulation of RCRA hazardous wastes for up to 90 days in containers or tanks provided generator complies with requirements of Subparts I and J of Part 265. Relevant and appropriate standards for less than 90 storage.	Any hazardous waste removal will be manage standards.
	RCRA Closure and Post-Closure Requirements, 40 C.F.R. Subpart G	Applicable	If contaminated sediments constitute characteristic hazardous waste these regulations are applicable. Closure must be completed in a manner that minimizes the need for further maintenance, and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere.	Closure of units which characteristic hazardo similar to hazardous w with this standard.

**ATTACHMENT 2 –LOWER SOUTH POND (LSP) SEDIMENTS DREDGING AND OFF-SITE
AND RESTORATION OF ALL DISTURBED AREAS**

ACTION-SPECIFIC ARARs (cont.)

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTIONS TO BE TAKEN TO
Federal Regulatory Requirements (cont.)	Clean Water Act, National Pollutant Discharge Elimination System (NPDES), 40 CFR 122 and 450	Applicable for discharge to surface water standards; Stormwater standards Applicable for over one acre, Relevant and Appropriate for under one acre	Regulates the discharge of water into public surface waters. Major requirements include the following: <ul style="list-style-type: none"> • Use of best available technology economically achievable is required to control toxic and non-conventional pollutants. Use of best conventional pollutant control technology is required to control conventional pollutants. Technology-based limitations may be determined on a case-by-case basis. • Applicable federally-approved state water quality standards must be complied with. These standards may be in addition to or more stringent than other federal standards under the CWA. Requires the use of best practicable technology (as defined at 40 C.F.R. 450.21) for disturbances of less than 10 acres and best available technology (as defined at 40 C.F.R. 450.22) for disturbance of over 10 acres to control stormwater discharges from construction activity.	Design specifications for t procedures and design system would ensure co discharge standards to protec The best practicable tec regulations) will be used to me requirements.
	Clean Water Act, Section 304(1)(1) National Recommended Water Quality Criteria	Relevant and Appropriate	Provides surface water quality standards for a number of organic and inorganic contaminants.	Water quality criteria will be u standards for the remed water quality.
	Clean Air Act (CAA), Hazardous Air Pollutants, 42.U.S.C. § 112(b)(1), National Emission Standards for Hazardous Air Pollutants (NESHAPS), 40 C.F.R. Part 61	Applicable	The regulations establish emissions standards for 189 hazardous air pollutants. Standards set for dust and other release sources.	Dust and other emissio standards will be control the remedial action. Air if determined to be nece

**ATTACHMENT 2 –LOWER SOUTH POND (LSP) SEDIMENTS DREDGING AND OFF-SITE
AND RESTORATION OF ALL DISTURBED AREAS**

ACTION-SPECIFIC ARARs (cont.)

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO
State Regulatory Requirements	Massachusetts Surface Water Quality Standards 314 CMR 4.00	Applicable	These standards designate the most sensitive uses for which the various waters of the Commonwealth shall be enhanced, maintained, or protected. Minimum water quality criteria required to sustain the designated uses are established. Federal NRWQCs are to be considered in determining effluent discharge limits. Where recommended limits are not available, site-specific limits shall be developed.	Will comply with this ARAR t engineering controls an methods and procedures th pre-design and design ph standards and methods dewatering effluent. W monitoring standards for the surface water quality.
	Water Quality Certification for Discharge of Dredged or Fill Material, Dredging and Dredged Material Disposal in Waters of the United States within the Commonwealth, 314 CMR 9.06	Applicable	For discharge of dredged or fill material, there must be no practicable alternative with less adverse impact on aquatic ecosystem; must take practicable steps to minimize adverse impacts on wetlands or land under water; stormwater discharges must be controlled with BMPs; must be no substantial adverse impact to physical, chemical, or biological integrity of surface waters.	Will be attained becaus alternative method with l aquatic ecosystem; (b) taken to minimize adve under water; (c) stormw controlled through BMPs; substantial long-term adv surface waters.
	Water Quality Certification for Discharge of Dredged or Fill Material, Dredging and Dredged Material Disposal in Waters of the United States within the Commonwealth, 314 CMR 9.07	Applicable	Hydraulic or mechanical dredging allowed; must avoid fisheries impacts.	There are no significant fi water quality will be prote practices during the dred aquatic habitat will be re

**ATTACHMENT 2 –LOWER SOUTH POND (LSP) SEDIMENTS DREDGING AND OFF-SITE
AND RESTORATION OF ALL DISTURBED AREAS**

ACTION-SPECIFIC ARARs (cont.)

