Lower Duwamish Waterway Source Control Action Plan for Early Action Area 4

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Lower Duwamish Waterway Source Control Action Plan for Early Action Area 4

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City of Tukwila

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Executive Summary

The Lower Duwamish Waterway (LDW), located in Seattle, Washington, was added to the U.S. Environmental Protection Agency (EPA) National Priorities List (Superfund) on September 13, 2001. Contaminants of concern (COCs) found in waterway sediments include polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), mercury and other metals, and phthalates. These COC's may pose threats to people, fish, and wildlife.

In December 2000, EPA and the Washington State Department of Ecology (Ecology) entered into an agreement with King County, the Port of Seattle, the City of Seattle, and The Boeing Company (Boeing), collectively referred to as the Lower Duwamish Waterway Group to conduct a Remedial Investigation (RI) and Feasibility Study (FS) of sediment contamination in the LDW to assess potential risks to human health and the environment and to evaluate cleanup alternatives. EPA is the lead agency for the RI/FS. Ecology is the lead agency for controlling ongoing sources of contamination to the LDW, in cooperation with the City of Seattle, King County, the Port of Seattle, the City of Tukwila, and EPA.

On September 13, 2001, EPA added the LDW to the National Priorities List. This is EPA's list of hazardous waste sites that warrant further investigation and cleanup under Superfund. Ecology added the site to the Washington State Hazardous Sites List on February 26, 2002.

Phase 1 of the RI/FS, published in July 2003, used existing data to provide an understanding of the nature and extent of chemical distributions in the LDW, provide a preliminary assessment of potential human health and ecological risks, identify information needs, and identify high priority areas for cleanup ("early action areas"). Early Action Area 4 (EAA-4) is one of seven EAAs identified by EPA and Ecology. A summary of information pertinent to sediment recontamination at EAA-4 is presented in *Summary of Existing Information and Identification of Data Gaps* (E&E 2007), which serves as the basis for the source control actions described in this Source Control Action Plan (Action Plan).

Section 1 of this Action Plan describes the LDW site, the strategy for source control, and the responsibilities of the public agencies involved in source control for the LDW. Section 2.0 of this Action Plan provides a summary of background information on EAA-4, including a description of the properties within the drainage, chemicals of concern to EAA-4 sediments, which consist primarily of PCBs, phthalates, PAHs, and metals; and potential migration pathways. It should be noted that although this Action Plan focuses on these COCs, other chemicals that could result in sediment recontamination will be addressed in the source control process as sources are identified. Section 3 provides an overview of potential sources of contaminants that may affect EAA-4 sediments, including upland facilities adjacent to EAA-4, groundwater, stormwater, bank erosion, and atmospheric deposition. Section 3 also describes actions planned or currently underway to control potential sources of contaminants. Sections 4 and 5 describe monitoring and tracking/reporting activities, respectively.

Table ES-1 lists the source control actions that have been identified for EAA-4. This table includes a brief description of the potential contaminant sources (including onsite and adjacent properties), planned source control action items, and parties involved in source control actions for each property or task.

Table ES-1
Source Control Actions – Lower Duwamish Waterway Early Action Area 4

Potential Sources	Action Items	Parties Involved
Boeing Plant 2		
Potential Historic Sources: Boeing manufactured airplane parts at Plant 2 since 1936. They used a wide range of hazardous chemicals including heavy metals (chrome, zinc, copper, cadmium, and silver); cyanide; mineral acids and bases; petroleum products; PCBs; and chlorinated solvents, such as trichloroethylene. In recent years, the function of Plant 2 shifted toward research and administration. Historical releases in some parts of Plant 2 have been a source of PCB contamination to the LDW. Comprehensive testing of catch basin solids in 2005 indicated that contaminants, primarily PCBs and metals, were accumulating in the catch basin solids in several areas. At Plant 2, Boeing is conducting data gap investigations for each of the seven CMS study areas to address source control actions that may be needed. EPA accepted work plans and data gap investigation reports for the South Yard Area and 2-60s Area. **Potential Ongoing Sources:** The South Yard, 2-60s, 2-66, and 2-40s CMS study areas contain groundwater and soil contamination. Out of the seven CMS study areas, EPA accepted work plans for the South Yard Area, 2-60s Area, and 2-66 Area; final data gap investigation reports for South Yard and 2-60s Area have been submitted to, but not yet accepted by, EPA. Boeing submitted a draft data gap investigation report to EPA. Boeing submitted the 2-40s Area work plan to EPA, but it is not yet accepted by the EPA. No information regarding CMS study areas 2-10, 2-31, and North Yard were found during a review of files from Ecology. No work plan or data gap investigation report has yet been prepared for these three areas.	Evaluation of the remaining CMS study areas will continue to determine needed source control actions.	EPA and Boeing
	Continue to delineate and evaluate the EMF plume.	EPA and Boeing
	Design and implementation of dredging, capping, and/or backfilling of the Duwamish Sediment Other Area Interim Measure will be completed.	EPA, Ecology, and Boeing
	Contaminated bank fill material will be removed.	EPA and Boeing
	Monthly sampling, including groundwater sampling and vapor sampling of the DDC wells and multiple points along the vapor treatment system, will continue.	EPA and Boeing
	Quarterly shoreline groundwater monitoring will continue.	EPA and Boeing
	The SWPPP will be re-evaluated and necessary changes will be made if process/operational changes are made at Plant 2.	Ecology and Boeing
	The removal of materials containing PCBs, specifically caulk, will be addressed.	EPA and Boeing
	Boeing and Jorgensen Forge will enter into a joint hydrologic investigation to provide additional hydrogeologic data at the boundary of the two facilities.	Boeing and Jorgensen Forge
	Boeing will include the following information to their drainage basin maps: flow direction arrows in drainage basins 34 to 37, locations of buildings and other structures, and if available, areas of known contamination. Locations of the City of Seattle and City of Tukwila discharge connections to Plant 2's stormwater drainage system will also be included.	Boeing

Potential Sources	Action Items	Parties Involved
Data collected as part of the data gap investigations will be evaluated, interpreted, and applied to future remedy selections. Future reports will also evaluate comparisons to historical areas of COC impacts above screening levels. EPA requested that Boeing start sampling for SVOCs in the shoreline monitoring wells to address this data gap. Another data gap regarding upland facilities is the EMF plume detected in Plant 2. This plume originates along the east side of KCIA and has migrated beneath Plant 2. Additional investigations will be conducted under a CERCLA Order and will address how this plume will be reduced and/or eliminated.	In-line sediment samples in the City of Seattle and City of Tukwila systems will be collected immediately prior to discharge to Plant 2's stormwater drainage system	EPA and Boeing
	It will be determined if the city storm drain outfall discharging to EAA-4 at the South Park Bridge is Outfall J or another outfall.	EPA and City of Seattle
Jorgensen Forge		
Potential Historic Sources: This property was developed as a fabricator of structural steel, tractor, and road equipment. Operations include forging, heat-treating, and cutting prefabricated steel rods to customers' specifications. From 1991 to present, SEACOR and others have conducted investigations, groundwater monitoring, and interim remedial actions for petroleum hydrocarbons (oil and gasoline) in soil and groundwater in Areas 1, 2, 3, and 4, on the Jorgensen Forge property. The four areas were reported to have releases which included cutting oil beneath equipment in the north portion of the forge shop building (Area 1), hydraulic oil from an oil/water separator into soil and groundwater northwest of the aluminum heat treating building (AHT; Area 2), diesel and gasoline in soil and groundwater from former USTs located on the eastern portion of the site (Area 3), and diesel and gasoline in soil and groundwater from former USTs located on the eastern portion of the site (Area 4) (Dames and Moore, 1999). An air sparge/vapor extraction system was installed in Area 3. The analytical results of groundwater samples collected from approximately 1993 to 1997 indicated that the air sparge/vapor extraction system was effective. A No Further Action determination was issued by Ecology for Area 3 in 1999. A	As part of the source control investigation, Jorgensen will conduct soil and groundwater sampling in the southeast portion of the site (historically thought to have been occupied by a wood treating facility) to determine if arsenic contamination is present and if this contamination is leaching into the adjacent sediments.	Ecology and Jorgensen
	Ownership of the 12- and 24-inch diameter stormwater lines located in an easement along the Jorgensen/Boeing property line will be determined. In addition, the exact locations of the connections between these lines and the stormwater systems of Jorgensen, Boeing, City of Tukwila, and KCIA will be determined. A comprehensive figure will be developed to show the locations, connections, and discharges of all these stormwater systems.	Ecology and Jorgensen (in coordination with Boeing, City of Tukwila, and KCIA)
	The quality of discharged water and process through which water is discharged from the onsite scale sumps including the vacuum degasser pit, railroad scale sumps, argon-oxygen-decarbonization, and scale sumps (which periodically discharge through outfalls 001, 002, and 003) will be assessed.	Ecology and Jorgensen
	PCB and metal contamination in sediments of the LDW and Shoreline Bank Area adjacent the facility will continue to be addressed through EPA CERCLA Order No. 10-2003-0001.	EPA and Jorgensen

Potential Sources	Action Items	Parties Involved
groundwater monitoring and sampling program is in place to assess the lateral extent of cutting oil as light nonaqueous-phase liquid (LNAPL) on the eastern portion of the Jorgensen Forge facility (Areas 1, 2, and 4), to monitor the concentrations of TPH (diesel-range, gasoline-range, and oil-range) and BTEX, and to ensure that this contamination is not migrating toward the LDW. **Potential Ongoing Sources:** The Jorgensen Forge facility is currently negotiating an EPACERCLA Order to address contamination in sediments of the LDW and Shoreline Bank Area adjacent to the facility. Jorgensen Forge and Ecology have entered into an Agreed Order (No. DE 4127) to conduct a source control investigation to determine if the Jorgensen Forge facility is an ongoing source of contamination to sediments in the LDW. Fill placed on the site is a potential source of PCBs and metals contamination to the LDW. The distribution of PCB contamination on-site is consistent with the placement of fill from historic hydraulic dredging of the LDW. Metals (arsenic, cadmium, chromium, copper, lead, silver, and zinc) were detected in subsurface fill in concentrations that exceeded screening levels. These metals are likely contained in the fill from hydraulic dredging and/or a result of historic site operations.	Ecology and Jorgensen will conduct a source control investigation through an Agreed Order (No. DE 4127) to determine if the Jorgensen Forge facility is an ongoing source of contamination to sediments in the LDW.	Ecology and Jorgensen
	A hydrogeologic site model will be developed as part of the source control investigation to characterize the groundwater system on site, including tidal influence.	Jorgensen and Boeing
	All current groundwater monitoring data will be reviewed to ensure that groundwater is not a pathway for migrating contamination to the LDW. A groundwater monitoring and sampling program is in place to assess the lateral extent of cutting oil as LNAPL on the eastern portion of the Jorgensen Forge facility, and to monitor areas where the concentrations of TPH (diesel-range, gasoline-range, and motor-oil range) and BTEX are detected in groundwater above the MTCA Method A cleanup levels.	Ecology and Jorgensen
	Groundwater sampling will be conducted in the center of the site (previously occupied by Isaacson Iron Works) to determine if COCs are present above screening levels.	Ecology and Jorgensen
King County International Airport (KCIA)		
Potential Historic Source: In 2005, sampling of the KCIA stormwater system and joint caulk material was conducted within the portion of KCIA that drains to EAA-4. The sampling results indicated levels of PCBs above Method A cleanup levels in one sample of stormwater sediments collected from a trench location and in one sample of joint caulk material. The sample	The connections between the KCIA stormwater system, the City of Tukwila system, and the 24-inch stormwater pipeline along the Jorgensen/Boeing property line will be determined. A comprehensive CAD file showing the locations, connections, and discharges of all these stormwater systems will be developed.	Ecology and KCIA (in coordination with Jorgensen, Boeing, and City of Tukwila)

Potential Sources	Action Items	Parties Involved
locations in this system discharge to EAA-4 via the 24-inch stormwater line located on an easement through the northern portion of Jorgensen. Due to a lack of information about the locations of stormwater discharges from this portion of the KCIA into the LDW, it is not clear whether or not some stormwater discharges into the EAA-4 area of interest. **Potential Ongoing Source:** In 2005, KCIA sampled the stormwater system catch basins and pavement joint caulk for potential PCB contamination. The airport has been cleaning out accumulated solids from each stormwater catch basin on the airport semi-annually. Each oil/water separator is cleaned annually, or more frequently, if there are any accumulations noted during weekly inspections. Spills in this portion of the KCIA could enter the storm drain system and be discharged to the LDW. Available information does not indicate whether any of the discharges into the LDW are to the EAA-4 area. However, activities that could potentially cause spills are controlled by the facility Industrial Stormwater General Permit and SWPPP.	The data presented in the excel file entitled *Catch Basin Sediment and Concrete Joint Compound PCB Sampling Results Lot 12 at King County International Airport, Seattle, Washington* (Renaud, 2007) will be reviewed to determine whether or not additional sampling of PCBs in the KCIA stormwater system and joint caulk material is necessary. In-line sediment concentrations maybe required.	Ecology
	Test, and as needed, remove any material (e.g., caulk containing PCBs) in this portion of KCIA that contains elevated levels of PCBs. The current SWPPP will be reviewed and necessary changes will be made to prevent contaminants from entering the KCIA stormwater system.	Ecology and KCIA
East Marginal Way, South		
Potential Historic Sources: East Marginal Way South runs in between the three potential sources of contamination identified for EAA-4. The northern portion is located in the City of Seattle, and the southern portion is located in the City of Tukwila. Drain lines and storm drain locations are shown on an aerial photo, but the lines are not labeled, and discharge points to the LDW are not indicated. As a result previous sampling has not been able to determine if East Marginal Way South is a source of contamination to EAA-4.	Determination of the exact location and connection of the large pipe crossing the northern edge of the Jorgensen site will be assessed. Ownership of this pipe – City of Tukwila or KCIA – will be determined once the location and connection has been investigated.	City of Tukwila, Jorgensen, and KCIA
	The exact connections between the KCIA stormwater system and the City of Tukwila system will be determined.	City of Tukwila and KCIA
Potential Ongoing Sources: As mentioned above, the drain lines and storm drain locations are only identified on an aerial photo; these lines are not labeled, and discharge points to the LDW are not indicated. It is unknown whether groundwater is contributing to the recontamination of the LDW.	Pipe locations and discharge points will be incorporate into a comprehensive CAD file.	City of Seattle, City of Tukwila, and Ecology

Potential Sources	Action Items	Parties Involved
Upland Spills		
The nature of the spill, track origin of the spill, and cleanup activities at Boeing, Jorgensen Forge, and KCIA will determine any post-spill source control needed.		
Atmospheric Deposition		
Potential Historic Sources: King County and SPU have been monitoring atmospheric deposition to assess whether it is a potential source of phthalates, particularly BEHP, in stormwater runoff. Results showed PAH, benzyl butyl phthalate, and bis(2-ethylhexyl)phthalate in the Duwamish Valley at concentrations two to three times higher than outside the valley (i.e., Beacon Hill) during the winter months compared to the spring months. This finding is consistent with historic Puget Sound Clean Air Agency data showing atmospheric particulate concentrations trending higher during fall/winter months than during spring/summer months. No previous atmospheric deposition sampling has been conducted at any of the four sites draining to EAA-4. **Potential Ongoing Sources**: Air pollution can enter the waterway directly or through stormwater, thus becoming a possible source of sediment contamination to EAA-4. Air pollution can be localized, such as paint overspray, sand-blasting, and fugitive dust and particulates from loading/unloading of raw materials such as sand, gravel, and concrete, or it can be widely dispersed from vehicle emissions and industrial smokestacks.	Atmospheric deposition will be investigated to assess whether atmospheric deposition is a potential source of phthalates, particularly bis(2-ethylhexyl) phthalate, in stormwater runoff at EAA-4.	Ecology in coordination with the members of the Source Control Work Group.

Key:

Boeing: The Boeing Company
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CMS: Corrective Measure Study
COCs: contaminants of concern
DDC: density-driven convection
EAA: Early Action Area
Ecology: Washington Department of Ecology
EMF: electronics manufacturing facility
EPA: U.S. Environmental Protection Agency
KCIA: King County International Airport
LDW: Lower Duwamish Waterway
MTCA: Model Toxics Control Act
PCB: polychlorinated biphenyl
SVOC: semivolatile organic compound
SWPPP: Stormwater Pollution Prevention Plan
TPH: total petroleum hydrocarbons

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List of Acronyms and Abbreviations

Anchor	Anchor Environmental, LLC
AOC	Area of Concern
AOD	argon-oxygen-decarbonization
AHT	aluminum heat treating building
BEHP	bis(2-ethylhexyl)phthalate
bgs	below ground surface
BMP	Best Management Practices
Boeing	Boeing Company
BTEX	benzene, toluene, ethylbenzene, and xylene
cDCE	cis-1,2-dichloroethene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMS	Corrective Measure Study
COC	Contaminants of concern
cPAH	carcinogenic polycyclic aromatic hydrocarbons
CSCSL	Confirmed and Suspected Contaminated Site List
CSL	Contaminant Screening Level
CSO	Combined Sewer Outflow
DCE	dichloroethene
DDC	density-driven convection
DO	dissolved oxygen
DRPH	diesel-range petroleum hydrocarbons
DSOA	Duwamish Sediment Other Area
E & E	Ecology and Environment, Inc.
EAA	Early Action Area
Ecology	Washington State Department of Ecology
EMF	Electronics Manufacturing Facility
EPA	U.S. Environmental Protection Agency
EPI	Environmental Partners, Inc.
ERD	enhanced reductive dechlorination
Farallon	Farallon Consulting, LLC
FCMS	Focused Corrective Measures Study
FS	Feasibility Study
gpd	gallons per day
GRPH	gasoline-range petroleum hydrocarbons
IM	Interim Measure
KCIA	King County International Airport
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group
LNAPL	light nonaqueous-phase liquid
LUST	leaking underground storage tank

List of Acronyms and Abbreviations (cont.)

mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MoRPH	motor oil-range petroleum hydrocarbons
MOU	Memorandum of Understanding
MTCA	Model Toxics Control Act
NPDES	National Pollutant Discharge Elimination System
NFA	No Further Action
NTU	nephelometric turbidity unit
OA	Other Area
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
ppm	parts per million
PSCAA	Puget Sound Clean Air Agency
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RM	river mile
ROD	Record of Decision
SCWG	Source Control Work Group
SEIIDGR	Summary of Existing Information and Identification of Data Gaps Report
SMS	Sediment Management Standard
SPU	Seattle Public Utilities
SQS	Sediment Quality Standard
SVE	Soil Vapor Extraction
SVOC	semivolatile organic compound
SWMU	Stormwater Management Unit
SWPPP	Stormwater Pollution Prevention Plan
TCE	trichloroethene
tDCE	trans-1,2-dichloroethene
TPH	total petroleum hydrocarbons
TRI	Toxics Release Inventory
TSD	treatment, storage, and disposal
UST	underground storage tank
VOC	volatile organic compound
WAC	Washington Administrative Code
Windward	Windward Environmental, LLC
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µg/m^2/day	micrograms per meter squared per day

1.0 Introduction

This Source Control Action Plan (Action Plan) describes potential sources of contamination that may affect sediments in and adjacent to Early Action Area 4 (EAA-4[1]). The purpose of this plan is to evaluate the significance of these sources and to determine if actions are needed to minimize the potential for recontamination of EAA-4 sediments. In addition, this Action Plan describes:

- Source control actions/programs that are planned or currently underway,
- Sampling and monitoring activities that will be conducted to identify additional sources and assess progress, and
- How these source control efforts will be tracked and reported.

The information in this document was obtained from a variety of sources, including the following documents:

- *Lower Duwamish Waterway, Early Action Area 4 Summary of Existing Information and Identification of Data Gaps Report (LDW EAA-4 SEIIDGR*; Ecology & Environment [E & E], 2007), located on Washington Department of Ecology's (Ecology) website: http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/sites/early_action_area_4/early_action_area_4.htm
- *Lower Duwamish Waterway Source Control Strategy*, January 2004 (Ecology, 2004a), also located on Ecology's website: http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/source_control/sc.html

1.1 Report Organization

Section 1 of this Action Plan describes the Lower Duwamish Waterway (LDW) site, the strategy for source control, and the responsibilities of the public agencies involved in source control for the LDW. Section 2.0 of this report provides a summary of background information on EAA-4, including a description of the properties within the drainage, chemicals of concern to LDW sediments, and potential migration pathways. Section 3.0 describes potential sources of contaminants to EAA-4 sediments including upland facilities, groundwater, stormwater, bank erosion, and atmospheric deposition. Section 3 also describes actions planned or currently underway to control potential sources of contaminants. Sections 4 and 5 describe monitoring and tracking/reporting activities, respectively. Section 6 provides a list of references cited in this report. As new information about the sites and potential sources discussed in this document becomes available and as source control progress is made, Ecology will update this Action Plan by appending Technical Memoranda to the original Action Plan.

1.2 Lower Duwamish Waterway Sites

The LDW is the downstream portion of the Duwamish River, extending from the southern tip of Harbor Island to just south of Turning Basin 3 (Figure 1). It is a major shipping route for bulk and containerized cargo. Most of the upland areas adjacent to the LDW have been developed for industrial and commercial

[1] This Action Plan incorporates data published through June 22, 2007. Section 5, Tracking and Reporting of Source Control Activities, describes how newer data will be disseminated.

operations. These include cargo handling and storage, marine construction, boat manufacturing, marina operations, concrete manufacturing, paper and metals fabrication, food processing, and airplane parts manufacturing. In addition to industry, the waterway is used for fishing, recreation, and wildlife habitat. Residential areas near the waterway include the South Park and Georgetown neighborhoods. Beginning in 1913, this portion of the Duwamish River was dredged and straightened to promote navigation and industrial development, resulting in the river's current form. Shoreline features within the waterway include constructed bulkheads, piers, wharves, buildings extending over the water, and steeply sloped banks armored with riprap or other fill materials (Weston, 1999a). This development left intertidal habitats dispersed in relatively small patches, with the exception of Kellogg Island, which is the largest contiguous area of intertidal habitat remaining in the Duwamish River (Tanner, 1991). Over the past 20 years, public agencies and volunteer organizations have worked to restore intertidal and subtidal habitat to the river. Some of the largest restoration projects are at Herring House Park/Terminal 107, Turning Basin 3, Hamm Creek, and Terminal 105.

The presence of chemical contamination in the LDW has been recognized since the 1970s (Windward Environmental, LLC [Windward], 2003a). In 1988, the U.S. Environmental Protection Agency (EPA) investigated sediments in the LDW as part of the Elliott Bay Action Program. Contaminants of concern (COCs) identified by the EPA study included metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), phthalates, and other organic compounds. In 1999, EPA completed a study of approximately 6 miles of the waterway, from the southern tip of Harbor Island to just south of the turning basin near the Norfolk combined sewer overflow (Weston, 1999a). This study confirmed the presence of PCBs, PAHs, phthalates, mercury, and other metals. These chemicals may pose threats to people, fish, and wildlife.

In December 2000, EPA and Ecology signed an agreement with the Lower Duwamish Waterway Group (LDWG, whose members are King County, the Port of Seattle, the City of Seattle, and The Boeing Company (Boeing). Under the agreement, the LDWG is conducting a Remedial Investigation (RI) and Feasibility Study (FS) of the LDW to assess potential risks to human health and the environment and to evaluate cleanup alternatives. The RI for the site is being done in two phases. Results of Phase 1 were published in July 2003 (Windward, 2003a). The Phase 1 RI and associated technical documents used existing data to provide an understanding of the nature and extent of chemical distributions in LDW sediments, develop preliminary risk estimates, identify candidates for early cleanup action, and identify data gaps. The Phase 2 RI is currently underway and is designed to fill critical data gaps identified in Phase 1. Based on the results of the Phase 2 RI, additional areas for cleanup may be identified. A FS will be completed that will address cleanup options for contaminated sediments in the LDW.

On September 13, 2001, EPA added the LDW to the National Priorities List. This is EPA's list of hazardous waste sites that warrant further investigation and cleanup under Superfund. Ecology added the site to the Washington State Hazardous Sites List on February 26, 2002.

An interagency Memorandum of Understanding (MOU), signed by EPA and Ecology in April 2002 and updated in April 2004, divides responsibilities for the site (EPA and Ecology, 2004). EPA is the lead for the RI/FS and provides support to Ecology on source control work; Ecology is the lead for source control and provides support to EPA on RI/FS issues.

In June 2003, the *Technical Memorandum: Data Analysis and Candidate Site Identification* (Windward, 2003b) was issued. Seven candidate sites for early action were recommended (Figure 1). These sites are:

- Area 1: Duwamish/Diagonal combined sewer overflow and storm drain;
- Area 2: River mile (RM) 2.2, on the west side of the waterway, just south of the 1st Avenue South Bridge;

- Area 3: Slip 4 (RM 2.8);
- Area 4: South of Slip 4 (RM 2.9 to 3.7) on the east side of the waterway, just offshore of the Boeing Plant 2 and Jorgensen Forge properties;
- Area 5: Terminal 117 and adjacent properties (RM 3.6) on the west side of the waterway;
- Area 6: RM 3.8 on the east side of the waterway; and
- Area 7: Norfolk Combined Sewer Overflow/Storm Drain Area (RM 4.8 to 5.0) on the east side of the waterway.

Of the seven recommended EAAs, five either had parties to begin investigations or were already under investigation by a member or group of members of the LDWG. These five sites are: Boeing Plant 2 (Plant 2) and the Jorgensen Forge (the subject of this Action Plan); Norfolk combined sewer overflow CSO)/storm drain; Slip 4; Terminal 117; and Duwamish/Diagonal CSO/storm drain. EPA is the lead for managing cleanup at Terminal 117 and Slip 4. Two early action cleanup projects (Plant 2 and Duwamish/Diagonal) began before the current LDW RI/FS was initiated. Cleanup and source control at Boeing Plant 2, under an EPA Resource Conservation and Recovery Act (RCRA) order, is currently underway. The Duwamish/Diagonal CSO/storm drain cleanup and the Norfolk CSO/storm drain were conducted under King County management as part of the Elliott Bay-Duwamish Restoration Program. The Duwamish/Diagonal CSO/storm drain cleanup was partially completed in March 2004. The Norfolk CSO/storm drain cleanup was completed between February and March 1999. Early action cleanups may involve members of the LDWG or other parties as appropriate. Planning and implementation of early action cleanups will continue to run concurrently with the LDW site-wide work, such as completion of the RI report, FS, and the development of the Record of Decision.

Further information about the LDW site can be found at:
http://yosemite.epa.gov/r10/cleanup.nsf/sites/lduwamish,
http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/lower_duwamish_hp.html, and
http://www.ldwg.org/index.htm.

1.3 Lower Duwamish Waterway Source Control Strategy

The *Lower Duwamish Waterway Source Control Strategy* (Ecology, 2004a) describes the process for identifying source control issues and implementing effective source controls for the LDW. The basic plan is to identify and manage sources of potential contamination and recontamination in coordination with sediment cleanups. The goal of the strategy is to minimize the potential for recontamination of sediments in excess of the LDW sediment cleanup standards. Existing administrative and legal authorities will be used to perform inspections and require necessary source control actions.

The strategy is being implemented through the development of a series of detailed, area-specific Action Plans that will be coordinated with sediment cleanups, beginning with the EAAs. Each Action Plan will document what is known about the area, the potential sources of recontamination, actions taken to address them, and how to determine when adequate source control is achieved for an area. Because the scope of source control for each site will vary, it will be necessary to adapt each plan to the specific situation at that site. The success of this strategy depends on the coordination and cooperation of all public agencies with responsibility for source control in the LDW area, as well as prompt compliance by the businesses that must make necessary changes to control releases from their properties.

The source control strategy focuses on controlling contamination that affects LDW sediments. It is based on the principles of source control for sediment sites described in EPA's *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites; February 12, 2002* (EPA, 2002), and Ecology's Sediment Management Standards (SMS; Washington Administrative Code [WAC] 173-204). The first

principle is to control sources early, starting with identifying all ongoing sources of contaminants to the site. EPA's Record of Decision (ROD) for the site will require that sources of sediment contamination to the entire site be evaluated, investigated, and controlled as necessary. Dividing source control work into specific Action Plans and prioritizing those plans to coordinate with sediment cleanups will address the guidance and regulations and will be consistent with the selected remedial actions in the EPA ROD.

Source control priorities are divided into four tiers. Tier One consists of source control actions associated with the EAAs identified to date. Tier Two consists of source control actions associated with any final, long-term sediment cleanup actions identified through the Phase 2 RI and the EPA ROD. Tier Three consists of source identification and potential source control actions in areas of the waterway that are not identified for cleanup, but where source control may be needed to prevent future contamination. Tier Four consists of source control work identified by post-cleanup sediment monitoring (Ecology, 2004a). This document is a Tier One Source Control Action Plan for an early action sediment cleanup.

Further information about the *Lower Duwamish Waterway Source Control Strategy* can be found at: http://www.ecy.wa.gov/biblio/0409043.html and http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/lower_duwamish_hp.html.

1.4 Source Control Work Group

The primary public agencies responsible for source control for the LDW are Ecology, City of Seattle, King County, Port of Seattle, and EPA. Because the Port of Seattle has no jurisdiction over the area included in EAA-4, the Port is not directly involved in source control activities for EAA-4.

In order to coordinate among these agencies, Ecology formed the Source Control Work Group (SCWG) in January 2002. The purpose of the SCWG is to share information, discuss strategy, actively participate in developing Action Plans, jointly implement source control measures, and share progress reports on source control activities for the LDW area. The monthly SCWG meetings are chaired by Ecology. All final decisions on source control actions and completeness will be made by Ecology, in consultation with EPA, as outlined in the April 2004 Ecology/EPA LDW MOU (EPA and Ecology, 2004).

Other public agencies with relevant source control responsibilities include the Washington State Department of Transportation, Puget Sound Clean Air Agency, City of Tukwila, and the Seattle/King County Department of Public Health. These agencies have been invited to participate as appropriate (Ecology, 2004a).

The King County Industrial Waste Program and Seattle Public Utilities (SPU) co-led the joint King County-Seattle program to inspect businesses in area that discharge to the LDW through either the city-owned storm drain system or the combined sanitary/storm sewer system. The goal of this effort was to complete the business inspections before sediment cleanup begins for the LDW Superfund Site (King County and Seattle Public Utilities 2005). SPU is currently conducting the business inspections solely.

2.0 Early Action Area 4

EAA-4 extends approximately 4,500 feet along the eastern bank of the LDW from Slip 4 to the south side of the Jorgensen Forge property (miles 2.9 to 3.7[2]; Figure 2). EAA-4 encompasses surface drainage for approximately 132 acres of commercial and industrial properties, as well as a portion of roadway in the LDW basin (Figure 3; King County, 2007). The four properties that drain into EAA-4 are Plant 2, Jorgensen Forge, a portion of the King County International Airport (KCIA), and a small portion of East Marginal Way South, a four-lane arterial. These properties have been identified as potential sources of sediment recontamination in EAA-4.

2.1 Site Description

General background information and a description of the greater LDW Superfund/Model Toxics Control Act (MTCA) site and the history behind its development are provided in the Phase I RI Report (Windward, 2003b).

Historical and current commercial and industrial operations in the LDW include cargo handling and storage, marine construction, boat manufacturing, marina operations, concrete manufacturing, paper and metals fabrication, food processing, and airplane and airplane parts manufacturing (Windward, 2003a).

Extensive topographic modifications have been made to the Duwamish River throughout EAA-4, including the filling of tideflats, old channel areas, floodplains, and lowlands to create a straightened river channel and allow for industrial operations to expand their land parcels (Farallon Consulting, LLC [Farallon] and Anchor Environmental, LLC [Anchor], 2006). This realignment moved the Duwamish River from its former location at the present day KCIA to its current location to the west (Weston, 1996).

The general direction of groundwater flow in the Duwamish Valley is toward the LDW, although the direction may vary locally depending on the nature of subsurface material and, temporally, based on proximity to the LDW and the influence of tidal action. The presence of brackish and saline water can affect groundwater flow because the less dense, fresh groundwater tends to migrate above the higher-density saline water. This density variance minimizes the potential for shallower groundwater to mix with the more brackish or saline zones. At low tide, the hydraulic gradient between the groundwater system and the LDW is typically at its highest, causing the flow of local groundwater into the LDW. At high tide, the hydraulic gradient can reverse direction, causing LDW surface waters to flow into the adjacent LDW sediments and soil. The amount of LDW water intrusion into and out of the area aquifer depends on tidal patterns, site-specific aquifer conditions and soil stratigraphy (i.e., permeability), and rainfall recharge conditions within the groundwater system. Overall, high tides throughout this area can cause temporary groundwater flow reversals, generally within 300 to 500 feet of the LDW (Ecology, 2006).

Groundwater flow to EAA-4 occurs between 9 and 13 feet below ground surface (bgs). Groundwater monitoring data in the EAA-4 drainage area indicates that the apparent direction of shallow groundwater flow is towards the southwest and tidal influences have been identified, particularly on the western portion of the action area (Boeing, 2006a; Farallon and Anchor, 2006). The tidal influence diminishes with increasing distance from the waterway, and is negligible (less than 1 percent) approximately 800 to 900 feet from the waterway (Boeing, 2006a). Horizontal hydraulic gradients along the shoreline of EAA-

[2] Note: These miles are based on measurements taken from the south end of Harbor Island; they are not official River Miles.

4 change in tidally influenced areas, with groundwater flow directions temporarily reversing during high tides in areas immediately adjacent to the waterway (Boeing, 2006a).

2.2 Contaminants of Concern

The sediments throughout EAA-4 have been documented to be impacted at levels of concern by PCBs, PAHs, phthalates, and metals in some portions of the area (Windward, 2003b).

Contaminated soil and groundwater under several facilities have been identified as potential sources of sediment recontamination in EAA-4. Boeing is investigating and cleaning up hazardous waste contamination at Plant 2 under EPA's RCRA. In 1994, EPA and Boeing signed an Administrative Order on Consent, which required Boeing to perform a corrective action at Plant 2. In July 2007, Ecology entered into the final stages of negotiating a draft MTCA Agreed Order with Jorgensen Forge. This formal agreement allows Jorgensen Forge and Ecology MTCA investigation to conduct upland source control activities to determine whether the Jorgensen Forge facility is an on-going source of contamination to sediments in the LDW. Bank and sediment cleanup at Jorgensen Forge will be conducted under a third, separate order with EPA under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and will be coordinated with the EPA RCRA order for Plant 2. Corrective actions will also identify areas that may be a continued source of contamination to the LDW sediments. Appropriate actions will then be taken to control any of these sources to the LDW sediments.

Results of sediment and groundwater sampling in EAA-4 are summarized in tables 1, 2, 3, and 4. Investigations that identify contaminants of potential concern within the EAA-4 area within various media are summarized below.

2.2.1 Boeing Plant 2 Studies

Plant 2 occupies approximately 109 acres of developed, topographically flat land, covered by buildings and paved yards (Figure 4). Since the EPA and Boeing signed an Administrative Order on Consent in 1994, over 2,600 soil samples from more than 950 locations have been collected and analyzed (Ernst, 2007). In addition, over 3,200 groundwater samples from almost 750 locations and 510 sediment samples from 271 locations in the LDW near Plant 2 have been collected and analyzed (Ernst, 2007). Chemicals detected in soil and groundwater included volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PCBs, total petroleum hydrocarbons (TPHs), and metals. Groundwater monitoring continues and is discussed in more detail in Section 3.2.3.4. Chemicals detected in sediment include PCBs, PAHs, and metals. Findings from recent site investigations detected the following COCs:

- **1,2,4-Trimethylbenzene** was detected in two of the 87 soil samples collected in the 2-60s area (Figure 5). The maximum soil concentration of 57,000 micrograms per kilogram (µg/kg) exceeded the proposed air pathway screening level (2,360 µg/kg; Environmental Partners, Inc., and Golder Associates, Inc. [EPI and Golder Associates], 2007a).

- **1,3,5-Trimethylbenzene** was detected in one of the 87 soil samples collected in the 2-60s area at 2,300 µg/kg (EPI and Golder Associates, 2007a).

- **Antimony** was detected in one sample in the 2-66s Area (Figure 5). This sample, at a concentration of 576 milligrams per kilogram (mg/kg), exceeded the soil screening level protective of surface water (464 mg/kg).

- **Arsenic** was detected in 15 soil samples in the 30-acre, 2-40s Area (Figure 5; EPI and Golder Associates, 2006a). Concentrations of samples ranged from 8 mg/kg to 13 mg/kg. Arsenic was

also detected in three samples in the 13-acre, 2-60s Area, with a maximum concentration of 10 mg/kg (EPI and Golder Associates, 2006b). In the 2-66s Area, arsenic was detected in 19 samples, with concentrations ranging from 7.4 mg/kg to 76 mg/kg (EPI and Golder Associates, 2005). Concentrations of all samples exceeded the Puget Sound Basin background concentration (7.3 mg/kg) calculated by Ecology (1994).

- **Cadmium** was detected in 12 soil samples in the 2-40s Area, with concentrations ranging from 1.41 mg/kg to 292 mg/kg (EPI and Golder Associates, 2006a). Cadmium was also detected in the 2-60s Area, at concentrations ranging from 0.4 to 0.6 mg/kg (EPI and Golder Associates, 2006b). In the 2-66s Area, cadmium was detected in 34 samples, at concentrations ranging from 1.31 mg/kg to 171 mg/kg (EPI and Golder Associates, 2005). The most contaminated soil areas for cadmium in Plant 2 that exceeded the soil screening level protective of surface water (1.21 mg/kg) were those samples collected in the 2-40s Area and 2-66s Area.

- **Cis-1,2-Dichloroethene (cDCE)** was detected above reporting limits in six of the 45 soil samples in the South Yard Area. Concentrations ranged from 2.0 µg/kg to 48 µg/kg, well below the screening level protective of surface water (7,725 µg/kg).

- **Copper** was detected in 22 soil samples in the 2-40s Area, at concentrations ranging from 36.5 mg/kg to 1,740 mg/kg (EPI and Golder Associates, 2006a). Copper was detected in three samples in the 2-60s Area at concentrations ranging from 40 mg/kg to 55.3 mg/kg (EPI and Golder Associates, 2006b). In the 2-66s Area, copper was detected in 30 samples, at concentrations ranging from 39.1 mg/kg to 28,100 mg/kg (EPI and Golder Associates, 2005). Concentrations of the samples collected in these three areas exceeded the Puget Sound Basin background concentration (36.4 mg/kg).

- **Cyanide** was detected in 55 soil samples in the 2-40s Area, at concentrations ranging from 0.21 mg/kg to 4,600 mg/kg (EPI and Golder Associates, 2006a). Cyanide was also detected in three samples in the 2-60s Area at concentrations ranging from 0.24 mg/kg to 1.2 mg/kg (EPI and Golder Associates, 2006b). In the 2-66s Area, cyanide was detected in 11 samples, at concentrations ranging from 0.21 mg/kg to 0.92 mg/kg (EPI and Golder Associates, 2005). These samples all exceeded the soil screening level protective of surface water (0.2 mg/kg).

- **Ethylbenzene** was detected in one of the 87 soil samples collected in the 2-60s area. The maximum soil concentration (13,000 µg/kg) exceeded the soil screening level (2,520 µg/kg; EPI and Golder Associates, 2007a).

- **Hexavalent chromium** was detected in two samples in the 2-40s Area, at concentrations of 26.5 mg/kg and 68.8 mg/kg (EPI and Golder Associates, 2006a). Both samples were above the soil screening level protective of surface water (19.2 mg/kg).

- **Lead** was detected in two samples in the 2-40s Area, at concentrations of 2,150 mg/kg and 3,150 mg/kg (EPI and Golder Associates, 2006a). Lead was also detected in nine samples in the 2-66s Area at concentrations ranging from 1,150 mg/kg to 17,300 mg/kg (EPI and Golder Associates, 2005). Both samples in the 2-40s Area exceeded the soil screening level protective of surface water (1,620 mg/kg), while the majority of samples collected in the 2-66s Area exceeded this screening level.

- **Manganese** was detected in three samples in the 2-66s Area, at concentrations ranging from 2,610 mg/kg to 3,170 mg/kg (EPI and Golder Associates, 2005). These concentrations exceeded the soil screening level protective of surface water (1,146 mg/kg).

- **Mercury** was detected in nine samples in the 2-60s Area, at concentrations ranging from 0.04 mg/kg to 0.28 mg/kg (Figure 5; EPI and Golder Associates, 2006b). However, only two of these nine samples exceeded the soil screening level (0.07 mg/kg). Mercury was also detected in 37 samples in the 2-66s Area, at concentrations ranging from 0.072 mg/kg to 6.6 mg/kg (EPI and Golder Associates, 2005), all of which exceed the soil screening level.

- **Naphthalene** was detected in five of the 87 soil samples collected in the 2-60s area, with concentrations ranging from 6.9 µg/kg to 38,000 µg/kg. The maximum concentration was below the soil screening level protective of surface water (EPI and Golder Associates, 2007a).

- **Nickel** was detected in five soil samples in the 2-40s Area, at concentrations ranging from 49 mg/kg to 1,770 mg/kg (EPI and Golder Associates, 2006a). Nickel was also detected in 20 samples in the 2-66s Area at concentrations ranging from 40 mg/kg to 1,140 mg/kg (EPI and Golder Associates, 2005). All the samples in the 2-40s Area and the majority of samples in the 2-66s Area exceeded the soil screening level protective of surface water (47.8 mg/kg).

- **Selenium** was detected in two samples in the 2-40s Area, both at concentrations of 9 mg/kg (EPI and Golder Associates, 2006a). Selenium was also detected in three samples in the 2-66s Area, all at concentrations of 8 mg/kg (EPI and Golder Associates, 2005). All five samples exceed the soil screening level protective of surface water (7.38 mg/kg).

- **Silver** was detected in 15 soil samples in the 2-40s Area, at concentrations ranging from 0.4 mg/kg to 60 mg/kg (EPI and Golder Associates, 2006a). Silver was detected in six samples in the 2-60s Area at concentrations ranging from 0.4 mg/kg to 0.5 mg/kg (EPI and Golder Associates, 2006b). In the 2-66s Area, silver was detected in 34 samples, at concentrations ranging from 0.4 mg/kg to 274 mg/kg (EPI and Golder Associates, 2005). All of these samples, except one in the 2-60s Area, exceeded the surface water screening level (0.32 mg/kg).

- **Trichloroethene (TCE)** was detected in 17 of the 45 soil samples above reporting limits in the South Yard Area. Concentrations ranged from 1.2 µg/kg to 130 µg/kg. Ten of these detections exceeded the screening level protective of surface water (2.0 µg/kg; EPI and Golder Associates, 2007b). Of the 87 soil samples collected in the 2-60s area, there were 11 detections with one above reporting limits (160 µg/kg) at 10 feet bgs. Three of these 11 samples detected concentrations exceeding the screening level protective of surface water (8.72 µg/kg; EPI and Golder Associates, 2007a).

- **Thallium** was detected in 17 soil samples collected in the 2-40s Area, at concentrations ranging from 5 mg/kg to 30 mg/kg (EPI and Golder Associates, 2006a). Thallium was also detected in 14 samples in the 2-66s Area at concentrations ranging from 6 mg/kg to 42 mg/kg (EPI and Golder Associates, 2005). All of these samples exceeded the surface water screening level (0.67 mg/kg).

- **Vinyl Chloride** was detected above reporting limits in five of the 45 soil samples in the South Yard Area. Concentrations ranged from 2.2 µg/kg to 11 µg/kg. Three of the five samples, collected at 10 feet bgs in the southeast corner of the South Yard Area, exceeded the screening level protective of surface water (4.59 µg/kg; EPI and Golder Associates, 2006c).

- **Zinc** was detected in five soil samples in the 2-40s Area, at concentrations ranging from 118 mg/kg and 595 mg/kg (EPI and Golder Associates, 2006a). Zinc was also detected in 31 samples in the 2-66s Area. Concentrations of these samples ranged from 104 mg/kg and 18,700 mg/kg (EPI and Golder Associates, 2005). Samples collected in both areas exceeded the soil screening level protective of surface water (101 mg/kg).

- **PCBs** were detected in eight of the 45 soil samples in the South Yard area. Aroclor 1254 was detected in eight of the samples and Aroclor 1260 was detected in seven samples. Concentrations of PCBs ranged from 82 µg/kg to 540 µg/kg, all above the soil screening level protective of surface water (33 µg/kg; EPI and Golder Associates, 2006c). In the 2-60s area, four of the 24 soil samples had detections above the soil screening level protective of surface water (33µg/kg). Concentrations ranged from 33 µg/kg to 400 µg/kg (EPI and Golder Associates, 2007a).

- **Tetrachloroethene (PCE)** was detected in 11 of the 45 soil samples above reporting limits in southeast corner of the South Yard Area. Concentrations ranged from 1.7 µg/kg to 110 µg/kg. Three of these samples exceeded the screening level protective of surface water (8.72 µg/kg).

Other Areas at or near Plant 2

Sediment investigations in the LDW offshore of Plant 2 identified the nature and extent of PCB contamination, which is generally confined to the upper 4 feet of sediment (Ernst, 2007). Metals contamination is much less common and mostly restricted to sediments along the Southwest Bank. Boeing has identified a roughly 15-acre area of intertidal and subtidal sediments (referred to as the Duwamish Sediments Other Area [DSOA]) along Plant 2 that will require dredging and capping. The investigation of sediment contamination has now been expanded into the navigation channel to more fully document the western boundary of the DSOA.

A series of 29 shoreline wells is monitored quarterly for metals, VOCs, and PCBs; Boeing has completed 19 quarterly sampling events of these wells (Figure 6; Ernst, 2007). The monitoring shows several VOCs, including vinyl chloride, present in groundwater at concentrations above EPA's criteria for surface water at some locations. However, VOC concentrations are generally declining and impacts are primarily limited to areas immediately down gradient of the sheet pile walls and at the Electronics Manufacturing Facility (EMF) plume, which originates east of the KCIA (Figure 7). Metals concentrations are also generally below criteria for surface water; the most significant exception to this is in wells located in the Southwest Bank area (EPI and Golder Associates, 2006b). The Southwest Bank fill material, placed in the 1940s, is considered to be the source for these exceedances and is targeted to be excavated in conjunction with the DSOA remedy. PCBs are intermittently detected in groundwater at low concentrations in one area of the Southwest Bank, which is subject to the planned excavation (Ernst, 2007).