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTIONS TO BE TAKEN TO
State Regulatory Requirements (cont.)	Massachusetts Surface Water Discharge Permit Regulations, 314 CMR 3.00	Applicable	Regulates the discharge of water into public surface waters, allows Commonwealth to establish state standards under federal NPDES program.	See above discussion of f
	Mass. Hazardous Waste Regulations (Storage of Hazardous Waste), 310 CMR 30.300, 30.680, 30.690 310 CMR 30.340	Applicable	Requirements for long-term storage, transport and disposal of RCRA hazardous waste in containers and tank systems	See discussion of federal Regulations above.
	Massachusetts Ambient Air Quality standards, 310 C.M.R. 6.0	Applicable	These regulations contain standard for fugitive emissions, dust, and particulates that may be generated from the remedial action.	Dust and other emission standards will be controlled the remedial action. Air if determined to be necessary
	Massachusetts Air Pollution Control Regulations, 310 C.M.R. 7.00	Applicable	These regulations contain standards for fugitive emissions, dust, and particulates that may be generated from the remedial action.	Dust and other emission standards will be controlled the remedial action. Air if determined to be necessary
Criteria, Advisories, and Guidance	Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, EPA-540-R-05-012 OSWER 9355.0-85 (December 2005)	To Be Considered	Guidance for making remedy decisions for contaminated sediment sites. Some of the relevant sections of the guidance address Remedial Investigations (Ch. 2), FS Considerations (Ch. 3), and Dredging and Excavation (Ch. 6).	Removal of all contaminants dewatering and off-site standards for addressing wetlands (as long as habitat can be met).
	Massachusetts Sedimentation and Erosion Control Guidance	To Be Considered	Standards for preventing erosion and sedimentation.	Remedial actions will be and sedimentation

**ATTACHMENT 2 –LOWER SOUTH POND (LSP) SEDIMENTS DREDGING AND OFF-SITE
AND RESTORATION OF ALL DISTURBED AREAS**

LOCATION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTIONS TO BE TAKEN TO
Federal Regulatory Requirements	Floodplain Management and Protection of Wetlands, 44 C.F.R. 9	Relevant and Appropriate	FEMA regulations that set forth the policy, procedure and responsibilities to implement and enforce Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands). Prohibits activities that adversely affect a federally-regulated wetland unless there is no practicable alternative and the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use. Requires the avoidance of impacts associated with the occupancy and modification of federally-designated 100-year and 500-year floodplain and to avoid development within floodplain wherever there is a practicable alternative. An assessment of impacts to 500-year floodplain is required for critical actions – which includes siting hazardous waste facilities in a floodplain. Requires public notice when proposing any action in or affecting floodplain or wetlands.	There is no practicable federal jurisdictional we and all practicable mea and mitigate any adverse i sedimentation control m construction and restor jurisdictional wetlands. regulated floodplain will be there is no practical altern cleanup objectives with l practical measures would mitigate any adverse im would be no likely impac would be taken to minimiz during the work; (e) afte would be no significant net and no significant net in and (f) river and riverba will be improved. Public Draft ESD concerning th and floodplain. No neg

**ATTACHMENT 2 –LOWER SOUTH POND (LSP) SEDIMENTS DREDGING AND OFF-SITE
AND RESTORATION OF ALL DISTURBED AREAS**

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTIONS TO BE TAKEN TO
Federal Regulatory Requirements (cont.)	Clean Water Act §404, and regulations, 33 USC 1344, 40 CFR, 230	Applicable	For discharge of dredged or fill material into water bodies or wetlands, there must be no practical alternative with less adverse impact on aquatic ecosystem; discharge cannot cause or contribute to violation of state water quality standard or toxic effluent standard or jeopardize threatened or endangered (T&E) species; discharge cannot significantly degrade waters of U.S.; must take practicable steps to minimize and mitigate adverse impacts; must evaluate impacts on flood level, flood velocity, and flood storage capacity. Sets standards for restoration and mitigation required as a result of unavoidable impacts to aquatic resources. EPA must determine which alternative is the “Least Environmentally Damaging Practicable Alternative” (LEDPA) to protect wetland and aquatic resources.	EPA has determined the Least Environmentally Damaging Practicable Alternative (LEDPA) because (a) the method that will achieve the least adverse impact; (b) all practical measures to minimize and mitigate adverse impacts; (c) there would be no net loss of storage capacity, and no change in stage or velocities; and (f) the river would be restored and habitat will be restored. No negative cumulative impacts finding.
	Fish and Wildlife Coordination Act 16 USC 662, 663	Applicable	Requires consultation with appropriate agencies to protect fish and wildlife when federal actions may alter waterways. Must develop measures to prevent and mitigate potential loss to the maximum extent possible.	Consultations with the USACE during the design phase. Measures to avoid, minimize, and compensate for adverse project related impacts will be taken, if necessary.
State Regulatory Requirements	Massachusetts Wetlands Protection Act and Regulations, MGL c. 131 § 40, 310 CMR 10.00	Applicable	Regulations restrict dredging, filling, altering, or polluting inland wetland resource areas and buffer zones and impose performance standards for work in such areas. Protected resource areas include: 10.54 (Bank); 10.55 (Bordering Vegetated Wetlands); 10.56 (Land under Water); 10.57 (Bordering Land subject to Flooding); and 10.58 (Riverfront Area).	Will be attained because (a) the method that will achieve the least adverse impact; (b) all practical measures to minimize and mitigate adverse impacts on wetlands will be controlled through Best Management Practices (BMPs); (d) actions will be taken to avoid, minimize, and compensate for hydrologic changes during construction; (e) after construction there will be no significant net loss of storage capacity, and no change in stage or velocities; (f) disturbed vegetation will be restored.