In 2005, Boeing completed the investigation of PCBs release discovered in the southwest corner of Plant 2, at the boundary with the Jorgensen Forge facility adjacent to the now-removed West Bank substation. The PCBs were primarily in fill placed at around the same time as fill place at the Jorgensen site (see in Section 2.2.2). This investigation identified the limits of subsurface soil contaminated by PCBs and TPH (Floyd|Snider, Inc., 2005). As part of this work, catch basin solids were also sampled in the area along three separate stormwater lines historically and/or currently draining Plant 2, Jorgensen Forge, and/or KCIA, and PCBs were found in each of the lines (Ernst, 2007). Boeing reportedly plugged its manholes to eliminate the chance of contaminated solids being discharged from Plant 2 to the LDW. Following EPA approval, Boeing intends to excavate PCB-contaminated soil in the area and remove Boeing's stormwater lines in the area in 2008 (Ernst, 2007). Ecology and EPA are working with other parties on non-Boeing sources in other stormwater drain lines.

According to a March 2007 progress report, EPA and Boeing are currently discussing an interim measure to address the possibility of soil and groundwater contamination, sampling, and potentially removal of all caulk at Plant 2. EPA has determined the caulk at Plant 2 to be an immediate and ongoing threat to human health and the environment (Boeing, 2007a). During this same time, Boeing and the EPA started working toward a one-time sampling at all wells for all SMS constituents' including SVOCs. After this

one-time sampling event, the sampling frequency may be changed from quarterly to semi-annual sampling (Boeing, 2007a).

2.2.2 Jorgensen Forge Findings, 2006

Samples of subsurface fill, fill from the shoreline bank-face, and debris piles located at the toe of the shoreline bank at the Jorgensen Forge site were collected using a variety of methods in 2004 and 2005 (Farallon and Anchor, 2006).

PCBs in Fill

Concentrations of PCBs ranging from 0.003 mg/kg to 0.668 mg/kg were detected above screening levels in upland fill samples collected from various depths in all subsurface fill borings (Figure 8). Fill samples collected from the shoreline bank-face indicated concentrations of PCBs ranging from 0.0255 mg/kg to 4.54 mg/kg, while samples collected from the debris piles had concentrations of PCBs ranging from 2.06 mg/kg to 2.34 mg/kg.

Metals in Fill

- **Arsenic** was detected in subsurface fill samples (Figure 9) collected from two soil borings at concentrations of 61.7 mg/kg and 62.7 mg/kg, both of which exceeded the SMS Sediment Quality Standard (SQS) of 57 mg/kg for arsenic in sediment, but are below the Contaminant Screening Level (CSL) of 93 mg/kg. Concentrations of arsenic found in the five other samples ranged from 3.47 mg/kg to 25.7 mg/kg—below the SMS. Arsenic was also detected in the shoreline bank-face fill at concentrations ranging from 9.95 mg/kg to 64.9 mg/kg. One sample of the shoreline bank-face fill exceeded the SQS, but did not exceed the CSL.

- **Chromium** was detected in two samples collected from the shoreline bank-face fill, at concentrations of 350 mg/kg and 386 mg/kg, exceeding the SQS (260 mg/kg) and the CSL (270 mg/kg) criterion.

- **Copper** was detected in shoreline bank-face fill samples at concentrations ranging from 72.4 mg/kg to 561 mg/kg, with only one sample exceeding the SQS (390 mg/kg) and the CSL (390 mg/kg) criterion.

- **Lead** concentrations, ranging from 543 mg/kg to 1,530 mg/kg, were observed in the subsurface fill, and concentrations of 1,010 mg/kg to 5,450 mg/kg were observed in shoreline bank-face fill samples. These concentrations exceeded the SQS criterion of 450 mg/kg and the CSL criterion of 530 mg/kg.

- **Nickel** in subsurface fill samples was detected between 61 mg/kg and 5,560 mg/kg; however, nickel does not have a promulgated SMS screening level.

- **Zinc** was detected in two subsurface borings at concentrations of 1,320 mg/kg and 1,380 mg/kg, while zinc ranged from 986 mg/kg to 5,430 mg/kg in shoreline bank-face fill samples. These concentrations exceeded the SQS criterion of 410 mg/kg and the CSL criterion of 960 mg/kg.

- **Copper, lead, chromium, and zinc** samples from debris piles indicated concentrations exceeding the SQS and the CSL criteria. Results also identified the presence of arsenic, mercury, and/or nickel in the samples, but with concentrations below the SQS and the CSL criteria.

Groundwater

Monitoring wells have been installed throughout the Jorgensen Forge site to monitor groundwater quality down gradient of documented releases of metals and hydrocarbons (Figure 10). Metals detected above the laboratory practical quantitation limits in groundwater at the Jorgensen Forge site include total arsenic, barium, cadmium, chromium, copper, iron, manganese, mercury, selenium, and zinc. However, only cadmium was detected at a concentration above the MTCA Method A cleanup level in samples from Monitoring Well-1. In 2001, concentrations of arsenic exceeded the MTCA Method A cleanup level from Monitoring Well PL2-JF01C. No other total or dissolved metals have been detected in groundwater above the MTCA Method A cleanup levels or MTCA Method B cleanup levels (in the absence of a MTCA Method A cleanup level). Groundwater data was not evaluated against surface water applicable or relevant and appropriate requirements.

2.2.3 Summary

Based on the results of sampling conducted between 2004 and 2007, the following chemicals are considered to be COCs at EAA-4, with regard to potential sediment recontamination. The bank sediments are scheduled to be cleaned up. Until the cleanup is completed, the following chemicals will continue to be considered COCs in fill material:

PCBs have been detected in subsurface fill samples at both the Plant 2 and Jorgensen Forge sites. Samples collected offshore of Plant 2, in the EAA-4, identified PCB contamination in the upper 4 feet of sediment (Ernst, 2007). In 2004, fill samples containing detectable-levels of PCBs also were collected from the shoreline bank-face and debris piles at Jorgensen Forge. In 2005, an investigation by Boeing discovered PCBs in the southwest corner of Plant 2, at the property boundary with Jorgensen Forge (Floyd|Snider Inc., 2005). Catch basin solids were sampled in the area along three separate stormwater lines historically and/or currently draining Plant 2, Jorgensen Forge, and/or KCIA; PCBs were found in each line (Ernst, 2007). Boeing has since reportedly plugged its manholes to eliminate the chance of contaminated solids being discharged to the LDW. The stormwater line that appeared to originate from Jorgensen Forge is likely associated with historical operations on the property and was inactive during the investigation. The stormwater line serving KCIA and City of Tukwila is still active.

Sixteen other COCs were detected in fill material in the southeast corner (i.e., 2-40s, 2-60s, and 2-66s areas) of Plant 2, and predominantly along the shoreline bank-face and debris piles at the Jorgensen Forge. These 16 COCs include:

- Antimony
- Arsenic
- Cadmium
- Copper
- Cyanide
- Hexavalent chromium
- Lead
- Manganese
- Mercury
- Nickel
- PAH
- Phthalates
- Selenium
- Silver
- Thallium
- Zinc

The following chemicals are considered to be COCs at EAA-4, with regard to potential groundwater contamination:

The monitoring at Plant 2 shows several VOCs, including vinyl chloride, present in groundwater at concentrations above EPA's criteria for surface water at some locations; however, VOC concentrations are generally declining and impacts are primarily limited to areas immediately down gradient of the sheet pile walls and at the EMF plume, which originates east of the KCIA. PCBs are also intermittently detected in groundwater at low concentrations in one area of the Southwest Bank, although this area is subject to excavation.

Metals detected above the laboratory practical quantitation limits in groundwater at the Jorgensen Forge site include total arsenic, barium, cadmium, chromium, copper, iron, manganese, mercury, selenium, and

zinc. However, only cadmium and arsenic were detected at two wells at a concentration above the MTCA Method A. No other total or dissolved metals have been detected in groundwater at Jorgensen Forge above the MTCA Method A cleanup levels or MTCA Method B cleanup levels (in the absence of MTCA Method A cleanup levels).

3.0 Potential Sources of Sediment Recontamination

3.1 Introduction

LDW sediments in the EAA-4 have been impacted by chemical contaminants from a variety of historical and potentially ongoing sources. The two industrial facilities in the EAA-4 drainage basin, Plant 2 and Jorgensen Forge, have been identified as potential sources of sediment contamination. These facilities, as well as other potential sources of contamination (i.e., KCIA and East Marginal Way South) have been identified as facilities of concern. To assess whether a facility could be a source of sediment recontamination, it is necessary to evaluate potential contaminant migration pathways that may exist between the potential sources and the LDW. Media relevant to source control that can potentially be impacted by human activities are water, soil, and air. Such contaminated media can impact sediments through several migration pathways, including direct discharges, stormwater discharges, combined sewer overflows, groundwater, bank erosion/leaching, atmospheric deposition, and spills. The potential contaminant migration pathways evaluated for EAA-4 are described below.

3.1.1 Direct Discharges

The direct discharge of contaminants to the waterway from commercial, industrial, private, or municipal outfalls may impact sediment quality, depending on the origin and character of the effluent. Figure 2 shows the extent of the EAA-4 draining basin and the location of the four facilities/areas of interest. Many direct discharges are permitted under the National Pollutant Discharge Elimination System (NPDES) program. Permitted discharges, whether or not they exceed applicable permit levels, may result in sediment contamination. In EAA-4 there are three industrial stormwater permits for Boeing Plant 2, Jorgensen Forge, and KCIA (numbers SO3000482D, SO3003231C, and SO3000343D, respectively). Table 5 summarizes property information and Table 6 summarizes the results of the regulatory search.

3.1.2 Stormwater Discharge

Generally, stormwater enters the waterway via storm drains and pipes, ditches, streams, or directly from properties adjacent to the waterway. Stormwater pollution is generated when rain contacts contaminants that have accumulated in or on exposed soils and surfaces. Stormwater pollution also comes from illegal discharges or illicit connections to storm sewers. Contaminated solids that collect in storm drains/pipes, ditches, or streams may be carried to the waterway by stormwater. In the LDW area, 80 industrial sites are authorized to discharge under the general NPDES permit for industrial stormwater. In addition, three individual NPDES permits are active for given industrial operations in the area. The City of Seattle and King County are municipal NPDES permittees for stormwater.

In identifying potential contaminant sources to EAA-4, the stormwater drainage systems at the four potential sources of contamination, including the potential for the stormwater drainage systems, serve as migration pathways of site-related contaminants to the LDW. Stormwater drainage systems that contain contaminants (e.g., within oil/water separator sludge, catch basins, or sediments) or that drain areas of known soil or groundwater contamination are potential contaminant migration pathways. Contaminants from spills or contaminated soil can migrate into the stormwater drainage system through surface water runoff; it is also possible that contaminated groundwater could migrate into the stormwater drainage system.

The EAA-4 drainage basin includes several point discharges to the LDW from three private stormwater drainage systems: Plant 2, Jorgensen Forge, and a portion of the KCIA (Figure 2; Ecology, 2007a). A small portion of the East Marginal Way South public storm drain system also drains to EAA-4. Several public and private outfalls in this action area also discharge to the LDW (Figure 3; King County and SPU, 2005).

Private waterfront properties are generally serviced by private on-site drainage systems, discharging directly to the waterway. These systems are generally smaller than public storm drain systems, and are owned and maintained by the property owner. Public storm drain systems collect and convey stormwater runoff from roadways and upland properties to the waterway. There are several private storm drain outfalls and one city storm drain outfall that discharge to the LDW within EAA-4 (Figure 3). The private outfalls include 24 outfalls that discharge to the waterway from Boeing Plant 2, and 4 private active outfalls that discharge to the waterway from Jorgensen Forge. Other outfall types that are not included within EAA-4 include combined sewer overflows and emergency overflows. Based on the information reviewed, there are no piped outfalls of unknown origin that discharge to EAA-4 (King County and SPU, 2005).

3.1.3 Groundwater

In general at EAA-4, shallow groundwater is encountered between 9 to 13 feet bgs and exists under unconfined conditions. The general direction of shallow groundwater flow is toward the LDW, although the direction may vary locally depending on the nature of the subsurface material and temporally based on proximity to the LDW and the influence of tidal action. High tides can cause temporary groundwater flow reversals, generally within 300 to 500 feet of the LDW (Ecology, 2006).

Contaminated groundwater may enter directly into the LDW via groundwater recharge and seeps, or infiltrate storm drains/pipes, ditches, or streams that discharge to the waterway. Contaminants in soil resulting from spills and releases to properties adjacent (and possibly upland) of the LDW may be transported to the groundwater and subsequently be released to EAA-4.

3.1.4 Spills

Spills of contaminants have a possibility of occurring in the four potential sources of contamination in EAA-4. These contaminants may migrate from surface water runoff, through storm drains, into the LDW. Plant 2 has recorded spills for the past three years in their Stormwater Pollution Prevention Plan (SWPPP). Spill control and cleanup actions prevented discharge to the LDW for all of these incidents at Plant 2. There are no documented spills at Jorgensen Forge or KCIA. However, there have been three documented releases of petroleum product and cutting oil to the soil and groundwater. All three releases were contained within isolated areas and do not present a source of contamination to the LDW.

3.1.5 Bank Erosion/Leaching

Waterway bank soil, contaminated fill, waste piles, landfills, and surface impoundments may release contaminants directly to the EAA-4 through erosion, soil erosion to stormwater, or leaching to groundwater.

Plant 2 and Jorgensen Forge are the two potential sources of contamination in EAA-4 located along the bank of the LDW. At Plant 2, Boeing plans to excavate contaminated sediment from the southwest bank of the LDW and then place a cap in those areas. The final plans have not been completed or approved by the EPA. Investigations of the shoreline bank fill at Jorgensen Forge indicate there is PCB and metals contamination. Historic erosion of this bank fill likely resulted in PCB and metals contamination in the adjacent sediments of the LDW. Although shoreline armoring is in place at the Jorgensen Forge facility,

bank erosion and leaching into the LDW still occurs and may be a significant source of contamination (Appendix A).

3.1.6 Atmospheric Deposition

Air pollution can enter the waterway directly or through stormwater, thus becoming a possible source of sediment contamination to EAA-4. Air pollution can be localized, such as paint overspray, sandblasting, and fugitive dust and particulates from loading/unloading of raw materials (i.e., sand, gravel, and concrete), or it can be widely dispersed from vehicle emissions and industrial smokestacks.

Contaminants originating from nearby city streets and industry may be transported and deposited through the air at EAA-4 and areas drained by outfalls from Plant 2, Jorgensen Forge, and KCIA facilities. Contaminants deposited within the EAA-4 drainage areas are transported to EAA-4 via surface water runoff.

3.2 Boeing Plant 2

3.2.1 Summary

Boeing manufactured airplane parts at Plant 2 since 1936. They used a wide range of hazardous chemicals including heavy metals (chrome, zinc, copper, cadmium, and silver); cyanide; mineral acids and bases; petroleum products; PCBs; and chlorinated solvents, such as trichloroethylene. In recent years, the function of Plant 2 shifted toward research and administration.

Historical releases in some parts of Plant 2 have been a source of PCB contamination to the LDW. Comprehensive testing of catch basin solids in 2005 indicated that contaminants, primarily PCBs and metals, were accumulating in the catch basin solids in several areas. At Plant 2, Boeing is conducting data gap investigations for each of the seven CMS study areas to address source control actions that may be needed. EPA accepted work plans and data gap investigation reports for the South Yard Area and 2-60s Area.

The South Yard, 2-60s, 2-66, and 2-40s CMS study areas contain groundwater and soil contamination. Of the seven CMS study areas, EPA accepted work plans for the South Yard Area, 2-60s Area, and 2-66 Area; final data gap investigation reports for South Yard and 2-60s Area have been submitted to, but not yet accepted by, EPA. Boeing submitted a draft data gap investigation report to EPA.

Boeing submitted the 2-40s Area work plan to EPA, but it is not yet accepted by the EPA. No information regarding CMS study areas 2-10, 2-31, and North Yard were found during a review of files. No work plan or data gap investigation report has yet been prepared for these three areas.

Data collected as part of the data gap investigations will be evaluated, interpreted, and applied to future remedy selections. Future reports will also evaluate comparisons to historical areas of COC impacts above screening levels. EPA requested that Boeing start sampling for SVOCs in the shoreline monitoring wells to address this data gap. Another data gap regarding upland facilities is the EMF plume detected in Plant 2. This plume originates along the east side of KCIA and has migrated beneath Plant 2. Additional investigations will be conducted under a CERCLA Order and will address how this plume will be reduced and/or eliminated.

3.2.2 Current Operations

This property lies within the City of Seattle and the City of Tukwila, along the eastern shore of the LDW. Plant 2 occupies approximately 109 acres of developed, topographically flat land, covered by buildings

and paved yards (Figure 4). Most buildings are slab-on-grade with below grade utilities (EPI and Golder Associates, 2006a). Current operations at the facility are primarily limited to vehicle maintenance in Building 2-15, vehicle traffic between buildings, and operation/support of research and development activity. Current manufacturing operations are predominantly for research and development purposes, and are located in buildings 2-10, 2-88, and 2-122. Past manufacturing operations also occurred in buildings 2-31, 2-40, 2-41, and 2-44 (Boeing, 2007b).

Plant 2 is bounded by East Marginal Way South, a four-lane arterial, to the east; Jorgensen Forge, an active steel and aluminum forge, to the south; Slip 4 and Emerald Services, Inc., to the north; and the LDW to the west. The LDW is a federally maintained shipping channel of the Duwamish River; Slip 4 is an off-channel extension of the waterway. Plant 2 is served by both truck and rail, and was historically accessible from the waterway. Plant 2 is divided into northern and southern sections by an arterial, 16th Avenue South, which services the 16th Avenue South Bridge over the LDW (EPI and Golder Associates, 2006a). The *LDW EAA-4 SEIIDGR* contains details of Plant 2 location and parcels (E & E, 2007).

Plant 2 is listed in Ecology's online Confirmed and Suspected Contaminated Site List (CSCSL) database (Facility Site Identification No. 2100; Ecology, 2007b). The facility is listed as having confirmed groundwater, surface water, soil, air, and sediment contamination. The contaminants are listed as halogenated organic compounds, EPA priority pollutants—metals and cyanide, PCBs, petroleum products, non-halogenated solvents, and PAHs. According to this database, this facility was listed as a hazard site on February 25, 1992. The Ecology interim action (remedial action) is listed as being effective March 1, 2000 through August 8, 2008.

Plant 2 is not listed on Ecology's online leaking underground storage tank (LUST) or underground storage tank (UST) databases (Ecology, 2007c). However, five USTs are listed in Boeing's revised 2007 SWPPP (Boeing, 2007a). The *LDW EAA-4 SEIIDGR* contains details of Plant 2's USTs (E & E, 2007).

Plant 2 is not listed in Ecology's online NPDES and State Waste Discharge Permit database (Ecology, 2007d).

Ecology issued an Industrial Stormwater General Permit for Plant 2 (Permit No. SO3000482D). The parameters of this permit, as listed on Ecology's database (Ecology, 2007e), are for fecal coliform (maximum of 400 per 100 milliliters), dissolved oxygen (DO; minimum of 6.5 milligrams per liter [mg/L]), and pH (maximum of 8.5 standard units and minimum of 6.5 standard units; Ecology, 2007e).

Plant 2 is listed on Ecology's online Hazardous Waste Facility Search (Facility Identification No. WAD009256819; Ecology, 2007f). This facility has been issued a Waste Discharge Permit by King County Department of Natural Resources and Parks, Industrial Waste Program (Permit No. 7811-01) for discharge to sanitary sewers. This permit was effective on April 28, 2006 and expires on April 27, 2011. Four industrial waste discharges have been identified:

- Building 2-15 car wash – for a daily maximum discharge volume of 4,500 gallons per day (gpd);
- Building 2-49 Groundwater Remediation Treatment System – for a maximum discharge volume of 2,000 gpd;
- Building 2-10 waterjet cutting machine – for a maximum discharge volume of 4,000 gpd; and
- Building 2-122 Wastewater Pretreatment Plant – for a maximum discharge volume of 30,000 gpd.

A search of EPA's online Toxics Release Inventory (TRI) database was conducted for information on toxic chemical releases and other waste management activities. In general, these releases and activities

are reported annually by certain covered industry groups, as well as federal facilities (EPA, 2007a). This database search focused on Release Reports, Waste Transfer Reports, and Waste Quantity Reports. Databases for Release Reports and Waste Transfer Reports contain data from 1988 to 2004. The database for Waste Quantity Reports contains data from 1991 to 2004. Plant 2's TRI Facility Identification No. is 98108BNGRS7755E (Standard Industrial Classification Code 3728). Table 7 lists the results of the search.

3.2.3 Historic Use

Plant 2 is located on the east bank of the Duwamish Waterway in the cities of Seattle and Tukwila. Historically, Plant 2 specialized in manufacturing aluminum alloy, steel alloy, and titanium alloy parts for airplanes. This facility was built on farmland in the late 1930s and became a significant manufacturing facility during World War II (EPI and Golder Associates, 2006a). Since 1936, Boeing has manufactured airplane parts at Plant 2 using a wide range of hazardous chemicals including heavy metals (chrome, zinc, copper, cadmium, and silver); cyanide; mineral acids and bases; petroleum products; PCBs; and chlorinated solvents, such as trichloroethylene. In recent years, the character of Plant 2 has shifted toward research and administration (EPI and Golder Associates, 2006a).

3.2.4 Environmental Investigations and Cleanup Activities

3.2.4.1 Upland Facilities

Boeing is investigating and cleaning up hazardous waste contamination at Plant 2, under RCRA (Identification No. WAD009256819). In 1994, EPA and Boeing signed an Administrative Order on Consent, which required Boeing to perform corrective action at Plant 2 in a manner acceptable to the EPA. The facility developed a RCRA Facility Investigation (RFI), which used a RCRA unit-by-unit approach to investigate the site. When corrective measures were being evaluated for groundwater, this unit-by-unit approach was found to be inadequate for remedy selection, due to the more integrated nature of groundwater contaminant distributions. After the development of the RFI, the Uplands Corrective Measure Study (CMS) was prepared. Boeing, along with EPA and Ecology, conducted focused investigations to enable the Uplands CMS to proceed. Plant 2 has been divided into seven "CMS Study Areas" to facilitate the development and screening of RCRA corrective measures (Figure 5; EPI and Golder Associates, 2006a). These are, from the south to the north:

- South Yard Area;
- 2-60s Area;
- 2-66 Area;
- 2-40s Area;
- North Area;
- 2-31 Area; and
- 2-10 Area.

The EPA has approved work plans for the South Yard Area, the 2-60s Area, and the 2-66 Area. Data gap investigation reports have been approved for the South Yard Area and the 2-60s Area. A work plan has been submitted for the 2-40s Area, but has not yet been accepted by the EPA. No work plan or data gap investigation report has been prepared for the North Area, 2-31 Area, or 2-10 Area.

3.2.4.1.1 South Yard Area

The southern portion of Plant 2 is referred to as the South Yard Area, and consists of approximately 13 acres (Figure 11). The South Yard Area extends from the northern exterior wall of buildings 2-80, 2-81, and 2-85; south to the Jorgensen Forge property and railroad line; east to East Marginal Way; and west to the boundary line of the 2-66 Area (EPI and Golder Associates, 2007b). The South Yard Area contains buildings 2-80/81, 2-83, 2-84, 2-85, 2-88, 2-117, and 2-126 (EPI and Golder Associates, 2007b).

Within the South Yard Area, there are 18 RCRA units that fall in the following categories (Table 8):

- Two Stormwater Management Units (SWMUs) are RCRA-regulated treatment, storage, and disposal (TSD) facilities;
- Ten SWMUs are not TSD facilities, but defined as "any discernable unit at which solid wastes have been placed at any time;"
- Three areas of concern (AOCs); and
- Three Other Areas (OAs).

A summary of these RCRA units can be found in the *LDW EAA-4 SEIIDGR* (E & E, 2007).

South Yard Data Gap Investigation Report Summary

The following points summarize the final data gap investigation conducted by Boeing (EPI and Golder Associates, 2007b).

Physical Conceptual Site Model for the South Yard Area: Some hydrogeologic data gaps were identified in the work plan. As a result of the data gap investigation, sufficient data exist to provide a general sense of groundwater elevations and groundwater flow direction along the border between Plant 2 and Jorgensen Forge. There is not enough tightly-spaced water level data to determine flow volumes or exact flow directions across the property line. A more focused water-level data gathering effort would need to be performed to obtain such information. Boeing intends to pursue a joint hydrologic investigation with Jorgensen Forge to provide the additional data needed for this evaluation.

Current Data: The lack of current groundwater data was identified as a data gap in the work plan. With the completion of the fieldwork, sufficient current groundwater data was obtained for further evaluation of groundwater COCs, and subsequent remedy selection in the CMS.

Source Control: Data gaps related to the potential presence of new sources in the soil were identified in the work plan. With the completion of fieldwork summarized in the data gap investigation report, sufficient current soil data were obtained to evaluate this data gap; no new sources have been identified.

Completed Pathways: Data gaps related to contaminant transport, via the soil to groundwater pathway, were identified in the work plan. With the completion of the fieldwork summarized in the data gap investigation report, sufficient data have been obtained to evaluate this data gap.

Background Data: This data gap has been filled with the use of the natural background concentrations for metals established for the Puget Sound Basin in the evaluation of soil results, and the use of EPA-accepted site-specific background values for arsenic, copper, and manganese in groundwater.

Exceedance of Screening Levels by Analytical Reporting Limits: Data gaps related to reporting limits, and exceeding screening levels were identified in the work plan. With the completion of the fieldwork,

sufficient data was obtained to evaluate this data gap. The following conditions were noted in the report, with respect to reporting limit issues:

- Benzo(a)anthracene and chrysene reporting limits in soil are slightly above the screening levels for EPA Method 8270C analyses. However, all samples analyzed by EPA Method 8270C were also analyzed by EPA Method 8270C Selected Ion Monitoring; the reporting limits associated with the second method were below the screening levels for these two contaminants.

- Silver reporting limits (0.4 mg/kg) in soil slightly exceeded the screening level (0.323 mg/kg) in approximately 40 percent of the data gap soil samples. The slightly elevated reporting limits were due to the variance in the percent solids in the samples analyzed, which impacted the corresponding reporting limits.

- Thallium was not detected in any data gap soil samples; however, the reporting limits in soil were greater than the screening levels. The analytical laboratory inadvertently analyzed thallium by EPA Method 6010, instead of EPA Method 200.8, as required by the work plan. Procedures for preliminary data review have been implemented by Boeing to provide earlier recognition of such situations and ensure there are no reoccurrences.

Data collected as part of the South Yard Area Data Gap Investigation will be evaluated, interpreted, and applied to future remedy selection in the CMS Volume IIIb Report. The Volume IIIb Report will also evaluate comparisons of current and historical areas of COC impacts above screening levels (EPI and Golder Associates, 2007b).

Soil Analysis

Soil data gaps were evaluated on a RCRA unit-by-unit basis, as opposed to an area-wide basis used to evaluate groundwater. The following is a summary of the soil COCs in the South Yard Area (see Table 2 and Figure 12; EPI and Golder Associates, 2007b). A more detailed summary of soil analysis for the South Yard Area is located in the *LDW EAA-4 SEIIDGR* (E & E, 2007). The data represents all soil data gathered to date.

<u>*Inorganics*</u> – The following 11 metals are COCs in soil for the South Yard Area:

- *Arsenic*: Four of the 45 samples had detections of arsenic above reporting limits. The maximum concentration of arsenic was 12 mg/kg. This maximum concentration value does not exceed the direct contact exposure pathway screening level (33.3 mg/kg).

- *Cadmium*: Cadmium was detected above reporting limits in eight of the 45 soil samples. Concentrations ranged from 0.2 mg/kg to 4.3 mg/kg. The maximum concentration (4.3 mg/kg) of cadmium in soil was below both the overall maximum concentration of cadmium in the South Yard Area soil (3,700 mg/kg) and the direct contact exposure pathway screening level (667 mg/kg).

- *Chromium VI*: There were no detections above its screening level in any of the 15 soil samples collected from five locations. All concentrations detected were below its screening level of 19.2 mg/kg.

- *Copper*: Copper was detected in all 45 samples, although no concentrations exceeded the soil screening level (36.4 mg/kg). Concentrations ranged from 9 mg/kg to 32 mg/kg. The maximum concentration of copper in soil (32 mg/kg) was below the direct contact exposure pathway screening level (49,300 mg/kg).

- *Manganese*: No information was provided for manganese in the data gap investigation report.

- *Mercury*: There were detections of mercury above reporting limits in nine of the 45 samples. Concentrations ranged from 0.04 mg/kg to 0.1 mg/kg. These concentrations were below the direct contact exposure pathway screening level (41.9 mg/kg).

- *Nickel (Soluble Salts)*: Concentrations in the 45 soil samples ranged from 6 mg/kg to 30 mg/kg, none of which exceeded the soil screening level (47.8 mg/kg). In addition, all samples were below the direct contact exposure pathway screening level (26,700 mg/kg).

- *Silver*: Two detections of silver in the 45 samples were above reporting limits. These detections (7.1 mg/kg and 2.1 mg/kg) exceeded the soil screening level protective of surface water (0.323 mg/kg) and were both collected at 1 foot bgs. These concentrations were below the direct contact exposure pathway screening level (6,670 mg/kg).

- *Selenium*: There were no detections above reporting limits in any of the 45 soil samples.

- *Thallium (Soluble Salts)*: There were no detections above reporting limits in any of the 45 samples.

- *Zinc*: There were no detections of zinc above reporting limits in any of the 45 samples. All samples were below the direct contact exposure pathway screening level (400,000 mg/kg) and below the soil screening level protective of surface water (101 mg/kg). Concentrations ranged from 17 mg/kg to 83.8 mg/kg.

Semivolatile Organic Compounds and Polychlorinated Biphenyls

The COC list for soils includes total PCBs, three aroclors, and eight SVOCs, which are as follows: total PCBs; Aroclors 1016/1242, 1254, 1260; benzo(b)fluroanthene, dibenz(a,h)anthracene, benzo(a)anthracene, benzo(k)fluroanthene, indeno(1, 2, 3-cd)pyrene, benzo(a)pyrene, chrysene, and BEHP (EPI and Golder Associates, 2007b). These are summarized below:

- *Carcinogenic PAHs*: Carcinogenic PAHs (cPAHs) were detected in 13 out of 33 soil samples, two of which had a concentration greater than their respective soil screening level protective of surface water.

- *bis(2-ethylhexyl)phthalate (BEHP)*: BEHP was detected above reporting limits in one out of 33 soil samples. Concentrations of BEHP (at 100 µg/kg) were detected in soil from 1-foot bgs, below the soil screening level protective of surface water (1,570 µg/kg) and the direct contact exposure pathway screening level (1,790,000 µg/kg). BEHP was not detected in deeper samples or from groundwater samples from this location.

- *PCBs*: PCBs were detected in eight of the 45 soil samples. Aroclor 1254 was detected in eight of the samples and Aroclor 1260 was detected in seven samples. Concentrations of PCBs ranged from 82 µg/kg to 540 µg/kg, all above the soil screening level protective of surface water (33 µg/kg). The maximum concentration detected is 540 µg/kg.

Volatile Organic Compounds

The following 10 VOCs are COCs in soil for the South Yard Area (EPI and Golder Associates, 2007b):

- *Benzene*: There was one detection of benzene above reporting limits in the 45 soil samples. However, the detected concentration (12 µg/kg) was below the soil screening level protective of

surface water (25.3 µg/kg), and below the direct contact exposure pathway screening level (1,360,000 µg/kg). Benzene was also detected in a groundwater sample (at 2 micrograms per liter [µg/L]) from the same location, but below the groundwater screening level protective of surface water (4.48 µg/L).

- *Methylene Chloride*: This chemical was detected (at 5.7 µg/kg) in one of the 45 soil samples, below the soil screening level protective of surface water (828 µg/kg) and the direct contact exposure pathway screening level (9,940,000 µg/kg). Methylene chloride was not detected in groundwater at this location. There were no detections in groundwater samples associated with this unit.

- *TCE*: There were 17 detections of TCE in the 45 soil samples above reporting limits. Concentrations ranged from 1.2 µg/kg to 130 µg/kg. Ten of these detections exceeded the screening level protective of surface water (2.0 µg/kg). Three groundwater samples, in locations associated with SWMU 2-91.79, exceeded groundwater screening levels protective of surface water.

- *1,1-dichloroethene (DCE)*: There were no detections of 1,1-DCE above reporting limits in any of the 45 soil samples. There were five detections in groundwater, but two were below the groundwater screening level protective of surface water (0.382 µg/L). The remaining three detections were above the groundwater screening level protective of surface water.

- *PCE*: There were 11 detections of PCE in the 45 soil samples above reporting limits. Concentrations ranged from 1.7 µg/kg to 110 µg/kg. Three of these exceeded the screening level protective of surface water (8.72 µg/kg); all the samples were located in the southeast corner of the South Yard Area. PCE was detected in three groundwater samples. One concentration was below the groundwater screening level protective of surface water (0.82 µg/L), while the other two (3.8 µg/L and 1.2 µg/L) were above this screening level.

- *Vinyl Chloride*: There were five detections of vinyl chloride, out of the 45 soil samples, above reporting limits. Concentrations ranged from 2.2 µg/kg to 11 µg/kg. There were four detections from SWMU 79.A, SWMU 79.B, and SWMU 2-89.68 that exceeded the groundwater screening level protective of surface water. Five samples from SWMU 2-91.70 had detections that exceeded the groundwater screening level protective of surface water.

- *cDCE*: There were six detections in the 45 soil samples above reporting limits. Concentrations ranged from 2.0 µg/kg to 48 µg/kg, well below the screening level protective of surface water (7,725 µg/kg) and the direct contact exposure pathway screening level (7,990,000 µg/kg).

- *Toluene*: Of the 45 soil samples collected, there were two detections below the soil screening level protective of surface water (109,000 µg/kg). There were no detections in the groundwater from these locations. There were no detections in any of the groundwater samples associated with these units.

- *Ethylbenzene*: There were no detections of ethylbenzene in any of the 45 soil samples. There were no detections of ethylbenzene in the groundwater samples.

- *1,1,1-Trichloroethane*: There was one detection of 1,1,1-trichloroethane in the 45 soil samples. This detection (at 1.2 µg/kg) was from soil collected west of SWMU 78.5 (Oil/Water Separator), and was well below the soil screening level protective of surface water (1,200,000 µg/kg).

Petroleum Hydrocarbons

Analysis was conducted for gasoline-range petroleum hydrocarbons (GRPH), diesel-range petroleum hydrocarbons (DRPHs), and motor oil-range petroleum hydrocarbons (MoRPH). Of the three samples tested, all had detections of DRPHs, but none were reported at concentrations greater than the soil screening level. Concentrations ranged from 15 mg/kg to 34 mg/kg—well below the direct contact exposure pathway screening level (2,000 mg/kg). No GRPHs were detected in the three samples from the data gap investigation (EPI and Golder Associates, 2007b).

Groundwater Analysis

For the data gap investigation, groundwater samples were collected and chemical analysis conducted for priority pollutant metals plus manganese and hexavalent chromium (chromium VI). Six inorganics (all metals) are included in the original South Yard Area area-specific groundwater COCs list. In addition to the six original area-specific metal COCs, two additional inorganic contaminants (mercury and zinc) were detected above their respective screening levels in dissolved (filtered) samples (EPI and Golder Associates, 2007b).

A detailed summary of groundwater analysis for the South Yard Area is located in the *LDW EAA-4 SEIIDGR* (E & E, 2007). The following briefly summaries the eight inorganic COCs in the South Yard Area (EPI and Golder Associates, 2007b).

Metals

- *Arsenic*: Of the 45 samples analyzed for arsenic, 40 had detections above the arsenic screening level (0.2 µg/L). Arsenic was detected at concentrations ranging from 0.2 µg/L to 99.8 µg/L. High arsenic concentrations at a facility are generally related to areas of reducing geochemical conditions.

- *Copper*: Copper was not detected above its screening level (3.1 µg/L) in any of the dissolved samples. However, copper was detected above its screening level in the total groundwater samples from three wells. Dissolved copper ranged from 0.5 µg/L to 1.2 µg/L; total copper results ranged from 0.5 µg/L to 52.4 µg/L.

- *Lead*: Dissolved lead ranged from 1.0 µg/L to 5.0 µg/L which are below the screening level for protection of surface water (8.1 µg/L); total lead ranged from 1.0 µg/L to 12.0 µg/L.

- *Manganese*: Dissolved manganese ranged from 90 µg/L to 6,930 µg/L, which is above the screening level protection of surface water (100 ug/L) in 44 of the 45 sampling locations. Total manganese results ranged from 96 µg/L to 4,850 µg/L.

- *Nickel (soluble salts)*: Dissolved nickel was detected in all 45 samples, ranging from 0.5 µg/L to 7.0 µg/L, which is below the screening level protection of surface water (8.2 µg/L). Total nickel results ranged from 1.0 µg/L to 27.2 µg/L.

- *Selenium*: Selenium was not detected in any of the dissolved samples. Three of the non-detect samples (from wells PL2-106C, PL2-110C, and PL2-155C) were at a reporting limit of 100 µg/L. There were also no detections of total selenium; however, two of the non-detects (in wells PL2-155C and PL2-106C) were at a reporting limit of 100 µg/L. These exceed the screening level for protection of surface water (71.0 µg/L).

- *Mercury*: Dissolved mercury was detected above the mercury screening level (0.025 µg/L) for the protection of surface water in one well, PL2-154a, at a concentration of 0.0604 µg/L. One sample had a total mercury concentration of 0.0332 µg/L.

- *Zinc*: results for dissolved zinc in groundwater ranged from non-detect (6.0 µg/L) to 717 µg/L. Total zinc results ranged from 6.0 µg/L to 953 µg/L, with three total zinc samples indicated a result above 81 µg/L.

Semivolatile Organic Compounds and Polychlorinated Biphenyls

Two SVOCs (2,4-dimethylphenol and BEHP) and one PCB (Aroclor 1254) were originally identified as area-specific COCs in groundwater in the South Yard Area; five additional SVOC contaminants were detected in samples collected during the data gap investigation (EPI and Golder Associates, 2007b). None of the five additional contaminants were detected above their applicable screening levels. The results found:

- *2,4-dimethylphenol*: No concentrations above the screening level were detected in 23 contaminant locations. Analytical results for 2,4-dimethylphenol in groundwater ranged from non-detect (1.0 µg/L) to 97 µg/L.

- *BEHP*: No concentrations above the screening level were detected at 23 contaminant locations. All results were non-detect at a limit of 1.0 µg/L.

- *Aroclor 1254*: No detections were observed at 28 contaminant locations at a reporting limit of 1.0 µg/L.

Volatile Organic Compounds

The seven VOCs detected in the original South Yard Area area-specific groundwater samples include benzene, 1,1-DCE, cDCE, PCE, 1,1,2-trichloroethane, TCE, and vinyl chloride (EPI and Golder Associates, 2007b). The results found:

- *Benzene*: Two of the 45 samples had detections above its screening level (4.48 µg/L). Results ranged from non-detect (0.2 µg/L) to 5.7 µg/L.

- *1,1-DCE*: There were detections above its screening level (0.382 µg/L) in three of the 45 samples. Results ranged from non-detect (0.2 µg/L) to 1.9 µg/L.

- *cDCE*: There were no detections above its detection level (1,130 µg/L) in the 45 samples, but 24 non-detects were observed in the A-level aquifer. Non-detect reporting limits ranged from 0.2 µg/L to 83 µg/L.

- *PCE*: Two of the 45 samples had detections in the A-level aquifer above its screening level (0.822 µg/L). Results ranged from non-detect (0.2 µg/L) to 1.2 µg/L.

- *1,1,2-trichloroethane*: There were no detections from the 45 sample locations. Results ranged within the non-detect limits (0.2 µg/L to 1.0 µg/L).

- *TCE*: Thirteen of the 45 samples had detections above the surface water screening level (0.302 µg/L), and one detection was above the air screening level (62 µg/L). Results ranged from non-detect (0.2 µg/L) to 110 µg/L.

- *Vinyl chloride*: Twenty-four of the 45 samples had detections above the surface water screening level (0.731 µg/L). Results ranged from non-detect (0.2 µg/L) to 31 µg/L.

- *1,1,1-Trichloroethane*: There were no detection of 1,1,1-trichloroethane above its respective screening level.

Petroleum Hydrocarbons

Samples were collected and analyzed for petroleum hydrocarbons to support data gap investigations. Samples were analyzed for GRPH and DRPHs. Two petroleum hydrocarbon ranges were detected in the samples above their screening level (500 µg/L): DRPHs and MoRPHs. Results for DRPH ranged from non-detect (at 250 µg/L) to 8,900 µg/L. Results for GRPH were all non-detect (at 250 µg/L). The MoRPH ranged from non-detect (at 250 µg/L) to 1,300 µg/L (EPI and Golder Associates, 2007b).

Groundwater Hydrogeologic Results

It appears that the generalized direction of groundwater flow along most of the border between Plant 2 and the Jorgensen Forge property is approximately parallel to the border or slightly toward the Jorgensen Forge property (Figure 13).

3.2.4.1.2 2-60s Area

The 2-60s Area, located north of the South Yard of Plant 2, consists of approximately 13 acres (Figure 5). This area is bordered by East Marginal Way South to the east; the South Yard Area to the south; the 2-66 Area to the west; and the 2-40s Area to the north. The 2-60s Area contains buildings 2-48, 2-51, 2-64, and part of Building 2-108. Demolition and decommissioning activities have resulted in slabs remaining at former buildings 2-61, 2-62, 2-63, and 2-65 (EPI and Golder Associates, 2007a).

No RCRA units have been closed within the 2-60s Area of Plant 2. One RCRA unit, SWMU 77.B (PCB Retention Tank), was previously granted a No Further Action (NFA) status for soils from EPA, however, this will be reviewed prior to development of the applicable workplan for future data gap investigations (EPI and Golder Associates, 2007a).

Within the 2-60s Area, there are a total of 14 RCRA units including 10 SWMUs, 2 AOCs, and 2 OAs (Table 9, Figure 14; EPI and Golder Associates, 2007a). A detailed summary of RCRA units located in 2-60s Area is described in the *LDW EAA-4 SEIIDGR* (E & E, 2007).

Soil Analysis

Soils were evaluated on a unit-by-unit basis, as opposed to an area-wide basis (see Table 4 and Figure 14; EPI and Golder Associates, 2007a). A more detailed summary of the following contaminants detected in soils in this area is located in the *LDW EAA-4 SEIIDGR* (E & E, 2007). The data represents all soil data gathered to date.

The following seven metals and cyanide are COCs in soil:

Metals (in soil)

- *Arsenic*: Of the 87 soil samples collected, three samples were above reporting limits, with a maximum concentration of 10 mg/kg; however they did not exceed the direct contact exposure pathway screening level (33.3 mg/kg).

- *Cadmium*: Of the 87 soil samples collected, three samples were above reporting limits. Concentrations ranged from 0.4 mg/kg to 0.6 mg/kg; but below the soil screening level protective of surface water (1.21 mg/kg). Cadmium was not detected above reporting limits in groundwater (and, therefore, below groundwater screening levels).

- *Copper*: All 87 soil samples had detections of copper, but none exceeded the soil screening level (36.4 mg/kg). Concentrations ranged from 8.4 mg/kg to 29.1 mg/kg.

- *Cyanide*: Of the 87 soil samples collected, three samples were above reporting limits and the soil screening level protective of surface water (0.202 mg/kg). Concentrations ranged from 0.24 mg/kg to 0.56 mg/kg.

- *Mercury*: Of the 87 soil samples collected, nine samples were above reporting limits, with two samples exceeding the screening level (0.07 mg/kg). Concentrations ranged from 0.04 mg/kg to 0.11 mg/kg.

- *Silver*: Of the 87 soil samples collected, there were six detections, five of which exceeded the soil screening level protective of surface water (0.323 mg/kg). Detected concentrations ranged from 0.9 mg/kg to 5.3 mg/kg. Silver was not detected above the screening level in any of the groundwater samples.

- *Thallium (Soluble Salts)*: Of the 87 soil samples collected, there were 14 detections; however, none exceeded the screening level protective of surface water (0.669 mg/kg). Concentrations ranged from non-detect at 0.1 mk/kg to 0.3 mg/kg.

- *Zinc*: All 87 soil samples had detections of zinc above reporting limits, but they were all below the soil screening level protective of surface water (101 mg/kg). Concentrations ranged from 12 mg/kg to 94.9 mg/kg.

Semivolatile Organic Compounds and Polychlorinated Biphenyls

The following SVOCs and PCBs are COCs in soil for the 2-60s Area (EPI and Golder Associates, 2007a):

- *Carcinogenic PAHs*: There were 13 detections from 36 soil samples, with none greater than their respective soil screening levels. Historically, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were detected above their respective soil screening levels protective of surface water (41.9 µg/kg, 113 µg/kg, 144 µg/kg, and 46.6 µg/kg respectively). Benzo(a)pyrene and benzo(b)fluoranthene were detected at concentrations greater than screening levels in two samples. Benzo(a)anthracene and chrysene were detected at concentrations greater than their respective soil screening levels in four and five samples, respectively. Results are shown in Table 4.

- *BEHP*: There were nine detections from 36 soil samples above reporting limits, but below the soil screening level protective of surface water (1,570 µg/kg). Concentrations ranged from 67 µg/kg to 800 µg/kg.

- *PCBs*: Of the 24 soil samples collected, four detections were above the soil screening level protective of surface water (33 µg/kg), with concentrations ranging from 33 µg/kg to 400 µg/kg.

Volatile Organic Compounds

The following 11 VOCs are COCs in soil for the 2-60s Area (EPI and Golder Associates, 2007a):

- *1,2,4-Trimethylbenzene*: Of the 87 soil samples collected, two detections were near SWMU 2-78.6 with a maximum of 57,000 µg/kg, were above the screening level (2,360 µg/kg).

- *Isopropylbenzene*: Of the 87 soil samples collected, there was only one detection (6,800 µg/kg), at 10 feet bgs, that was above the screening level (1,270 µg/kg).

- *PCE*: Of the 87 soil samples collected, there was one detection above the reporting limit of 1.0 µg/kg.

- *1,3,5-Trimethylbenzene*: Of the 87 soil samples collected, there was one detection (2,300 µg/kg), which is below the screening level (2,470 µg/kg).

- *n-Butylbenzene*: Of the 87 soil samples collected, there was one detection (9,700 µg/kg) at 10 feet bgs, which exceeded the screening level (4,640 µg/kg).

- *TCE*: Of the 87 soil samples collected, there were seven detections of TCE, they ranged from 1.2 to 8.4 µg/kg. Four of these detections exceeded the screening level protective of surface water (2.0 µg/kg).

- *Benzene*: Of the 87 soil samples collected, there was only one detection (12 µg/kg), collected at 10 feet bgs, which was below the soil screening level protective of surface water (25.3 µg/kg).

- *n-Propylbenzene*: Of the 87 soil samples collected, one detection (6,100 µg/kg), at 10 feet bgs, near SWMU 2-78.6 exceeded the screening level (1,360 µg/kg).

- *Naphthalene*: Of the 87 soil samples collected, five detections had concentrations ranging from 6.9 µg/kg to 38,000 µg/kg. The highest concentration is below the soil screening level protective of surface water.

- *Ethylbenzene*: Of the 87 soil samples collected, there was one only detection (13,000 µg/kg) that was below the screening level (18,100 µg/kg).

- *Sec-butylbenzene*: Of the 87 soil samples collected, only one detection (4,700 µg/kg) at 10 feet bgs was below the screening level (7,860 µg/kg).

Petroleum Hydrocarbons

Only one category of petroleum hydrocarbons, GRPH, was identified as a COC in soil for the 2-60s Area. There were four detections, out of 10 samples, from the data gap investigation. Concentrations ranged from 9.9 mg/kg to 3,900 mg/kg, two of which exceeded the screening level protective of surface water (30 mg/kg).

Groundwater Analysis

In 2006, a data gap investigation was conducted, and monitoring wells and direct-push probes were installed. Three new monitoring wells, 26 existing monitoring wells, and 26 probe locations were sampled in 2006 to provide the current COC concentrations of the 2-60s Area. Soil samples were also collected for laboratory analysis and geologic logging, as described in the *Volume IVb CMS Repor*t (see Table 3 and Figure 14; EPI and Golder Associates, 2007a).

No new site-wide COCs were added as a result of the 2-60s Area data gap investigation; however, four existing site-wide COCs were added to the 2-60s Area area-specific COCs list (EPI and Golder Associates, 2007a). They include:

- Aroclor 1260 (and by default, Total PCBs)
- BEHP
- Mercury
- Zinc

Seven inorganic contaminants, consisting of six metals and cyanide, are included in the 2-60s Area area-specific groundwater COCs list. Two area-specific COCs for the 2-60s Area were added as a result of the area-wide data gap investigation (EPI and Golder Associates, 2007a). The area-specific inorganic COCs in groundwater for the 2-60s Area include:

Metals

- Arsenic
- Copper
- Cyanide
- Manganese
- Mercury (new COCs)
- Nickel (soluble salts)
- Zinc (new COCs)

Data below is summarized from the *2-60s Area Data Gap Investigation Report* (EPI and Golder Associates, 2007a). A detailed summary of the following contaminants is located in the *LDW EAA-4 SEIIDGR* (E & E, 2007).

Aroclor 1260

The PCB, Aroclor 1260, was detected above its screening level (0.01 µg/L) in 4 of the 13 samples, with concentrations ranging from non-detect at a reporting limit of 0.01 ug/L to detect at a concentration of 0.73 µg/L in the A-level sample.

Arsenic

Arsenic was detected in 59 samples, and at concentrations above the arsenic screening level (0.2 µg/L) in 57 of those samples. Data gap investigation analytical results for dissolved arsenic in groundwater ranged from non-detect (0.2 µg/L) to 47.0 µg/L. Total arsenic results for the Data Gaps Investigation ranged from 0.3 µg/L to 34.7 µg/L, with the highest concentration noted in the sample from a new well (PL2-606A), located in OA-9 (former USTs PL-16, 17, and 18).

BEHP

BEHP was analyzed from 12 direct-push probe locations in the A-level of the aquifer, and at eight probe locations in the B-level of the aquifer, for a total of 20 samples. BEHP was detected in three of the 20 samples, with two above its screening level (3.0 µg/L). Concentrations ranged from non-detect at a reporting limit of 1.0 µg/L to detect at a concentration of 3.4 µg/L in the A-level sample.

Copper

Copper was analyzed in groundwater samples in all 29 monitoring wells and 26 direct-push probes (18 sampled from both the A- and B-levels of the aquifer), for a total of 73 groundwater sample locations. Copper was detected in 49 of the samples, with 22 samples above the screening level (3.1 µg/L). Data from the 2-60s Area data gap investigation for dissolved copper in groundwater ranged from non-detect (0.5 µg/L) to 74.6 µg/L in an A-level sample from direct-push probe 2-60-DP-25. Total copper results ranged from non-detect (0.05 µg/L) to 52.4 µg/L in a sample from monitoring well PL2-117A; however, this total copper sample had a high turbidity of 158 nephelometric turbidity unit (NTU) and may be impacted by the high turbidity.

Cyanide

Data from the 2-60s Area data gap investigation for total cyanide in groundwater ranged from non-detect (5.0 µg/L) to 64 µg/L in the A-level sample (direct-push probe 2-60-DP-18). Total cyanide was detected in four of the samples above the screening level for the protection of surface water (5.0 µg/L).

Manganese

Manganese was detected in all samples, with 55 samples above the screening level (100 µg/L). The screening level was adjusted to the background level (2,000 µg/L). Data from the 2-60s Area data gap investigation for dissolved manganese in groundwater ranged from 2.0 µg/L to 5,290 µg/L. Three of the samples had dissolved manganese concentrations above the background-adjusted screening level, and one sample had a total manganese concentration above the background-adjusted screening level. Total manganese results range from 2.0 µg/L to 5,160 µg/L.

Mercury

Data for dissolved mercury in groundwater ranged from non-detect to 0.106 µg/L in the A-level samples from probe 2-60-DP-25. The A-level sample from probe 2-60-DP-25 was the only groundwater sample with dissolved mercury above the screening level (0.025 µg/L). Total mercury results were all non-detect at a reporting limit of 0.025 µg/L.

Nickel (Soluble Salts)

Dissolved nickel was detected in 72 samples, ranged from non-detect to 37.8 µg/L, with six samples above the screening level (8.2 µg/L). Total nickel ranged from non-detect to 8.3 µg/L in samples from well PL2-327A; however, this total nickel sample had a turbidity of 17.1 NTU and may be biased due to the high turbidity.

Zinc

Zinc was detected in 50 groundwater samples, with one sample (from direct-push probe 2-60-DP-06) above the screening level of 81 µg/L. Total zinc was not detected above the screening level.

Volatile Organic Compounds

Seven VOCs are identified as area-specific COCs in groundwater for the 2-60s Area.

- *Benzene*: There were detections in 10 of the 73 samples. Four samples were above the screening level for protection of surface water (4.48 µg/L). There was one A-level area of benzene, and none in the B- and C-levels of the aquifer. Benzene concentrations ranged from non-detect at 0.2 µg/L to 110 µg/L.

- *1,1-DCE*: There were four detections out of the 73 samples, none of which were above the screening level for protection of surface water (0.382 µg/L). Concentrations ranged from non-detect (0.2 µg/L) to 0.3 µg/L.

- *Ethylbenzene*: There were four detections out of the 73 samples, none of which were above the screening level for protection of surface water (2,100 µg/L). Concentrations ranged from non-detect (0.2 µg/L) to 900 µg/L.

- *Methylene Chloride*: There were no detections in the 73 samples, and all concentrations were below the non-detect value (0.2 µg/L), well below the screening level for protection of surface water (190 µg/L).

- *PCE*: There were 11 detections from the 73 samples, 8 of which were above the screening level for protection of surface water (0.822 µg/L). Concentrations ranged from non-detect (0.2 µg/L) to 15 µg/L.

- *TCE*: There were 32 detections from the 73 samples, 28 of which were above the screening level for the protection of surface water (0.302 µg/L). Concentrations ranged from 0.2 µg/L to 250 µg/L.

- *Vinyl Chloride*: There were 28 detections from the 73 samples, 13 of which were above the screening level (0.731 µg/L) protective of surface water. Concentrations ranged from non-detect (0.2 µg/L) to 15 µg/L.

There were 22 additional VOCs that were detected in groundwater samples collected during the 2-60s Area data gap investigation. None of these VOCs were detected at concentrations above respective screening levels; therefore, no new COCs for the VOC constituent group were added to the 2-60s Area area-specific COC list, or to the site-wide COC list (EPI and Golder Associates, 2007a).

Petroleum Hydrocarbons

Groundwater samples were collected and analyzed for GRPH and DRPH. Both contaminants were detected in groundwater samples, at concentrations above their screening levels (500 µg/L and 800 µg/L, respectively; EPI and Golder Associates, 2007a).

3.2.4.1.3 2-66 Area

The 2-66 Area is toward the southwest area of Plant 2 (Figure 5). This area is bordered to the east by the 2-60s Area and the South Yard Area; to the southeast by Jorgensen Forge; and to the northwest by the LDW and the 2-40s Area. The 2-66 Area contains major portions of Building 2-49 and the former Building 2-66 slab. This area includes the Southwest Bank CMS Study Area and the Transformer PCB Investigation Area (also referred to as the West Bank electrical substation area; EPI and Golder Associates, 2005).

Within the 2-66 Area there are 10 identified RCRA units, including four AOCs and six OAs. No RCRA units have been closed within the 2-66 Area of Plant 2 (Figure 15; EPI and Golder Associates, 2005).

The RCRA units are characterized as follows (information taken from EPI and Golder Associates, 2006c):

- AOC 2-108.72 (Wet Paint Booths);

- AOC 2-108.73 (Paint Booth Sump); and

- OA 17 (Transformer Vaults).

The groundwater associated with these units will be further evaluated. A summary of these RCRA units can be found in the *LDW EAA-4 SEIIDGR* (Table 10; E & E, 2007).

A data gap investigation report has not been completed for the 2-66 Area. The proposed sampling locations are found in Figure 16.

Density-Driven Convection System (2-66 Area IM System)

The two density-driven convection (DDC) wells were in operation as Interim Measure (IM) technology, inside the sheet pile containment structure, near former Building 2-66. The objective of this IM was to remove contaminant mass from the subsurface within the sheet pile structure. The System began operation on March 23, 2004 in Soil Vapor Extraction (SVE)-only mode. The SVE-only operation was implemented initially for remediation of vadose zone soil prior to the full-scale, closed-loop DDC operation, which included groundwater treatment. SVE-only operation was terminated on June 21, 2004 due to its permit limit. The System was then modified for closed-loop operation and on June 22, 2004 DDC operations. Operational sampling is performed monthly and includes groundwater sampling of the DDC wells, vapor sampling from the DDC wells, and multiple points along the vapor treatment system. Performance sampling is conducted quarterly and includes groundwater sampling of a network of 33 monitoring wells both inside and outside the sheetpile structure (EPI and Golder Associates, 2007c).

Since the system startup in March 2004, 667.8 pounds of solvent have been physically removed from Plant 2. Quarterly sampling was conducted on November 9, 2006; Boeing will deliver a report on soil samples collected from within the sheet pile and the recalculation of contaminant mass remaining within the sheet pile to the EPA. The sheet pile remedy issue will be discussed in later reports (Boeing, 2006b).

The 2-66 Area IM System quarterly performance monitoring is timed to occur with the quarterly Shoreline Monitoring Program, taking advantage of the fact that seven of the 2-66 Area IM monitoring wells are included in both programs (EPI and Golder Associates, 2007c).

Historically, there was an underground TCE tank and piping system outside the southwest corner of former Building 2-66. This tank and piping system has since been removed. Soil and groundwater impacts from this tank and piping were noted during environmental investigations. In 1993, an IM consisting of interlocking steel sheet piles was installed around approximately 90 percent of the mass of TCE contamination. The sheet piles extend to a depth of approximately 50 bgs. Based on the data, the majority of the contaminant mass inside the sheet pile is located at depths shallower than 20 feet bgs (EPI and Golder Associates, 2006c).

The COCs for the area enclosed by the sheet pile include TCE and its degradation products—cDCE and vinyl chloride. The degradation products are the result of natural attenuation of TCE occurring in the subsurface (EPI and Golder Associates, 2007c).

The DDC system was installed from late 2003 through early 2004. This system consists of two DDC wells installed within the sheet pile structure and 11 new monitoring wells/piezometers installed within and around the sheet pile structure. When the system was first installed, it was first operated in Soil Vapor Extraction-only mode for remediation of vadose-zone soil, prior to full-scale, closed-loop DDC operation, which includes groundwater treatment. In June 2004, the operation began in startup DDC mode (EPI and Golder Associates, 2007c).

Operational sampling is performed monthly and includes groundwater sampling and vapor sampling of the DDC wells and multiple points along the vapor treatment system. This sampling is conducted quarterly and includes groundwater sampling of a network of 33 monitoring wells, both inside and outside the sheet pile structure (EPI and Golder Associates, 2007c).

From June 25, 2004, until November 9, 2006, VOCs measured in wells decreased in concentration. Of the two DDC wells, VOC concentrations were greater at monitoring well DDC2-66-1 because the majority of the contamination existed near this well. Conversely, less VOC concentrations were consistently measured at monitoring well DDC2-66-2 because lower contaminant concentrations originally existed in that area (EPI and Golder Associates, 2007c).

Ninth-quarter VOC concentrations from shallow and deep piezometers at monitoring well DDC-1 and DDC-2 generally remained unchanged, or decreased slightly, relative to seventh-quarter data. The vapor VOC concentrations decreased from June 2004 to November 2006. The data indicated month-to-month fluctuations, occasionally increasing in vapor phase concentration, but were downward over the remedial time period. The reported vapor concentrations were indicative that VOCs in the groundwater were successfully stripped in the vapor phase by the DDC wells (EPI and Golder Associates, 2007c).

Total VOC concentrations in groundwater samples from both DDC wells have decreased from the start of DDC operation, in late June 2004 through the end of the ninth quarterly DDC operation period, in November, 2006. The average stripping efficiency of both wells remains high, indicating a successful operation. The overall decrease in extracted vapor concentrations from both DDC wells were expected, based on the observation of the successful DDC operation (EPI and Golder Associates, 2007c).

Groundwater from 33 monitoring wells and piezometers were sampled as part of the quarterly monitoring. Increases in total VOCs for some wells occurred because the operation of the DDC wells mixed areas of high groundwater VOC concentration with areas of low VOC concentration, resulting in total VOC concentrations increasing somewhat at some sample points. In addition, biodegradation was boosted by air injection and groundwater recirculation (the nature of the DDC wells operation), degrading TCE into DCE, and then DCE into vinyl chloride. Thus, temporary increases in DCE and vinyl chloride was anticipated and observed in some wells (EPI and Golder Associates, 2007c).

Increases have been noted in some total metals results from monitoring wells PL2-010A and PL2-021A. These two wells are located immediately adjacent to the two DDC wells and, thus, are subjected to low pH conditions. This localized effect demonstrates that acid injection into the DDC wells over two years of operation has mobilized metals only in the vicinity of these two closest wells. Adjustments to the acid metering system are ongoing to maintain sufficiently low pH in the DDC wells and infiltrations galleries, preventing plugging by iron precipitation or other reaction products formed by introduction of oxygen in the groundwater. Total and dissolved metal concentrations inside the DDC wells have increased approximately two to five times over baseline concentrations. Metals concentrations at monitoring wells near DDC wells PL2-010A and PL2-021A have shown similar increases. These wells have also shown decreased pH from acid injection (EPI and Golder Associates, 2007c).

Monitoring wells outside the sheet pile and B- and C-level wells inside the sheet pile are unaffected by DDC system operations (EPI and Golder Associates, 2007c).

Transformer Investigation

In August of 2001, Boeing discovered high levels of PCBs in the soil underlying the area near the West Bank electrical substation, located adjacent to the southern border of the facility. Soils in the vicinity were excavated to attempt to define the extent of the PCBs. A Phase I and Phase II investigation were conducted to define this PCB contamination. The initial screening results indicated relatively high levels of PCBs in the soil underlying the area. Based on these results, Boeing excavated an area measuring approximately 6 feet by 10 feet by 3 feet deep (approximately 7 cubic yards) to remove contaminated soil and to further define the extent of PCBs. Analyses of samples collected from the sidewalls and bottom of the excavation (termed the "Area of Discovery") revealed variable PCB concentrations ranging from non-detect up to 460,000 µg/kg (taken from a sidewall sample along the western property line. During the Phase I Upland study, a total of 180 soil samples were collected and analyzed for PCBs. PCB concentrations ranged from non-detect to 660,000 µg/kg. The highest concentrations were located in or under the Area of Discovery. PCB concentrations decreased laterally with distance from the Area of Discovery and were not detected at concentrations greater than 1,000 µg/kg in borings located more than 80 feet from the Area of Discovery. PCB concentrations were all less than 1,000 µg/kg in samples collected below a depth of 14 feet bgs. Several questions remained unanswered after Phase 1 activities

regarding the current conditions and historical connections of the storm system that were addressed during the Phase II investigation. The four transformers at the West Bank substation were drained of their fluid and removed in 2004. Samples were collected during the transformer decommissioning process, and included samples of the drained transformer oil, wipe samples of the exterior surfaces of the transformers, and concrete samples of the pad underlying the transformers. Details on the decommissioning of the transformers, including sampling results are contained in Appendix D of the Phase II Work Plan (Floyd|Snider Inc., 2005).

Shoreline Groundwater Monitoring

Beginning in 2001, groundwater samples were collected and analyzed in support of two separate and concurrent evaluations. The first evaluation, referred to as the "Sediment Cap Impact Evaluation," is described in the *CMS Phase Sediment Cap Impact Evaluation Groundwater Monitoring Plan*. This plan was designed to provide an assessment of the potential for contaminated groundwater, discharging from the facility, to contaminate the clean sediment backfill proposed as part of the DSOA remedy. The second evaluation is described in the *CMS Phase Effectiveness of Buildings 2-10 and 2-66 Interim Measures Monitoring Plan*. This evaluation is designed to assess the effectiveness of the sheet pile containment structure IMs, and is referred to as the "Effectiveness Evaluation." Both of these evaluations involve quarterly groundwater monitoring (EPI and Golder Associates, 2006b).

Seven of the Shoreline Monitoring Program wells are included in the *Quarterly Performance Monitoring Program for the Building 2-66 IMs Density-Driven Convection Well System Project* (Figure 6; EPI and Golder Associates, 2006b). The seven wells common to both monitoring programs are:

- PL2-JF01AR;
- PL2-JF01B;
- PL2-JF01C;
- PL2-030A;
- PL2-030C;
- PL2-043B; and
- PL2-044B.

In an effort to increase monitoring efficiency, Boeing coordinates the two quarterly sampling schedules with the sampling of seven wells common to both programs, under the Shoreline Monitoring Program (EPI and Golder Associates, 2006b).

In August 2006, 25 of the 28 shoreline monitoring wells were sampled. Dissolved metals, VOCs, total metals and PCBs were detected in the samples (EPI and Golder Associates, 2006b).

The EPA has requested that Boeing conduct SVOC monitoring in the shoreline monitoring wells. This monitoring is to verify that no SVOCs are being transported via the groundwater from upland areas to on-site sediments (Ernst, 2007). This sampling event may be combined with a one-time sampling event at all wells for all SMS constituents.

Volatile Organic Compounds

In the August 2006 sampling event, the following 11 VOCs were detected in 18 of the 25 shoreline monitoring wells sampled (EPI and Golder Associates, 2006b):

- *1,1-DCE*: 1,1-DCE was detected in monitoring wells PL2-030A, PL2-043B, and PL2-044B at concentrations of 0.4 µg/L, 0.6 µg/L, and 0.6 µg/L, respectively. The screening level in groundwater under the draft CMS is 112,000 µg/L.

- *Acetone*: Acetone detected in monitoring wells PL2-013AR, PL2-015B, PL2-420A, and PL2-443A at concentrations of 1.8 µg/L, 1.5 µg/L, 1.9 µg/L, and 1.2 µg/L, respectively. The screening level in groundwater under the draft CMS is 6,430,000 µg/L.

- *Benzene*: This compound was detected in monitoring well PL2-030A at a concentration of 2.6 µg/L. The screening level in groundwater under the draft CMS is 4.48 µg/L.

- *Carbon Tetrachlorid*e: detected in monitoring well PL2-015AR at a concentration of 0.9 µg/L. The screening level in groundwater under the draft CMS is 0.526 µg/L.

- *Chlorobenzene* – detected in monitoring well PL2-JF01AR at a concentration of 22.0 µg/L. The screening level in groundwater under the draft CMS is 1,600 µg/L.

- *Chloroform* – detected in monitoring wells PL2-015A and PL2-015AR at concentrations of 0.4 µg/L, and 3.3 µg/L, respectively. The screening level in groundwater under the draft CMS is 56.1 µg/L.

- *cDCE* – detected in 10 monitoring wells at concentrations ranging from 0.2 µg/L, to 1,800 µg/L. One of the samples, PL2-258B, has a concentration above the draft CMS screening level of 1,550 µg/L.

- *PCE* – detected in monitoring well PL2-015AR at a concentration of 1.0 µg/L. The screening level in groundwater under the draft CMS is 0.822 µg/L.

- *Trans-1,2-Dichloroethene (tDCE)* – detected in monitoring wells PL2-030A and PL2-258A at concentrations of 0.3 µg/L and 22.0 µg/L, respectively. The screening level in groundwater under the draft CMS is 10,000 µg/L.

- *TCE* – detected in monitoring wells PL2-013A, PL2-013AR, PL2-015A, PL2-015AR, and PL2-044B at concentrations of 2.6 µg/L, 5.0 µg/L, 2.1 µg/L, 29.0 µg/L, and 0.3 µg/L, respectively. The screening level in groundwater under the draft CMS is 0.302 µg/L.

- *Vinyl Chloride* – detected in monitoring wells PL2-013AR, PL2-015B, PL2-030A, PL2-258A, PL2-420A, PL2-443A, PL2-JF01AR, PL2-JF01B, and PL2-JF02A at concentrations ranging from 0.3 µg/L to 850 µg/L. Five of the nine samples with detected vinyl chloride had concentrations above the draft CMS screening level of 0.731 µg/L.

TCE, cDCE, tDCE, and vinyl chloride were frequently detected, particularly in areas of the sheet pile IMs. VOCs were associated with Plant 2 operations.

During the August 2006 sampling event, the following 13 metals were detected in 22 of the 25 shoreline monitoring wells sampled (EPI and Golder Associates, 2006b):

- *Antimony* – total antimony was detected in one sample at a concentration of 3.0 µg/L; well below the screening level (513 µg/L).

- *Arsenic* – dissolved arsenic was detected in 17 samples and total arsenic was detected in 19 samples. Two of the dissolved and four of the total arsenic detections were above the background screening level (8.0 µg/L).

- *Beryllium* – total beryllium was detected in one monitoring well (PL2-233A) at a concentration of 2.7 µg/L, well below the beryllium screening level (135 µg/L).

- *Cadmium* – dissolved cadmium was detected in monitoring well PL2-013A and total cadmium was detected in monitoring well PL2-013A at concentrations of 130 µg/L and 137 µg/L, respectively. This is above the cadmium screening level (8.8 µg/L).

- *Chromium* – total chromium was detected above the screening level (50 µg/L) in monitoring well PL2-233A, at a concentration of 150 µg/L. This sample had a turbidity of 515 NTU; therefore, total metals results may be biased high for this sample.

- *Copper* – dissolved copper was detected in 14 samples and total copper was detected in 18 samples. One of the 14 dissolved and three of the 14 total copper detections were above the background-adjusted screening level (8.0 µg/L).

- *Lead* – total lead was detected from monitoring well PL2-233A at a concentration of 3.0 µg/L—below its screening level of 8.1 µg/L. This sample had a turbidity of 515 NTU; therefore, the results may be biased high for this sample.

- *Manganese* – dissolved manganese was detected in 16 samples and total manganese was detected in 18 samples. Three of the dissolved and three of the total manganese detections were above the background-adjusted screening level (2,000 µg/L).

- *Mercury* – total mercury was detected above the screening level (0.025 µg/L) in monitoring well PL2-233A, at a concentration of 0.0295 µg/L. This sample had a turbidity of 515 NTU; therefore, results may be biased high for this sample.

- *Nickel* – total and dissolved nickel was detected in 22 samples. Four of the total nickel and two of the dissolved nickel concentrations were above the screening level (8.2 µg/L).

- *Silver* – dissolved silver was detected in monitoring well PL2-013A at a concentration of 45 µg/L. Total silver was detected in seven samples. One dissolved and one total silver sample, both from monitoring well PL2-013A, had detections above the screening level (1.9 µg/L).

- *Vanadium* – dissolved and total vanadium were detected in 14 samples. None of these were above the screening level (2,810 µg/L).

- *Zinc* – dissolved zinc was detected in five groundwater samples. Total zinc was detected in 11 samples. Three dissolved and five total zinc samples had detections above the zinc screening level of 81 µg/L.

Groundwater samples from monitoring wells PL2-036A and PL2-036AR were analyzed for low concentrations of PCBs. These wells were selected because PCBs were historically detected at low concentrations in monitoring well PL2-036A during the RFI. No PCBs were detected in either well. Quarterly groundwater monitoring is ongoing in this area.

3.2.4.1.4 2-40s Area

The 2-40s Area consists of approximately 30 acres, and is bordered to the south by the 2-60s Area and 2-66 Area; to the north by the 2-31 Area; to the west by the LDW; and to the east by East Marginal Way South (Figure 5). The 2-40s Area contains buildings 2-40, 2-41, 2-44, and 2-45 (EPI and Golder Associates, 2006a).

The western edge of the 2-40s Area abuts the LDW, along the rear bulkhead wall that parallels the waterway the full length of buildings 2-41, 2-44, and 2-49. The western-most 50 feet of buildings 2-41, 2-44, and 2-49 extend over the waterway and are supported by wood piles. The ground surfaces on the waterway side of the rear bulkhead wall are below the customary high water mark, and are considered sediments and not soils. For this reason, RCRA units (or portions of RCRA units) and features found west (waterway side) of the rear bulkhead wall in the 2-40s Area are managed as part of the DSOA, through a parallel RCRA process under the same order. The RCRA units accounted for under the DSOA include the west end of Underflow Flume (SWMU 2-41.36), Quench Tanks (SWMU 2-41.35), Outfall #23 area (OA 20), Outfall #16 area (OA 22B), Outfall #14 area (OA 22A), and TCE degreaser (AOC 2-41.29; EPI and Golder Associates, 2006a).

Within the 2-40s Area, there are 12 identified RCRA units (see Table 11 and Figure 17; EPI and Golder Associates, 2006a). These RCRA units are categorized as follows:

- Five SWMUs were used as TSD facilities;
- Two SWMUs were not TSD facilities, but were defined in the Order as "any discernable unit at which solid wastes have been placed at any time;"
- One AOC, a category of units defined in the Order as "any area of the facility where a release to the environment of a hazardous waste or hazardous contaminants has occurred, is suspected to have occurred, or may occur;" and
- Seven OAs, a category of units not defined within the Order, but which, by practice, are treated identically to an AOC.

There are three RCRA units in the 2-40s Area where the EPA had determined that NFA is needed for vadose-zone soils (EPI and Golder Associates, 2006a). The data gap investigation report for the 2-40s Area has not yet been submitted to the EPA, and as such, this NFA will be reviewed prior to the development of the applicable workplan for future data gap investigations. Groundwater associated with these units will be evaluated further in the CMS. These units are:

- OA 17 (Transformer Vaults OA 17.2, OA 17.5, OA 17.6, OA 17.7, and OA 17.8);
- SWMU 2-41.30 (Manhole Vault); and
- SWMU 2-41.34 (Tunnel Area).

A summary of these RCRA units can be found in the *LDW EAA-4 SEIIDGR* (E & E, 2007).

Electronics Manufacturing Facility Plume

Ongoing remedial actions have been occurring in the EMF plume underlying the 2-40s Area (Figure 7). The EMF plume is not a RCRA unit. This facility is located east of KCIA and upgradient of Plant 2. The plume is a chlorinated VOC plume and portions of the plume underlie the 2-40s Area of the facility (EPI and Golder Associates, 2006a).

Based on existing data, groundwater impacts associated with the EMF plume are limited to the B-level of the aquifer in the 2-40s Area of Plant 2. However, an upward vertical hydraulic gradient direction occurs near the waterway causing the EMF plume to rise somewhat, possibly into the A-level of the aquifer, as it approaches the waterway (EPI and Golder Associates, 2006a). The width of the plume at the shoreline is not fully understood at this time.

In 2002, remediation technology selected for the EMF plume was Enhanced Reductive Dechlorination (ERD) using biostimulants, such as sodium lactate or sugar solution (EPI and Golder Associates, 2006a). In 2003, an ERD pilot test was conducted (EPI and Golder Associates, 2006a).

Based on the pilot test results, a full scale ERD program was implemented. Several rounds of sodium lactate solution injections were performed during 2004 and 2005; down gradient wells were monitored to evaluate the effectiveness of the remediation effort. In 2005, the EPA required the EMF plume to be transferred from Ecology's Voluntary Cleanup Program to EPA's purview, and ongoing remediation work associated with the Voluntary Cleanup Program at Plant 2 be halted until further evaluations were conducted under the CERCLA Order (EPI and Golder Associates, 2006a).

Analytical results of groundwater testing, following injections of sodium lactate solution into the EMF plume, showed decreases in chlorinated VOC concentrations within the EMF plume. Boeing plans to voluntarily continue the ERD work (EPI and Golder Associates, 2006a). The EMF plume will be further delineated and evaluated. Delineation of the entire plume will be determined both laterally and vertically (EPI and Golder Associates, 2006a).

3.2.4.1.5 North Yard

The work plan and the subsequent data gap investigation have not yet been completed for the North Yard. There are two RCRA units in the North Yard. A summary of these RCRA units can be found in the *LDW EAA-4 SEIIDGR* (E & E, 2007).

3.2.4.1.6 2-31 Area

The work plan and subsequent data gap investigation have not yet been completed for the 2-31 Area. The 2-31 CMS Study area contains nine RCRA units, six of which had been approved for a NFA by the EPA; this NFA will be reviewed prior to the development of the applicable workplan for future data gap investigations (Weston Solutions, 2000a). A summary of these RCRA units can be found in the *LDW EAA-4 SEIIDGR* (E & E, 2007).

3.2.4.1.7 2-10 Area

The work plan and the subsequent data gap investigation have not yet been completed for the 2-10 Area. The 2-10 CMS Study Area contains 21 RCRA units, four of which had previously been granted a NFA status for soils by the EPA; this NFA will be reviewed prior to the development of the applicable workplan for future data gap investigations (Weston Solutions, 2000b). A summary of these RCRA units can be found in the *LDW EAA-4 SEIIDGR* (E & E, 2007).

Interim Measures in the 2-10 Area

In September 2006, there was an IM in the 2-10 Area (Figure 5) to remove UST PL-52 in SWMU 2-15.7A. This UST was a 1,000-gallon waste storage tank. This tank and its ancillary piping originally functioned as an oil/water separator, plumbed to receive liquids from the Building 2-15 steam clean area (Golder Associates, 2006a).

The condition of the ancillary piping, formerly used to convey wastewater between the sump in the steam cleaning room (OA 15) and UST PL-52, was checked and the piping was cleaned and plugged. Video inspections of the piping, between OA 15 and PL-52, were conducted to enable an assessment of the integrity of the pipe and determine whether releases may have occurred from the pipe. The video surveys indicated no releases likely occurred from the pipe, and the piping was in good condition with no holes or corrosion (Golder Associates, 2006a). Concentrations of PCBs, cPAHs, and arsenic were detected in various soil samples at levels slightly above PCLs, and/or 2004 screening levels.

3.2.4.2 Stormwater Discharge

Stormwater Pollution Prevention Plan

The 2007 revision of Boeing's SWPPP for Plant 2 (Permit No. S03-000482D) includes a potential pollutant source inventory identifying activities or practices that may be a source of stormwater pollution (Boeing, 2007b). The potential sources identified for Plant 2 are listed in Table 12.

Stormwater Drainage System

The Plant 2 stormwater drainage system includes approximately 360 catch basins, 120 storm drain manholes, six oil/water separators, five shut-off valves, and three biofiltration swales (figures 18 and 19; Boeing, 2007b). There are 24 active outfalls draining to the LDW (Boeing, 2007c). The stormwater outfall identification system was modified between 2000 and 2007 (see Figure 20 for Plant 2 outfalls, with their former identifiers). The current identifiers are listed in figures 18 and 19. Information pertaining to each of the 24 active outfalls, including the former outfall identifier, outfall diameter, drainage basin area, and a brief description of the drainage area they serve, is summarized in Table 13. Fifteen of the 24 active outfalls primarily discharge stormwater falling upon building roofs. The remaining nine active outfalls (A, B, H, I, J, K, L, V, Z) drain mostly paved areas, or paved areas and building roofs combined. The drainage basins of lines J and Z include some public roadway runoff from the 16th Avenue South Bridge and roadway (Line J), and East Marginal Way South (Line Z; Boeing 2007b). There is also an active 24-inch KCIA stormwater line that discharges at the southern boundary of Plant 2, located approximately 10 feet in the Jorgensen Forge property. According to Plant 2's SWPPP, this outfall is not a Boeing outfall; however, there was a historical connection from the Plant 2 facility to this outfall (Golder Associates and Floyd|Snider Inc., 2006). Several of these outfalls are partially or entirely submerged during high tides. Plant topography is relatively flat, sloping on average less than half of a percent toward the LDW (Boeing, 2007b). Tidal changes in Elliot Bay cause significant changes in the LDW water level adjacent to the plant.

There are no identified areas where stormwater from off-site runs onto Plant 2. However, because Plant 2 is located between East Marginal Way South and the LDW, some discharge from off-site flows through City of Seattle and City of Tukwila storm drain systems, and enters the Plant 2 system. Consequently, some discharge from off-site sources commingles with Plant 2 storm drainage before reaching the LDW. These commingled waters are discharged at Outfall No. Z (9A; City of Tukwila) and Outfall No. J (27; City of Seattle). No data has been collected to evaluate the relative flow from non-Boeing sources through these outfalls (Boeing, 2007b).

Stormwater lines X and Y previously collected stormwater in the 2-60s and 2-66 CMS study areas, which housed buildings 2-66, 2-65, 2-64, 2-63 and 2-62 (Figure 21). These subject buildings, with the exception of Building 2-64, were removed in recent years, and all that remains are concrete slabs, asphalt paved areas, and stormwater drains. The removal work in 2-66 Area was completed in May 2007. Beginning in January 2006, a temporary stormwater collection and treatment system was installed to replace the drainage capacity of lines X and Y. This construction activity resulted in the temporary sealing of the surface of all the catch basins and manholes on lines X and Y, removing those lines from

service, and installing new drains, lines, asphalt swales, and treatment vaults, and conveying treated stormwater into stormwater Line Z. Line Z is immediately south of the lines X and Y (Golder Associates, 2006b).

Stormwater Source Control Activities

The following sections describe historical and recent source control activities at Plant 2.

Previous Source Control Activities

Over the past several decades, as the activity at Plant 2 has changed from aerospace manufacturing to office-oriented research and development and warehousing, many historical sources of contamination to the waterway have been eliminated. For example, the transition from manufacturing has resulted in the elimination of hundreds of hazardous chemicals and waste generation processes, along with the concurrent decommissioning, cleanup, and interim closure of many inactive RCRA waste management units (EPI and Golder Associates, 2006b).

Specific activities undertaken by Boeing to control or eliminate sources of contaminants to the waterway include installing three sheet pile enclosures to contain solvent-contaminated soil and groundwater; removing of free petroleum product from groundwater; and replacing hazardous materials, such as chlorinated solvents, with less toxic alternatives. For example, fluids containing PCBs above 50 ppm have been drained from all transformers at Plant 2, and replaced with non-PCB containing fluids (EPI and Golder Associates, 2006b).

Historical releases in some parts of Plant 2 have been a source of PCB contamination to the LDW, and have been eliminated, controlled, or identified for future actions. For example, a subsurface transformer vault in Building 2-49 was once connected to Outfall 12 (part of Line W) by a sump pump; after a spill of transformer fluids containing PCBs was automatically pumped to Outfall 12, the line to the waterway was replaced and PCBs were removed from the system in the 1990s. Similarly, there were historical PCB releases to soil that migrated to the Outfall 9 (part of Line Z; Table 14) manhole structure near former Seattle City Light transformers at the southern property boundary; this pathway to surface water has been controlled and the stormwater manhole has been temporarily plugged. Other stormwater lines that parallel the property line with Jorgensen Forge have also been assessed for possible sources and have been plugged, where possible, as an initial control (EPI and Golder Associates, 2006b).

Recent Source Control Activities

A storm system survey was recently conducted to identify PCB- and metal-contaminants in storm solids present in Plant 2 stormwater structures. The survey was conducted in two phases, from August through October 2005. Eight stormwater lines, draining most of the paved portions of Plant 2, were selected for the initial phase (Tier 1) of the survey, in which a sample of accumulated solids was collected from the furthest down gradient structure associated with each line (i.e., the last catchment along the main trunk line prior to the outfall or prior to discharge from municipal storm drains; EPI and Golder Associates, 2006b).

At catch basins containing inserts (retrofitted traps for accumulation of solids) samples were collected from within the insert and at the bottom of the catch basin. Because samples were collected from the base of catchments specifically designed to retain particulates, they are not representative of the quality of suspended solids actually discharged to the LDW. However, these data were used as a screening tool to prioritize source control efforts; if PCBs were detected at a screening concentration exceeding 1 part per million (ppm) in a Tier 1 sample, additional samples (Tier 2) were collected from upgradient catchments along the line in order to better identify the sources and extent of the contaminants (EPI and Golder Associates, 2006b).

In general, PCBs were detected well above 1 ppm in Line X (2,600 ppm) and Line Y (37 ppm), and slightly above 1 ppm in Line I (EPI and Golder Associates, 2006b). Elevated concentrations of lead, chromium, and mercury were also detected in solids samples associated with these lines. Thus, Tier 2 sampling was subsequently conducted along lines I, X, and Y (EPI and Golder Associates, 2006b). These results are summarized in Table 14.

Results from the Tier 2 sampling indicated storm solids in most upgradient catch basins along lines X and Y were impacted by PCBs. The PCB concentrations in Tier 2 samples associated with Line X ranged from 3.9 to 2,660 ppm, while concentrations in Line Y samples ranged from 8.8 to 134 ppm (EPI and Golder Associates, 2006b). These PCBs were detected at concentrations between 0.5 and 3.1 ppm in Tier 2 samples, associated with Line I. All catch basins associated with lines X and Y were cleaned of solids in August (Tier 1 structures) and November (Tier 2 structures) of 2005. Cleanout of catch basins along Line I was completed in May 2006. The fact that PCBs were detected in the solids within the inserts (where present) indicated that an ongoing source of PCBs existed in the drainage area of lines X and Y, as the catch basins and inserts are cleaned periodically.

In 2006, in accordance with Administrative Order on Consent No. 1092-01-22-3008(h) between Boeing and the EPA, the EPA ordered that the X and Y lines be removed, as solids collected from within these lines were found to contain elevated concentrations of PCBs and metals. These lines were decommissioned during the winter of 2006 and stormwater drainages were diverted from lines X and Y to a new stormwater collection system and a treatment vault was plumbed to line Z which was designed to effectively remove solids. The *Interim Measure Work Plan for Stormwater Lines X & Y* (Golder Associates, 2006b) describes the decommissioning, and presents the permanent removal and management approaches for lines X and Y (Golder Associates, 2006b).

Following the storm system survey, floor caulking and sealants in building slabs and roadways within the drainage areas of lines X and Y were tested to identify potential sources of PCBs to storm solids. Results indicated some PCB-containing products, applied as joint caulking and floor sealants, are present along sections of the floor slabs. Along Line X, PCB concentrations in joint material samples ranged from non-detect to 740 ppm, and concentrations in floor sealant samples ranged from non-detect to 350 ppm (EPI and Golder Associates, 2006b). In Line Y samples, PCB concentrations in joint material ranged from non-detect to 40,500 ppm, and concentrations in floor sealant ranged from non-detect to 54 ppm (EPI and Golder Associates, 2006b). The PCB-containing joint caulking and floor sealant in that part of Plant 2 will be removed as part of demolition and/or redevelopment actions. Further characterization of the caulk at Plant 2 is being evaluated under the *Draft Interim Measure Work Plan, Characterization of Caulk in Concrete Pavements at Boeing Plant 2*. Subsequent sampling of Line Z should determine if the source control actions are effective. If not effective, removal of the caulking and floor sealant would be implemented prior to demolition/redevelopment.

The following structural and non-structural measures have been adopted to control potential stormwater pollution at Plant 2 (Boeing, 2007b):

All Outfalls

- Secondary containment and weather protection is provided for outside container storage areas;
- Secondary containment is provided for liquid materials in tanks;
- Waste containers and tanks are managed according to the WAC 173-303;
- Underground petroleum product tanks are managed according to WAC 173-360;

- Manufacturing activities occur only inside buildings;
- Catch basins and oil/water separators are inspected yearly and cleaned as necessary;
- The Boeing Fire Department periodically tests emergency systems;
- Plans are implemented (SWPPP, hazardous waste management plan, hazardous material management plan, spill prevention, control and countermeasures plan, comprehensive contingency plan and facility response plan);
- Training and inspection programs are in place;
- Storm drain covers are located near catch basins where there are more potential pollutant sources;
- Spill kits are provided in outdoor work areas;
- Pavement is swept on a regular basis;
- Particulate air emissions are controlled and permitted;
- Plant access is restricted only to Boeing personnel and authorized contractors;
- Best Management Practices (BMPs) are implemented; and
- Other material and waste management practices are implemented.

Outfall No. Z (9A)

- Stormwater in the vicinity of transformer vaults discharges to the ground or these vaults have controlled discharges via secondary containment;
- Emissions from spray coating booths are controlled by water washing or dry filter to reduce the amount of particulates that may accumulate on nearby pavements;
- Emissions from the woodworking shop are controlled by a cyclone/baghouse combination, helping reduce solids accumulating on nearby pavement;
- Catch basins have SC-type oil/water separation capability;
- Storm drain covers are ready for use at catch basins in higher risk areas;
- Tanks APL-120, APL-164, and the two emergency generators have secondary containment;
- Hard piping is used on two chillers by Building 2-80 and the North End;
- Outside material storage and waste areas are protected from the weather and have secondary containment;
- An emergency shutoff valve is present and tested periodically; and
- A berm has been constructed along the south fence line to prevent off-site run-on.

Outfall No. Z (11)

- Transformers have secondary containment;
- Drain covers are ready for use in catch basins at high use areas;
- All catch basins have SC-type oil/water separation capability;
- Tank APL-305 has secondary containment and overfill protection; and
- Stormwater in the vicinity of the spray booth and woodworking shop is protected by dry filters and a cyclone, respectively.

Outfall No. I (14)

- Material and waste storage areas are protected from the weather and have secondary containment;
- Drainage from the forklift parking area (under Building 2-48) flows through an oil/water separator;
- Tank APL-149 has secondary containment and overfill protection;
- Drain covers are ready for use in catch basins at high use areas;
- All catch basins have SC-type oil/water separation capability;
- Stormwater in the vicinity of the spray coating booth is protected by dry filters; and
- An emergency shutoff valve is present and tested periodically.

Outfall No. J (27)

- The pump in the catch basin nearest Tank UPL-065 is disabled when this tank is filled;
- An SC-type oil/water separator has been installed in the catch basin downstream of the pump;
- Piping between emergency generator buildings (2-J [27], 2-30 and 2-36) is double-walled;
- Containment berms are present in the doorways at buildings 2-J (27), 2-30, and 2-36;
- Stormwater at the transformers drains to the ground; and
- The generator day tank has secondary containment.

Outfall No. I (28)

- Transformers and material storage sheds have secondary containment;
- Drainage from the 2-05 fueling area and area surrounding tanks UPL-063 and UPL-064 flows through an oil/water separator;
- Drainage from the automotive vehicle maintenance area and the area surrounding tanks APL-162, APL-517, APL-063, UPL-007, and UPL-008 flows through an oil/water separator;

- The steam clean area at Building 2-15 is managed as dangerous waste;
- Wastewater discharge from the car wash at Building 2-15 is routed to the sanitary sewer and permitted by King County;
- Fill pipes for tanks UPL-007 and UPL-008 have spill containment;
- The catch basin nearest the fill for tanks UPL-007 and UPL-008 has a shutoff valve that is closed when filling occurs;
- The area surrounding the fill pipe for tank APL-063 is bermed; and
- Tanks APL-517, APL-063, and APL-162 have secondary containment and overfill protection

Outfall No. B (35)

- The fuel handling area for tanks APL-001 and APL-002 is bermed and drains into a large spill containment sump. The sump is pumped through an oil/water separator under manual control;
- Catch basins in the area of tanks APL-001 and APL-002 have SC-type oil/water separation capability;
- The 2-120 central accumulation area is sheltered from the weather and provided with secondary containment;
- Pumps in sumps at the 2-120 are manually operated;
- Drainage from the fuel handling area at the 2-13 and the hazardous waste storage area at the 2-120 flows through an oil/water separator;
- Tanks APL-001, APL-002 and APL-053 have secondary containment; and
- Stormwater flow from the generator day tank and transformer discharge through an oil/water separator.

Outfall No. A (36)

- There are three bio-filtration swales in the 36 drainage areas;
- There are shut-off valves at the inlet to the biofiltration swales, which are periodically tested; and
- Emissions from the spray coating booth are controlled by dry filters.

Stormwater Drainage System Sampling and Potential as a Contaminant Migration Pathway

In 2005, Boeing completed the investigation of PCBs discovered in the southwest corner of Plant 2, along the boundary of the Jorgensen Forge property, adjacent to the now-removed West Bank electrical substation. This investigation identified the limits of subsurface soil contaminated by PCBs and TPH. As part of this work, catch basin solids were also sampled in the area along three separate stormwater lines historically and/or currently draining Plant 2, Jorgensen Forge, and/or KCIA properties; PCBs were found in each line. Boeing plugged its manholes to eliminate the chance of contaminated solids being discharged to the LDW. In 2008, following EPA approval, Boeing intends to excavate PCB-

contaminated soil in the area of discovery and remove Boeing's stormwater lines in that area (Ernst, 2007). Ecology and EPA are working with other parties on non-Boeing sources in other storm lines (Ernst, 2007).