**ATTACHMENT 2 –LOWER SOUTH POND (LSP) SEDIMENTS DREDGING AND OFF-SITE
AND RESTORATION OF ALL DISTURBED AREAS**

CHEMICAL-SPECIFIC ARARs

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTIONS TO BE TAKEN TO
Criteria, Advisories, and Guidance	Canadian Council of Ministers of the Environment (CCME). 1999. Canadian water quality guidelines for the protection of aquatic life: Benzene. In: Canadian environmental quality, 1999, Canadian Council of Ministers of the Environment, Winnipeg.	To Be Considered	Guidance used to develop benzene sediment cleanup level based on the water quality guidelines and site specific calculation of a sediment benchmark for the protection of freshwater aquatic life due to chronic exposure.	All sediments exceeding benzene will be removed from off-site. Confirmatory all sediments exceeding the

Attachment 3

Tables of Revised Applicable and Relevant and Appropriate Standards (ARARs)

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

LOCATION-SPECIFIC ARARs

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM 2006 ROD	
Federal Regulatory Requirements	<p><u>Floodplain Management and Protection of Wetlands, 44 C.F.R. 9</u> <u>Statement of Procedures on Wetlands Protection</u> 40 CFR Part 6, App. A, Exec. Order 11990 (1977) 40 CFR 6.302(a) and Executive Order for Floodplain Management Exec. Order 11988 (1977) 40 CFR Part 6, App. A, 40 CFR 6.302(b)</p>	<p>Changed Relevant and Appropriate</p>	<p>FEMA regulations that set forth the policy, procedure and responsibilities to implement and enforce Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands). Prohibits activities that adversely affect a federally-regulated wetland unless there is no practicable alternative and the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use. Requires the avoidance of impacts associated with the occupancy and modification of federally-designated 100-year and 500-year floodplain and to avoid development within floodplain wherever there is a practicable alternative. An assessment of impacts to 500-year floodplain is required for critical actions – which includes siting hazardous waste facilities in a floodplain. Requires public notice when proposing any action in or affecting floodplain or wetlands.</p>	<p>The ROD cited regulations in the Action Location-Specific ARARs tables for component of the ROD remedy affecting wetlands/ floodplain at 40 C.F.R. Part 6, Appendix 40 C.F.R. 6.302(a) and 6.302(b). These regulations have been removed from the of Federal Regulations. The new regulatory ARAR citation at 44 C.F.R. 9 is added for component of the remedy, which formerly 40 C.F.R Part 6, Appendix A and 40 C.F 6.302(a) and 6.302(b).</p> <p>Through this ESD these regulations are as Location-Specific ARARs in Tables D-8 because the remedial activities address these areas occur within or adjacent to jurisdictional wetlands and/or floodplain</p>	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

LOCATION-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM 2006 ROD	
Federal Regulatory Requirements (cont.)	Clean Water Act §404, and regulations, 33 U.S.C. 1344, 40 C.F.R., 230	Moved Applicable	For discharge of dredged or fill material into water bodies or wetlands, there must be no practical alternative with less adverse impact on aquatic ecosystem; discharge cannot cause or contribute to violation of state water quality standard or toxic effluent standard or jeopardize threatened or endangered (T&E) species; discharge cannot significantly degrade waters of U.S.; must take practicable steps to minimize and mitigate adverse impacts; must evaluate impacts on flood level, flood velocity, and flood storage capacity. Sets standards for restoration and mitigation required as a result of unavoidable impacts to aquatic resources. EPA must determine that the remedial action is the "Least Environmentally Damaging Practicable Alternative" (LEDPA) to protect wetland and aquatic resources.	In the ROD identified in the Action-spec ARARs tables for components of the ROD remedy involving dredging/filling in federal jurisdictional wetlands; moved to Location specific ARARs tables for each component of the ROD remedy involving dredging/filling in federal jurisdictional wetlands.	
	RCRA Floodplain Restrictions for Solid Waste Disposal Facilities and Practices, 40 C.F.R. 257.3-1	Relevant and Appropriate	Solid waste practices must not restrict the flow of a 100-year flood, reduce the temporary water storage capacity of the floodplain or result in washout of solid waste, so as to pose a hazard to human life, wildlife, or land or water resources.	No change from the ROD.	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

LOCATION-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM THE 2006 ROD	
Federal Regulatory Requirements (cont.)	RCRA Floodplain Restrictions for Hazardous Waste Facilities, 40 C.F.R. 264.18(b)	Relevant and Appropriate	A hazardous waste treatment, storage, or disposal facility located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout or to result in no adverse effects on human health or the environment if washout were to occur.	No change from the ROD.	
	Fish and Wildlife Coordination Act and regulations, 16 USC 662, 663 40 CFR 6.302(g)	Applicable	Requires consultation with appropriate agencies to protect fish and wildlife when federal actions may alter waterways. Must develop measures to prevent and mitigate potential loss to the maximum extent possible.	The ROD cited these regulations for components of the ROD remedy affecting fish/wildlife habitat at 40 CFR 6.302(g). regulations have been removed from the of Federal Regulations. Only the remaining statutory requirements at 16 U.S.C. 662, are retained for each component of the remedy affecting fish/ wildlife habitat.	
State Regulatory Requirements	Massachusetts Wetlands Protection Act and Regulations, MGL c. 131 § 40, 310 CMR 10.00	Applicable	Regulations restrict dredging, filling, altering, or polluting inland wetland resource areas and impose performance standards for work in such areas. Protected resource areas include: 10.54 (Bank); 10.55 (Bordering Vegetated Wetlands); 10.56 (Land under Water); 10.57 (Bordering Land subject to Flooding); and 10.58 (Riverfront Area).	Through this ESD these regulations are added as Location-Specific ARARs in Tables D D-8 because the remedial activities addressed in these areas occur within or adjacent to jurisdictional wetlands and/or buffer zones	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