The sediments located along the southern portion of the Southwest Bank, the DSOA, and along the northern portion of Jorgensen Forge (to approximately Jorgensen Outfall 9) were studied as part of the Transformer Investigation. PCB migration from the area of discovery did not reach the waterway via subsurface transport mechanisms; however, they are believed to have historically reached the waterway via the storm system that discharged through Boeing Outfalls 9/9A. The manhole has been plugged as a temporary measure for source control. PCBs released from Outfall 9/9A contributed to the contamination in the southern portion of the present DSOA. PCBs released from the Property Line Outfalls contributed to the area of PCB contamination in front of these outfalls (Floyd|Snider Inc., 2005).

Regarding stormwater source control, Boeing has eliminated or replaced a number of drainages found to contain PCBs and/or metals. Comprehensive testing of catch basin solids in 2005 indicated that contaminants, primarily PCBs and metals, were accumulating in the catch basin solids in several areas. All catch basins were cleaned and routine sampling continues to assess these structures over time. Two adjacent storm drainage lines in particular, lines X and Y, warranted prompt action. Boeing initiated construction of a modern drainage system to replace them and plugged the problem lines. In 2007, Boeing plans to remove lines X and Y during the initial stages of redevelopment of this area (Ernst, 2007).

The EPA has also recently approved a work plan to sample and evaluate suspended solids and actual storm water discharges (as opposed to the solids retained in catch basins) throughout Plant 2. This evaluation will identify the presence of any ongoing sources and associated risks to the LDW, and trigger actions to ensure the timely control of those sources (Ernst, 2007). Boeing has an ongoing road and parking area street sweeping program to reduce the introduction of solids to the stormwater system.

The Plant 2 stormwater drainage system drains areas of known groundwater and/or soil contamination and, therefore, is a potential migration pathway of site-related contaminants to the LDW. Outfall Z drains drainage basins 34, 35, 36, 37, and 39 (Figure 18 and Table 13), which encompasses the South Yard, and 2-60s and 2-66 CMS study areas (Figure 5). The 2-40s CMS Study Area is drained by outfalls L, M, N, O, P, Q, R, S, T, U, V, W, and Z. Furthermore, the drainage basins of lines J and Z include some public roadway runoff from the 16th Avenue South Bridge and roadway (Line J), and East Marginal Way South (Line Z). Little information is available concerning the potential migration of contaminants to the LDW from these sources. In addition to the known PCB contamination referred in the above paragraphs, the South Yard, 2-60s, 2-66, and 2-40s CMS study areas have also been found to have groundwater and soil contamination. Out of the seven CMS study areas, the South Yard Area, 2-60s Area, and 2-66 Area have had a work plan accepted by the EPA; and a data gap investigation report submitted to, but not yet accepted by, the EPA. The 2-40s Area has had a work plan submitted, but not yet accepted by, the EPA. No work plan or data gap investigation report has yet been prepared for the North End, 2-31 Area, and 2-10 Area.

Areas that have been studied have all shown some form of soil and/or groundwater contamination. The remaining study areas (that have yet to under go a data gap investigation to address source control actions) may contain contamination, as well. As a result, if contamination is present in the remaining study areas, the entire Plant 2 area could potentially contribute contaminants to the LDW through the stormwater drainage system.

3.2.4.3 Groundwater

Plant 2 is located in the central portion of the Duwamish Valley, adjacent to the tidally influenced LDW. Industrial development of the area, beginning in the 1930s, resulted in pavement or buildings covering a large portion of Plant 2 (EPI and Golder Associates, 2006a).

The soils in the upper 100 feet beneath Boeing Plant 2 consist of four major geologic units.

Within the uppermost unit, the first 3 to 9 feet of soil are comprised of a dark gray to brown fill that is a loose to very dense, fine to medium sand, and gray to grayish-brown gravel. Much of the fill appears to be alluvial in nature and probably reflects dredge spoils from modifications to the Duwamish River channel at the beginning of the 20th Century. Some debris exists within the fill. The fill is underlain by a discontinuous layer of brownish to greenish-gray to black silt, and a soft organic silt layer that is approximately 2 feet thick (EPI and Golder Associates, 2006a).

Beneath the silt is the shallow portion of the upper aquifer, consisting of poorly graded, dark gray, fine to medium sand, with varying amounts of silt. This alluvial unit extends from approximately 10 feet bgs to approximately 50 feet bgs. Underlying this unit are older Duwamish River alluvial deposits consisting of thick, coarsening-upward sequences of inter-bedded sand and silty sand. These alluvial deposits extend from approximately 40 to 50 feet bgs to approximately 80 feet bgs (EPI and Golder Associates, 2006a).

At approximately 80 feet bgs, monitoring well logs from Plant 2 describe a distinctive marine silt layer with shell fragments. The contact between the overlying silty sand and the marine silt is sharp and is readily noted in the field. The marine silt layer is underlain by a dense gray glacial till unit. These two low-permeability deposits form an aquitard that isolates the shallow aquifer (upper 80 to 100 feet) from the deeper aquifers beneath Plant 2 (EPI and Golder Associates, 2006a).

Groundwater occurs in the alluvial aquifer, generally starting at 9 to 13 feet bgs. The general groundwater flow direction is southwest, towards the LDW. The majority of groundwater from Plant 2 flows directly to the waterway without crossing other properties, except for limited migration across the southern property line and onto the northern portion of the Jorgensen Forge facility. Even in that location, the dominant flow direction appears to be approximately parallel to the fence line and toward the LDW (EPI and Golder Associates, 2006a).

The LDW in the vicinity of Plant 2 is a tidally controlled marine embayment, with a fresh water lens of outgoing river water on top of the denser (more saline) marine waters. The sediments, while alluvial in nature, have salinities consistent with the marine waters from Elliott Bay. A saline groundwater wedge extends into the Uplands, from the waterway, and deeper deposits (greater than 60 feet) contain groundwater with high salinity, due to trapped sea water that was present at the time of sedimentation. The groundwater column ranges from saline at depth, to fresh on the top (EPI and Golder Associates, 2006a).

Shallow monitoring wells, generally in the upper 30 feet, are referred to as A-level wells. Wells installed deeper in this sand unit (generally from 30 to 60 feet bgs) are referred to as B-level wells. At approximately 60 feet bgs, the silt content increases in a gradational change that can be distinguished based on field observations. The aquifer material below this layer is referred to as the C-lever of the upper aquifer, and wells installed below 60 feet are referred to as C-level wells (EPI and Golder Associates, 2006a).

Groundwater flow is primarily horizontal with a calculated average flow velocity range of 490 to 970 feet per year in the upper A- and B-levels of the aquifer, and 4.2 feet per year in the C-level of the aquifer (EPI and Golder Associates, 2006a).

Details concerning the extent of contamination that has been found in the seven CMS study areas are provided in their respective sections. The data gap section details areas from the South Yard Area and 2-60s Area, where the contaminant plume is not delineated. In these areas, there is a possibility that contaminants could reach the LDW. The following is a summary of COCs that were detected in the South Yard Area and 2-60s Study Area during their data gap investigations:

- Arsenic
- Benzene
- Copper
- 1,1-DCE
- DRPH
- Manganese
- Mercury
- MoRPH
- PCE
- TCE
- Vinyl chloride
- Zinc

The following COCs had detections in soil above reporting limits in the South Yard Area during the data gap investigations (EPI and Golder Associates, 2007b):

- Aroclor 1254
- Aroclor 1260
- Arsenic
- Benzo(a)fluroanthene
- Benzo(a)anthracene
- Benzo(k)fluroanthene
- Benzo(a)pyrene
- BEHP
- Benzene
- Cadmium
- Chrysene
- Copper
- cDCE
- DRPH
- Mercury
- Nickel
- PCE
- Silver
- TCE
- 1,1,1-trichloroethane
- Toluene
- Vinyl chloride
- Zinc

COCs, via the surface water pathway, were evaluated to assess whether groundwater had been impacted by COCs in soils. The following COCs in soils were also found in groundwater above screening levels protective of surface water in the South Yard Area:

- Benzene
- 1,1-DCE
- Mercury
- PCE
- TCE
- Vinyl chloride

The following COCs had detections in groundwater above screening levels in the 2-60s Area during the data gap investigations (EPI and Golder Associates, 2006b):

- Aroclor 1260
- Arsenic
- BEHP
- Benzene
- Copper
- Cyanide
- 1,1-DCE
- DRPH
- Ethylbenzene
- GRPH
- Manganese
- Mercury
- Nickel (soluble salts)
- PCE
- Vinyl chloride
- Zinc

The following COCs had detections in soil above reporting limits in the 2-60s Area during the data gap investigations (EPI and Golder Associates, 2006b):

- Arsenic
- BEHP
- Benzene
- n-Butylbenzene
- Sec-Butylbenzene
- Cadmium
- Cyanide
- Ethylbenzene
- GRPH
- Isopropylbenzene
- Mercury
- Naphthalene
- PCBs
- PCE
- n-Propylbenzne
- Silver
- TCE
- 1,2,4-trimethylbenzene
- 1,2,5-trimethylbenzene
- Zinc

COCs were evaluated, via the surface water pathway, and assessed to determine whether groundwater had been impacted by COCs in soils. The following COCs in soils were also found in groundwater above screening levels protective of surface water in the 2-60s Area (EPI and Golder Associates, 2006b):

- Cyanide
- Mercury
- PCBs
- PCE
- Zinc

3.2.4.4 Spills

The spill log for Plant 2 indicated that 10 discharges occurred at the facility within the past three years (Note: this log only included spills that had the potential to discharge into the LDW since April 1998). Spill control and cleanup actions prevented discharge to the LDW for all of these incidents (Boeing, 2007b). A summary of these discharges can be found in the *LDW EAA-4 Summary of Existing Information Data Gaps Report* (E & E, 2007).

3.2.4.5 Bank Erosion/Leaching

A data gap investigation has not been conducted for the 2-66, 2-40, 2-31, 2-10, and North End areas, which all have part of the study area that is located along the banks of the LDW (Figure 5). It is possible that contaminants in these parts of Plant 2 may contribute to ongoing contamination to the LDW.

Plant 2 is nearly (98 percent) covered by impervious materials such as concrete, asphalt, and building roofs. There is virtually no stormwater overland flow from the site; instead, it is contained within the storm drain system. Generally, the west side of the property facing the Duwamish Waterway slopes so that stormwater flows back through the storm drain system, as opposed to over the bank and into the LDW. Also, the Duwamish bank is partially vegetated and lined with rip-rap to reduce possible erosion (Boeing, 2007b). Several of the discharge points have been noted by the EPA to have erosion around the discharge point area.

3.2.4.6 Shoreline Areas

Duwamish Sediment Other Area and Southwest Bank Focused Corrective Measures Study

The DSOA and Focused Corrective Measures Study (FCMS) include dredging, with subsequent capping and/or backfilling of the DSOA open-water areas (Figure 22; MCS Environmental, Inc., 2006). This area includes the western and southern boundary extensions, as described below:

- Dredging with subsequent capping and backfilling of the Under-building Area;

- Removal of sediment and subsequent backfilling of the Outfall 12 area; and

- Removal of contaminated bank fill material from the Southwest Bank area, with subsequent reconstruction of the bank.

The DSOA is an interim measure and not a final remedy. The DSOA portion of the CMS was originally defined (although the boundaries have never been approved by the EPA) as the cleanup of sediment contiguous to the facility to the west with boundaries established by the south edge of Slip 4 to the north; the western projection of the Plant 2-Jorgensen Forge property line to the south; the approximate top of the eastern slope of the shipping channel to the west; and the mean higher high water line to the east. The boundary of the DSOA was subsequently determined by EPA (in consultation with Ecology) to extend west to the Federal Navigation Channel and south, approximately 100 feet (MCS Environmental, Inc., 2006), and may be further expanded based upon April 2007 sampling.

During the RFI, samples were collected throughout the uplands and in waters adjacent to the facility. The Duwamish Waterway Sediment Investigation, a component of the RFI, collected surface sediment samples (0 to 4 inches) at approximately 60 locations (excluding additional samples collected in the vicinity of Outfall 12) within the DSOA (MCS Environmental, Inc., 2006). Samples were analyzed for total organic carbon, PCBs, metals, and SVOCs. In addition, subsurface sediment cores were collected at 16 locations within the DSOA. Subsurface composite samples (2 to 5 feet long) were collected from each of the cores and were also analyzed for total organic carbon, PCBs, metals, and SVOCs (MCS Environmental, Inc., 2006). The RFI evaluation indicated the following:

- PCBs were wide-spread in front of the Plant 2 facility and were detected in the majority of the samples.

- Metals were detected in a few locations at Plant 2, predominately at the toe of the Southwest Bank (an area where metal-containing debris was found in the shoreline fill).

- A few other SVOCs, primarily PAHs and phthalates, were detected in the sediments, but always within the footprint defined by the broader and more extensive PCB contamination.

Based on the findings in the RFI, PCBs and seven metals (cadmium, chromium, copper, lead, mercury, silver, and zinc) were identified as COCs for the DSOA. Elevated metal concentrations were largely limited to the toe of the slope at the Southwest Bank, and were limited in depth. Their source is suspected to be in the bank fill materials, as the highest concentrations of metals within the Southwest Yard Area are found in the bank materials and at the toe of the slope. The metals were found in areas that also contained PCB contamination, but the metals contamination was neither as extensive nor as deep as the PCB contamination (MCS Environmental, Inc., 2006).

Subsequent to the RFI, 101 subsurface sediment cores were collected within and upriver of the DSOA (MCS Environmental, Inc., 2006). Subsurface sediment cores from 81 locations within, or immediately adjacent to, the DSOA were used in the geospatial analysis (MCS Environmental, Inc., 2006).

All of the post-RFI core sampling focused on refining the depth and extent of PCB and metals contamination. After the collection and review of the post-RFI data, a technical working group was formed to perform a geospatial analysis of the data. Some of the spatial trends are presented below (MCS Environmental, Inc., 2006):

- In the 2- to 3-foot intervals, elevated concentrations of PCBs are wide-spread across the DSOA, except in the some of the near shore areas north of the 16th Avenue South Bridge.

- Concentrations of PCBs significantly decreased in the 4- to 5-foot intervals, as compared to the 2- to 3-foot intervals. In the 4- to 5-foot intervals, PCB concentrations are below the SQS in the northern one-third of the DSOA and in most of the near shore section of the middle third of the DSOA. Elevated concentrations of PCBs are present in the 4- to 5-foot intervals, near the navigation channel and south of the 16th Avenue South Bridge.

- In the 5- to 6-foot intervals, PCB concentrations in all of the DSOA north of the Southwest Bank are below the SQS.

- Elevated PCB concentrations extend to a deeper depth near the south end of the DSOA.

- Samples selected for metals analysis at the Southwest Bank show that elevated metals concentrations did not extend below the 3- to 4-foot layer. Metals were otherwise collocated with PCBs and did not extend below the depth that PCBs were found.

A physical conceptual site model was developed for the sediments in the DSOA to aid in the evaluation of the dredge and fill alternatives and to better understand potential design requirements (MCS Environmental, Inc., 2006). Two alternatives for the DSOA Corrective Measure were evaluated. They are:

- *Alternative 1:* A fixed 4-foot total dredge depth and cap/backfill alternative (the original concept of the DSOA Corrective Measure). This alternative leaves behind some areas with sediment PCB concentrations exceeding the SQS beneath an engineered cap. In areas where sediments are not expected to substantially exceed the SQS, the engineered cap is replaced with simple backfilling to existing grade.

- *Alternative 2:* A variable-depth dredge and backfill alternative, where it is expected that no sediments substantially exceeding the SQS will remain followed by backfilling to return the site to grade.

Both of these DSOA alternatives will result in a restored sediment surface that meets the SQS for the top 4-inch surface layer (MCS Environmental, Inc., 2006). The DSOA remedy will include the removal of contaminated sediments from the Duwamish Waterway shoreline and the placement of clean backfill and/or capping materials.

Boeing conducted an analysis of these two alternatives. The performance expectation for the variable-depth dredge and backfill rated equal to or higher than the 4-foot dredge and cap/backfill alternative (MCS Environmental, Inc., 2006). In addition, the cost for implementing the variable-depth dredge alternative is estimated to be approximately $100,000 less than the 4-foot dredge alternative. Based on the results, Boeing recommended that the EPA select the variable-depth dredge and backfill alternative as the corrective measure for the DSOA.

The western boundary of the cleanup has not been agreed upon. Boeing proposed a western boundary for the DOSA cleanup (the eastern margin of the federal navigation channel); however, EPA directed additional sampling into the federal navigation channel to determine extent of PCB contamination.

The corrective measures for the Under-building Area, Outfall 12, and the Southwest Bank will be implemented concurrently with the DSOA Corrective Measure (MCS Environmental, Inc., 2006).

Under-Building Area

The Under-building Area is an approximately 1,000-foot long section of buildings (2-41, 2-44, and 2-49) overhanging the LDW. The overhanging portion is 50 feet wide and is supported by wooden piles and is

physically separated from the uplands by a continuous bulkhead wall. Running underneath the overhang are a number of pipes, vaults, and other utility infrastructures that once supported the former manufacturing operations in the buildings. The surface beneath the overhang is a steep riverbank slope, covered with riprap extending to a scalloped sediment interface that is only exposed during low tide.

There are nine RCRA units in the Under-building Area (MCS Environmental, Inc., 2006). The first five units have a footprint that straddles the boundary between the uplands and the DSOA. The last four units are outfalls that daylight in the Under-building Area. The nine RCRA units are:

- SWMU 2-41.35 (Quench Tanks);
- AOC 2-41.29 (J-25 TCE Degreaser);
- SWMU 2-41.36 Of the 73 groundwater samples, there were 11 detections above the screening level (0.822 µg/kg; Underflow Flume);
- OA 19 (Outfall 12 and Stretch-Press Pit [only stretch-press pit portion straddles boundary]);
- OA 20 (Outfall 23);
- OA 22.A (Outfall 14);
- OA 22.B (Outfall 16); and
- Outfall 12.

Sampling in the Under-building Area was concentrated in areas associated with uplands RCRA units that extend through the bulkhead, IM areas, or in RCRA units associated with the outfalls. Various investigations conducted in the Under-building Area found samples with elevated levels of metals and organic COCs (at or above the SQS) were always within the more wide-spread footprint of PCBs, and appear to be restricted to recent depositional sediments (MCS Environmental, Inc., 2006). The native alluvium deposits are considered to be generally free of COC.

There have been two IMs conducted in the Under-building Area; the Underflow Flume IM and the Building 2-41 Debris Area IM. Further investigations of the Under-building Area will be conducted in association with the *Alternative Corrective Measure Evaluation Report*.

In the Underflow Flume IM, previous sediment samples indicated elevated concentrations of PCBs that justified removal, via an IM (MCS Environmental, Inc., 2006). During this IM, samples were collected near the Underflow Flume to finalize the design and determine the depth to which sediment was to be removed. Approximately 30 cubic yards were removed at the Underflow Flume (MCS Environmental, Inc., 2006). Sediments with concentrations of PCBs above the SQS remain in place below the backfilled IM excavation.

During the Building 2-41 Debris Area IM, the IM targeted an isolated area where sediment containing elevated lead concentrations had been identified. Fourteen samples were collected for design of the IM (MCS Environmental, Inc., 2006). Approximately 20 cubic yards of sediment were removed during the IM. Two confirmation samples were collected from the bottom of the excavations before backfilling.

The Outfall 12 area is in the intertidal zone located on the bank at the south end of the Building 2-49, adjacent to the Southwest Bank. An IM was conducted in this area, removing sediment and soils with elevated concentrations of PCBs (MCS Environmental, Inc., 2006). Approximately 20 cubic yards of

sediment were removed at Outfall 12. Sediments with concentrations of PCBs above SQS remain in place below the backfilled IM excavation.

Additional sampling in the Outfall 12 area was conducted during the DSOA and Outfall 12 characterization (MCS Environmental, Inc., 2006). This characterization indicated that elevated PCB concentrations extend to a depth of approximately 5 to 6 feet below mudline (about 2 feet below the prior IM backfill), in an approximate 10-foot-by-12-foot area of the prior Outfall 12 area IM. Outside the footprint of the prior IM, elevated concentrations of PCBs were limited to 2 to 3 feet below the mudline. The Outfall 12 action was designed to remove sediments with elevated concentrations of COCs, leaving in place sediments that are not expected to substantially exceed the SQS. Excavation adjacent to the Outfall 12 area will be to a depth of 4 feet bgs for both alternatives in the DSOA. In addition, within the footprint of the prior IM, sediment will be removed to a depth of approximately 6 feet below the mudline. After excavation, the Outfall 12 area will be backfilled with clean sand material to restore elevations. This excavation is expected to be less than 100 cubic yards. Some of the material in this area is expected to exceed Toxic Substance Control Act levels for PCBs (>50 ppm) and will require special handling.

Southwest Bank Corrective Measure

The Southwest Bank refers to the southern most portion of Plant 2, fronting the LDW, specifically the section of riverbank located between the Plant 2 southern border and Building 2-49, approximately 400 feet to the north.

A variety of chemical data has been collected at the Southwest Yard (MCS Environmental, Inc., 2006). These data primarily consist of analysis of surface sediment (collected offshore of the Southwest Bank), surface soil (exposed along the bank itself), subsurface soil (collected from soil borings within the Southwest Yard), and groundwater. Additional subsurface soil data were collected in the summer of 2001, as part of the preliminary design of the Southwest Bank CMS.

Elevated metals concentrations (primarily cadmium, copper, lead, and zinc) found in Southwest Bank soils appeared to be related to large amounts of debris found within the upper deposits of the Southwest Bank fill (MCS Environmental, Inc., 2006). Furthermore, PCBs were also occasionally detected. The locations where PCBs were detected did not correlate with locations of elevated metals concentrations.

The preliminary conclusion of that evaluation was that the Southwest Bank had a sufficiently steep slope (approximately 1:1), and contained enough construction debris and contaminated soil that removal of the debris within the Southwest Bank was deemed more practical than capping this material (MCS Environmental, Inc., 2006). Removal of the bulk of the contaminated bank fill material was selected as the preferred alternative in the Southwest Bank FCMS, submitted to, and approved by, the EPA. The Southwest Bank corrective measure will be timed to occur concurrently with DSOA dredging, and the design documents for the Southwest Bank will be integrated into the larger DSOA design (MCS Environmental, Inc., 2006).

Memorandum of Understanding

On July 2, 2007, a revised MOU between Boeing, Earl M. Jorgensen, and the Jorgensen Forge (the signatory parties) was submitted to the EPA (Boeing, 2007d). The purpose of this MOU is for the three signatory parties to cooperate and coordinate the cleanup of certain sediments and the associated sediment-shoreline back interface areas in the LDW adjacent to Plant 2 and the Jorgensen Forge.

The specific boundary between each property and areas each party will undertake as part of the overall cleanup is identified in this MOU. The signatory parties will frequently communicate, throughout the development of the respective cleanup alternatives analyses. This communication will coordinate key elements of pre-remedy selection and post-remedy selection design and implementation process.

Although signatory parties will communicate on a regular basis, each party will individually develop EPA-approved design and construction documents for the cleanup of their respective sediment areas.

3.2.5 Potential for Future Release

CMS Study Areas

At Plant 2, Boeing is conducting data gap investigations, one at a time, for each of the seven CMS study areas in order to address source control actions that will be needed. The South Yard Area and 2-60s Area have had work plans submitted to, and accepted, by the EPA; and data gap investigation reports have been submitted for each area to, but not yet accepted by the EPA. The 2-40s Area has had a work plan submitted to, but not yet accepted, by the EPA. No information regarding CMS study areas 2-10, 2-31, and North Yard were found during a review of files.

Data collected as part of the data gap investigations will be evaluated, interpreted, and applied to future remedy selections. These future reports will also evaluate comparisons to historical areas of COC impacts above screening levels. EPA has requested Boeing start sampling for SVOCs in the shoreline monitoring wells to address this data gap. Another data gap regarding upland facilities is the EMF plume detected in Plant 2. This plume originates along the east side of KCIA and has migrated onto Plant 2. Under a CERCLA Order, additional investigations will be conducted and will address how this plume will be reduced and/or eliminated (see below: Electronics Manufacturing Facility Plume).

Density-Driven Convection System (2-66 Area IM System)

Two DDC wells were in operation as IM technology, inside the sheet pile containment structure, near former Building 2-66. The objective of this IM was to remove contaminant mass from the subsurface within the sheet pile structure (EPI and Golder Associates, 2007a).

Since the system startup in March 2004, 667.8 pounds of solvent have been physically removed from Plant 2. Quarterly sampling has been conducted since November 6, 2006; Boeing will deliver a report on soil samples collected from within the sheet pile and the recalculation of contaminant mass remaining within the sheet pile to the EPA. The sheet pile remedy issue will be discussed in future reports (Boeing, 2006c).

The 2-66 Area IM System quarterly performance monitoring is timed to occur with the quarterly Shoreline Monitoring Program, taking advantage of the fact that seven of the 2-66 Area IM monitoring wells are included in both programs (EPI and Golder Associates, 2007a).

The DDC system was installed from late 2003 through early 2004. This system consists of two DDC wells installed within the sheet pile structure and 11 new monitoring wells/piezometers installed within and around the sheet pile structure. When the system was first installed, it was operated in Soil Vapor Extraction-only mode for remediation of vadose-zone soil, prior to full-scale, closed-loop DDC operation, which includes groundwater treatment. In June 2004, the full-scale, closed-loop DDC operation began (EPI and Golder Associates, 2007a).

Operational sampling is performed monthly and includes groundwater sampling and vapor sampling of the DDC wells and multiple points along the vapor treatment system. This sampling is conducted quarterly and includes groundwater sampling of a network of 33 monitoring wells, both inside and outside the sheet pile structure (EPI and Golder Associates, 2007a).

Shoreline Groundwater Monitoring

Beginning in 2001, groundwater samples were collected and analyzed in support of two separate and concurrent evaluations. The first evaluation, referred to as the "Sediment Cap Impact Evaluation," is described in the *CMS Phase Sediment Cap Impact Evaluation Groundwater Monitoring Plan*. This plan was designed to provide an assessment of the potential for contaminated groundwater, discharging from the facility, to contaminate the clean sediment backfill proposed as part of the DSOA remedy. The second evaluation is described in the *CMS Phase Effectiveness of Buildings 2-10 and 2-66 Interim Measures Monitoring Plan*. This evaluation is designed to assess the effectiveness of the sheet pile containment structure IMs, and is referred to as the "Effectiveness Evaluation." Both of these evaluations involve quarterly groundwater monitoring (EPI and Golder Associates, 2006b).

In August 2006, 25 of the 28 shoreline monitoring wells were sampled. Dissolved metals, VOCs, total metals, and PCBs were detected in the samples (EPI and Golder Associates, 2006b).

Electronics Manufacturing Facility Plume

Voluntary remedial actions to the EMF plume underlying the 2-40s Area continue. The EMF plume is not a RCRA unit. This facility is located east of KCIA and upgradient of Plant 2, at 7355 Perimeter Road South (Figure 7). The plume is a chlorinated VOC plume and portions of the plume underlie the 2-40s Area of the facility (EPI and Golder Associates, 2006a).

Based on existing data, groundwater impacts associated with the EMF plume are limited to the B-level of the aquifer in the 2-40s Area of Plant 2. However, an upward vertical hydraulic gradient direction occurs near the waterway causing the EMF plume to rise somewhat, possibly into the A-level of the aquifer, as it approaches the waterway (EPI and Golder Associates, 2006a).

Analytical results of groundwater testing, following injections of sodium lactate solution into the EMF plume, showed decreases in chlorinated VOC concentrations within the EMF plume. Boeing plans to voluntarily continue the Enhanced Reductive Dechlorination work (EPI and Golder Associates, 2006a). The EMF plume will be further delineated and evaluated. Delineation of the entire plume will be determined both laterally and vertically (EPI and Golder Associates, 2006a). The width of the plume at the shoreline is currently not fully understood.

Duwamish Sediment Other Area and Southwest Bank Focused Corrective Measures Study

The DSOA and FCMS include dredging, with subsequent capping and/or backfilling of the DSOA open-water areas (Figure 22; MCS Environmental, Inc., 2006). The DSOA is an interim measure and not a final remedy. The DSOA portion of the CMS was originally defined (although the boundaries have never been approved by the EPA) as the cleanup of sediment contiguous to the facility to the west with boundaries established by the south edge of Slip 4 to the north; the western projection of the Plant 2-Jorgensen Forge property line to the south; the approximate top of the eastern slope of the shipping channel to the west; and the mean higher high water line to the east. The boundary of the DSOA was subsequently extended to the west to the Federal Navigation Channel and to the south, approximately 100 feet (MCS Environmental, Inc., 2006), and may be further expanded based upon April 2007 sampling.

During the RFI, samples were collected throughout the uplands and in water areas adjacent to the facility. The *Duwamish Waterway Sediment Investigation*, a component of the RFI, collected surface sediment samples (0 to 4 inches) at approximately 60 locations (excluding additional samples collected in the vicinity of Outfall 12) within the DSOA (MCS Environmental, Inc., 2006). Based on the findings in the RFI, PCBs and seven metals (cadmium, chromium, copper, lead, mercury, silver, and zinc) were identified as COCs for the DSOA. Elevated metal concentrations were largely limited to the toe of the slope at the Southwest Bank, and were limited in depth (MCS Environmental, Inc., 2006). Their source is

suspected to be in the bank fill materials, as the highest concentrations of metals within the Southwest Yard Area are found in the bank materials and at the toe of the slope. The metals were found in areas that also contained PCB contamination, but the metals contamination was neither as extensive nor as deep as the PCB contamination (MCS Environmental, Inc., 2006).

Spills

Spills at the Plant 2 may enter the storm drain system and be discharged to EAA-4. However, activities that could potentially cause spills are controlled by the industrial stormwater permit and SWPPP.

Groundwater

There are several groundwater contaminant plumes that could contribute to the recontamination of the LDW. The dissolved copper, dissolved mercury, dissolved nickel, TCE, and vinyl chloride groundwater plumes in the 2-60s Area appear to extend into the 2-66 study area, which is adjacent to the LDW (EPI and Golder Associates, 2007b). The most recent porewater investigation conducted by the LDW (*Final Data and Analysis Report: Porewater Sampling of Lower Duwamish Waterway*; Windward, 2006) identified detected concentrations of halogenated volatile organic compounds (i.e, 1,1-DCE [0.2 to 0.3 µg/L], cDCE [0.2 to 1.7 µg/L], TCE [0.2 µg/L], and vinyl chloride [0.2 to 13 µg/L) within the LDW adjacent to the Boeing/Jorgensen property line intersection. This data provides some evidence that the 2-66 study area may be contributing chemicals to the waterway. The extent of this plume needs be determined during the 2-66 Area data gap investigation; this would include a full delineation of the plume along the LDW. Findings of this delineation should be incorporated in future CMSs.

In the South Yard Area, plumes of the following groundwater contaminants do not appear to be fully delineated and could potentially contribute to the recontamination of the LDW: dissolved arsenic, dissolved manganese, dissolved zinc, benzene, 1,1-DCE, PCE, TCE, vinyl chloride, TPH-diesel range, and TPH-motor oil range (EPI and Golder Associates, 2007b). The plumes are delineated only up to the property line between Plant 2 and Jorgensen Forge. A full delineation of the groundwater plumes is necessary to evaluate the potential for the plumes to impact the LDW.

Elevated metals concentrations (primarily cadmium, copper, lead, and zinc) found in Southwest Bank soils (Southwest Bank CMS) appear to be related to large amounts of debris found within the upper deposits of the Southwest Bank fill (MCS Environmental, Inc., 2006). In addition, PCBs were also occasionally detected in this area. The locations where PCBs were detected did not correlate with locations of elevated metals concentrations.

The preliminary conclusion of the Southwest Bank evaluation was that there was a sufficiently steep slope (approximately 1:1), and the area contained enough construction debris and contaminated soil, that removal of the debris within the Southwest Bank was deemed more practical than capping the material (MCS Environmental, Inc., 2006). Removal of the bulk of the contaminated bank fill material was selected as the preferred alternative in the Southwest Bank FCMS, submitted to, and approved by, the EPA. The Southwest Bank corrective measure will be timed to occur concurrently with DSOA dredging, and the design documents for the Southwest Bank will be integrated into the larger DSOA design. This design has not yet been completed. No additional data gaps have been identified for bank erosion/leaching at the Plant 2.

Stormwater Drainage System

In 2005, Boeing completed the investigation of a PCB release discovered in the southwest corner of Plant 2, along the northern boundary of the Jorgensen Forge property, adjacent to a now-removed West Bank electrical substation. This investigation identified the limits of subsurface soil contaminated by PCBs and TPH. As part of this work, catch basin solids were also sampled in the area along three separate

stormwater lines historically and/or currently draining Plant 2, Jorgensen Forge, and/or KCIA properties; PCBs were found in each line. Boeing plugged its manholes to eliminate the chance of contaminated solids being discharged to the LDW. In 2008, following EPA approval, Boeing intends to excavate PCB-contaminated soil area of discovery and remove Boeing's stormwater lines in that area (Ernst, 2007). Ecology and EPA are also working with other parties on non-Boeing sources in other storm lines (Ernst, 2007).

The Plant 2 stormwater drainage system drains areas of known groundwater and/or soil contamination and, therefore, is a potential migration pathway of site-related contaminants to the LDW. Outfall Z drains drainage basins 34, 35, 36, 37, and 39 (Figure 18 and Table 13), which encompasses the South Yard, and 2-60s and 2-66 CMS study areas (Figure 5). The 2-40s CMS Study Area is drained by outfalls L, M, N, O, P, Q, R, S, T, U, V, W, and Z. Furthermore, the drainage basins of lines J and Z include some public roadway runoff from the 16th Avenue South Bridge and roadway (Line J), and East Marginal Way South (Line Z). Little information is available concerning the potential migration of contaminants to the LDW from these sources. In addition to the known PCB contamination referred in the above paragraphs, the South Yard, 2-60s, 2-66, and 2-40s CMS study areas have also been found to have groundwater and soil contamination. Out of the seven CMS study areas, the South Yard Area, 2-60s Area, and 2-66 Area have each had a work plan accepted by the EPA; and a data gap investigation report submitted to, but not yet accepted, by the EPA. The 2-40s Area has had a work plan submitted, but not yet accepted, by the EPA. No work plan or data gap investigation report has yet been prepared for the North End, 2-31 Area, and 2-10 Area.

3.2.6 Planned Source Control Actions

The following source control actions are planned:

- EPA and Boeing will continue to evaluate the remaining CMS study areas to determine needed source control actions.
- EPA and Boeing will continue to further delineate and evaluate the EMF plume.
- EPA and Boeing will design and implement the dredging, capping, and/or backfilling of the DSOA Interim Measure.
- EPA and Boeing will remove the bulk of the contaminated bank fill material in the Southwest Bank FCMS.
- EPA and Boeing will continue sampling, including vapor sampling, the DDC wells and multiple points along the vapor treatment system. This sampling is conducted quarterly and includes groundwater sampling of a network of 33 monitoring wells, both inside and outside the sheet pile structure.
- EPA and Boeing will continue to conduct and review the quarterly shoreline groundwater monitoring reports. After initiating the one-time sampling of all wells for SMS, including SVOCs, it will be determined if monitoring frequency be switched to a semi-annual basis.
- The SWPPP will be re-evaluated if process/operational changes have been made at Plant 2 and make any necessary changes to address new conditions.
- EPA and Boeing will discuss options for the removal of materials containing less than 50 ppm PCB.

- Boeing and Jorgensen Forge will enter into a joint hydrologic investigation to provide additional hydrogeologic data at the boundary of the two facilities. There is not enough tightly-spaced water level data to determine flow volumes or exact flow directions across the property line.

- In addition to the information shown in figures 18 and 19, showing Plant 2's stormwater drainage system, including drainage basins, stormwater drain lines, flow direction, catch basins, manholes, oil/water separators and pump stations, Boeing will include the following information: flow direction arrows in drainage basins 34-37, locations of buildings and other structures, and if available, areas of known contamination. Moreover, the locations of the City of Seattle and City of Tukwila discharge connections to Plant 2's stormwater drainage system should be included.

- EPA and Boeing will collect in-line sediment samples in the City of Seattle and City of Tukwila systems immediately prior to discharge to Plant 2's stormwater drainage system.

- EPA and Boeing will collect in-line sediment samples from Plant 2's stormwater drainage system prior to discharge to the LDW.

- EPA and the City of Seattle will determine whether the city storm drain outfall shown discharging to EAA-4 at the 16th Avenue South Bridge is Outfall J or another outfall (Figure 3).

- The stormwater path will be determined in the southwest corner of Plant 2, where the manholes were reportedly plugged to eliminate the chance of contaminated solids entering the drainage system.

- Boeing will submit a work plan for the soil excavation of PCB-contaminated soil and storm drain replacement in the South Yard area. The cleanup levels for PCBs in the sidewalls of the excavation will be determined.

3.3 Jorgensen Forge

3.3.1 Summary

The Jorgensen Forge was developed as a fabricator of structural steel, tractor, and road equipment. Operations include forging, heat-treating, and cutting prefabricated steel rods to customers' specifications. From 1991 to present, SEACOR and others have conducted investigations, groundwater monitoring, and interim remedial actions for petroleum hydrocarbons (oil and gasoline) in soil and groundwater in Areas 1, 2, 3, and 4, on the Jorgensen Forge property. The four areas were reported to have releases which included cutting oil beneath equipment in the north portion of the forge shop building (Area 1), hydraulic oil from an oil/water separator into soil and groundwater northwest of the aluminum heat treating building (AHT; Area 2), diesel and gasoline in soil and groundwater from former USTs located on the eastern portion of the site (Area 3), and diesel and gasoline in soil and groundwater from former USTs located on the eastern portion of the site (Area 4; Dames and Moore, 1999). An air sparge/vapor extraction system was installed in Area 3. The analytical results of groundwater samples collected from approximately 1993 to 1997 indicated that the air sparge/vapor extraction system was effective. A No Further Action determination was issued by Ecology for Area 3 in 1999. A groundwater monitoring and sampling program is in place to assess the lateral extent of cutting oil as light nonaqueous-phase liquid (LNAPL) on the eastern portion of the Jorgensen Forge facility (Areas 1, 2, and 4), to monitor the concentrations of TPH (diesel-range, gasoline-range, and oil-range) and benzene, toluene, ethylbenzene, and xylene (BTEX), and to ensure that this contamination is not migrating toward the LDW.

The Jorgensen Forge facility is currently negotiating an EPA CERCLA Order to address contamination in sediments of the LDW and Shoreline Bank Area adjacent to the facility. Jorgensen Forge and Ecology

have entered into an Agreed Order (No. DE 4127) to conduct a source control investigation to determine if the Jorgensen Forge facility is an ongoing source of contamination to sediments in the LDW. Fill placed on the site is a potential source of PCBs and metals contamination to the LDW. The distribution of PCB contamination on-site is consistent with the placement of fill from historic hydraulic dredging of the LDW. Metals (arsenic, cadmium, chromium, copper, lead, silver, and zinc) were detected in subsurface fill in concentrations that exceeded screening levels. These metals are likely contained in the fill from hydraulic dredging and/or a result of historic site operations.

3.3.2 Current Operations

The Jorgensen Forge Corporation facility is located at 8531 East Marginal Way South in Seattle. The site occupies approximately 21.6 acres between Slip 4 and Slip 6 on the east bank of the LDW (Figure 2). The land use surrounding the facility is primarily industrial. The facility is part of a larger, contiguous, industrial area that extends from Harbor Island through the Duwamish Waterway corridor. The site is bounded by Plant 2 to the north, the Boeing-Isaacson property to the south, the KCIA to the east, and the LDW to the west.

Currently, manufacturing operations on-site consist of precision-machined forgings from material grades, including carbon and low-alloy steels, duplex stainless grades, aluminum alloys, titanium alloys, and nickel-base alloys for the commercial aircraft, aerospace, energy (i.e., oil exploration), power generation, automotive, and shipbuilding industries.

The site is developed and includes the following facilities: a machine shop, forge shop, melt shop, aluminum heat treating area, former power house, rectifier room, office building, and storage areas. The majority of the site is covered with impermeable surfaces that consist of asphalt, concrete paving, and buildings. Along the western shoreline area of the property, there are some portions of the ground surface that are covered with gravel.

To the south of the site (address not listed, Parcel No. 0001600014) is the approximate 10-acre Boeing-Isaacson property, owned by Boeing. The property is currently a vacant commercial property. To the north of the site (7755 East Marginal Way South) is an approximate 30-acre property (Parcel No. 0001600020), which is the southern section of Boeing Plant 2. This property contains several buildings including warehouses, offices, and industrial engineering and light manufacturing buildings. To the west of the site is the LDW. To the east of the site (8700 East Marginal Way South) is an approximate 9-acre property (Parcel No. 0001600049) owned by King County. The property is currently part of the KCIA. Also to the east of the site (6505 Perimeter Rd South) is an approximate 565-acre property (Parcel No. 2824049007) owned by King County. This property is currently the KCIA and contains an air terminal and hangars (King County, 2007).

Decades ago, the western portion of the Jorgensen Forge site contained an embayment of the LDW. A review of aerial photographs and historic information indicates this embayment was filled in the early 1940s (EPA, 2003), although the exact year could not be determined. The source of the fill is likely the result of historical hydraulic dredging conducted in the LDW by the U.S. Army Corps of Engineers (Farallon and Anchor, 2006).

The west side of the Jorgensen Forge site is a relatively steep eastern bank of the LDW. Approximately 8 to 9 vertical feet of the bank adjacent the site extends above the mean higher high water elevation (to approximately 11.1 feet). The shoreline bank of the site is heavily armored with a variety of materials. The northern portion is armored with riprap and woody debris. The middle portion of the bank consists of riprap intermixed between remnant timber piles. The upper elevations of the bank area are densely vegetated. A gravel surface extends to the top of the bank, along the majority of this area of the shoreline. The southern portion is a vertical sheet steel pile/concrete bulkhead (Farallon and Anchor, 2006).

The Jorgensen Forge facility has currently entered into an EPA Superfund Administrative Order on Consent (CERCLA Order No. 10-2003-0001) to investigate potential sources of PCBs and metals from the facility to the LDW. Jorgensen Forge is currently negotiating an amended EPA Superfund Administrative Order on Consent to conduct an Engineering Evaluation/Cost Analysis for remediation of contaminated sediments in the LDW and the shoreline bank adjacent to the facility (EPA, 2007b). In addition, Jorgensen Forge has entered into an Agreed Order (No. DE 4127) with Ecology to conduct an investigation to determine whether the upland portion of the facility is an ongoing source of contamination to sediments in the LDW (Ecology, 2007g). These orders from EPA and Ecology are working concurrently.

The Jorgensen Forge facility is listed as a hazardous facility on Ecology's online Hazardous Site Facility Search Database and its RCRA Site Identification No. is WAD000602813 (Ecology, 2007e).

According to Ecology's online NPDES and State Water Discharge Permit database, there is no NPDES Individual Wastewater Discharge permit for this site (Ecology, 2007d). The Jorgensen Forge facility has been issued a NPDES Industrial Stormwater General Permit (No. SO3003231C) by Ecology. The parameters for this permit are for turbidity (Action Level of 50 NTU), petroleum – oil and grease (Action Level of 30 mg/L), total copper (Action Level of 149 µg/L), total lead (Action Level of 159 µg/L), total zinc (Action Level of 372 µg/L), and pH (303d listed Action Level range of 6.5 to 8.5 standard pH units) (Ecology, 2004b and 2007d). There is currently no Wastewater Discharge Permit from King County Industrial Waste Program for Jorgensen Forge.

The EPA TRI database annually records toxic releases and other waste management activities. Available data includes reports on releases, water transfers, and waste quantity from 1988 to 2004. The information from the database indicates that all waste from Jorgensen Forge (TRI Identification No. 98108RLMJR8531E) has been transferred off-site for waste management. Waste includes metals and metal compounds such as aluminum, chromium, lead, manganese, molybdenum, nickel, and zinc. The quantity of waste materials ranged from 156 to 640,250 pounds, depending on the chemical and the year (EPA, 2007b).

3.3.3 Historic Use

This property was developed in 1942, and operated from 1942 to 1965 as a fabricator of structural steel, and tractor and road equipment. On-property operations included forging, and heat-treating by Isaacson Iron Works, which operated as a U.S. naval vessel manufacturer. From approximately 1953 to 1963, Bethlehem Steel operated a steel distribution center on the northwestern portion of the property. Bethlehem Steel operations consisted of cutting prefabricated steel rods to customers' specifications. From 1965 to 1992, this property was owned and operated by the Earle M. Jorgensen Company. In July, 1992, the facility was purchased by a plant management group and became the Jorgensen Forge Corporation.

3.3.4 Environmental Investigations and Cleanup Activities

3.3.4.1 Upland Remedial Investigations

Environmental investigations and cleanup activities have been conducted at Jorgensen Forge under the RCRA program (RCRA Site ID No. WAD000602813; Ecology, 2007f). In 1991, Ecology responded to complaints that petroleum contamination occurred at the Jorgensen Forge facility. After a site visit, the inspector determined the site required further inspection. In 1992, the Jorgensen Forge property was added to Ecology's Integrated Site Information Systems list of confirmed and suspected contaminated sites, to await further assessment under the MTCA (Ecology, 2007b).

From 1991 to present, SEACOR and others have conducted investigations, groundwater monitoring, and interim remedial actions for petroleum hydrocarbons (oil and gasoline) in soil and groundwater in Areas 1, 2, 3, and 4, on the Jorgensen Forge property. The four areas were reported to have releases which included cutting oil beneath equipment in the north portion of the forge shop building (Area 1), hydraulic oil from an oil/water separator into soil and groundwater northwest of the aluminum AHT (Area 2), diesel and gasoline in soil and groundwater from former USTs located on the eastern portion of the site (Area 3), and diesel and gasoline in soil and groundwater from former USTs located on the eastern portion of the site (Area 4; Dames and Moore, 1999). A summary for each area is provided below.