CHEMICAL-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM 2006 ROD	
Federal Regulatory Requirements	Clean Water Act, Ambient Water Quality Criteria, 33 U.S.C. § 1314, 40 C.F.R. 131.36(b)(1)	Applicable	National recommended criteria for surface water quality.	No change from the ROD, although currently referred to as “National Recommended Quality Criteria” (NRWQC).	
State Regulatory Requirements	Massachusetts Contingency Plan (MCP), 310 C.M.R.	Applicable	The MCP has established a set of risk-based threshold concentrations (UCLs) that must be attained in order to achieve a condition of no significant risk for groundwater or soil within a particular groundwater classification area.	The ROD cited the Status of these standards as “To Be Considered.” The Status is changed to “Applicable” because these are promulgated standards within the MCP regulations.	
	Massachusetts Surface Water Quality Standards, 314 C.M.R. 4.05(5)(e)	Applicable	Establishes federal water quality criteria as allowable water quality concentrations. Allows for site-specific criteria where federal criteria are invalid due to site-specific characteristics.	No change for the ROD citations in Tables D-4, D-5, and D-6. The ROD cites these regulations in both Chemical-Specific and Action-Specific Tables D-7 and D-8. Removed as Chemical-Specific ARARs (not used to develop cleanup standards) and retained as Action-Specific Standards for monitoring surface water.	
	Massachusetts Groundwater Quality Standards, 314 C.M.R. 6.00	Applicable	These standards designate and assign uses for which groundwater in the Commonwealth shall be managed and protected, and set forth water quality criteria necessary to maintain the designated areas.	No change from the ROD.	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

CHEMICAL-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM 2006 ROD	
State Regulatory Requirements (cont.)	Massachusetts Ambient Air Quality standards (310 C.M.R. 6.0) and Massachusetts Air Pollution Control Regulations (310 C.M.R. 7.00	Moved	This regulation also contains standards for fugitive emissions, dust, and particulates during construction.	The ROD cited these as Chemical-Specific ARARs. Moved to the Action-Specific ARAR table because the standards regulate emissions, rather than establishing specific cleanup levels.	
Criteria, Advisories, and Guidance	Cancer Slope Factors (CSFs)	To Be Considered	Guidance values used to evaluate the potential carcinogenic risk caused by exposure to contaminants.	No change from the ROD.	
	Reference Doses (RfDs)	To Be Considered	Guidance values used to evaluate the potential non-carcinogenic hazard caused by exposure to contaminants.	No change from the ROD.	
	EPA Health Advisories, Human Health Risk Assessment Guidance, and Ecological Risk Assessment Guidance	To Be Considered	These advisories and guidance documents provide guidance for developing health risk information and environmental assessments at Superfund sites.	No change from the ROD	
	1999 Update of Ambient Water Quality Criteria for Ammonia, EPQ-822-R-99-014	To Be Considered	Ammonia water quality criteria for adjusted for temperature and pH in accordance with this guidance.	Cited in the ARARs tables in the Clean Act, Ambient Water Quality Criteria synopsis	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

CHEMICAL-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM 2006 ROD	
Criteria, Advisories, and Guidance (cont.)	<u>Canadian Council of Ministers of the Environment (CCME). 1999. Canadian water quality guidelines for the protection of aquatic life: Benzene. In: Canadian environmental quality, 1999, Canadian Council of Ministers of the Environment, Winnipeg.</u>	To Be Considered	Guidance used to develop benzene sediment cleanup level based on the water quality guidelines and site specific calculation of a sediment benchmark for the protection of freshwater aquatic life due to chronic exposure.	New guidance standard for sediments the ESD	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

ACTION-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM THE 2006 ROD	
Federal Regulatory Requirements	RCRA Identification and Listing of Hazardous Wastes, 40 C.F.R. 261.3	Applicable	Criteria for determining if a waste or contaminated media is a hazardous waste subject to regulation. If a contaminated media exhibits the characteristics of a hazardous waste, RCRA hazardous waste regulations are applicable.	The Status of these standards is only Applicable (the ROD lists as either being Applicable Relevant and Appropriate). Add to Table D-2.	
	RCRA Closure and Post-Closure Requirements, 40 C.F.R. <u>Part 264</u> , Subpart G	Applicable	If contaminated sediments constitute characteristic hazardous waste these regulations are applicable. Closure must be completed in a manner that minimizes the need for further maintenance, and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere.	The Status of these standards is Applicable (the ROD lists as Relevant and Appropriate).	
	RCRA – Groundwater Monitoring, 40 C.F.R. <u>Part 264</u> , Subpart F	Relevant and Appropriate	This regulation details the requirements for groundwater monitoring and responding to releases from solid waste management units.	No change from the ROD.	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