Area 1

Area 1 is located adjacent to and north of the machine shop, between the shop and the office building. Area 1 consists of three hollowbore Niles lathes and one solid-bore Rheinstah-Wagner lathe, which lie parallel to the north wall of the machine shop. The lathes were installed in the late 1940s to early 1950s. Three of the four lathes use petroleum-based cutting oil supplied by a cutting oil holding tank located just outside of the shop. The fourth lathe is supplied from a separate system located within the machine shop. The steel holding tank is located in a concrete vault beneath the ground surface. The oil in the lathes is contained within the machines and associated metal troughs (SECOR, 1992).

Product recovery wells and a groundwater recovery and reinjection system were installed in 1993. The system consists of a horizontal recovery well system with pneumatic pumps for recovering cutting oil, a LNAPL. A total of 7,450 gallons of cutting oil was recovered (Dames and Moore, 1999). Monitoring well data provided by SECOR through November 25, 1996, indicates that 15,106 gallons of cutting oil were recovered and more than 120,500 gallons of groundwater were extracted in Area 1 (Dames and Moore, 1999).

Several feet of cutting oil have been measured in the monitoring wells located in Area 1. However, no dissolved concentrations of TPH as oil-range organics or BTEX were detected in groundwater in the down-gradient monitoring wells above the MTCA Method A cleanup level. The data suggests that despite the relatively large volume of separate-phase cutting oil measured on the groundwater table, immiscible and dissolved petroleum hydrocarbons do not appear to be migrating. This is confirmed by semi-annual groundwater monitoring and sampling.

Area 2

Area 2 is located in the east/central portion of the Jorgensen Forge facility between the main forge building and the AHT building. Area 2 includes an oil/water separator that was installed in 1968 to separate residual or spilled non-PCB hydraulic oil that collected in a sump in the hydraulic press area. The discharge from the sump goes through a settling process to separate the hydraulic oil for reuse and to recover as much hydraulic oil as possible prior to discharge through the oil/water separator (SECOR, 1992).

Analytical results of the groundwater samples collected from the monitoring wells located in Area 2 indicate that there is up to a few feet of hydraulic oil LNAPL on the groundwater table. There have not been significant changes in the thickness of immiscible oil or dissolved concentrations of oil-range organics in groundwater located in Area 2. This is confirmed by semi-annual groundwater monitoring and sampling.

Area 3

Area 3 is located in the eastern portion of the site, near the main entrance of the Jorgensen Forge facility. Three gasoline USTs located in the vicinity of the guard shack near the main entrance, were decommissioned in 1991. Approximately 65 cubic yards of soil with TPH were removed from beneath

the USTs. Following the removal of the USTs, a RI/FS, site remediation, and groundwater monitoring were conducted by SECOR. An air sparge/vapor extraction system was installed in Area 3 (SECOR, 1997). The analytical results of groundwater samples collected from approximately 1993 to 1997 indicated that the air sparge/vapor extraction system was effective. A No Further Action determination was issued by Ecology for Area 3 in 1999 (Ecology, 1999).

Area 4

Area 4 is located in the vicinity of the AHT building near the southeast corner of the Jorgensen Forge facility. There are eight storage tanks located in a concrete vault to the east of the AHT building. The storage tanks are located in underground concrete vaults and are used to store diesel fuel as a backup for furnaces in the main building. Dames and Moore (1999) completed an investigation to assess the lateral extent of diesel-range organics in soil and groundwater in Area 4 and to assess the size of the plume of diesel-range organics in groundwater. The soil and groundwater investigation was conducted to assess the changes to the lateral extent of the diesel plume in soil and groundwater since 1996. In addition, the scope of work included delineating the lateral extent of the oil-range TPH, down gradient of the oil/water separator and extraction wells. This was not previously delineated in the earlier investigations. To conduct this investigations, nine samples were collected between the AHT building and the forge shop building. Selected existing monitoring and extraction wells were assessed for fluid level measurements and groundwater sampling, where appropriate (Figure 20). Hydrocarbons (i.e., LNAPL) were observed in all wells except EW-2 (Dames and Moore, 1999).

Soil samples collected by Dames and Moore (1999) at a depth of 7 to 10 feet bgs were analyzed for TPH as diesel and heavy oil. Diesel-range hydrocarbons were detected in soil samples P-1 through P-4 and P-7. Concentrations of petroleum hydrocarbons in soil in these samples ranged from 34 mg/kg (P-7) to 15,000 mg/kg (P-4). Heavy oil-range TPH was not detected in the soil samples (Dames and Moore, 1999).

Groundwater samples from borings P-1 through P-5 and P-9 were analyzed for TPH as diesel and heavy oil. The results detected DRPH in groundwater samples collected from borings P-1 through P-5 and P-7. The diesel-range TPH concentrations in groundwater ranged from 1.2 mg/L (P-2) to 96 mg/L (P-7). Heavy oil-range TPH was not detected in any of the groundwater samples (Dames and Moore, 1999).

Soil samples from borings P-1 through P-4 contained diesel TPH concentrations in soil greater than the MTCA Method A soil cleanup level (200 mg/kg). Results of the investigation determined the contaminated soil was bounded by well EW-2 to the north, borings SB-12 and P-5 to the south, boring SB-10 to the east, and boring P-7 to the west. The soil and groundwater data suggests the TPH-diesel range plume is similar in lateral extent as it was in 1996. Dissolved TPH-diesel range in the groundwater has migrated only slightly further south. The analytical results, as indicated that TPH as oil, was not detected in the current plume of dissolved TPH-diesel range. In addition, TPH as oil was not detected in the groundwater at EW-2 and P-9 (Dames and Moore, 1999).

The results indicated that the plume of dissolved diesel-range organics is similar to the plume identified in 1996 by SECOR (Dames and Moore 1999). The results showed that the diesel-range organics plume was not migrating. Dames and Moore (1999) concluded that there is limited diesel-range organics dissolving from the LNAPL into the groundwater and that the dissolved diesel-range organics is attenuating naturally over a lateral distance of approximately 40 feet.

During the summer of 1993, Ecology conducted a Site Hazard Assessment of the Jorgensen Forge property, assigning a site ranking of 5 (1 being the highest level of concern, 5 being the lowest). This ranking was determined according the groundwater pathway scoring for petroleum contamination (Ecology, 2005).

3.3.4.2 EPA Investigation Administrative Order on Consent

In 2003, the EPA entered into an Administrative Order on Consent with the Earle M. Jorgensen Company. The purpose of the Administrative Order on Consent was to determine whether sediments in the LDW adjacent to the Jorgensen Forge site have been impacted by PCB and/or metals contamination from current or historical operations at the site. The investigation included advancing soil borings, shoreline sediment sampling, catch basin sampling, an inactive outfall video reconnaissance survey, and a site stormwater drainage survey (Farallon and Anchor, 2006).

From 2003 to 2006, Farallon Consulting and Anchor Environmental conducted a phased site investigation which entailed two rounds of sampling and preparation of an investigation data summary report. The task of the first phase was to identify potential sources of PCBs from current or historical operations at the site, define potential contamination pathways, and identify data gaps for further sampling. Results concluded there was no evidence that PCBs had been or are used at the Jorgensen Forge facility. The use of PCBs was not identified in chemical inventories of process chemicals from 1994 to 2002. Further, Material Safety Data Sheets for hydraulic oil, cutting oil, and metal working fluid indicate that these oils do not contain PCBs. The only potential source of PCBs on site could be dielectric fluid contained in some of the on-site transformers. However, there is no evidence that any release from these transformers has ever occurred on-site (Farallon and Anchor, 2006).

Fill placed on-site, in the embayment, was identified as a potential source of PCBs and metals contamination. The source of the fill is likely from historic hydraulic dredging for channel modification and maintenance of the LDW, conducted by the U.S. Army Corp of Engineers, or from unknown upland sources (Farallon and Anchor, 2006).

The second phase of investigation was to identify data gaps from the first phase, including investigations of bank erosion and the stormwater conveyance system. This second phase included sampling of the subsurface fill, shoreline bank fill, debris piles located at the toe of the shoreline bank, and solids in the stormwater catch basins. The scope of work also included a video survey of the outfalls and outfall reconnaissance survey.

During the second phase of the site investigation, two debris piles (North and South) were sampled. These debris piles are located adjacent to the site and within the intertidal zone on the shoreline bank (see Appendix A). The analytical results of this investigation indicated that samples collected from the North Debris Pile and the South Debris Pile detected concentrations of PCBs at 2.34 mg/kg (North) and 2.06 mg/kg (South), which exceed the lowest apparent effect threshold of 0.13 mg/kg. In both debris piles, concentrations of copper and lead exceeded the SQS and CSL. In the North Debris Pile, concentrations of chromium and zinc exceeded the SQS and CSL. In addition, arsenic, mercury, and nickel were detected in both piles below SQS and CSL (Farallon and Anchor, 2006).

The third phase included collecting surface and subsurface sediment samples, solids residing in the stormwater catch basins, and water samples from outfall discharges from active outfalls (Farallon and Anchor, 2006). The results of the stormwater catch basins and outfall sampling are discussed in detail in Section 3.3.4.

The distribution of PCBs contamination on-site is consistent with the placement of fill from historic hydraulic dredging of the LDW (Farallon and Anchor, 2006).

Metals including arsenic, cadmium, chromium, copper, lead, silver, and zinc were found in subsurface fill in concentrations that exceeded screening levels. These metals are likely contained in the fill from hydraulic dredging and/or a result of historic site operations. The metals are located within the fill on-site, and in other portions throughout the site. These contaminants are not a source of contamination to the LDW through groundwater or bank erosion (Farallon and Anchor, 2006).

Results of the sample analysis showed soil contamination of PCBs and several heavy metals at concentrations exceeding the MTCA. The results were forwarded to Ecology for review. After evaluating the data, Ecology decided that the Jorgensen Forge property should be re-ranked using data containing the new contaminants. For the new Site Hazard Assessment, Jorgensen received a ranking of 1 (Ecology, 2005).

3.3.4.3 Groundwater

The Jorgensen Forge site is underlain by fill that was placed from hydraulic dredging of the LDW for channel modifications and maintenance by the U.S. Army Corp of Engineers. This fill consists of gray and brown sands that extend to a depth of 2 to 10 feet bgs. There is a silt layer between 8 to 10 feet bgs that represents the uppermost native soil. The site hydrogeology is complicated because of this historic fill placement over lenses and layers of clay and silt. These layers perch and locally confine groundwater in several locations. Depth to groundwater at the site occurs between 9 and 13 feet bgs (Farallon and Anchor, 2006). There is no documented use of groundwater for private or municipal wells for either drinking water or irrigation within a 2-mile radius (Ecology, 2005).

Shallow groundwater flow beneath the site apparently flows to the southwest, towards the LDW, under an average gradient of 0.0167 feet per foot. The groundwater gradient increases near the LDW, where tidal effects are prevalent. On the western side of the site, monitoring wells identify tidal influences on the groundwater. On the eastern portion of the site, water levels fluctuate seasonally, with water levels 1 to 2 feet higher during the rainy season (Farallon and Anchor, 2006). Overall, tidal influence and the lack of wells in the center of the facility make groundwater flow direction difficult to specify.

The analytical results of groundwater samples collected from monitoring wells located throughout the site from 1993 to 2003 did not detect concentrations of PCBs above the MTCA Method A cleanup levels (Figure 23). Monitoring wells that previously detected PCB concentrations in the LNAPL samples of 1993 did not detect concentrations in 2003 above the detection limit (0.1 µg/L; Farallon and Anchor, 2006).

Groundwater samples were collected in 1990 and 1992 from monitoring wells-1, -9, and -23 and analyzed for total metals. Concentrations of total arsenic, barium, cadmium, chromium, copper, iron, manganese, mercury, selenium, and zinc were detected in groundwater above the laboratory practical quantitation limits. However, only cadmium was detected at a concentration above the MTCA Method A cleanup level in Monitoring Well-1. In 2001, concentrations of arsenic exceeded the MTCA Method A cleanup level in Monitoring Well PL2-JF01C, located in the northwest corner of the Jorgensen Forge facility. There were no other metals detected in groundwater samples collected from the monitoring wells that exceeded the applicable MTCA Method A cleanup levels (Figure 23; Farallon and Anchor, 2006).

3.3.5 Stormwater Drainage

Jorgensen Forge contains a stormwater conveyance system that consists of 19 catch basins and underground piping that historically discharged and currently discharges to the LDW through four active outfalls (figures 24 and 25; Farallon and Anchor, 2006). The stormwater conveyance system captures stormwater runoff from impermeable surfaces, including paved areas outside the existing buildings, and the building roof drains. Surface water within the interior of the buildings is not captured or delivered in the stormwater collection and conveyance system. Historically, nine outfalls, identified as outfalls 001 through 009, existed at the facility and discharged stormwater to the LDW (Figure 25). In the mid-1980s, outfalls 005 through 009 were plugged using concrete, and a dye tracer study was used to confirm complete enclosure of each outfall (Farallon and Anchor, 2006). Stormwater runoff from the facility currently discharges to the LDW through outfalls 001, 002, 003, and 004 (Figure 25). Stormwater runoff

from the eastern side of the facility discharges to the King County Metro stormwater system (Farallon and Anchor, 2006).

Outfalls 005 through 009, which historically discharged roof drains and other unknown sources of stormwater, are inactive. The origins of stormwater discharging through inactive outfalls 006 through 009 have not been determined (Farallon and Anchor, 2006). To ensure that no flow currently discharges to the LDW from outfalls 006, 007, and 008, a video survey and underground stormwater conveyance line location was conducted by Applied Professional Services on August 26, 2004. The survey identified that the stormwater piping for outfalls 006, 007, and 008 were blocked approximately 10 linear feet eastward from the face of the bank. Applied Professional Services attempted to locate each of the stormwater lines from the upland portion of the site; however, as discussed above, the outfalls were plugged with concrete in the mid-1980s. In addition, a comprehensive site stormwater drainage investigation study conducted October 13 to 15, 2004, confirmed that no discharge occurred from historical outfalls 005 through 009 (Anchor, 2006).

Stormwater from impermeable surfaces and roof drains; groundwater that accumulates in the vacuum degasser sump, railroad scale sumps, electric furnace pit, argon-oxygen-decarbonization (AOD) and scale sumps; and non-contact cooling water from the cooling tower system are periodically discharged through outfalls 001, 002, 003, and 004 (Figure 25; Farallon and Anchor, 2006). Stormwater from the parking area adjacent to the site is discharged to the King County Metro stormwater system. Outfall 001 collects stormwater, including roof drains, from the southern portion of the property. On occasion, small amounts of groundwater that accumulate in the Vacuum Degasser Pit also discharge to Outfall 001. Outfall 002 collects stormwater, including roof drains, from the southern portion of the property. Outfall 003 collects stormwater, including roof drains, from the remainder of the property. On occasion, small amounts of groundwater that accumulate in the AOD scale sump also discharge to Outfall 003 (Anchor, 2006).

Based on discussions with Jorgensen Forge personnel, it was determined that Outfall 004 was previously designated as an active stormwater outfall and permitted under NPDES Permit No. SO3 - 003231. This outfall was designed to discharge water from the cooling tower concrete basin in the event that the cooling tower pump system malfunctioned or a pipe break resulted in water accumulation in this area. This outfall is supplied by a single catch basin in the bottom of the subgrade concrete basin. Any historical water discharged from this outfall would be composed of non-contact cooling water, supplied by King County. To the recollection of several long-term Jorgensen Forge personnel, a pump malfunction or pipe breakage has not occurred for over 10 years and, therefore, this outfall is considered to have very infrequent discharges to the LDW (Anchor, 2006).

A chemical inventory for the entire facility was completed in 1994 as part of the Spill Control Plan, included as an appendix to the SWPPP (Anchor, 2006). This chemical inventory is updated periodically to reflect materials used at the facility. Based on an evaluation of the stormwater system and the use of chemicals at the facility, areas of industrial activities that have potential to introduce pollutants to stormwater discharges, and the specific pollutants associated with each of these areas, have been identified (Anchor, 2006).

Refer to the *LDW EAA-4 SEIIDGR* for a more detailed discussion on the Jorgensen stormwater system (E & E, 2007).

Stormwater Drainage System Sampling and Potential as a Contaminant Migration Pathway

Catch Basin Solids Sampling

Catch basin solids were collected from stormwater catch basins CB1 through CB4, located on the western, central, and eastern portions of Jorgensen Forge, on August 31, 2004 (Farallon and Anchor, 2006). The concentrations of PCBs detected in the solids samples collected from the catch basins ranged from 0.129 mg/kg (catch basin CB4) to 0.302 mg/kg (catch basin CB2). Following the catch basin sampling in August 2004, all of the on-site stormwater catch basins were thoroughly cleaned and removed of all residual solids. Additional sampling in these four catch basins was proposed as part of the third phase of the investigation to assess ongoing PCB- and metals-loading into the stormwater drainage system from solids recently (i.e., within nine months) deposited into the catch basins. As part of the third phase of the investigation, sampling of the catch basins was attempted in May 2005. During these attempts, each of the catch basins had insufficient (i.e., less than 0.4 inches of solids on the catch basin floor) solids accumulation; therefore, no sampling was performed. The lack of accumulated solids in the targeted catch basins following catch basin cleanout indicates that the on-site stormwater BMPs have successfully limited the amount of solids entering the on-site catch basins during rainfall events. Those BMPs include regularly scheduled comprehensive sweeping and/or vacuuming of all paved surfaces, as well as installation and regular replacement of filter fabric in each of the 19 catch basins. In addition, the lack of solids indicates that the solids identified during the second phase investigation likely were due to years of accumulation. See *Data Investigation Summary Report, Jorgensen Forge Facility* for a more detailed discussion of the catch basin solids sampling (Farallon and Anchor, 2006).

Outfall Discharge Water Sampling

Grab water samples were collected from outfalls 002 and 003 on May 19, 2005, during a rainfall event of sufficient intensity to produce surface water runoff. The LDW surface water elevations at the time of sampling were low enough to facilitate visual inspection of the discharge from each of the outfalls. However, insufficient discharge from outfalls 001 and 004 occurred during the rainfall event, so no samples were collected from these outfalls. The samples collected from outfalls 002 and 003 were submitted for laboratory analysis of pH, total suspended solids, total PCBs, and total and dissolved metals. The outfall discharge concentrations were evaluated to determine whether the stormwater discharge to sediments pathway was contributing elevated levels of PCBs and/or metals to sediments adjacent to active outfalls 001, 002, and 003. Data evaluation determined that discharges from these outfalls, as measured during rainfall events, were not associated with the observed SMS exceedances. See *Data Investigation Summary Report, Jorgensen Forge Facility* for a more detailed discussion of the outfall discharge sampling (Farallon and Anchor, 2006).

Jorgensen Forge Facility – Boeing Plant 2 Facility Property Line Stormwater Outfall Sampling

Boeing conducted an investigation of stormwater structures in accordance with the EPA-approved *Phase II Transformer Investigation Work Plan* (Farallon and Anchor, 2006). The investigation included collecting and analyzing solids material within the 12- and 24-inch diameter stormwater lines, located in the easement on the northern portion of the Jorgensen Forge site, that convey stormwater runoff from Plant 2 and KCIA (Figure 24). In May 2005, solids samples were collected from the manholes located along the 12- and 24-inch stormwater outfalls. A video survey of the stormwater outfall conveyance pipes conducted at the same time identified two drainage lines were connected to the 24-inch stormwater outfall, including a 15-inch diameter pipe extending from Plant 2, and an inactive 12-inch diameter pipe extending from Jorgensen Forge. No cross-connections from the Jorgensen Forge site were identified in the video survey of the 12-inch diameter storm drain line (Farallon and Anchor, 2006).

Solids samples were collected from three manhole locations, MN 37-2, SDMH-24B, and SDMH-24A, along the 24-inch diameter pipe; a manhole location on the previously unidentified Boeing 15-inch diameter pipe (MH37-7); and two manhole locations, SDMH-15B and SDMH-15A, along the 12-inch

diameter pipe (Farallon and Anchor, 2006). The solids sampled from the 12-inch diameter pipe consisted of several inches of silty sand and/or gravel overlying approximately 0.5 inch of oily sludge in SDMH-15B to a bottom layer of silty sand sludge with a grey-black, oily appearance and a hydrocarbon odor in SDMH-15A. The solids sampled from the 24-inch diameter pipe consisted of several inches of silty sand and/or gravel overlying approximately 0.5 inch of oily sludge in MN 37-2, MN 37-7, and SDMH-24B, to very little accumulated granular material and the presence of oily sludge along the bottom surface in SDMH-24A (Farallon and Anchor, 2006).

The concentrations of PCBs detected in the granular samples, collected by Boeing from the 24-inch diameter stormwater outfall (samples SD001 and SD004) upstream from the 12-inch diameter stormwater outfall that extends from Jorgensen Forge, were as high as 2,600 mg/kg (Figure 24; Farallon and Anchor, 2006). The analytical results of a sample collected from the 12-inch diameter stormwater pipe connecting Plant 2 to the 24-inch diameter stormwater outfall, upstream of the cross-connection of the 12-inch diameter pipe from Jorgensen Forge, detected a concentration of PCBs of 730 mg/kg. A concentration of PCBs of 10,000 mg/kg was detected in the sample of oily sludge collected downstream of the connection with the inactive 12-inch diameter pipe extending from Jorgensen Forge (Farallon and Anchor, 2006).

Samples of solids material were collected from the inactive 12-inch diameter pipe, extending from Jorgensen Forge to the 24-inch diameter stormwater outfall, at a distance of approximately 6 inches from the junction (Farallon and Anchor, 2006). The 12-inch diameter pipe was traced as far as possible onto the Jorgensen Forge site, and a sample of solids material was collected at a distance of approximately 40 feet from the junction by excavating vertically, cutting the pipe, and collecting an undisturbed sample of the black silty sand (Farallon and Anchor, 2006). The concentration of PCBs detected in the solids sample collected from the 12-inch diameter pipe was 1,100 mg/kg in the sample collected at 6 inches. The concentration of PCBs detected in the sample collected at a distance of 40 feet from the junction of the 12- and 24-inch diameter pipes was 6.5 mg/kg. The solids sample collected 6 inches from the junction of the 12- and 24-inch diameter pipes was at an elevation that is tidally influenced (Farallon and Anchor, 2006).

The results of the stormwater drainage investigation indicated that the 12-inch diameter pipe, extending from Jorgensen Forge, is not the source of PCBs detected in the solids sample collected in the 24-inch diameter stormwater outfall. A more detailed discussion of the stormwater drainage investigation was provided to EPA in the *Technical Memorandum Regarding Storm Drain Line Data Summary* (Farallon and Anchor, 2006).

Outfalls Discharging to LDW

Outfalls 001, 002, and 003 currently discharge all collected stormwater runoff from Jorgensen Forge to the LDW during rainfall events (Farallon and Anchor, 2006). Outfall 004 does not appear to be affected or influenced by precipitation events. Site research produced no evidence that PCBs have been or are used at Jorgensen Forge, with the exception of dielectric fluid contained in some of the transformers on-site (Farallon and Anchor, 2006). Surface water in the interior of the current buildings is not captured and/or delivered to the stormwater collection and conveyance system. The relatively low concentrations of PCBs detected in the samples of solids collected from the catch basins on Jorgensen Forge, likely are the result of PCB-containing windblown soil and waste particulates that accumulated in the catch basins. The catch basins have recently been cleaned out and have been protected from further sedimentation through the implementation of BMPs. If these BMPs are maintained, these procedures will decrease the likelihood that outfalls 001, 002, and 003 will contribute to PCB contamination of the LDW (Farallon and Anchor, 2006).

Metals used at Jorgensen Forge in the manufacturing processes are limited to the interior of buildings. Surface water in the interior of the buildings is not captured and/or delivered to the stormwater collection

and conveyance system. This limits the potential for metals migration from manufacturing processes into the LDW. Large metal scraps used during manufacturing processes are stored on pavement outside the building. Inspection of this pavement indicated that it is in good condition (i.e., few visible cracks), limiting direct metal migration to groundwater (Farallon and Anchor, 2006). Stormwater that comes into contact with this stored metal is conveyed to the 19 on-site catch basins. The design of the catch basins, which were constructed to facilitate settling of particulates, and implementation of stormwater BMPs (e.g., on-site sweeping and use of filter fabric to limit solids infiltration into the catch basins) limit potential suspended metals that migrate to the catch basins. An evaluation of the potential for metals migration through the stormwater conveyance system, prior to and following the implementation of BMPs, is presented below (Farallon and Anchor, 2006).

The evaluation conducted during the third phase investigation concluded that metal concentrations of stormwater discharges from outfalls 002 and 003 collected during a single rainfall were not above the applicable water quality screening levels. This indicates that the implementation of BMPs has successfully limited the introduction of solids into the stormwater conveyance system (Farallon and Anchor, 2006).

The elevated concentrations of chromium, copper, and zinc in the solids samples collected from catch basins indicated discharge of water through the stormwater conveyance system that potentially resulted in the deposition of solids into the LDW, containing concentrations of chromium, copper, and zinc exceeding the SQS and the CSL. To evaluate this potential pathway, the catch basin solids metals concentrations were compared to the surface sediment concentrations identified in the vicinity of the outfall discharge locations (Farallon and Anchor, 2006).

The concentrations of chromium, copper, and zinc detected in surface sediment adjacent to Jorgensen Forge, surrounding outfalls 003, 004, and 005, are similar to the concentrations detected in the solids samples collected from the catch basins. Outfall 003 consists of an 18-inch diameter ductile iron pipe extending through the sheet pile wall at an elevation of 8.91 feet above mean lower low water. The surface of the bank beneath Outfall 003 is composed of armored rock. Stormwater discharged through Outfall 003 is expected to flow across the bank with little to no erosion of bank material and little to no deposition of solids, during low tides. Any suspended solids in the stormwater stream, including metals, could be deposited on top of surface sediment when the velocity of the stormwater discharge decreases upon entering the LDW. This material could then be transported to the surrounding sediments during tidal fluctuations. Given the similarity in metals concentrations identified in sediments in the vicinity of this outfall and the catch basin solids (CB1, CB2, and CB3) conveyed through this outfall, prior to implementation of BMPs, Outfall 003 was a likely source of metals to the LDW (Farallon and Anchor, 2006).

Outfall 004 is an active outfall that, on rare occasions, discharges non-contact cooling water from the cooling tower system. Discussions with Jorgensen Forge personnel indicate the last discharge from this outfall occurred more than 10 years ago (Farallon and Anchor, 2006). Similarly, Outfall 005 is a historical outfall that has not discharged for at least 20 years. Given these outfalls have been inactive for an extended period; it is unlikely that they are the source of elevated surface sediment metals concentrations identified adjacent to their outfall discharge locations (Farallon and Anchor, 2006).

The analytical results of the solids samples collected from catch basin CB4 detected concentrations of chromium and copper exceeding the SQS and the CSL. The water and solids captured by catch basin CB4 are discharged through the stormwater conveyance system to Outfall 002. The results of surface sediment samples collected near Outfall 002 detected concentrations of chromium exceeding the SQS and CSL in surface sediment, indicating that discharge of stormwater through Outfall 002 was, prior to implementation of BMPs, a likely source of metals to the LDW (Farallon and Anchor, 2006).

Memorandum of Understanding

Earl M. Jorgensen, Jorgensen Forge, and Boeing prepared and submitted a final MOU to the EPA in early October 2007. The purpose of this MOU is for the three signing parties to cooperate and coordinate the cleanup of certain sediments and the associated sediment-shoreline back interface areas in the LDW adjacent Plant 2 and the Jorgensen Forge (see Section 3.2.3.12 for more details).

3.3.6 Potential for Future Release

3.3.6.1 Upland Facilities

Although the fill at Jorgensen Forge has elevated concentrations of contaminants, it is unknown whether the upland area is a source of sediment recontamination to the LDW. The majority (over 80 percent) of the upland area is covered with impervious surfaces, reducing exposure of the fill to erosion. Ecology is concerned about unknown contamination in the southeast portion of the site, which is thought to have been historically occupied by or adjacent to a wood treating facility. There is significant arsenic contamination on the Boeing-Isaacson property, adjacent to this area.

There have been investigations related to releases of hydrocarbons to the soil in several areas at the Jorgensen Forge facility. In addition, several years of semi-annual groundwater monitoring has been conducted, while measuring the TPH concentration and redox conditions in the soil at the time of sampling. However, the geochemical effects of petroleum hydrocarbons in the soil on the redox potential of the groundwater have not been investigated.

3.3.6.2 Stormwater

It is unclear who owns and operates the 12- and 24-inch diameter stormwater lines located in the easement on the northern portion of the Jorgensen Forge site. These stormwater lines convey stormwater runoff from Plant 2 and KCIA (Figure 24). PCB contamination has been detected in the 24-inch stormwater line. Ownership of these stormwater lines and the exact locations of connections to the adjacent stormwater systems of Jorgensen, Boeing, KCIA, and City of Tukwila need to be established to better understand the pathway of contamination and potential for future release.

Stormwater from impermeable surfaces and roof drains; groundwater that accumulates in the vacuum degasser sump, railroad scale sumps, AOD and scale sumps are periodically discharged through outfalls 001, 002, and 003 (Figure 25; Farallon and Anchor, 2006). The quality of the water discharged and the process through which water is discharged from the scale sumps needs to be determined.

3.3.6.3 Groundwater

Although a hydraulic connection between shallow groundwater and the LDW exists, the concentrations of TPH (as diesel-range organics and oil-range organics) detected in groundwater above the MTCA Method A cleanup levels on the eastern portion of the Jorgensen Forge site do not appear to be migrating and therefore, do not present a source of contamination to the LDW (Farallon and Anchor, 2006). However, this area requires continued monitoring to ensure that the contamination does not migrate towards the LDW.

As part of the Source Control Investigation, Jorgensen Forge anticipates developing a hydrogeological site model that will characterize the groundwater system, including tidal influence, at the site.

Ecology is concerned about potential unknown contamination in the center of the site which was previously occupied by Isaacson Iron Works. There has been no groundwater sampling or monitoring in this area to determine the groundwater quality and flow direction.

3.3.6.4 Bank Erosion

Concentrations of PCBs and metals have been detected in the shoreline bank of the Jorgensen Forge facility. This bank material was likely dredged from the LDW and placed on-site as fill by the U.S. Army Corp of Engineers. Historically, bank erosion was likely a source of PCBs and metals contamination for the adjacent sediments in the LDW. Currently, the shoreline bank is heavily armored with riprap, woody debris, vegetation, and steel sheet pile/concrete bulkhead. However, contamination in the shoreline bank occurs within the intertidal zone (see Appendix A), which is flooded twice a day by tides. In addition, there are debris piles in the intertidal zone. For this reason, contamination of the shoreline bank is likely eroding and leaching into the sediments of the LDW.

3.3.7 Planned Source Control Actions

The following source control actions are planned:

- As part of the source control investigation, Jorgensen will conduct soil and groundwater sampling in the southeast portion of the site (historically thought to have been occupied by a wood treating facility) to determine if arsenic contamination is present and if this contamination is leaching into the adjacent sediments.

- Ecology will work with Jorgensen (in coordination with Boeing, City of Tukwila, and KCIA) to determine the ownership of the 12- and 24-inch diameter stormwater lines located in an easement along the Jorgensen/Boeing property line. In addition, the exact locations of the connections between these lines and the stormwater systems of Jorgensen, Boeing, City of Tukwila, and KCIA will be determined. A comprehensive figure will be developed showing the locations, connections, and discharges of all these stormwater systems.

- Jorgensen will investigate the quality of discharged water and the process through which water is discharged from the onsite scale sumps, including the vacuum degasser sump, railroad scale sumps, AOD and scale sumps, which periodically discharge through outfalls 001, 002, and 003.

- EPA and Jorgensen will continue to address PCBs and metals contamination in sediments of the LDW and Shoreline Bank Area adjacent the facility through an EPA Superfund Order (CERCLA Order No. 10-2003-0001).

- Ecology and Jorgensen will conduct a source control investigation through an Agreed Order (No. DE 4127) to determine if the Jorgensen Forge facility is an ongoing source of contamination to sediments in the LDW.

- Jorgensen will develop a hydrogeologic site model, as part of the source control investigation, to characterize the groundwater system on site, including tidal influence.

- Jorgensen will review all current groundwater monitoring data to ensure that groundwater is not a pathway for contamination to the LDW. A groundwater monitoring and sampling program is in place to assess the lateral extent of cutting oil as LNAPL on the eastern portion of the Jorgensen Forge facility, and to monitor areas where the concentrations of TPH (diesel-range, gasoline-range, and motor-oil range) and BTEX are detected in groundwater above the MTCA Method A cleanup levels.

- Jorgensen will conduct groundwater sampling to determine if COCs above screening levels are present in the center of the site (previously occupied by Isaacson Iron Works).

3.4 King County International Airport

3.4.1 Summary

In 2005, sampling of the KCIA stormwater system and joint caulk material was conducted within the portion of KCIA that drains to EAA-4. The sampling results indicated levels of PCBs above Method A cleanup levels in one sample of stormwater sediments collected from a trench location and in one sample of joint caulk material. The sample locations in this system discharge to EAA-4 via the 24-inch stormwater line located on an easement through the northern portion of Jorgensen.

Due to a lack of information about the locations of stormwater discharges from this portion of the KCIA into the LDW, it is not clear whether or not some stormwater discharges into the EAA-4 area of interest.

In 2005, KCIA sampled the stormwater system catch basins and pavement joint caulk for potential PCB contamination. The airport has been cleaning out accumulated solids from each stormwater catch basin on the airport semi-annually. Each oil/water separator is cleaned annually, or more frequently, if there are any accumulations noted during weekly inspections.

Spills in this portion of the KCIA could enter the storm drain system and be discharged to the LDW. Available information does not indicate whether any of the discharges into the LDW are to the EAA-4 area. However, activities that could potentially cause spills are controlled by the facility Industrial Stormwater General Permit and SWPPP.

3.4.2 Current Operations

KCIA, also known as Boeing Field, is located at 7277 Perimeter Road South, Seattle. This facility is also listed under the address of the airport maintenance building, at 6518 Ellis Avenue, Seattle. The KCIA is a general aviation airport, owned and operated by King County as a public utility. The site covers approximately 615 acres, 435 of which are impervious surface, covered by buildings and paved areas. The remaining 180 acres consist of grass and landscape area. Twenty six acres of the KCIA is located in the EAA-4 and drains to the LDW (Figure 1). This area is located west of East Marginal Way South and both north and south of the Federal Aviation Administration Air Traffic Control Tower.

The KCIA averages more than 300,000 operations (takeoffs and landings) each year and serves small commercial passenger airlines, cargo carriers, private aircraft owners, helicopters, corporate jets, and military and other aircraft. The airport is also home to Boeing's 737 aircraft flight-test program, along with other Boeing operations (KCIA, 2007a).

According to the King County Tax Assessor website, the portion of KCIA located in EAA-4 is part of Parcel No. 2824049007, with a listed address of 6505 Perimeter Road South (King County, 2007). This parcel consists of 564.77 acres and 101 buildings that have various uses including office buildings, storage hangers, industrial light manufacturing, material storage sheds and warehouses, and service repair garages (King County, 2007). A map of the KCIA indicates the only buildings in EAA-4 are the Federal Aviation Administration Air Traffic Control Tower and Aircraft Rescue and Fire Fighting facilities (Figure 26; KCIA, 2007a).

KCIA has a NPDES Industrial Stormwater General Permit (No. SO3000343D) for the airport maintenance shop, located north of the EAA-4 drainage basin. The parameters for this permit are for pH, with a minimum of 6.5 and a maximum of 8.5 standard pH units. This permit expires on September 20, 2007. Ecology plans to reissue Industrial Stormwater Permits on August 20, 2007. These reissued permits would be effective from September 20, 2007 through September 20, 2012 (Ecology, 2007e). According to Ecology's online NPDES and State Waste Discharge Permit database, this site does not

have a NPDES Individual Wastewater Discharge Permit (Ecology, 2007d). KCIA has a SWPPP addressing the airport maintenance facilities, the paved areas (runways and taxiways), and activities such as de-icing (KCIA, 2006).

3.4.3 Historic Use

The airport is the homestead site of the original settlers who arrived in King County. In the early 1900s, the natural course of the Duwamish River, which meandered through much of the airport property, was straightened and filled.

Construction of the airport began in 1928. The airport served as the community's aviation center until December 6, 1941, when the U.S. Army took over the airport for strategic and production reasons. The airport remained under military jurisdiction through the end of World War II. In the late 1940s, the airport was reopened for passenger and other commercial traffic. After Seattle-Tacoma International Airport opened in 1947, KCIA usage evolved to general aviation, serving industrial, business, and recreational purposes (Ecology, 2006).

3.4.4 Environmental Investigations and Cleanup Activities

In 2001, KCIA sampled stormwater catch basin sediments and pavement caulk in the EAA-4 drainage area. During the sampling event, four sediment samples were collected from the storm drain system. The samples were analyzed for PCBs and metals including arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. In addition, two samples of caulk were collected from the concrete joint areas and analyzed for PCBs. The analytic results of this sampling event indicated that elevated concentrations of cadmium (21.9, 2.70, and 3.94 mg/kg) and lead (276, 294, and 257 mg/kg) were detected at CB-1-F, CB 1802, and CB-4-F, respectively. The cadmium and lead concentrations were greater than the Method A cleanup levels for residential soil. In addition, three of the storm drain sediment samples and two of the caulk samples detected concentrations of PCBs. However, PCB concentrations in all samples were less than 1 mg/kg, which is the MTCA Method A cleanup level for PCBs (IT Corporation, 2001).

In 2005, KCIA sampled the stormwater system catch basins and pavement joint caulk for potential PCB contamination. During this sampling event, sediment samples were collected from three stormwater catch basins, two trenches, and joint compound samples from three concrete joint areas (Figure 27). The analytical results of this sampling event showed elevated concentrations of PCBs in one trench sample and one joint caulk sample. The results are presented in an excel file entitled *Catch Basin Sediment and Concrete Joint Compound PCB Sampling Results Lot 12 at King County International Airport, Seattle, Washington,* and show Aroclor 1260 concentrations of 2.67 mg/kg and 1.69 mg/kg at Trench 2 and JC-3, respectively (Renaud, 2007). These results exceed 1 mg/kg, which is the MTCA Method A cleanup level for PCBs.

The airport has been cleaning out accumulated solids from each stormwater catch basin on the airport semi-annually. Each oil/water separator is cleaned annually, or more frequently, if there are any accumulations noted during weekly inspections (Ecology, 2006).

The areas of the KCIA listed on Ecology's online LUST and UST databases are located outside of the EAA-4 drainage basin. In addition, there have been two clean-ups noted for KCIA, both are outside EAA-4, and therefore are not considered a potential contributor to sediment recontamination of EAA-4. In addition, Boeing has been working to remove PCB-contaminated joint caulk material from the paved areas at North Boeing Field, outside of EAA-4. Refer to *LDW EAA-4 SEIIDGR* for a more detailed discussion on the KCIA site (E & E, 2007).

There is no baseline for a study of air pollution at KCIA. There is no system set up at this time to study air pollution.

3.4.5 Stormwater Drainage

There are approximately 15 miles of drainage pipe in the KCIA stormwater drainage system. There are five outfalls or discharge points (Figure 28). There are two pumping stations, lifting water and pumping it out at two outfalls (outfalls 1 and 2). There are three gravity lines, feeding two outfalls (outfalls 3 and 4), that drain the south end of the airport. There are several off-site stormwater sources (Associated Grocers, Railroad Right-of-Way, City of Seattle, and others) which discharge into the KCIA drainage system. Some north end KCIA facilities are connected to a storm sewer system owned by the Washington State Department of Transportation, which serves the Interstate 5 freeway. Other non-KCIA-owned properties (Boeing Company, Museum of Flight, and City of Seattle) contribute stormwater at outfalls 3 and 4. Some KCIA properties along East Marginal Way South go into a combination of Boeing and City of Tukwila storm drainage systems (KCIA, 2007b).

There is an active 24-inch line that discharges into the LDW at the southern boundary of Plant 2, located approximately 10 feet into the Jorgensen Forge property on an easement. There was a historical connection from the Plant 2 facility to this outfall (Golder Associates and Floyd|Snider Inc., 2006).

The area described by Ecology as "draining to the LDW in EAA-4 is within Drainage Basin 5" is approximately 26 acres (figures 29 and 30; KCIA, 2007b). Figure 2 shows the entire Drainage Basin 5 stormwater drainage system as included in the EAA-4 drainage basin. While all of this 26-acre drainage basin should discharge through Outfall 5, CAD files provided by KCIA show this is not the location where Outfall 5 drains into the LDW. According to Ecology, the 26-acre area drains through the aforementioned 24-inch line located on the property boundary between Jorgensen Forge and Plant 2 (Figure 24).

3.4.6 Potential for Future Release

The analytical results from the 2005 stormwater catch basin and joint caulk sampling event (as presented in an excel file entitled *Catch Basin Sediment and Concrete Joint Compound PCB Sampling Results, Lot 12 at King County International Airport, Seattle, Washington*) showed elevated levels of PCBs in the stormwater sediments of Trench 2 and the joint caulk samples at concrete joint area location, JC-3 (Renaud, 2007). This area is located within Drainage Basin 5, which drains through Outfall 5 to the LDW via the 24-inch line located along the property boundary between Jorgensen Forge and Plant 2 (Figure 24). Some PCB contamination was also found in the 24-inch diameter stormwater outfall that discharges to the LDW on the property boundary of Jorgensen Forge and Plant 2. Therefore, the KCIA stormwater drainage system is a potential migration pathway of site-related contaminants to the LDW. The precise location and connection of the KCIA stormwater system to the City of Tukwila, Jorgensen, and Boeing stormwater systems, and discharge location to LDW is still unknown. There is no CAD file available that shows the connections between stormwater systems. For more detailed discussion of the KCIA Drainage Basin 5, connection with other stormwater systems, and drainage to the LDW, refer to the *LDW EAA-4 SEIIDGR* (E & E, 2007). There have been no groundwater investigations or monitoring for this portion of the airport.

3.4.7 Planned Source Control Actions

The following source control actions are planned:

- Ecology will work with the KCIA (in coordination with City of Tukwila, Jorgensen, and Boeing) to determine the exact connections between the KCIA stormwater system, the City of Tukwila

system, and the 24-inch stormwater pipeline along the Jorgensen/Boeing property line. A comprehensive CAD file will be developed to show the locations, connections, and discharges of all these stormwater systems.

- Ecology will review the data presented in the excel file entitled *Catch Basin Sediment and Concrete Joint Compound PCB Sampling Results, Lot 12 at King County International Airport, Seattle, Washington* to determine whether or not additional sampling of PCBs in the KCIA stormwater system and joint caulk material is necessary.

- Ecology and KCIA will review the current SWPPP and make necessary changes and additions to prevent contaminants from entering the KCIA stormwater system.

3.5 East Marginal Way South

3.5.1 Current Operations

East Marginal Way South runs in between the three potential sources of contamination that are identified for EAA-4 (Figure 1). The northern portion is located in the City of Seattle and the southern portion is located in the City of Tukwila. Sampling has been conducted in the portion located in the City of Tukwila.

3.5.2 Historic Use

No information regarding historic use in this portion of East Marginal Way South was found during the review of Ecology's files.

3.5.3 Environmental Investigations and Cleanup Activities

Stormwater Discharge

A small portion of the East Marginal Way South right-of-way and the City of Tukwila Stormwater Drainage System drains to EAA-4 (figures 31 and 32). The northern portion is located in the City of Seattle and the southern portion is located in the City of Tukwila.

Mr. Ryan Larson, engineer at the City of Tukwila, suspects the drainage in this area drains to a point and then is piped across Plant 2 to the LDW (Larson, 2007). According to Boeing, the City of Tukwila's public roadway drainage from East Marginal Way South discharges to the LDW, through Plant 2's Outfall Z (Boeing, 2007b). Mr. Larson also mentioned there is a large pipe that conveys drainage across the northern edge of the Jorgensen Forge site, but its location is unknown. This drainage pipe does not appear to be connected to the City of Tukwila's drainage system, but rather to the KCIA drainage system (Figure 24; Larson, 2007).

There is not enough information to determine whether or not the City of Tukwila's stormwater drainage system along East Marginal Way South is a potential migration pathway of site-related contaminants to the LDW. No information regarding environmental investigations and cleanup activities in this portion of East Marginal Way South was found during the review of Ecology's files.

3.5.4 Potential for Future Release

Stormwater Discharge

The maps supplied by the City of Tukwila showed minimal information (figures 31 and 32). The drain lines and storm drain locations are shown on an aerial photo, but the lines are not labeled and discharge points to the LDW are not indicated. More detailed information on maps, showing exact drain line locations and storm drain locations, is needed to determine if this portion of East Marginal Way South could potentially contribute to sediment recontamination of the LDW in EAA-4.

Groundwater

There have been no groundwater investigations or monitoring for this portion of East Marginal Way South; therefore, it is unknown whether groundwater is contributing to the recontamination of the LDW.

3.5.5 Planned Source Control Actions

The following source control actions are planned:

- Ecology will work with the City of Tukwila (in coordination with KCIA, Jorgensen, and Boeing) to determine the exact connections between the KCIA stormwater system and the City of Tukwila system. A comprehensive CAD file will be developed, showing the locations, connections, and discharges of all these stormwater systems.

- Ecology will work with the City of Tukwila to determine the exact location and connection of a large pipe that conveys drainage across the northern edge of the Jorgensen Forge site. The pipe location will be incorporated into the comprehensive CAD file mentioned above.

- Ecology will work with the City of Tukwila and KCIA to determine the connection of the large pipe and responsible party – the City of Tukwila or KCIA.

3.6 Atmospheric Deposition

King County and SPU have been monitoring atmospheric deposition to assess whether it is a potential source of phthalates, particularly BEHP, in stormwater runoff (King County and SPU, 2005). Sampling used passive deposition samplers (i.e., stainless steel bowls that drain into a glass bottle) at four locations in the LDW (as well as placing additional samplers in surrounding neighborhoods) to collected wet and dry deposition. Results showed PAH, benzyl butyl phthalate, and bis(2-ethylhexyl)phthalate in the Duwamish Valley at concentrations two to three times higher than outside the valley (i.e., Beacon Hill) during the winter months compared to the spring months (King County and SPU, 2005). This finding is consistent with historic Puget Sound Clean Air Agency (PSCAA) data showing atmospheric particulate concentrations trending higher during fall/winter months than during spring/summer months.