ACTION-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM THE 2006 ROD	
Federal Regulatory Requirements (cont)	RCRA Hazardous Waste Regulations (Storage and Disposal of Hazardous Waste) 40 CFR Part 262, Subpart A, 40 C.F.R. Part 264, Subparts I and J.	Applicable	Subpart A of Part 262 provides that a generator who treats, stores, or disposes of hazardous waste on-site must determine whether or not he has a hazardous waste, obtain an EPA identification number for any hazardous waste and comply with the regulations regarding accumulation of hazardous waste and recordkeeping. Subparts I and J of Part 264 identify design, operating, monitoring, closure, and post-closure care requirements for long-term storage of RCRA hazardous waste in containers and tank systems, respectively. However, Section 262.34(a) allows accumulation of RCRA hazardous wastes for up to 90 days in containers or tanks provided generator complies with requirements of Subparts I and J of Part 265.	No change from the ROD	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

ACTION-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM THE 2006 ROD	
Federal Regulatory Requirements (cont.)	Clean Water Act, National Pollutant Discharge Elimination System (NPDES), 40 C.F.R. Parts 122 and <u>450</u>	Applicable for discharge to surface water standards; Stormwater standards Applicable for over one acre, Relevant and Appropriate for under one acre	Regulates the discharge of water into public surface waters. Major requirements include the following: <ul style="list-style-type: none"> • Use of best available technology economically achievable is required to control toxic and non-conventional pollutants. Use of best conventional pollutant control technology is required to control conventional pollutants. Technology-based limitations may be determined on a case-by-case basis. • Applicable federally-approved state water quality standards must be complied with. These standards may be in addition to or more stringent than other federal standards under the CWA. • <u>Requires the use of best practicable technology (as defined at 40 C.F.R. 450.21) for disturbances of less than 10 acres and best available technology (as defined at 40 C.F.R. 450.22) for disturbance of over 10 acres to control stormwater discharges from construction activity.</u> 	Added to the Action-Specific ARARs table where there may be discharges to surface water standards is Applicable (the ROD lists as Relevant and Appropriate). This ESD adds NPDES stormwater regulation for construction activity at 40 C.F.R. 450 not promulgated at the time of the ROD.	
	Clean Water Act, Section 304(1)(1) National Recommended Water Quality Criteria	Relevant and Appropriate	Provides surface water quality standards for a number of organic and inorganic contaminants.	Added as surface water/sediment monitoring standards for remedy components (Table D-4, D-5, D-6) where remedial activities water quality (including stormwater impact)	
	<u>Underground Injection Control, 40 C.F.R. 144, 146, 147</u>	Relevant and Appropriate	Establishes standards to prevent underground injection from endangering drinking water sources.	Not cited in the ROD. Added as protective standards for remedy components that involve in-situ treatment of groundwater.	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

ACTION-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM THE 2006 ROD	
Federal Regulatory Requirements (cont.)	<u>Clean Air Act (CAA), Hazardous Air Pollutants, 42.U.S.C. § 112(b)(1), National Emission Standards for Hazardous Air Pollutants (NESHAPS), 40 C.F.R. Part 61</u>	Applicable	The regulations establish emissions standards for 189 hazardous air pollutants. Standards set for dust and other release sources.	Not cited in the ROD. Added as air monitoring and control stand remedy components (Tables D-3, D-4, D-5, D-6) where remedial activities may generate emissions of regulated air pollutants.	
State Regulatory Requirements	Massachusetts Surface Water Quality Standards 314 CMR 4.00	Applicable	These standards designate the most sensitive uses for which the various waters of the Commonwealth shall be enhanced, maintained, or protected. Minimum water quality criteria required to sustain the designated uses are established. Federal NRWQC are to be considered in determining effluent discharge limits. Where recommended limits are not available, site-specific limits shall be developed.	Added as surface water/sediment monitoring standards for remedy components (Tables D-4, D-5, D-6) where remedial activities water quality (including stormwater impact In the ROD, specifically cited as 4.05(5)(e) in Tables D-5, D-7, and D-8. All of Section applicable to the remedial activities addressed under these tables.	
	Water Quality Certification for Discharge of Dredged or Fill Material, Dredging and Dredged Material Disposal in Waters of the United States within the Commonwealth, 314 CMR 9.06	Applicable	For discharge of dredged or fill material, there must be no practicable alternative with less adverse impact on aquatic ecosystem; must take practicable steps to minimize adverse impacts on wetlands or land under water; stormwater discharges must be controlled with BMPs; must be no substantial adverse impact to physical, chemical, or biological integrity of surface waters.	No change from the ROD.	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

ACTION-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM 2006 ROD	
State Regulatory Requirements (cont.)	Water Quality Certification for Discharge of Dredged or Fill Material, Dredging and Dredged Material Disposal in Waters of the United States within the Commonwealth, 314 CMR 9.07	Applicable	Hydraulic or mechanical dredging allowed; must avoid fisheries impacts.	No change from the ROD.	
	Massachusetts Surface Water Discharge Permit Regulations, 314 C.M.R. 3.00	Applicable	Regulates the discharge of water into public surface waters, allows Commonwealth to establish state standards under federal NPDES program.	The ROD cited these regulations in the A and Chemical-Specific ARARs tables for components of the ROD remedy affecting discharges to surface waters (Tables D-5, D-Removed from the Chemical-Specific ARAR tables.	
	<u>Underground Injection Control, 310 C.M.R. 27</u>	Relevant and Appropriate	Establishes standards to prevent underground injection from endangering drinking water sources.	Not cited in the ROD. Added as protective standards for remedy components that involve in-situ treatment of groundwater.	
	Massachusetts Groundwater Discharge Permit Program, 314, C.M.R. 5.00	Moved Relevant and Appropriate	Groundwater discharges shall not result in a violation of Massachusetts Surface Water Quality Standards or Massachusetts Groundwater Quality Standards.	The ROD cited these as Chemical-Specific ARARs. Moved to the Action-Specific ARAR table because the standards regulate discharges rather than establishing specific cleanup levels.	

ATTACHMENT 3 – CHANGES IN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FROM THE 2006 ROD

ACTION-SPECIFIC ARARs					
AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CHANGE FROM THE 2006 ROD	
State Regulatory Requirements (cont.)	Mass. Hazardous Waste Regulations (Storage of Hazardous Waste), 310 CMR 30.300, 30.680, 30.690 310 CMR 30.340	Relevant and Appropriate	Requirements for long-term storage, transport and disposal of RCRA hazardous waste in containers and tank systems	No change from the ROD	
	Massachusetts Ambient Air Quality standards (310 C.M.R. 6.0) and Massachusetts Air Pollution Control Regulations (310 C.M.R. 7.00)	Moved Applicable	These regulations also contains standards for fugitive emissions, dust, and particulates during construction.	The ROD cited these as Chemical-Specific ARARs. Moved to the Action-Specific ARAR table because the standards regulate emissions rather than establishing specific air clean levels.	
Criteria, Advisories, and Guidance	<u>Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, EPA-540-R-05-012 OSWER 9355.0-85 (December 2005)</u>	To Be Considered	Guidance for making remedy decisions for contaminated sediment sites. Some of the relevant sections of the guidance address Remedial Investigations (Ch. 2), FS Considerations (Ch. 3), and Dredging and Excavation (Ch. 6).	Not cited in the ROD.	
	<u>Massachusetts Sedimentation and Erosion Control Guidance</u>	To Be Considered	Standards for preventing erosion and sedimentation.	Not cited in the ROD.	

Attachment 4

Cost Evaluation

Attachment 4 – Cost Evaluation Explanation
of Significant Differences (ESD) Industri-Plex
Superfund Site, Operable Unit 2
August 2014

Task	Bid Item	Unit	Quantity	Rate	Total Cost	Notes
1	Mobilization/site prep	EA	1			
	office trailer/facilities	mo	2	\$ 25,000.00	\$ 50,000.00	
	Temporary utilities	ls	1	\$ 10,000.00	\$ 10,000.00	
	Mobilization	ls	1	\$ 10,000.00	\$ 10,000.00	
	Abandon Monitoring Wells in-place 8-10' each	well	6	\$ 1,000.00	\$ 6,000.00	
	Monitoring well protection	well	2	\$ 1,000.00	\$ 2,000.00	
						take-off from drawings (est avg thickness at 3')
	access road material	ton	1350	\$ 25.00	\$ 33,750.00	
	Staging area material	ton	1000	\$ 25.00	\$ 25,000.00	
	Materials placement and removal	ton	3200	\$ 15.00	\$ 48,000.00	
	Geotextile under roads	2250 sqft/roll	15	\$ 600.00	\$ 9,000.00	
	Survey (layout, construction control and as-builts)	ls	1	\$ 15,000.00	\$ 15,000.00	
	Construction QA/Field Eng	hr	352	\$ 75.00	\$ 26,400.00	
2	Portadam/cofferdam					
	first month minimum rental period plus shipping	mo	1	\$ 28,000.00	\$ 28,000.00	250 LF Measured off of drawings
	in-water crew, on-site, 10-hour weekday	day	5	\$ 4,200.00	\$ 21,000.00	
	crew travel expenses, each roundtrip	day	5	\$ 2,500.00	\$ 12,500.00	
3	Dewatering					
	Slug Test	ea	1	\$ 5,000.00	\$ 5,000.00	
	pump test	ea	1	\$ 20,000.00	\$ 20,000.00	
	O&M	ea	1	\$ 50,000.00	\$ 50,000.00	
	turbidity curtains	lf	250	\$ 30.00	\$ 7,500.00	take-off from drawings
	straw wattles/erosion control	lf	2000	\$ 5.00	\$ 10,000.00	take-off from drawings
4	Water Treatment System					cost from AECOM similar project
	Carbon (10,000 pound)	per/gac	2	\$ 17,500.00	\$ 35,000.00	take-off from drawings
	Sand Filter	per/filter	2	\$ 2,000.00	\$ 4,000.00	
	20,000 gal Frac tanks	per/tank	4	\$ 1,500.00	\$ 6,000.00	
	Tow Behind Pumps	per/pump	4	\$ 4,000.00	\$ 16,000.00	
	Oversight Set Up / Break Man	ea	1	\$ 20,000.00	\$ 20,000.00	
5	Excavation & Backfill					
	mud mats	LS	1	\$ 5,000.00	\$ 5,000.00	300SF area measured off of drawing
	excavator	mo	1	\$ 7,000.00	\$ 7,000.00	
	loader	mo	1	\$ 4,500.00	\$ 4,500.00	
	operator (3)	day	22	\$ 2,250.00	\$ 49,500.00	
	backfill	cy	900	\$ 15.00	\$ 13,500.00	
						0.5 W by 125'L x 8' H = 500CF
	Aquagate and PAC geotextile	ton	21	\$ 650.00	\$ 13,650.00	85#/cuft = 42,000# = 21 tons
6	Material Disposal					
	Excavated Sediment	CY	900			
	(factor 1.6 tons per CY)	ton	1440			
	Portland Cement (amendment)	ton	144	\$ 95.00	\$ 13,680.00	
Disposal	ton	1584	\$ 125.00	\$ 198,000.00		
7	Restoration, Monitoring, Demobilization					
	Confirmatory Sampling and analysis	LS	1	\$ 20,000.00	\$ 20,000.00	
	Air Monitoring equipment	LS	1	\$ 15,000.00	\$ 15,000.00	
	Sampler, enviro tech	day	30	\$ 1,500.00	\$ 45,000.00	
	revegetation	SF	10000	\$ 1.00	\$ 10,000.00	
8	Subtotal				\$ 865,980.00	
	Profit	%	0.15		\$ 129,897.00	
	taxes	%	0.07		\$ 86,598.00	
	Contingency	%	0.3		\$ 259,794.00	
Total					\$ 1,342,269.00	
				-30%	\$ 939,588.30	
				+50%	\$ 2,013,403.50	