The King County/SPU (2005) study concluded that the LDW sample results compared well with studies conducted within the same airshed (i.e., Georgia Basin) and with other regions (i.e., Great Lakes and Roskilde Fjord [Denmark] studies). PAH values observed in LDW samples (0.006 to 0.28 micrograms per meter squared per day [$\mu g/m^2/day$]) were comparable to the average values reported for the Georgia Basin airshed (0.004 to 0.36 $\mu g/m^2/day$). The BEHP values in the LDW (0.23 to 3.5 $\mu g/m^2/day$) were higher than the Georgia Basin average values (0.3 to 0.6 $\mu g/m^2/day$), but were comparable with the results from the Denmark study (0.068 to 2.16 $\mu g/m^2/day$). However, the study found that further air deposition testing would allow the source control efforts to evaluate the reproducibility of results and to perform correlations with existing atmospheric measurements (e.g., particulate concentrations).

The PSCAA, a regional agency working in partnership with Ecology and EPA, monitors air quality in Puget Sound (King, Kitsap, Pierce, and Snohomish counties). Monitoring stations have been set up in Seattle, including stations on Beacon Hill and in the Duwamish Valley, measuring carbon monoxide, lead, sulfur dioxide, ozone, nitrogen oxide, and particulate matter (discrete solid or aerosol particles in the air) 10 and 2.5 micrometers in diameter in the air. With the exception of fine particulate matter 2.5 and ozone, criteria air pollutant concentrations have fallen well below levels of concern in Puget Sound (PSCAA, 2006). Based on complaints from residents in local neighborhoods, in 2004 the PSCAA surveyed the Duwamish Valley for increased levels of nitrogen oxide and sulfur dioxide. While results were inconclusive, circumstantial evidence pointed to the Lafarge Cement Plant as the source of these pollutants. Lafarge has since been working with the PSCAA to work at reducing its emissions (PSCAA, 2007). This plant is located few miles north of where the complaints originated and southwest of EAA-4.

Although no previous atmospheric deposition sampling has been conducted at any of the four sites draining to EAA-4, contaminants originating from nearby city streets and industry may be transported and deposited through the air at these sites. Contaminants deposited within the drainage areas are transported to these four areas via surface water runoff. There is not enough information about this contaminant transport mechanism to determine if it could result in contaminant concentrations within EAA-4 above local background levels observed in the LDW. King County and SPU concluded continual monitoring is required, as data at that time was insufficient. This sampling design assesses atmospheric deposition within the Duwamish Valley, near EAA-4.

3.6.1 Planned Source Control Actions

Atmospheric deposition will be further evaluated to assess whether atmospheric deposition is a potential source of phthalates (particularly bis(2-ethylhexyl) phthalate) and other contaminants (such as PCBs) in stormwater runoff. However, at this time, there are no available resources to address this issue. Any future atmospheric deposition work to assess potential sources of phthalates and other potential contaminants will consider the findings and recommendations of the Phthalate Work Group.

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4.0 Monitoring

Monitoring efforts by Boeing and Jorgensen Forge will continue to assist in identifying and tracing ongoing sources of the COCs present in the LDW sediments. This information is being used to focus source control efforts on specific problem areas within EAA-4 drainage basin and to track the progress of the source control program. The following types of sampling will continue to be implemented:

- Additional source tracing within the drainage basin to identify potential ongoing discharges to the LDW (e.g., in-line sediment grabs and traps, and onsite/right-of-way catch basin sampling).
- Soil and groundwater sampling, as necessary.

If monitoring data indicates additional sources of sediment recontamination are present then Ecology will identify additional source control activities as appropriate.

Because source control is a repetitive process, monitoring is necessary to identify trends in concentrations of COCs. In-water sediment monitoring is anticipated to continue for some years. Decisions to discontinue monitoring will be made jointly by Ecology and EPA, based on the evidence. At this time, Ecology plans to review the progress and data on the action items for each Action Plan annually, and will periodically update the plans with technical memoranda.

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5.0 Tracking and Reporting of Source Control Activities

Ecology is the lead for tracking, documenting, and reporting the status of source control to EPA. In turn, source control activities will be documented by the appropriate parties performing the source control work. The parties will provide reports to Ecology, who will provide LDW-wide and basin-specific reports.

The management of information and data is divided into two levels. The first level is documentation and tracking, where information is organized so that Ecology can track and manage source control activities at a given source or within a given basin. The second level is reporting to EPA. Please refer to the *Lower Duwamish Source Control Strategy* for further details (Ecology, 2004a).

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7.0 Figures

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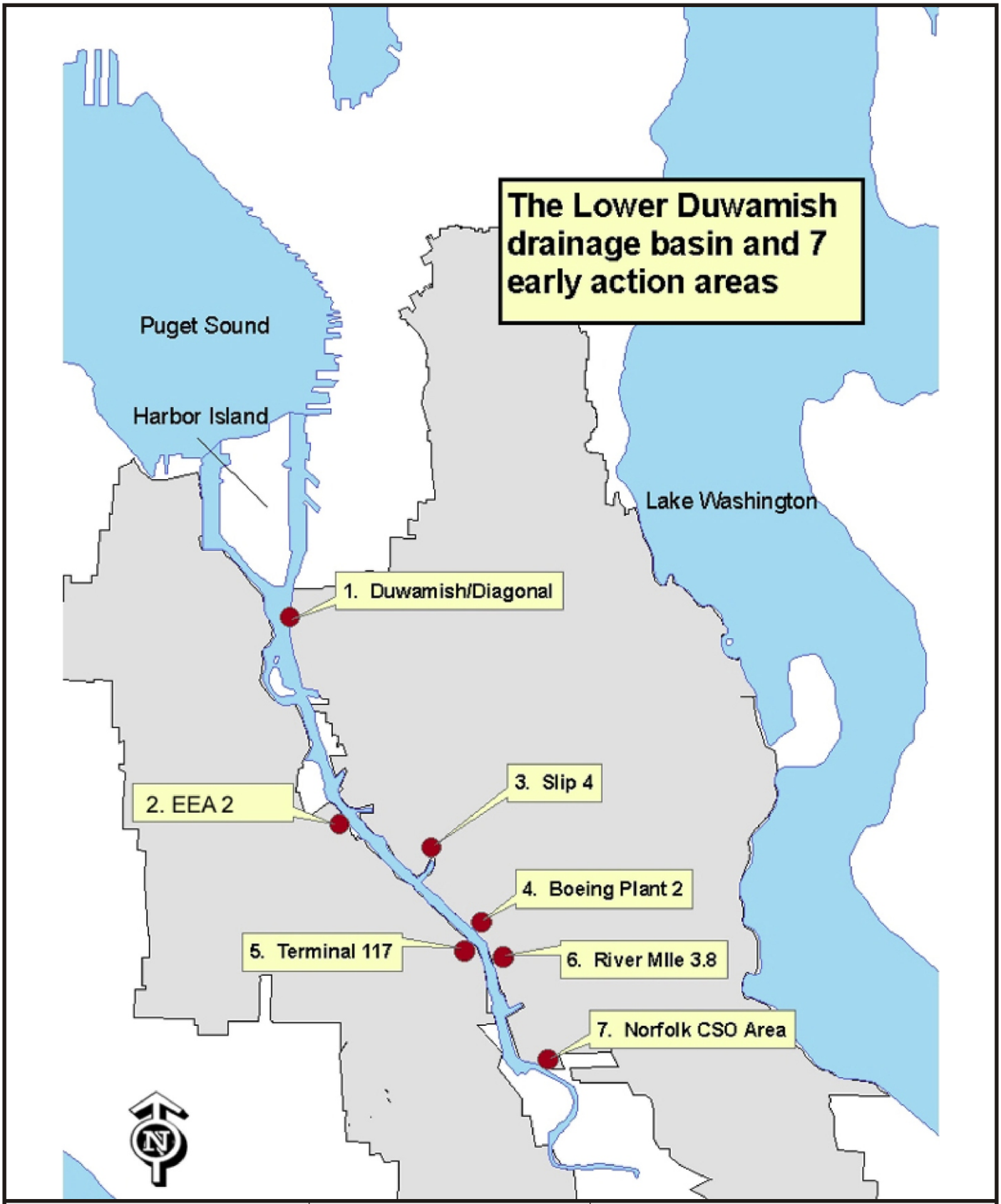

ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY EARLY ACTION AREA 4 Seattle, Washington	Figure 1 LOWER DUWAMISH WATERWAY EARLY ACTION AREAS		
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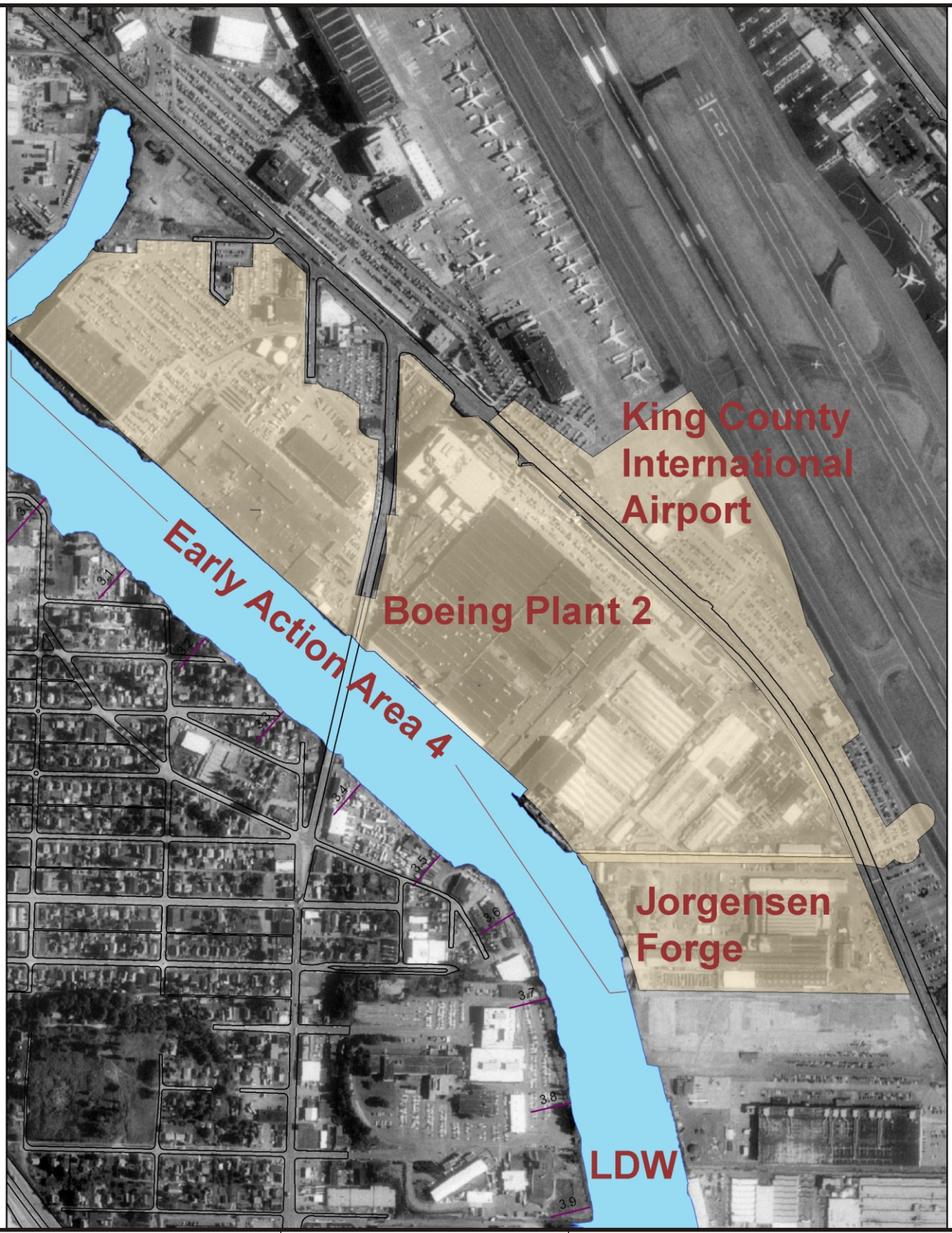

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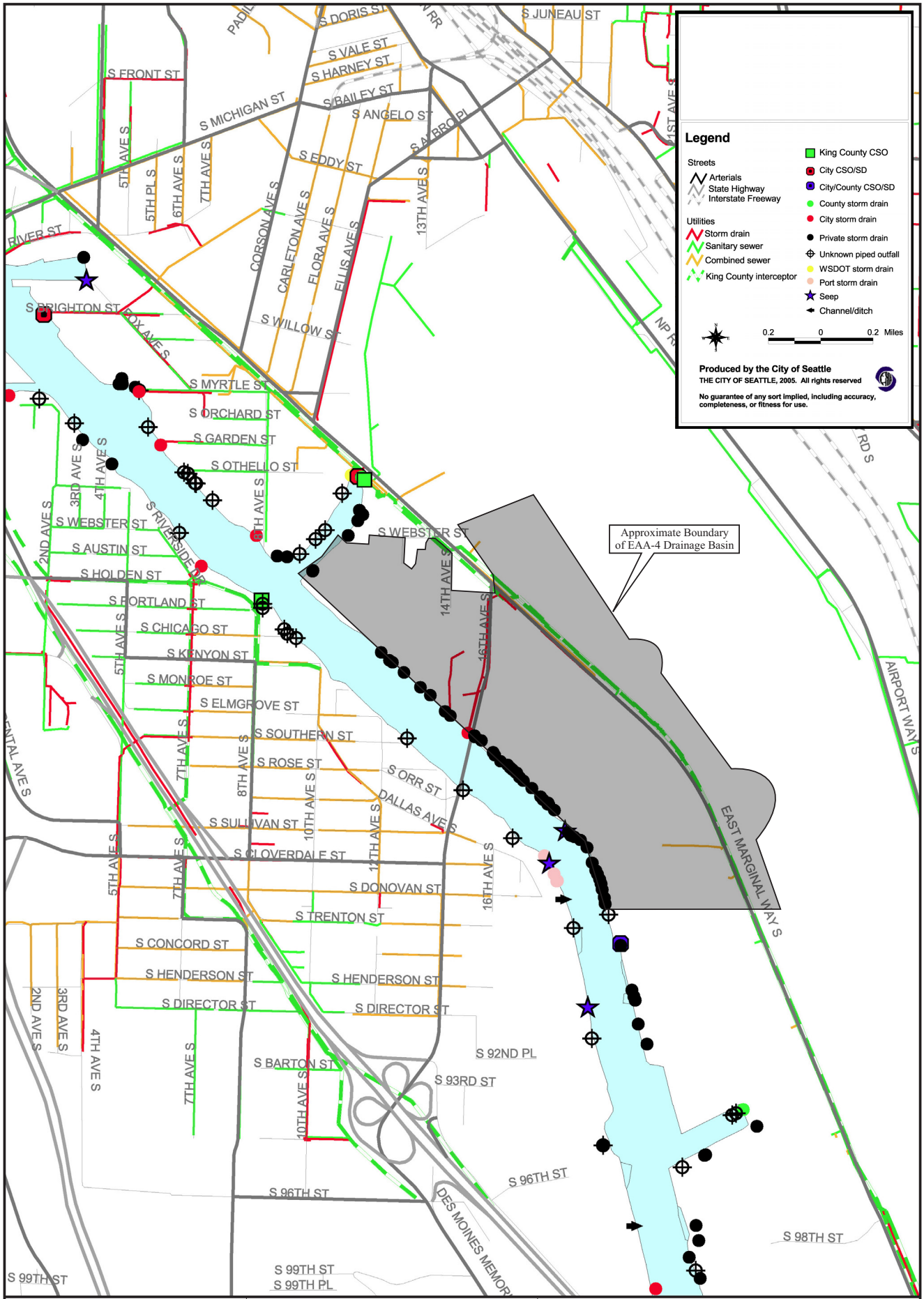
LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle, Washington

Figure 2
EAA 4 DRAINAGE BASIN AND
POTENTIAL SOURCES OF CONTAMINATION

Base Map Reference: Boeing, March 2006.

Date:	Drawn by:	
6-22-07	AES	10:002330WD0702\fig 2



ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY EARLY ACTION AREA 4 Seattle/Tukwila, Washington	Figure 3 OUTFALLS IN THE LOWER DUWAMISH WATERWAY		
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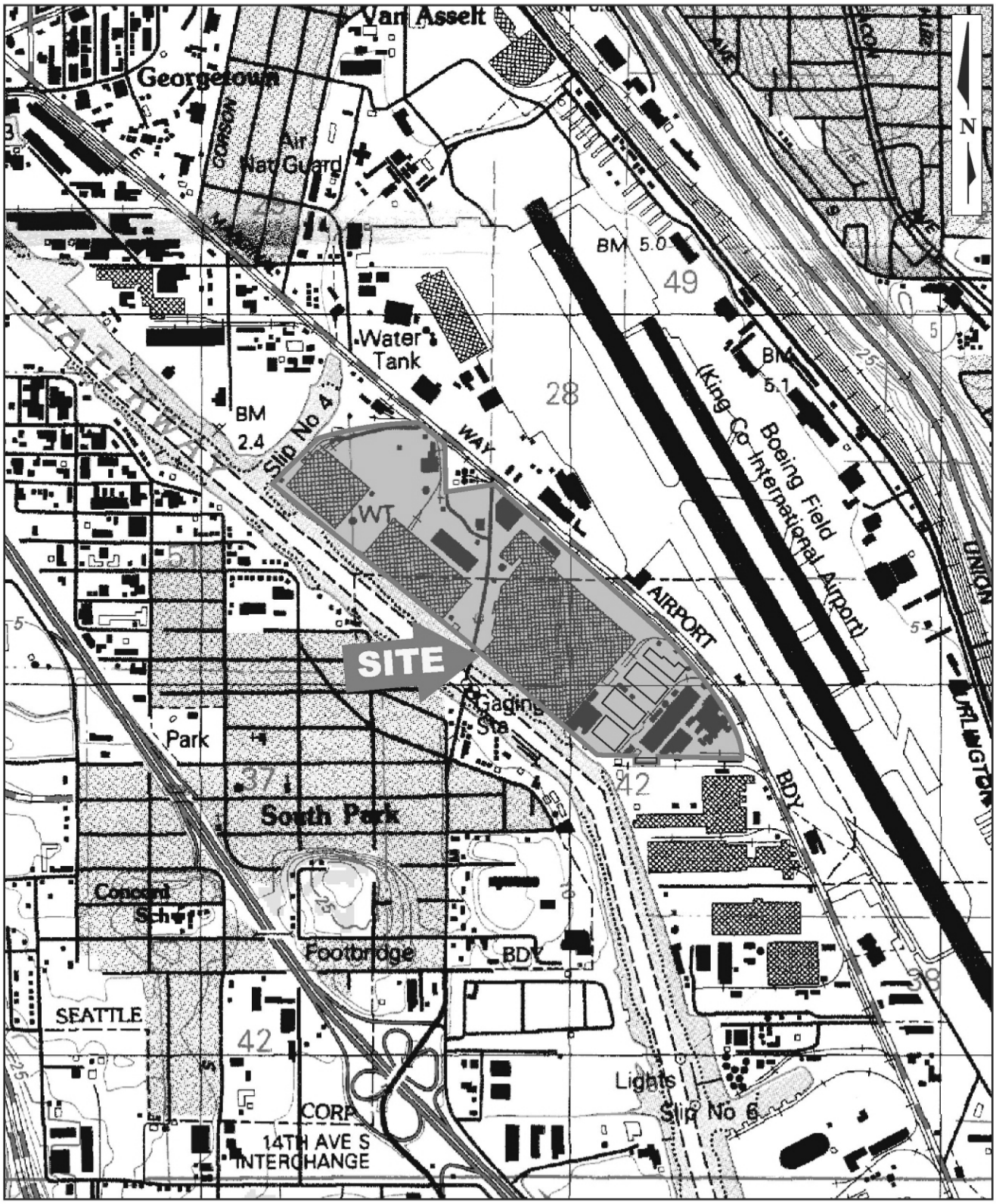

ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY EARLY ACTION AREA 4 Seattle/Tukwila, Washington	Figure 4 BOEING PLANT 2 FACILITY MAP		
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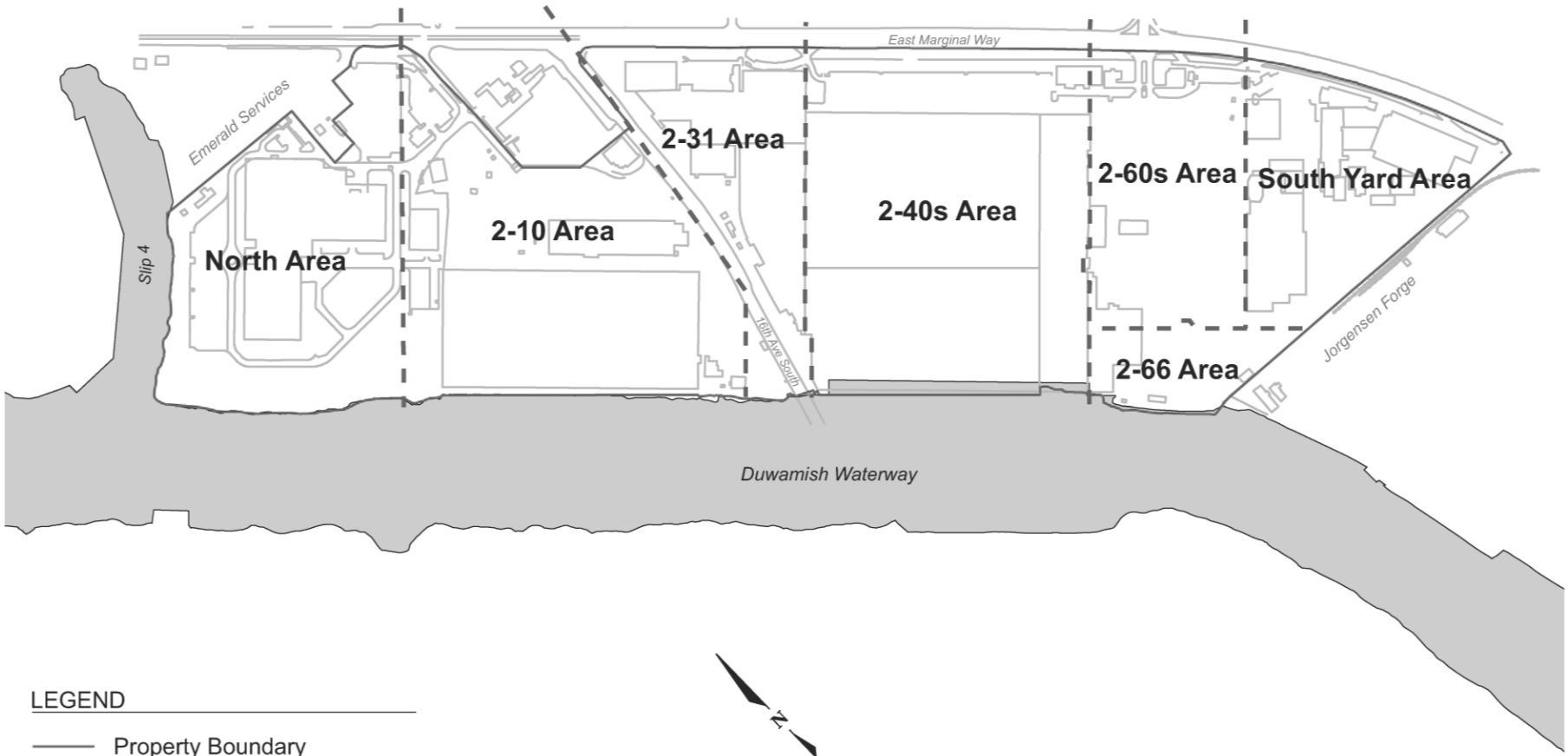

Source: Floyd Snider McCarthy, Inc (06/23/04)

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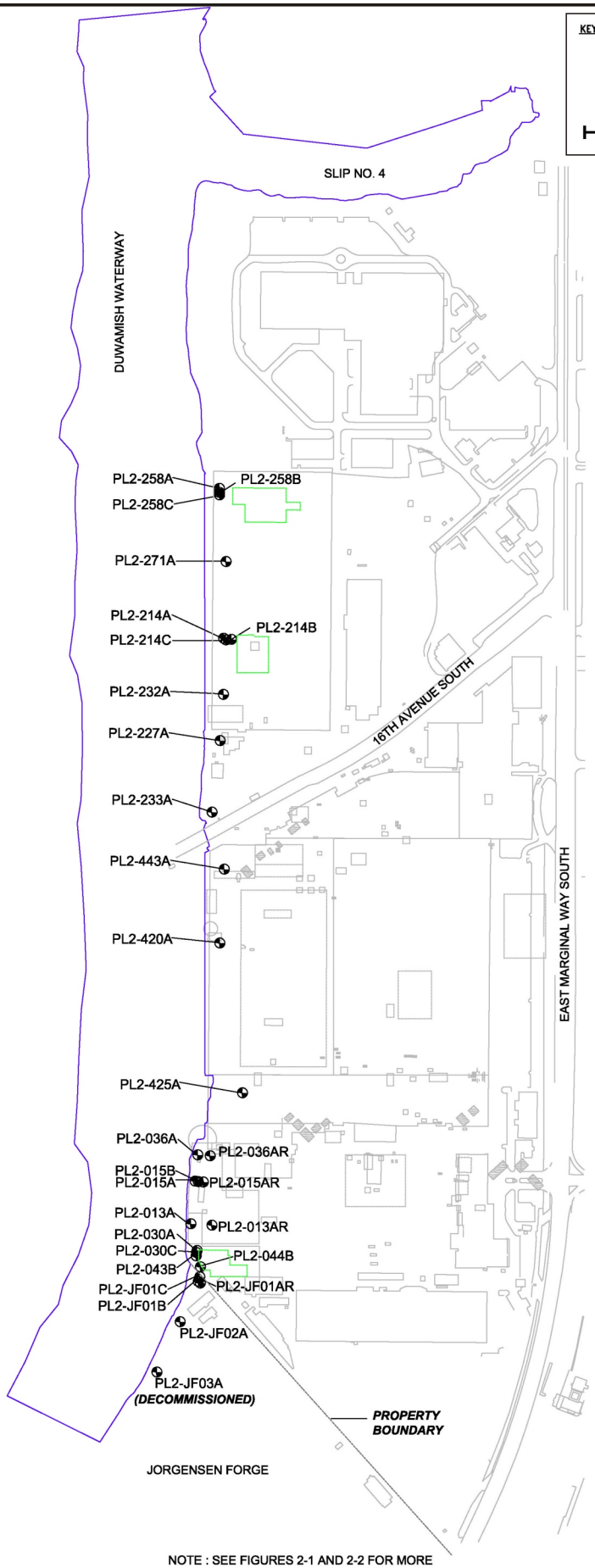
LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 5
BOEING PLANT 2 FACILITY
7 CORRECTIVE MEASURE STUDY AREAS

Base Map Reference: Golder Associates, 2005.

Date: 2/23/07 | Drawn by: AES | 10:002330WD0702\fig 5



NOTE : SEE FIGURES 2-1 AND 2-2 FOR MORE DETAILED WELL LOCATION MAPS

PLANT 2 RCRA CORRECTIVE ACTION
SHORELINE MONITORING SCHEDULE

Well Designation	Laboratory Analysis: Volatile Organic Compounds			PP Metals		PCB
	Quarterly	Semi-Annually	Annually	Quarterly	Annually	Quarterly
PL2 -013A	X			X		
PL2 -013AR	X			X		
PL2 -015A	X			X		
PL2-015AR	X			X		
PL2-015B	X			X		
PL2-030A	X			X		
PL2-030C	X				X	
PL2-036A		X		X		X
PL2-036AR		X		X		X
PL2-043B	X			X		
PL2-044B	X				X	
PL2-214A	X			X		
PL2-214B	X			X		
PL2-214C		X			X	
PL2-227A			X	X		
PL2-232A		X		X		
PL2-233A		X		X		
PL2-258A	X			X		
PL2-258B	X			X		
PL2-258C		X			X	
PL2-271A		X		X		
PL2-420A	X				X	
PL2-425A		X		X		
PL2-443A	X			X		
PL2-JF01AR	X			X		
PL2-JF01B	X			X		
PL2-JF01C		X			X	
PL2-JF02A	X			X		

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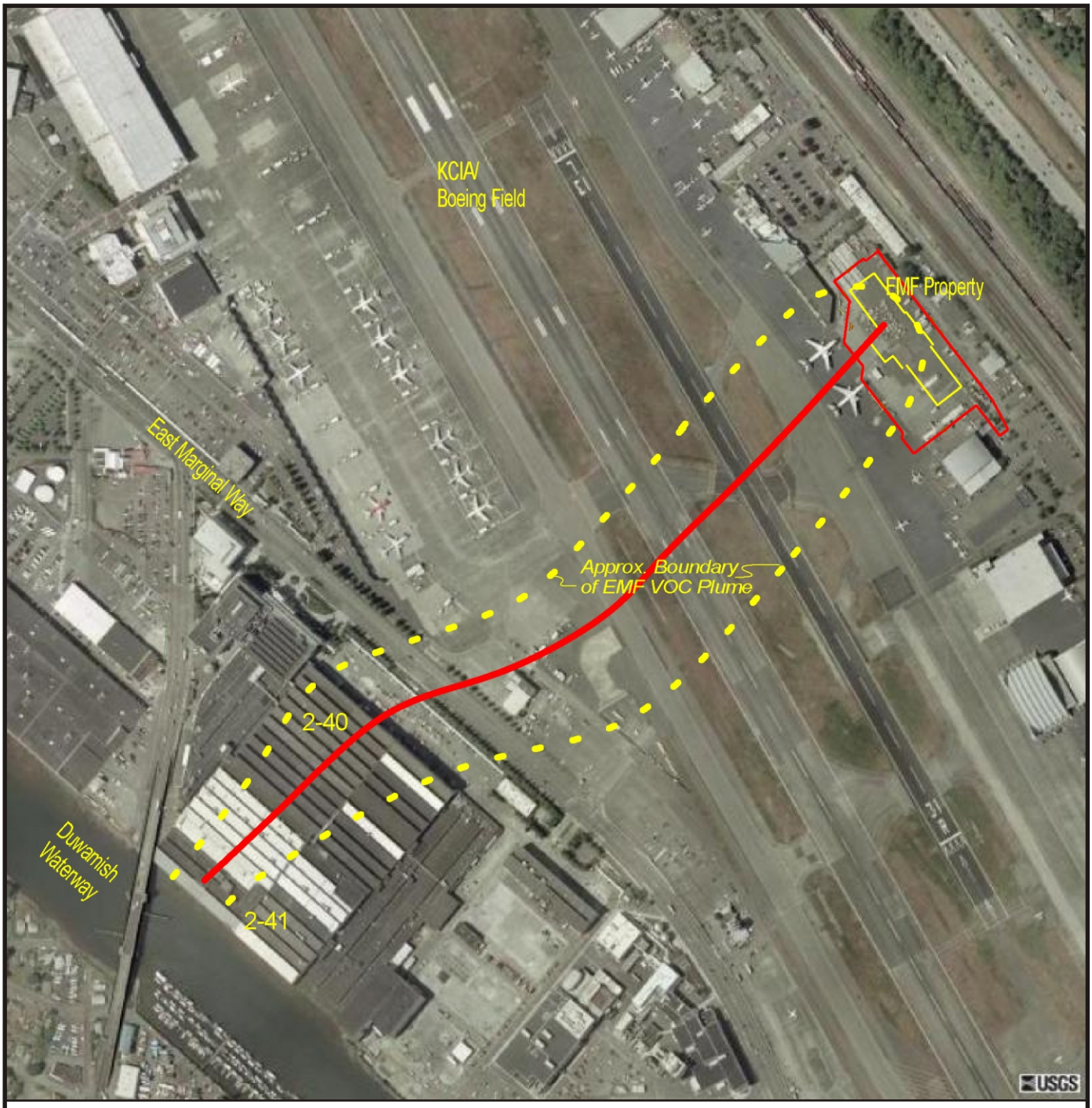
	Base Map Reference: Environmental Partners, Inc. 2006.	Date: 4/5/07	Drawn by: AES 10:002330WD0702\fig 6



N

0 500 1000

Approximate Scale in Feet

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LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 7

LOCATION OF THE EMF PLUME
AT BOEING PLANT 2

Source: Boeing, 2007a.

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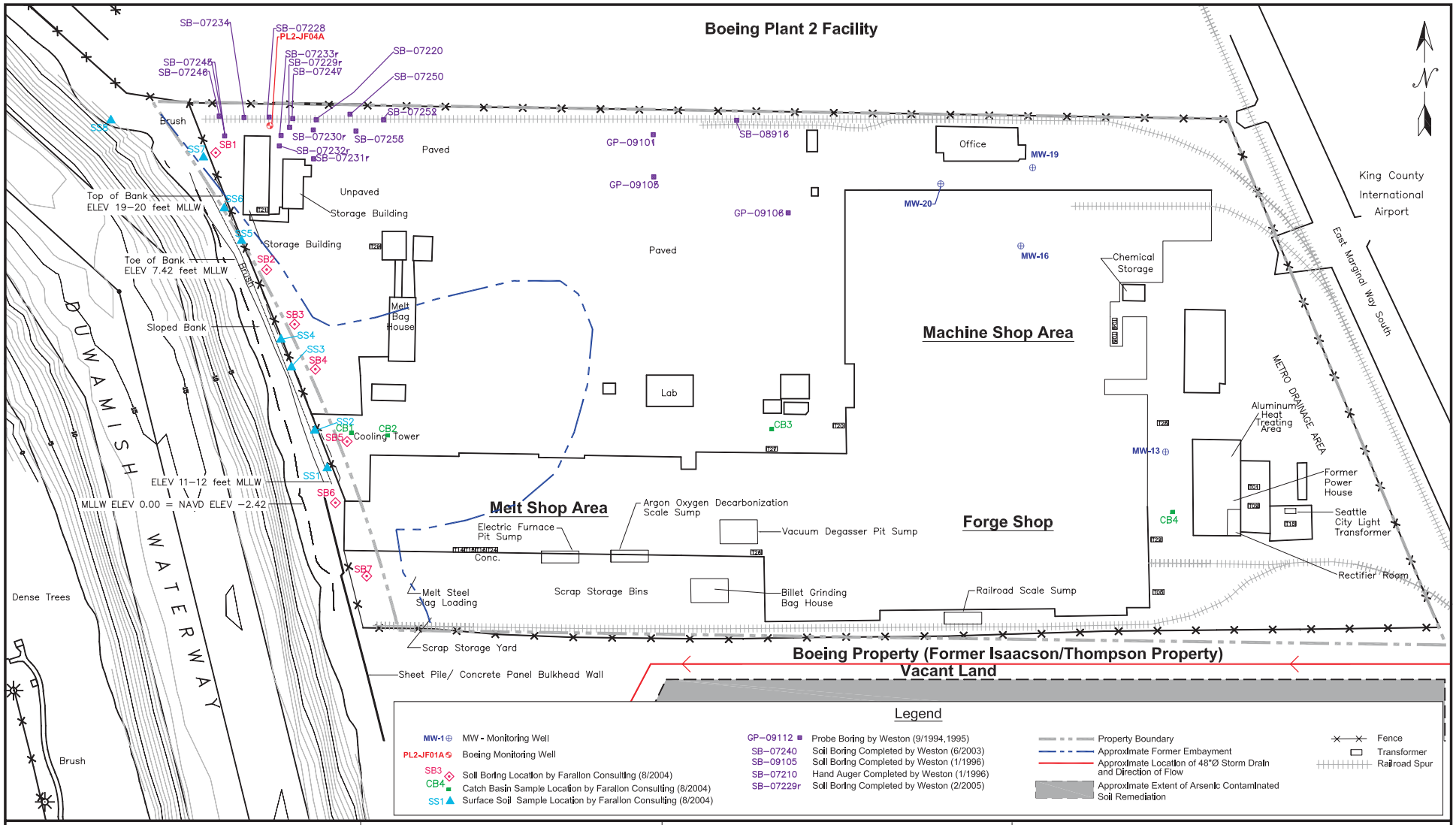
11-14-07	AES	10:002330WD0702\fig 7



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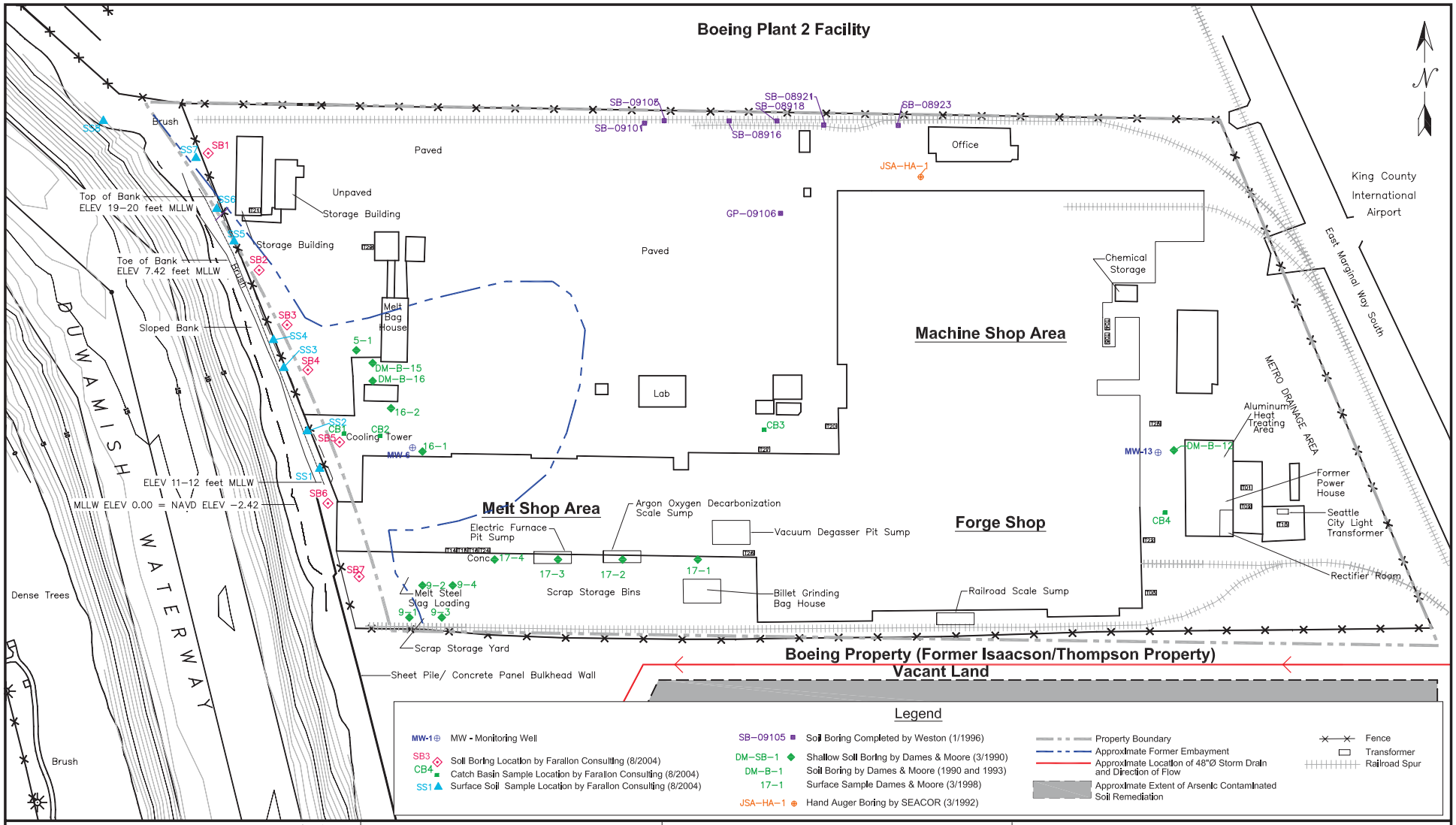
0 120 240
Approximate Scale in Feet

Source: Farallon Consulting, L.L.C. and Anchor Environmental, L.L.C 2006.

LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 8
SITE PLAN SHOWING SAMPLE LOCATIONS FOR PCB DATA IN SOIL
JORGENSEN FORGE FACILITY

Date: 10/1/07 | Drawn by: | 10:002330WD0702\fig 8



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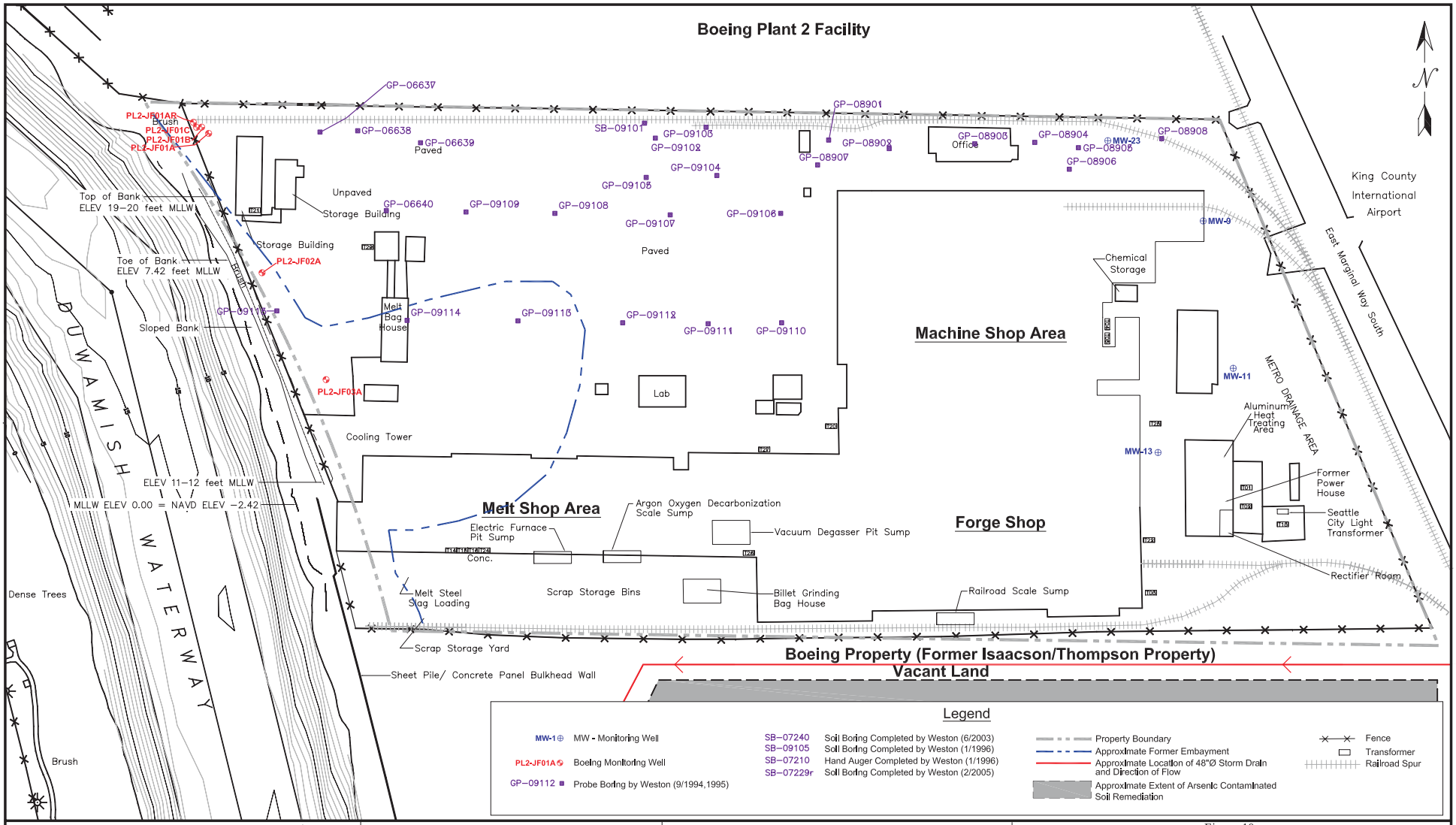
0 120 240
Approximate Scale in Feet

Source: Farallon Consulting, L.L.C. and Anchor Environmental, L.L.C 2006.

LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 9
SITE PLAN SHOWING SAMPLE LOCATIONS FOR METALS DATA IN SOIL
JORGENSEN FORGE FACILITY

Date:	Drawn by:	
10/1/07		10:002330WD0702\fig 9



ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

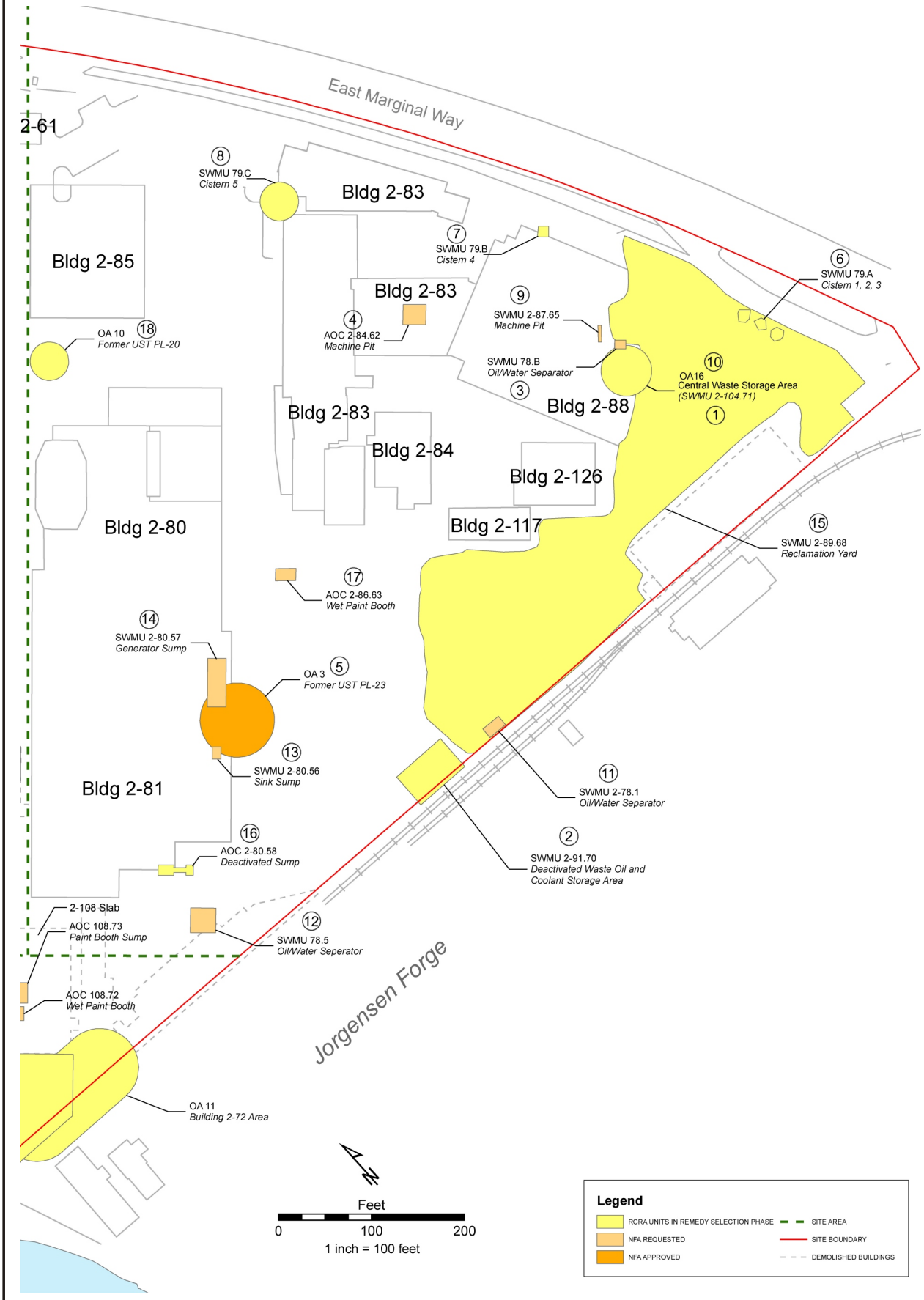
0 120 240
Approximate Scale in Feet

Source: Farallon Consulting, L.L.C. and Anchor Environmental, L.L.C 2006.