Attachment 5

MassDEP ESD Letter of Support



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

DEVAL L. PATRICK
Governor

MAEVE VALLELY BARTLETT
Secretary

DAVID W. CASH
Commissioner

September 10, 2014

Mr. Robert Cianciarulo, Chief
Massachusetts Superfund Section
US EPA, Mail Code: OSRR07-01
5 Post Office Square, Suite 100
Boston, MA 02109

Re: MassDEP Concurrence Letter
Draft ESP 2014, Industri-Plex
Superfund Site OU#2
Woburn, MA

Dear Mr. Cianciarulo:

The Massachusetts Department of Environmental Protection (MassDEP) has reviewed the proposed Explanation of Significant Differences (ESD) for the second Operable Unit of the Industri-Plex Superfund Site. The primary purpose of the ESD is to expand the OU2 Remedy to include an ecological cleanup goal of 1,290 mg/Kg for benzene in sediments of the Lower South Pond, located adjacent to the West Hide Pile. The site-specific cleanup goal of 1,290 mg/kg was developed based on benzene toxicity data to freshwater aquatic organisms.

Sediments with benzene concentrations above the cleanup goal will be dredged, dewatered and disposed off-site, and all disturbed areas will be restored to a native wetland habitat. The estimated volume of sediments contaminated with benzene above the 1,290 mg/Kg cleanup standard is approximately 900 cubic yards. Post-excavation sediment confirmation sampling and monitoring of the wetland restoration measures will also be conducted.

This remedial approach is consistent with the sediment remedial approach in the 2006 OU2 ROD for dredging, off-site disposal and restoration of all disturbed areas for the Southern Portion of the HBHA Pond, and the Wells G&H Wetland and Cranberry Bog Conservation Area.

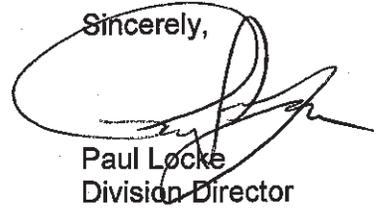
MassDEP believes that the addition of a PRG for benzene in sediment in the Lower South Pond will improve the protectiveness of the Selected Remedy for OU2.

A second purpose of the ESD is to update a number of federal and state ARARs cited in the 2006 ROD that have been eliminated, modified or otherwise changed from when the 2006 ROD was issued (including federal wetland, floodplain, and storm water standards). None of these ARAR changes fundamentally alters the selected remedy.

Page 2
OU2 ESD Concurrence Letter
September 10, 2014

If you have any questions concerning this concurrence letter, please contact the MassDEP project manager, Jennifer McWeeney, at 617-654-6560.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Locke", is written over a large, light-colored oval shape.

Paul Locke
Division Director
Bureau of Waste Site Cleanup

cc: Joseph LeMay, USEPA
Jennifer McWeeney, MassDEP

e-file: 20140910_OU2_ESD_Concurrence_Letter

Attachment 6

Responsiveness Summary

Attachment 6 - Responsiveness Summary
Industri-plex Superfund Site, Operable Unit 2 (OU-2)
Explanation of Significant Difference (ESD)

September 2014

EPA released a draft Explanation of Significant Difference (ESD) and Administrative Record (AR) on August 19, 2014, which was posted on EPA's Industri-plex Superfund Site web page (<http://www.epa.gov/region1/superfund/sites/industrialplex>) and available at the following locations: Woburn Public Library, 45 Pleasant Street, Woburn, MA 01801; and U.S. Environmental Protection Agency, Records Center, 5 Post Office Square, Suite 100, Boston, MA 02109. In addition, electronic copies of the draft ESD and AR were provided to the Industri-plex OU-2 Settling Defendants Coordinator, Aberjona Study Coalition (recipient of EPA's Technical Assistant Grant for the Industri-plex Superfund Site), City of Woburn, and MassPort Authority. EPA published a legal notice of the draft ESD in the Woburn Daily Times Chronicle on August 19th announcing a 14-day public comment period, which concluded on September 3, 2014. A copy of the notice was also posted on the Industri-plex web page.

Outlined below are comments received during the public comment period and EPA's response to those comments.

A. Comments by Bruce R. Thompson, de maximus, inc., consultant for the Industriplex OU-2 Settling Defendants:

1. The commenter stated that: "The Settling Defendants are prepared to implement the remedial action that the ESD identifies for the Lower South Pond portion of the Site."

EPA Response: EPA appreciates the Settling Defendants' willingness to implement the remedial action called for in the ESD and will work with them to implement the remedial action to address the identified Site risks in a protective manner that will meet all legal requirements.

2. The commenter stated that "in response to the Settling Defendants' demonstration that there is no ongoing migration of benzene-impacted groundwater from the West Hide Pile to the Lower South Pond, [they understand that] this dredging-based remedy for the Lower South Pond would be in lieu of the in situ bioremediation remedy contemplated for this portion of the Site in the OU-2 ROD."

EPA Response: The removal of contaminated sediments is being conducted in response to elevated concentrations of benzene in sediments that pose unacceptable risk to the environment (e.g. benzene toxicity to aquatic organisms). The ESD accurately describes the addition of the benzene-contaminated sediment cleanup in the LSP wetland as an "expansion of the ROD" where the additional remedial action "adds cleanup of contaminated sediments in the LSP wetland to the OU-2 remedial action." All other soil, sediment and groundwater components of the remedy documented in the ROD¹ are unchanged

¹ See: Record of Decision, OU-2 Industri-plex Superfund Site (and including OU-3, Wells G&H Superfund Site), January 2006 at <http://www.epa.gov/region1/superfund/sites/industrialplex/70376.pdf>

and are not impacted by this sediment-dredging component of the ESD. The CERCLA remedy described in the ROD includes, “if necessary, In-situ Enhanced Bioremediation of contaminated groundwater plumes (e.g., benzene) at the West Hide Pile (WHP)” (ROD, p. 6). The ROD also states, “If EPA determines that there are no unacceptable risks from contaminated groundwater discharges after the collection and evaluation of additional data during pre-design studies, and institutional controls have been implemented appropriately on the property restricting human health exposures to the contaminated groundwater, then it may not be necessary to implement this enhanced bioremediation component of the remedy” (ROD, p. 88) Following the implementation of the ESD’s sediment removal and restoration of disturbed areas, EPA will evaluate environmental monitoring data including long term groundwater, surface water and sediment near the WHP and LSP. Considering this data and consistent with the ROD and SOW, EPA will determine if it is necessary to implement the enhanced bioremediation component of the remedy at the WHP.

3. The commenter stated that the Settling Defendants disagree with the method through which EPA’s Preliminary Remediation Goal (PRG) of 1.290 mg/kg for benzene in sediment was derived, and suggested it was overly conservative (too low). The Settling Defendants proposed another approach which would create three different, higher PRGs for benzene in sediment depending upon the sediment’s percent solids (PRG = 1.33 mg/kg for 89% solids; PRG = 1.61 mg/kg for 53.2% solids; and PRG = 2.97 mg/kg for 18% solids). The Settling Defendants also acknowledged that the use of their proposed three, higher PRGs instead of the ESD’s PRG of 1.290 mg/kg is not expected to have a material effect on the volume of sediments necessitating removal from the LSP.

EPA Response: The ESD’s PRG of 1.29 mg/L is supported by the information provided in ESD Attachment 1 – PRG Summary and is considered protective for this site. In addition, the Settling Defendants’ proposal would create three different, higher PRGs based upon percent solids, which would cause schedule delays, additional sediment sampling, sediment dredging/management/handling criteria, and increase implementation costs.

4. The commenter noted in footnote #1 of his letter: “The proposed PRG for benzene in sediment applies only to the Lower South Pond. No PRG has been established for benzene in sediment elsewhere at the Site, and Settling Defendants have no obligation to remediate benzene in sediment elsewhere at the Site.”

EPA Response: The ESD’s PRG is based upon data collected during Industri-plex OU-2 predesign investigations in the Lower South Pond. If additional areas of OU-2 sediments are found to contain elevated levels of benzene above the ESD’s PRG, then EPA would evaluate and determine what remedial action, if any, would be necessary to address the benzene. The Settling Defendants’ obligations to address changes to the OU-2 remedial action is addressed under the OU-2 Consent Decree.

5. The commenter noted that the “Settling Defendants agree to the updated ARAR matrix attached to the ESD. We note, however, that absent a finding by EPA to the effect that ARAR revisions are “necessary to ensure that the remedy is protective of human health and the environment,” or absent the Settling Defendants’ agreement to apply revised ARARs, the ARARs originally identified in the 2006 ROD remain applicable. See 40 CFR § 300.430(f)(1)(ii)(B)(1).”

EPA Response: EPA appreciates that the Settling Defendants are in agreement with the ARARs changes incorporated into ESD Attachment 3 for the OU-2 remedy.

The final ESD will include the finding that the ARARs revisions identified in ESD Attachment 3 are “applicable or relevant and appropriate and necessary to ensure that the remedy is protective of human health and the environment,” in accordance with 40 CFR § 300.430(f)(1)(ii)(B)(1). The ARARs identified in ESD Attachment 3 revise or replace, as documented in the Attachment, the ARARs identified in the ROD.

6. The commenter state that the Settling Defendants “note that, to the extent the ESD purports to characterize portions of the OU-2 remedial action that will occur in locations other than the Lower South Pond, those components of the remedy remain as described in the ROD and SOW, each as incorporated by reference in the OU-2 Consent Decree.

EPA Response: See EPA’s above responses to comments 4 and 5.