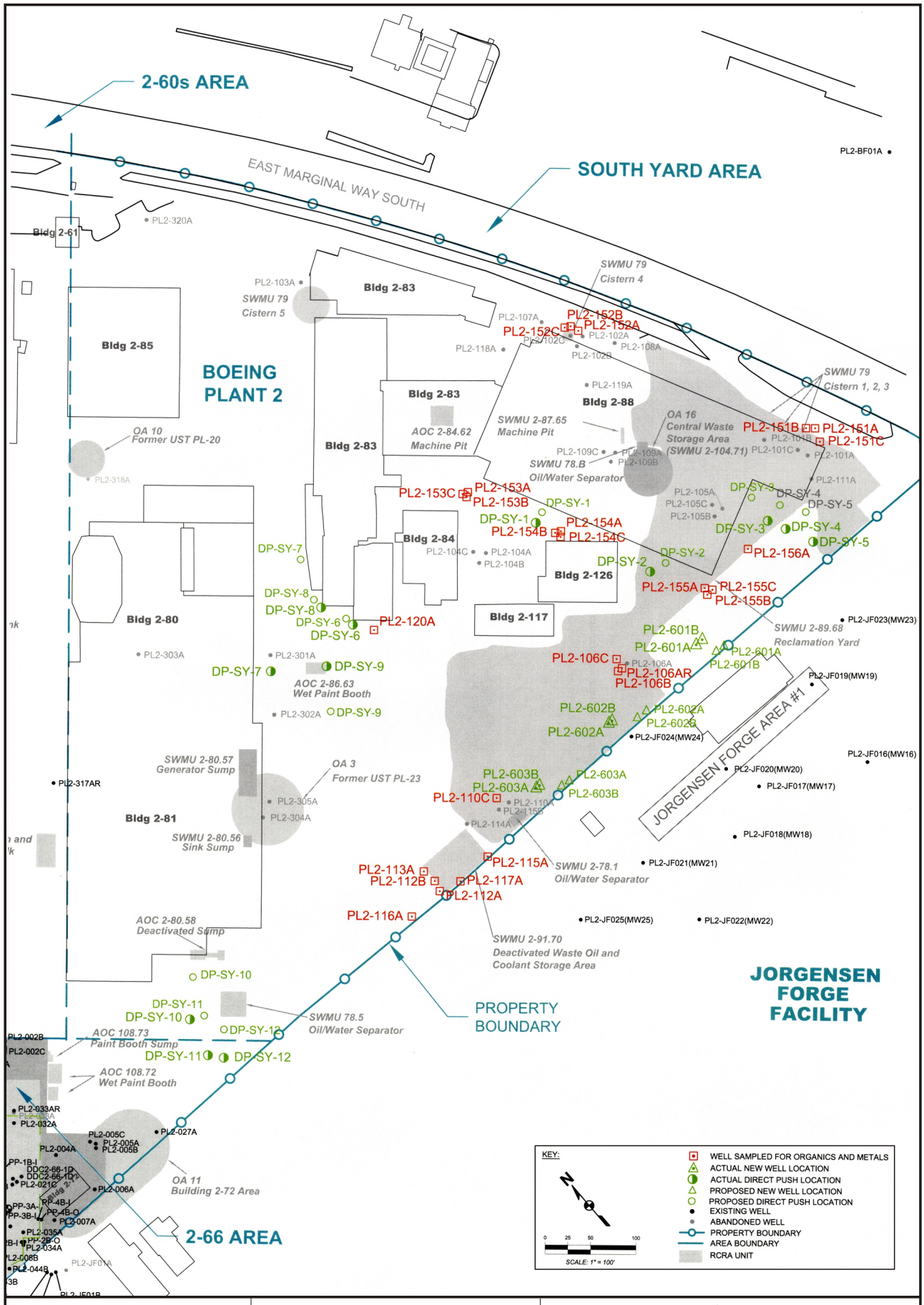
LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 10
SITE PLAN SHOWING SAMPLE LOCATIONS FOR METALS DATA IN GROUNDWATER
JORGENSEN FORGE FACILITY

Date: 10/1/07 | Drawn by: | 10:002330WD0702\fig 10



ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY EARLY ACTION AREA 4 Seattle/Tukwila, Washington	Figure 11 BOEING PLANT 2 FACILITY SOUTH YARD RCRA UNITS		
	Base Map Reference: Floyd/Snider 2005.	Date: 2/23/07	Drawn by: AES	10:002330WD0702\fig 11



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LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

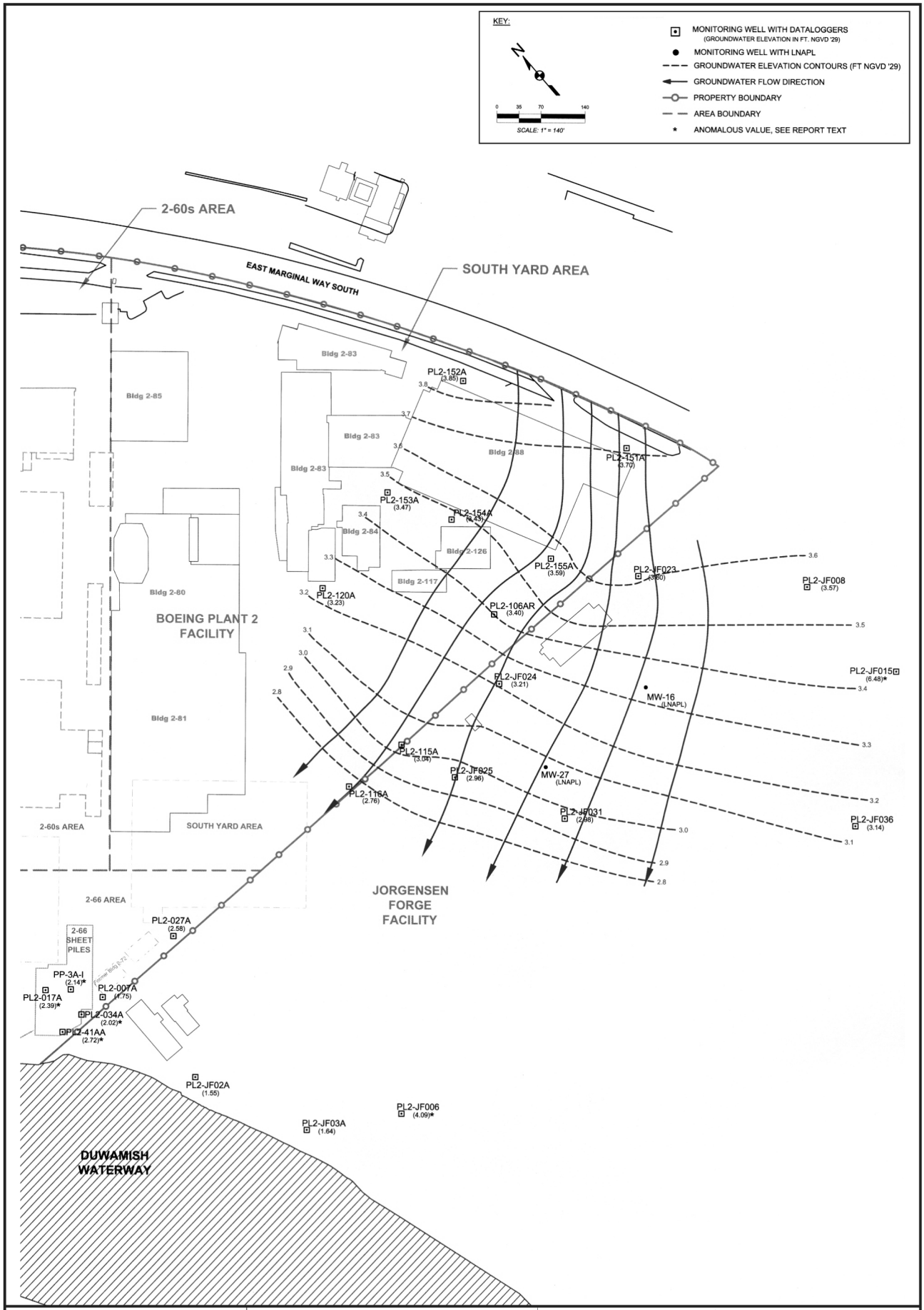
Figure 12
BOEING PLANT 2 FACILITY
SOUTH YARD AREA SAMPLING LOCATIONS

Base Map Reference: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

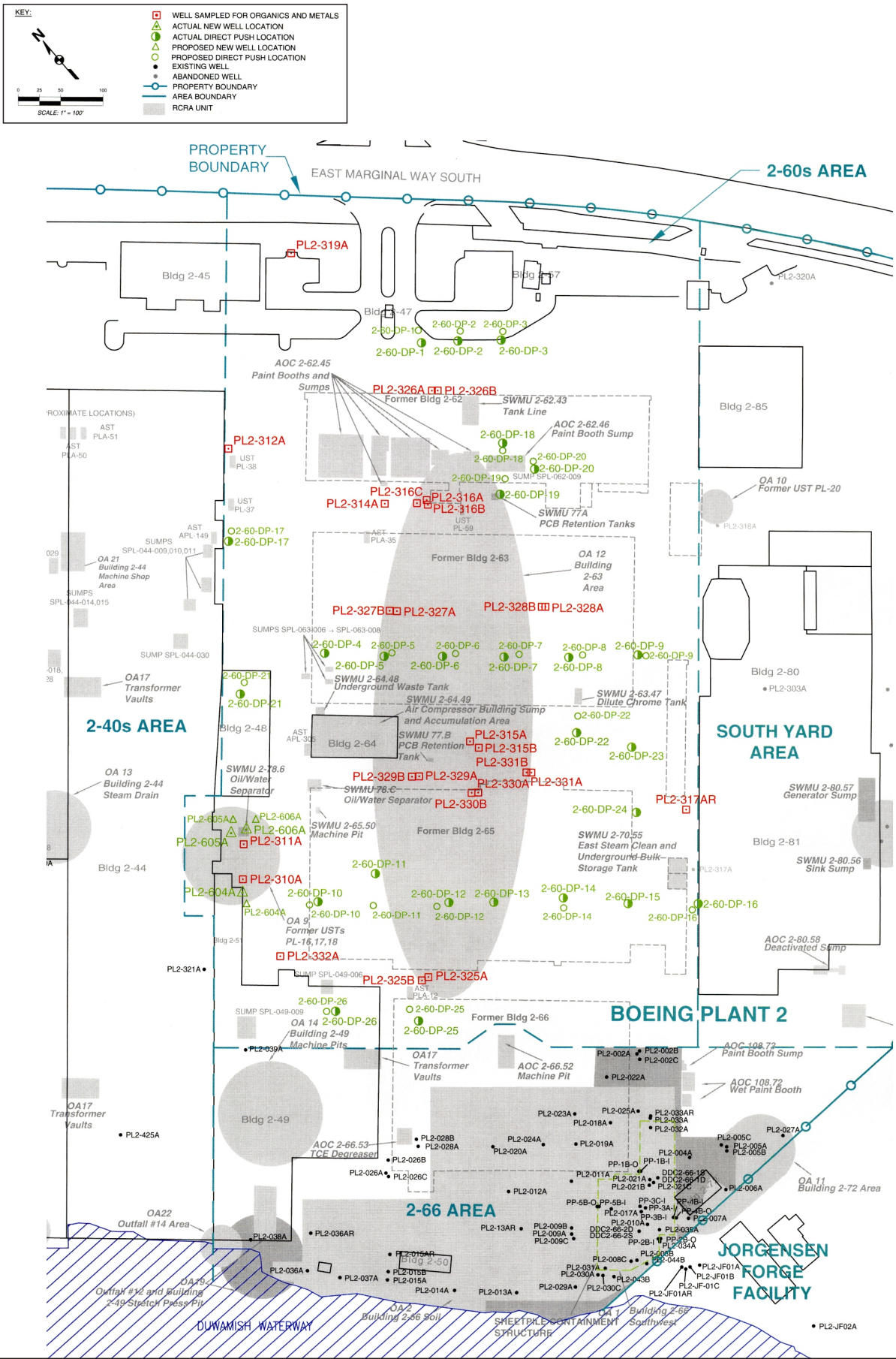
Date: 2/23/07

Drawn by: AES

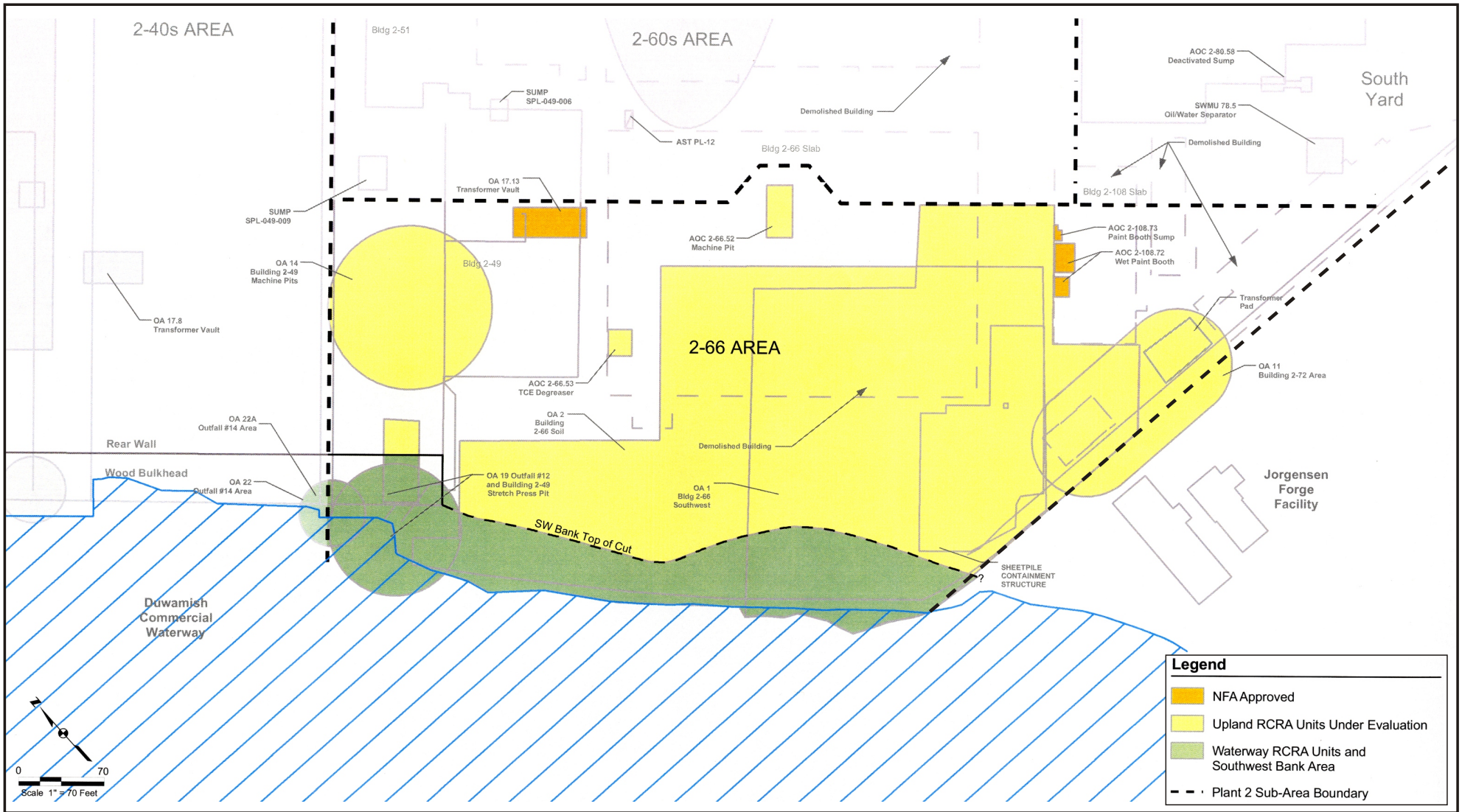
10:002330WD0702\fig 12



ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY EARLY ACTION AREA 4 Seattle/Tukwila, Washington	Figure 13 BOEING PLANT 2 MEAN GROUNDWATER ELEVATION, SOUTH YARD AREA FEBRUARY 1, 2005 TO FEBRUARY 4, 2005		
	Base Map Reference: Environmental Partners, Inc.; Golder Associates, Inc. 2006.	Date: 4/13/07	Drawn by: AES	10:002330WD0702\fig 13



ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY EARLY ACTION AREA 4 Seattle/Tukwila, Washington	Figure 14 BOEING PLANT 2 FACILITY 2-60S AREA PROPOSED SAMPLING LOCATIONS	
	Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.	Date: 2/23/07	Drawn by: AES	10:002330WD0702\fig 14



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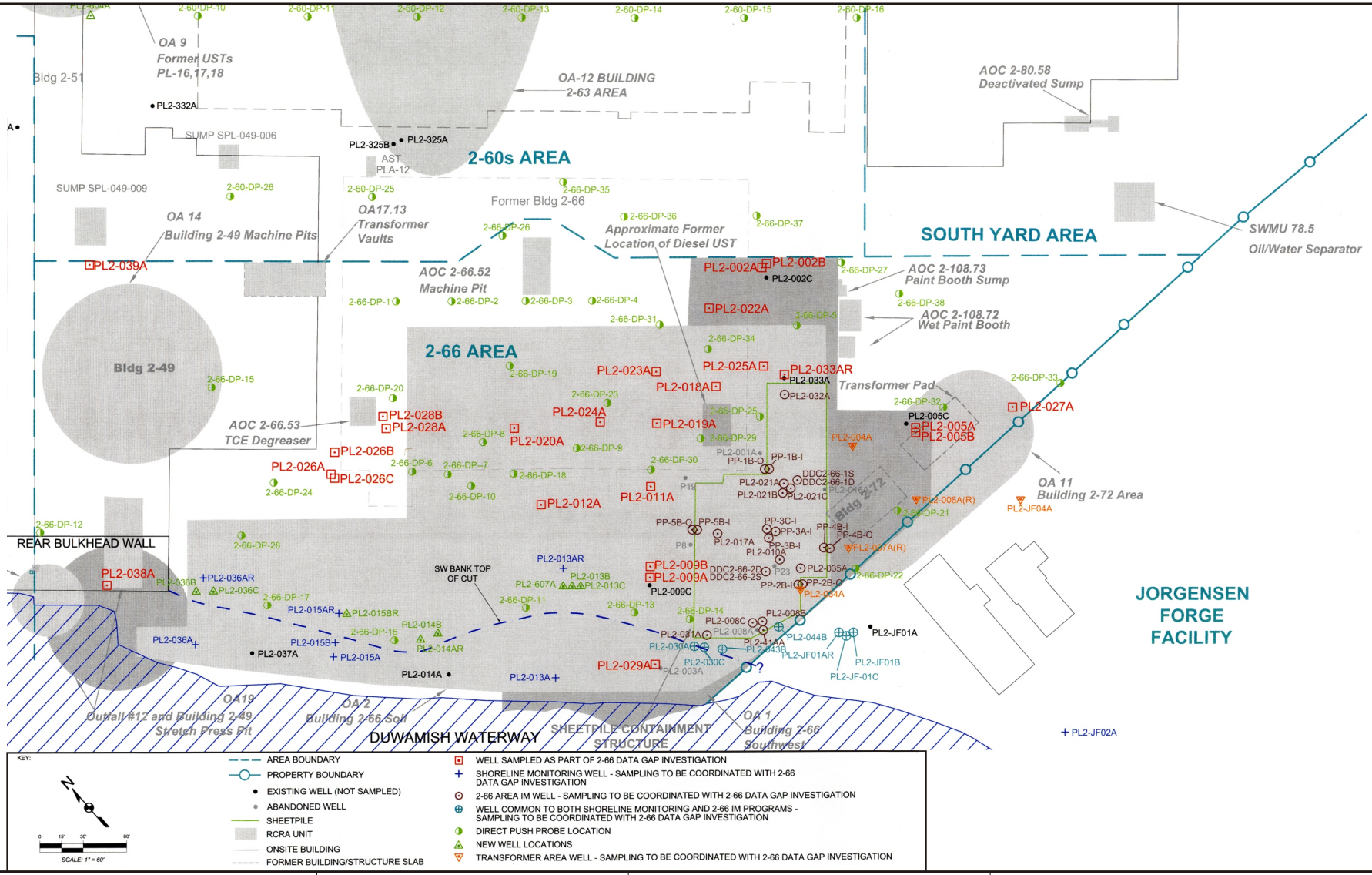
Base Map Reference: Environmental Partners, Inc.; Golder Associates, Inc. 2006

LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 15
BOEING PLANT 2 FACILITY
2-66 AREA RCRA UNITS

Date:	Drawn by:	
4/5/07	AES	10:002330WD0702\fig 15



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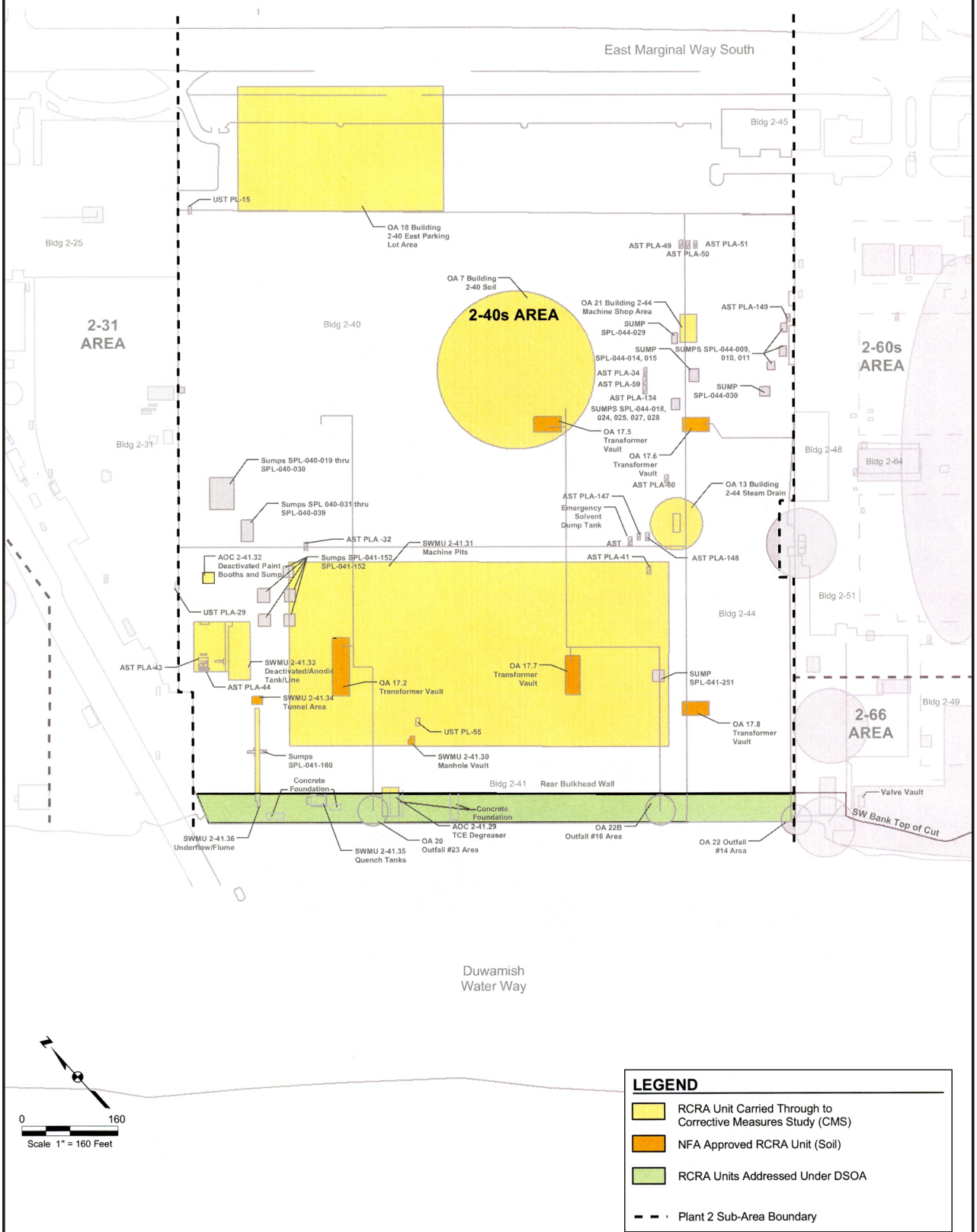
Base Map Reference: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 16
BOEING PLANT 2 FACILITY
2-66 AREA PROPOSED SAMPLING LOCATIONS

Date:	Drawn by:	
4/5/07	AES	10:002330WD0702\fig 16



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LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

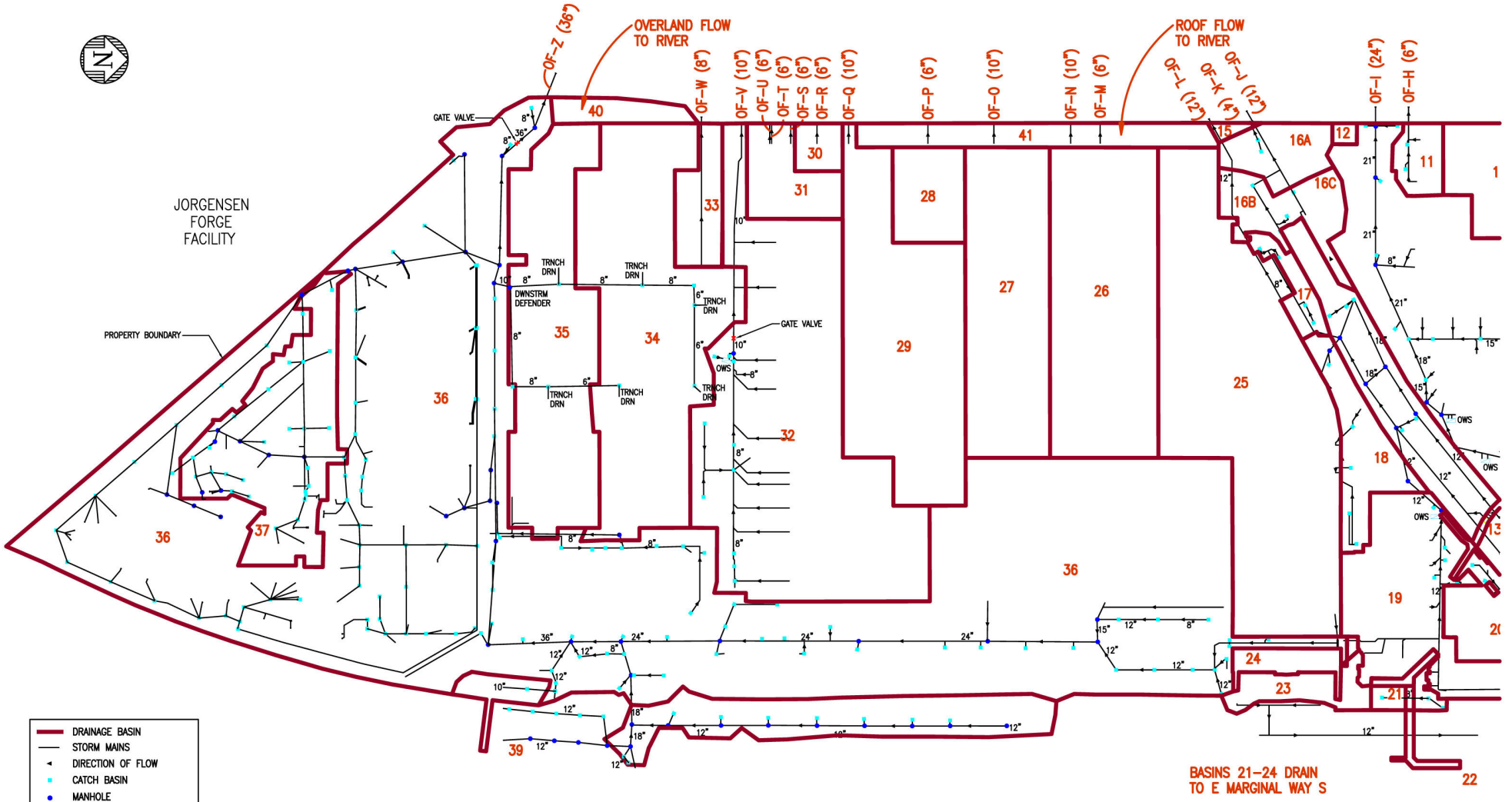
Figure 17
BOEING PLANT 2 FACILITY
2-40S AREA RCRA UNITS

Base Map Reference: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Date: 2/23/07

Drawn by: AES

10:002330WD0702\fig 17



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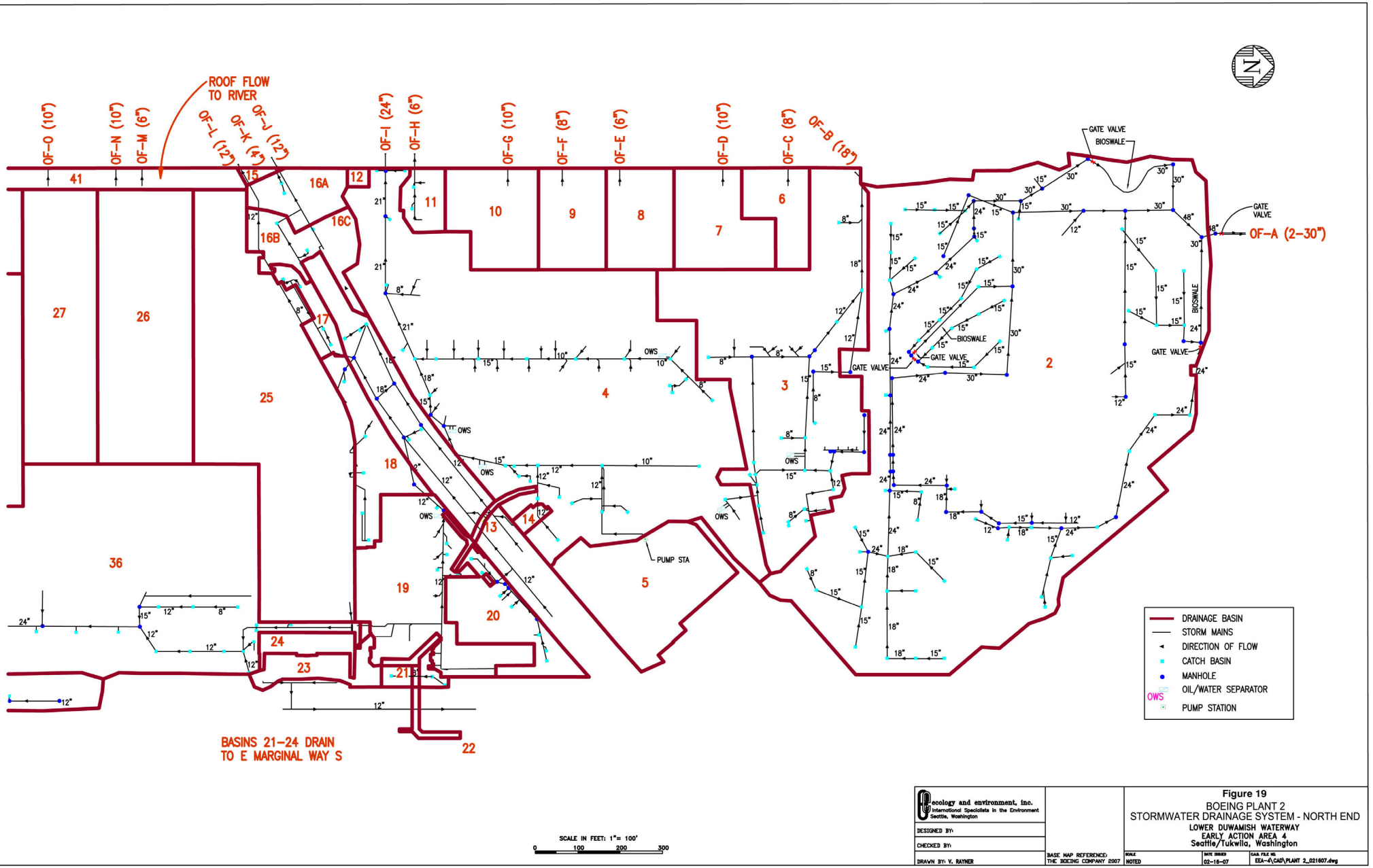
DESIGNED BY:
CHECKED BY:
DRAWN BY: V. RAYNER

BASE MAP REFERENCED: THE BOEING COMPANY 2007

Figure 18
BOEING PLANT 2
STORMWATER DRAINAGE SYSTEM - SOUTH END
LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

SCALE: NOTED
DATE ISSUED: 04-18-07
CAD FILE NO.: EEA-4\CAD\PLANT 2_041807.dwg



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DESIGNED BY:
CHECKED BY:
DRAWN BY: V. RAYNER

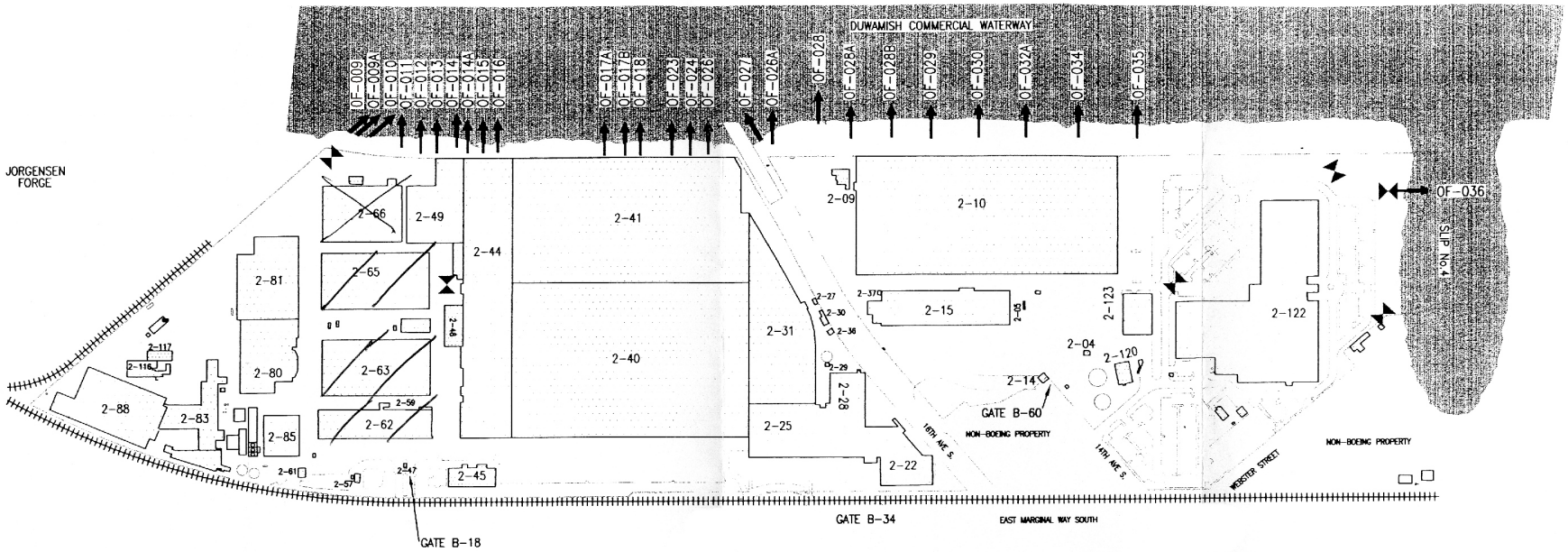
BASE MAP REFERENCE: THE BOEING COMPANY 2007

Figure 19
BOEING PLANT 2
STORMWATER DRAINAGE SYSTEM - NORTH END
LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

SCALE	DATE ISSUED	CAD FILE NO.
NOTED	02-16-07	EEA-4\CAD\PLANT 2_021607.dwg

BOEING COMMERCIAL AIRPLANE GROUP

PLANT 2



OUTFALL DIAMETERS

OF-9A	36"	OF-26	12"
OF-10	18"	OF-27	18"
OF-11	15"	OF-26A	4"
OF-12	8"	OF-28	24"
OF-13	2.5"	OF-28B	10"
OF-14	10"	OF-29	8"
OF-14A	6"	OF-30	6"
OF-15	6"	OF-32A	10"
OF-16	10"	OF-34	8"
OF-17B	6"	OF-35	18"
OF-18	10"	OF-36	30"
OF-23	6 PIPES	-	

LEGEND

RAILROAD TRACKS

BUILDINGS

STORM OUTFALL

GATE VALVE (SHUT OFF)

N

200' 0 200' 400'

SCALE IN FEET

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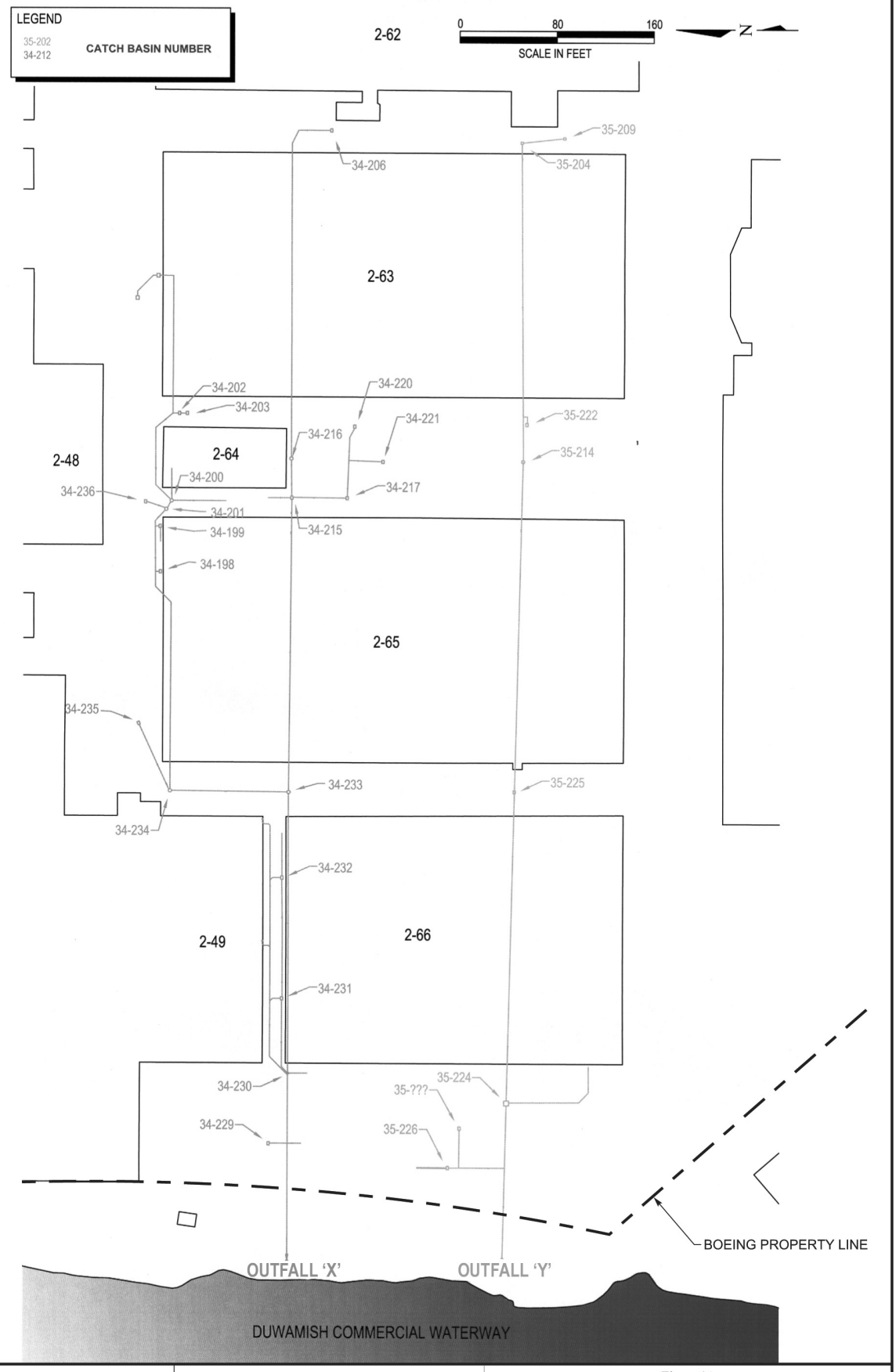
Base Map Reference: Boeing 2000.

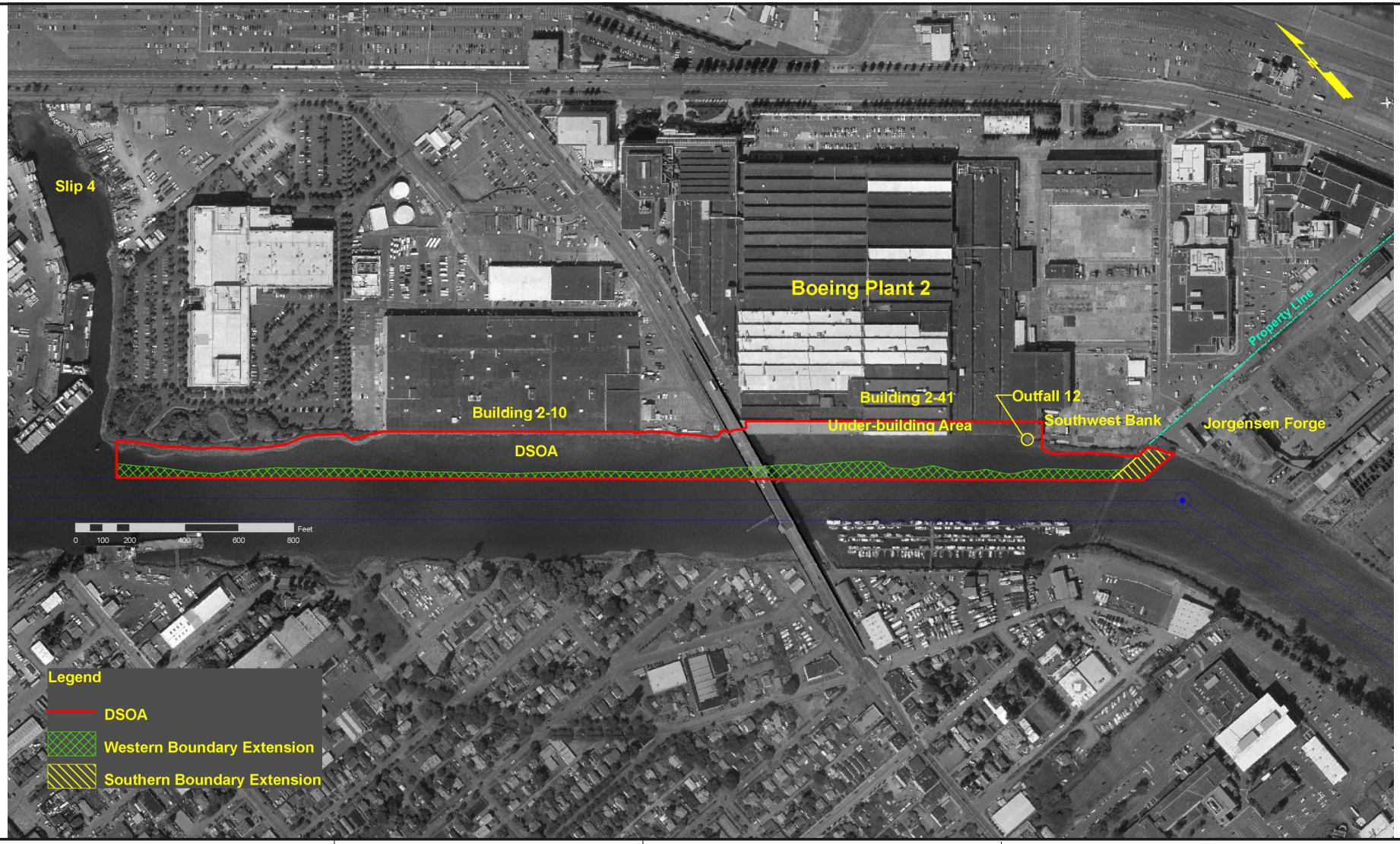
LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 20
BOEING PLANT 2 FACILITY
OUTFALLS WITH FORMER IDENTIFIERS

Date:	Drawn by:	
11/13/07	AES	10:002330WD0702\fig 20



ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY EARLY ACTION AREA 4 Seattle/Tukwila, Washington	Figure 21 BOEING PLANT 2 FACILITY STORMWATER LINES X AND Y		
	Base Map Reference: Golder Associates, Inc. 2006.	Date: 5/23/07	Drawn by: AES	10:002330WD0702\fig 21



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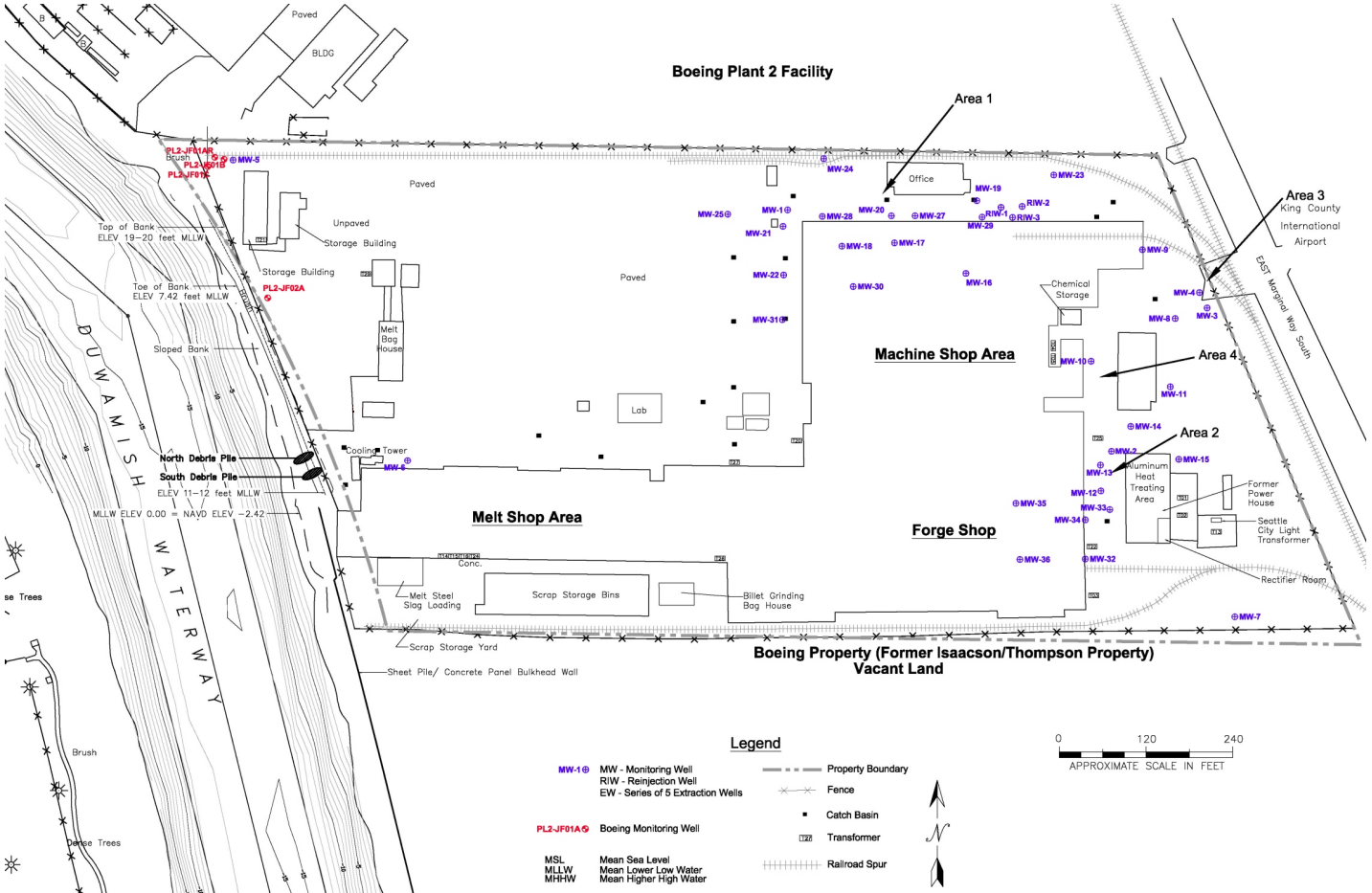
Base Map Reference: MCS Environmental, Inc. 2006.

LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 22
BOEING PLANT 2 FACILITY
LOCATION OF DUWAMISH SEDIMENT OTHER AREA AND
SOUTHWEST BANK CORRECTIVE MEASURE

Date:	Drawn by:	
2/23/07	AES	10:002330WD0702\fig 22



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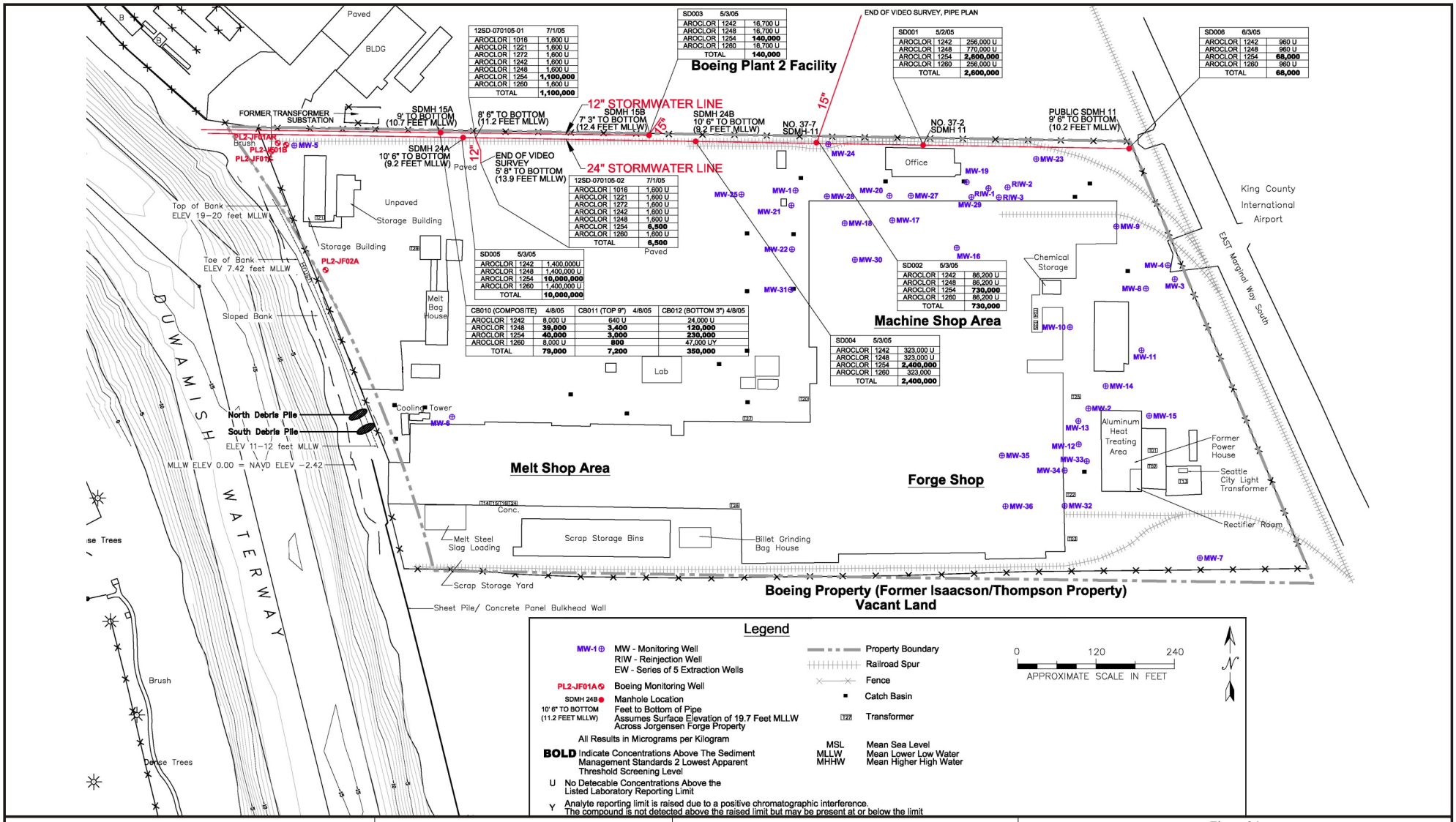
Base Map Reference: Farallon Consulting, L.L.C.; Anchor Environmental, L.L.C. 2005.

LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 23
JORGENSEN FORGE FACILITY
LOCATION OF MONITORING WELLS

Date:	Drawn by:	
12/11/07	AES	10:002330WD0702\fig 23



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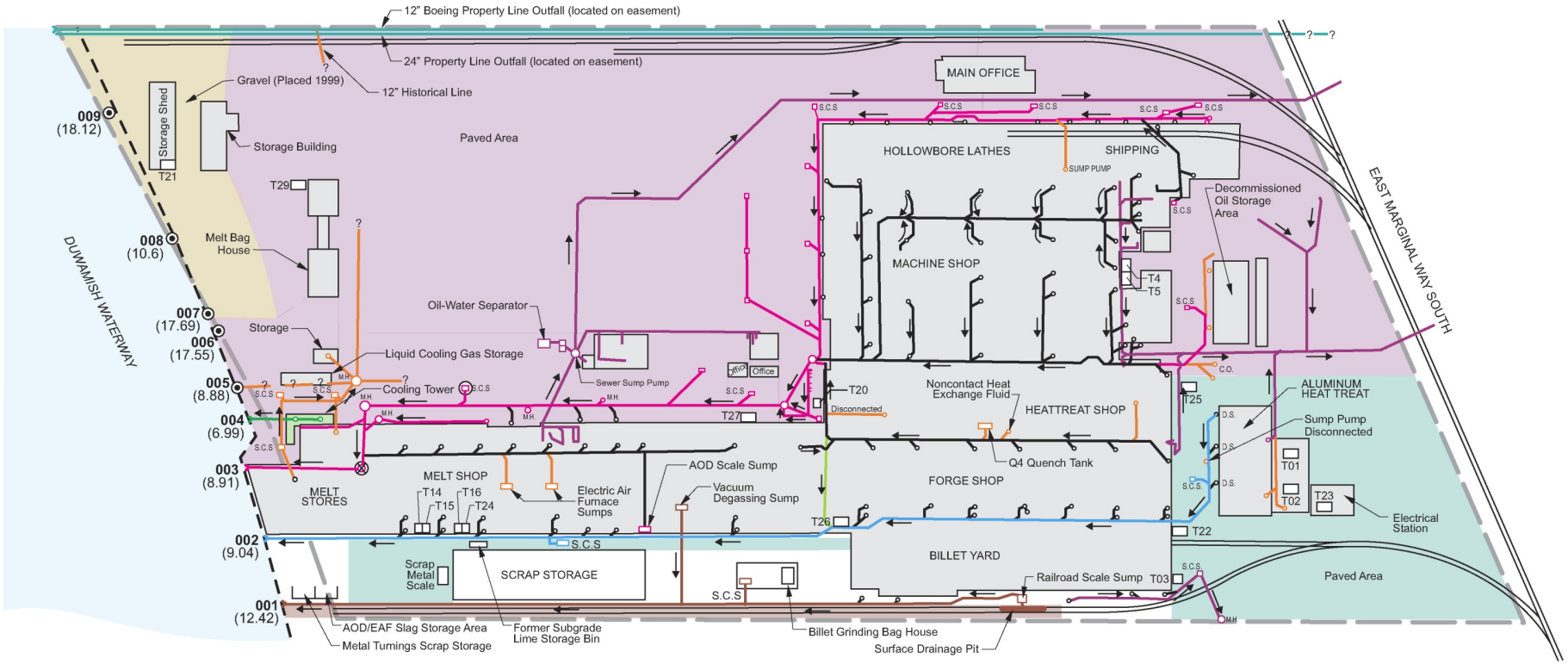
Base Map Reference: Earle M. Jorgensen Company 2005.

LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 24
JORGENSEN FORGE FACILITY
JORGENSEN FORGE FACILITY - BOEING PLANT 2 FACILITY
PROPERTY LINE STORMWATER LINES

Date:	Drawn by:	
4/5/07	AES	10:002330WD0702\fig 24



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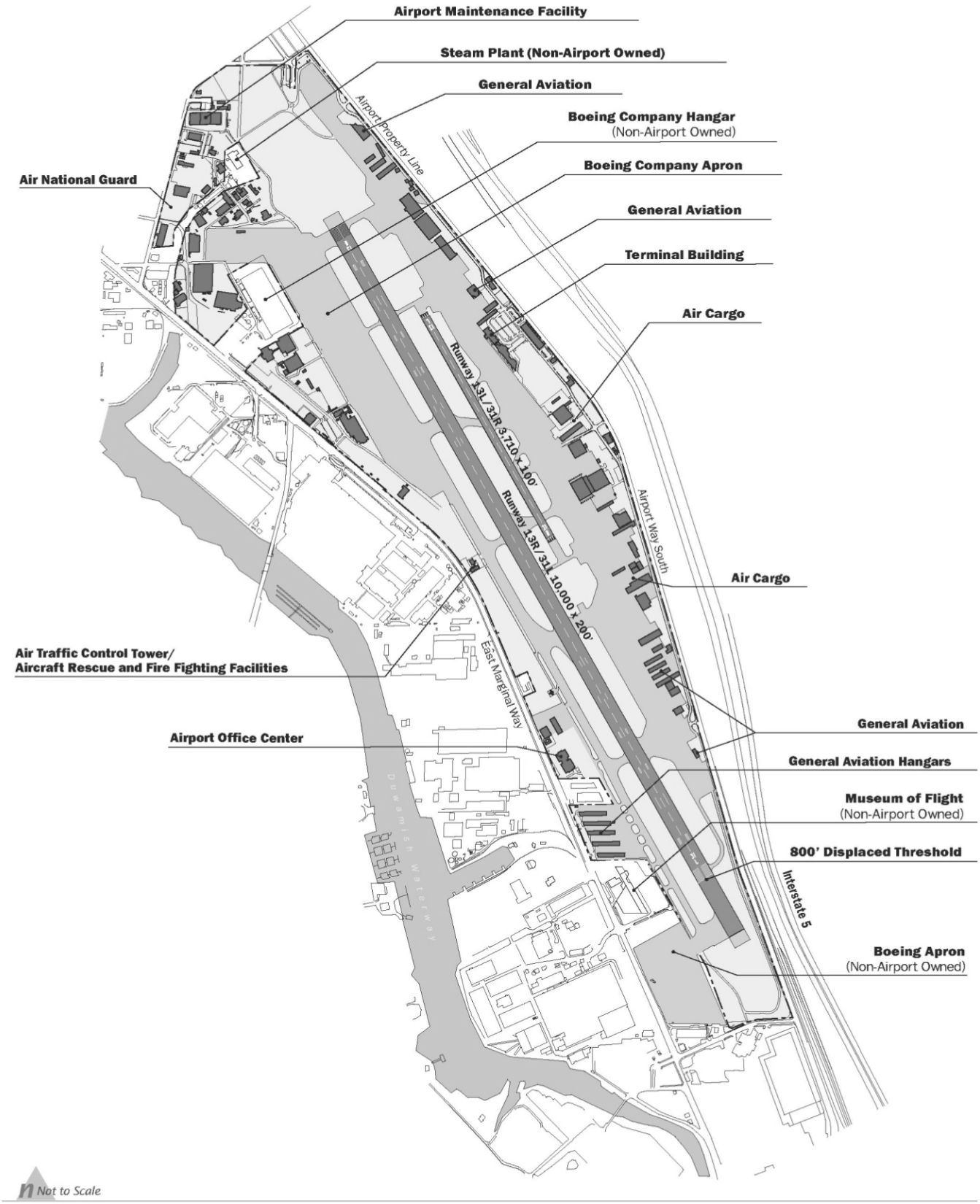
Base Map Reference: Anchor Environmental, L.L.C. 2005.

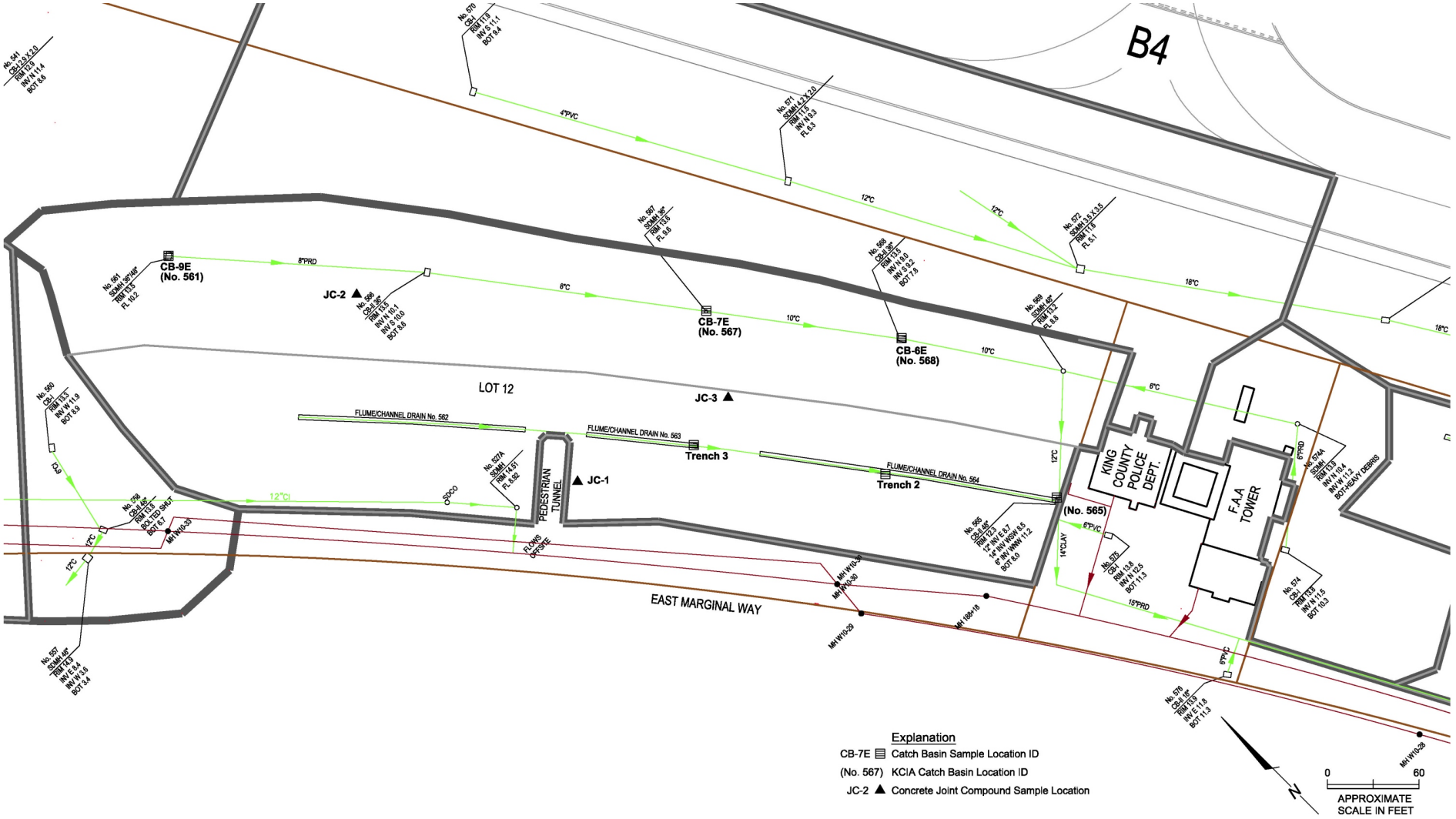
LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 25
JORGENSEN FORGE FACILITY
CURRENT SITE STORMWATER DRAINAGE PLAN

Date:	Drawn by:	
2/23/07	AES	10:002330WD0702\fig 25



ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY EARLY ACTION AREA 4 Seattle/Tukwila, Washington	Figure 26 KING COUNTY INTERNATIONAL AIRPORT SITE MAP		
	Base Map Reference: Barnard Dunkelberg & Company, 2001.	Date: 2-16-07	Drawn by: AES	10:002330WD0702\fig 26



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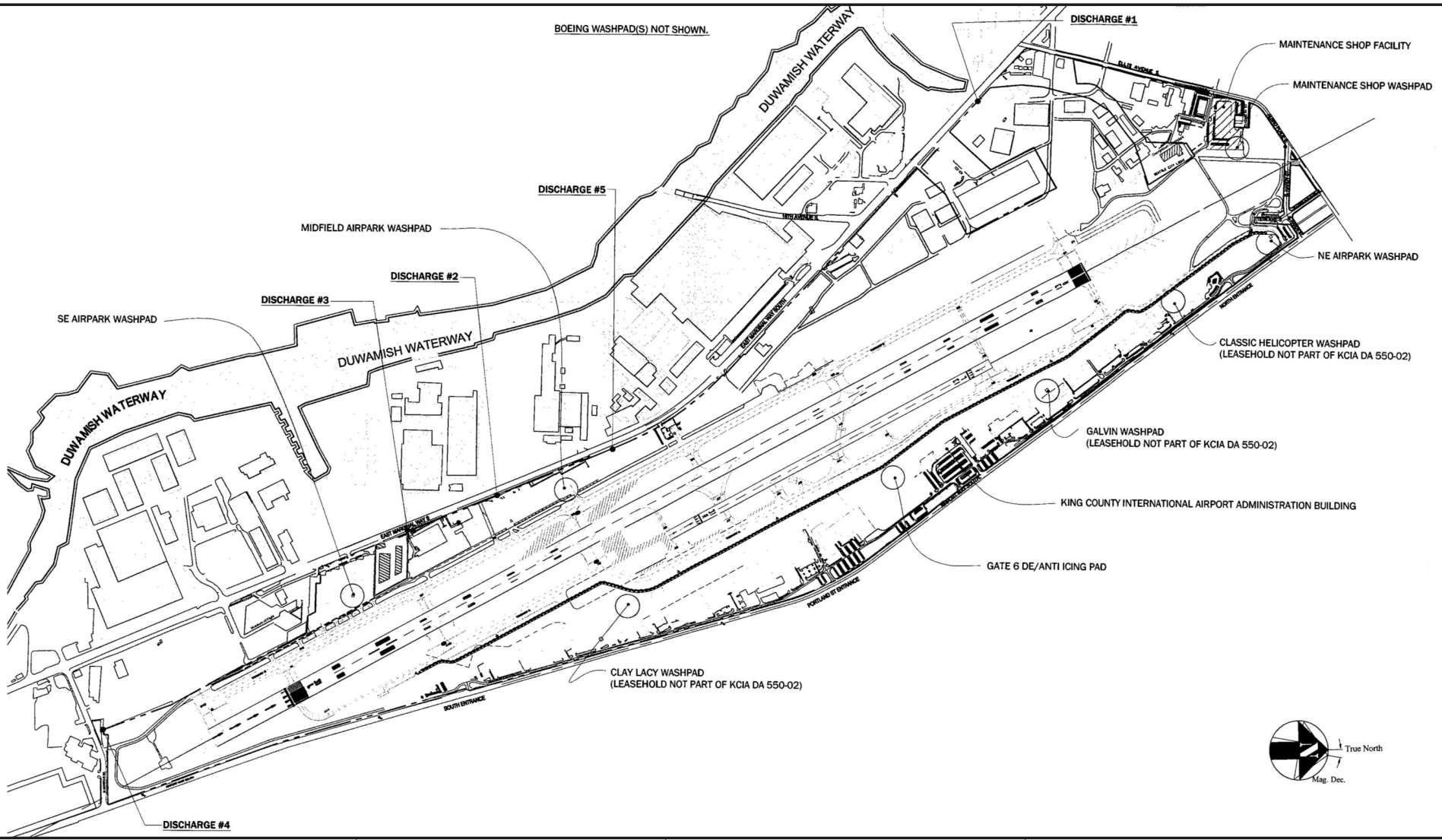
Seattle, Washington

Base Map Reference: PES Environmental, Inc. 2005.

LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 27
KING COUNTY INTERNATIONAL AIRPORT
SAMPLE LOCATIONS

Date:	Drawn by:	
2/23/07	AES	10:002330WD0702\fig 27



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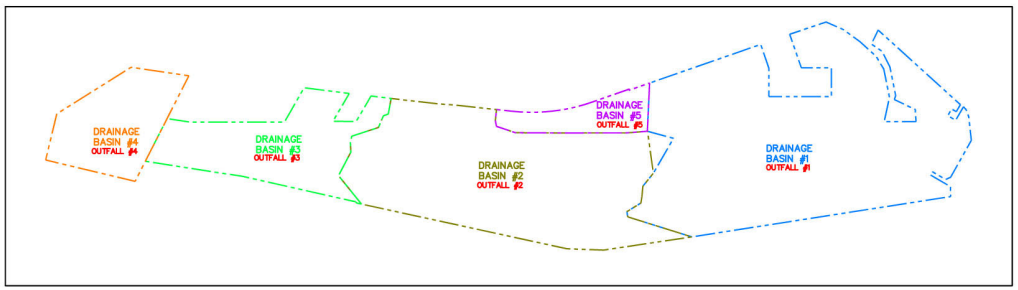
Base Map Reference: King County International Airport, 2006.

LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 28
KING COUNTY INTERNATIONAL AIRPORT
STORMWATER OUTFALL SITE MAP

Date:	Drawn by:	
2/23/07	AES	10:002330WD0702\fig 28



DRAINAGE BASIN BOUNDARY #5
OUTFALL #5

8700 HANGAR "B" 22,440 S.F.
8700 HANGAR "A" 13,108 S.F.
F.A.A TOWER & ADMIN OFFICE
CITY OF TUKWILA
CITY OF SEATTLE

LEGEND:
- CATCH BASIN
- MANHOLE
- EDGE DRAIN CLEANOUT
- DRAINAGE BASIN #1
- DRAINAGE BASIN #2
- DRAINAGE BASIN #5
- SD — DRAINAGE BASIN #5 STORM DRAIN
- PSD — PERFORATED STORM DRAIN (EDGE DRAIN)

SCALE IN FEET: 1"= 150'
0 150 300 450

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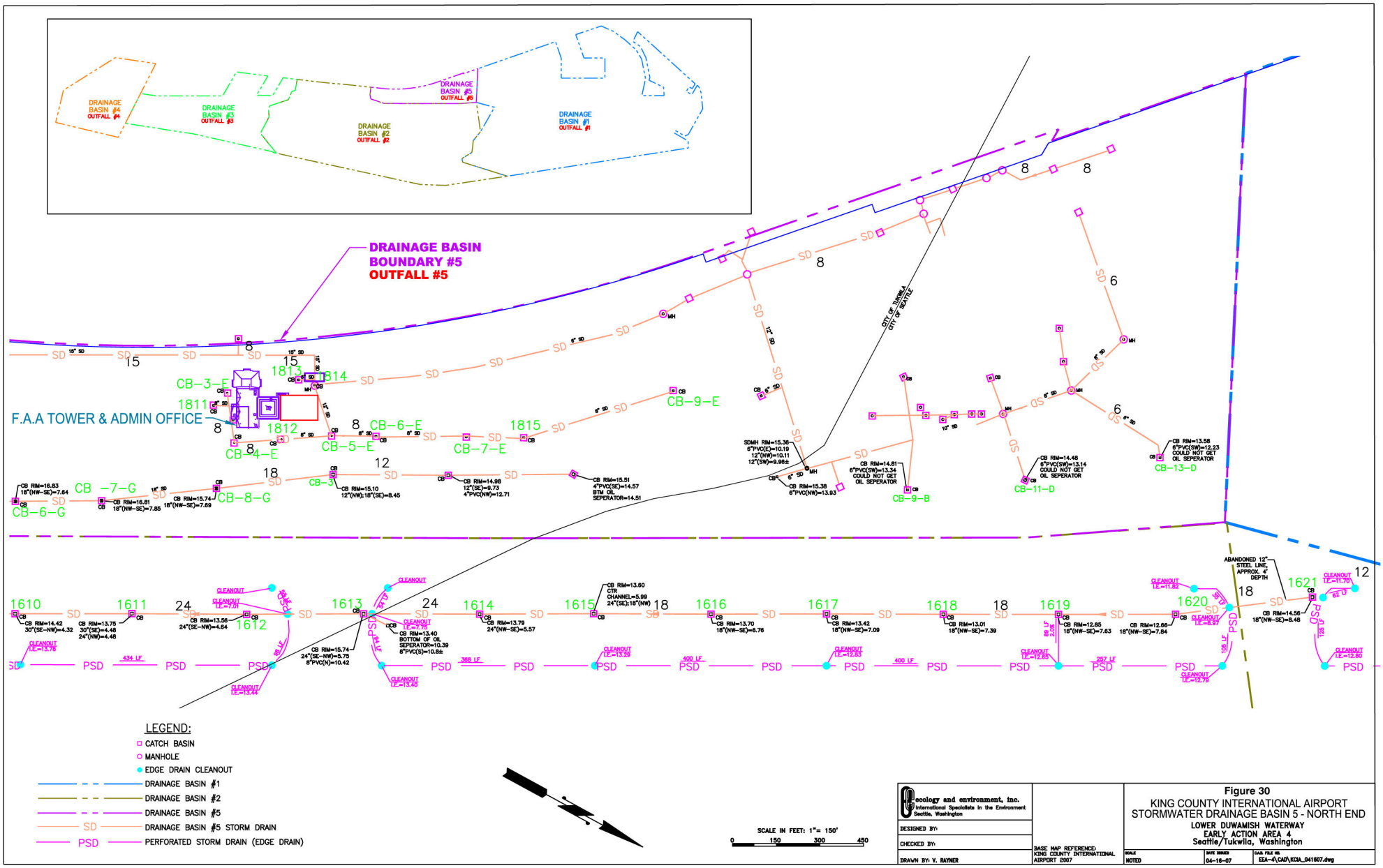
Seattle, Washington

DESIGNED BY:
CHECKED BY:
DRAWN BY: V. RAYNER

BASE MAP REFERENCE: KING COUNTY INTERNATIONAL AIRPORT 2007

Figure 29
KING COUNTY INTERNATIONAL AIRPORT
STORMWATER DRAINAGE BASIN 5 - SOUTH END
LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

SCALE: NOTED
DATE ISSUED: 04-16-07
CAD FILE NO: EA-4\CAD\KCIA_041607.dwg



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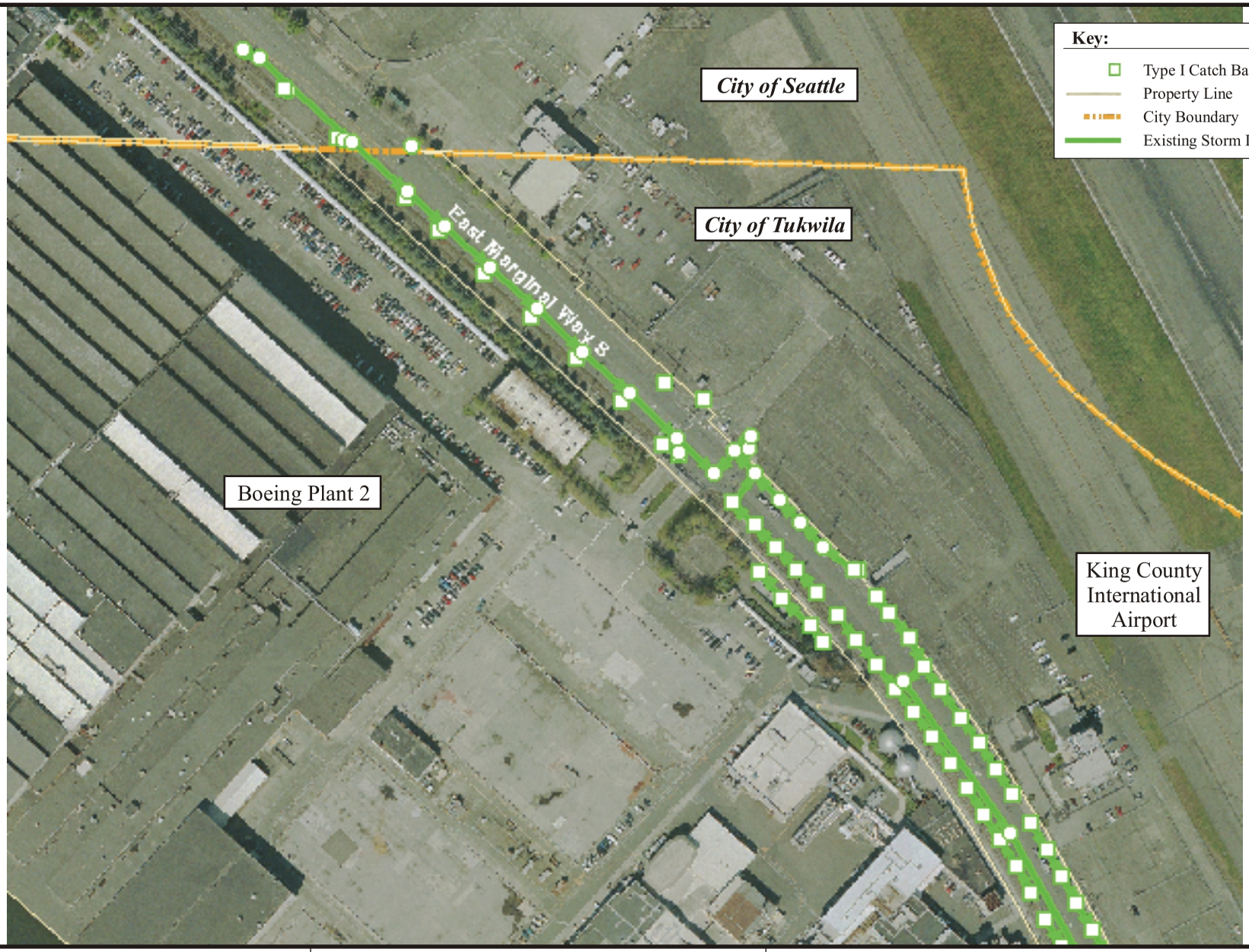
Seattle, Washington

DESIGNED BY:
CHECKED BY:
DRAWN BY: V. RAYNER

BASE MAP REFERENCE:
KING COUNTY INTERNATIONAL AIRPORT 2007

Figure 30
KING COUNTY INTERNATIONAL AIRPORT
STORMWATER DRAINAGE BASIN 5 - NORTH END
LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

SCALE	DATE ISSUED	CAD FILE NO.
NOTED	04-16-07	EEA-4\CAD\KCIA_041607.dwg



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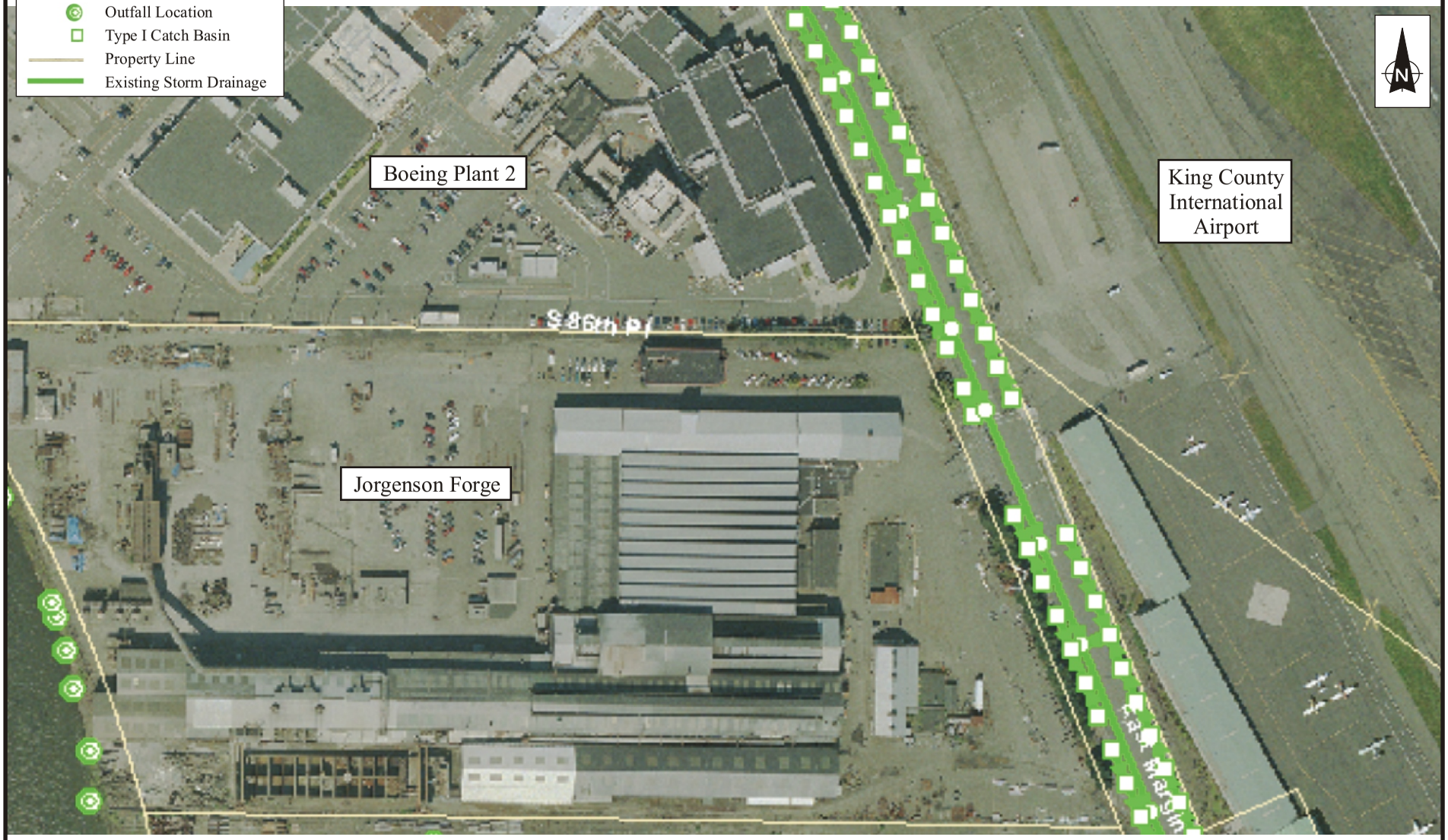
LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Figure 31
EAST MARGINAL WAY SOUTH
CITY OF TUKWILA STORMWATER
DRAINAGE SYSTEM - NORTH PORTION

Base Map Reference: City of Tukwila, 2007.

Date:	Drawn by:	
4/20/07	AES	10:002330WD0702\fig 31



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LOWER DUWAMISH WATERWAY
EARLY ACTION AREA 4
Seattle/Tukwila, Washington

Base Map Reference: City of Tukwila, 2007.

Figure 32
EAST MARGINAL WAY SOUTH
CITY OF TUKWILA STORMWATER
DRAINAGE SYSTEM - SOUTH PORTION

Date:	Drawn by:	
4/18/07	AES	10:002330WD0702\fig 32

8.0 Tables

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Table 1

Boeing Plant 2
Data Gap Investigation, South Yard Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID: / Location: / Depth (ft bgs): / Sample Date:	SY-DP-01-15 DP-SY-01 15 - 15 3/8/2005	SY-DP-01-15-F DP-SY-01 15 - 15 3/8/2005	SY-DP-02-15 DP-SY-02 15 - 15 3/7/2005	SY-DP-02-15-F DP-SY-02 15 - 15 3/7/2005	SY-DP-03-15 DP-SY-03 15 - 15 3/7/2005	SY-DP-03-15-1 DP-SY-03 Dup. 15 - 15 3/7/2005	SY-DP-03-15-F DP-SY-03 15 - 15 3/7/2005	SY-DP-03-15-F-1 DP-SY-03 Dup. 15 - 15 3/7/2005	SY-DP-04-15 DP-SY-04 15 - 15 3/7/2005	SY-DP-04-15-F DP-SY-04 15 - 15 3/7/2005	SY-DP-05-15 DP-SY-05 15 - 15 3/7/2005	SY-DP-05-15-F DP-SY-05 15 - 15 3/7/2005	SY-DP-06-15 DP-SY-06 15 - 15 3/7/2005	SY-DP-06-15-F DP-SY-06 15 - 15 3/7/2005	SY-DP-07-15 DP-SY-07 15 - 15 3/7/2005	SY-DP-07-15-F DP-SY-07 15 - 15 3/7/2005	SY-DP-08-15 DP-SY-08 15 - 15 3/7/2005
VOCs (µg/L)																				
Vinyl Chloride	EPA 8260B	0.731		0.9		10		7.1	20			28		31		0.2 U		0.2 U		0.2 U
Chloroethane	EPA 8260B			0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
Methylene Chloride	EPA 8260B	190		0.3 U		0.3 U		0.3 U	2 U			2 U		2 U		0.3 U		0.3 U		0.3 U
Acetone	EPA 8260B			1 R		1 R		1 R	5 R			5 U		5 U		1 R		1 R		1 R
Carbon Disulfide	EPA 8260B			0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
1,1-Dichloroethene	EPA 8260B	0.382		0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
1,1-Dichloroethane	EPA 8260B			2.4		8.6		0.5	1.4			1 U		1 U		0.2 U		0.2 U		0.2 U
trans-1,2-Dichloroethene	EPA 8260B	10000		0.2 U		1.4		0.4	1.2			1.4		1.7		0.2 U		0.2 U		0.2 U
cis-1,2-Dichloroethene	EPA 8260B	1550		0.2 U		2		0.7	2			3.8		8.3		0.3		0.2 U		0.4
Chloroform	EPA 8260B	56.1		0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
1,2-Dichloroethane	EPA 8260B	11.7		0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
2-Butanone	EPA 8260B			1 U		1 U		1 U	5 U			5 U		5 U		1 U		1 U		1 U
1,1,1-Trichloroethane	EPA 8260B	206000		0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
Bromodichloromethane	EPA 8260B	5.52		0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
Trichloroethene	EPA 8260B	0.302		0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
Benzene	EPA 8260B	4.48		0.2 U		0.8		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
Methyl isobutyl ketone	EPA 8260B			1 R		1 U		1 U	5 U			5 U		5 U		1 U		1 U		1 U
Tetrachloroethene	EPA 8260B	0.822		0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
Toluene	EPA 8260B	15000		0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
Ethylbenzene	EPA 8260B	2100		0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
Trichlorofluoromethane	EPA 8260B			0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
1,1,2-Trichlorotrifluoroethane	EPA 8260B			0.2 U		0.2 U		0.2 U	2 U			2 U		2 U		0.2 U		0.2 U		0.2 U
m,p-Xylene	EPA 8260B			0.4 U		0.4 U		0.4 U	1 U			1 U		1 U		0.4 U		0.4 U		0.4 U
o-Xylene	EPA 8260B			0.2 U		0.2 U		0.2 U	1 U			1 U		1 U		0.2 U		0.2 U		0.2 U
SVOCs (µg/L)																				
Phenol	EPA 8270C	275000		1 U		1 U		1 U	1 U			1 U		1 U		1 U		1 U		1 U
2-Methylphenol	EPA 8270C	10200		1 U		1 U		1 U	1 U			1 U		1 U		1 U		1 U		1 U
4-Methylphenol	EPA 8270C	1030		1 U		1 U		1 U	1 U			1 U		1 U		1 U		1 U		1 U
2,4-Dimethylphenol	EPA 8270C	273		1 U		1 U		1 U	1 U			1 U		1 U		1 U		1 U		1 U
Naphthalene	EPA 8270C	2440		1 U		1 U		1 U	1 U			1 U		1 U		1 U		1 U		1 U
4-Chloro-3-methylphenol	EPA 8270C	18300		5 U		5 U		5 U	5 U			5 U		5 U		5 U		5 U		5 U
Di-n-Butylphthalate	EPA 8270C	1440		1 U		1 U		1 U	1 U			1 U		1 U		1 U		1 U		1 U
Naphthalene	EPA 8270SIM	2440		0.1 U		0.1 U		0.1 U	0.1 U			0.1 U		0.1 U		0.1 U		0.1 U		0.1 U
Inorganics (Total) (µg/L)																				
Arsenic	EPA 200.8	0.2																		
Cadmium	EPA 6010B	8.8																		
Chromium	EPA 6010B																			
Copper	EPA 200.8	3.1																		
Lead	EPA 200.8	8.1																		
Manganese	EPA 6010B	100																		
Mercury	EPA 1631E	0.025																		
Nickel	EPA 200.8	8.2																		
Silver	EPA 200.8	1.9																		
Vanadium	EPA 6010B	2810																		
Zinc	EPA 6010B	81																		
Inorganics (Dissolved) (µg/L)																				
Arsenic	EPA 200.8	0.2			36.1		67			82.8	82.1		86.6		75.4		7.6 U		8.2 U	
Cadmium	EPA 6010B	8.8			2 U		2 U			2 U	2 U		2 U		2 U		2 U		2 U	
Chromium	EPA 6010B				5 U		5 U			5 U	5 U		5 U		5 U		5 U		5 U	
Chromium(VI)	A3500D	50	11 UJ		11 U		11 U	11 U				11 U		11 U						
Copper	EPA 200.8	3.1			0.5 U		0.5 U			0.5 U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Lead	EPA 200.8	8.1			1 U		1 U			1 U	1 U		1 U		1 U		1 U		1 U	
Manganese	EPA 6010B	100			1250		4300			2310	2300		6930		4590		852		903	
Mercury	EPA 1631E	0.025			0.025 U		0.025 UJ			0.025 UJ	0.025 UJ		0.025 UJ		0.025 UJ		0.025 UJ		0.025 UJ	
Nickel	EPA 200.8	8.2			0.6		2.1			1.2	1.2		2.2		1.7		1.1		1.8	
Silver	EPA 200.8	1.9			0.2 U		0.2 U			0.2 U	0.2 U		0.2 U		0.2 U		0.2 U		0.2 U	
Vanadium	EPA 6010B	2810			13		7			10	10		6		8		3 U		3	
Zinc	EPA 6010B	81			11		20			6 U	6 U		24		23		8		8	
Petroleum Hydrocarbons (µg/L)																				
TPH - Diesel Range	NWTPH-Dx	500																		
TPH - Motor Oil Range	NWTPH-Dx	500																		

Notes:
Dup. = Duplicate analysis
Re. = Reanalysis
Re. Ex. = Reextraction

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 1

Boeing Plant 2
Data Gap Investigation, South Yard Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID:	SY-DP-08-15-F	SY-DP-09-15	SY-DP-09-15-F	SY-DP-10-18	SY-DP-10-18	SY-DP-10-18-F	SY-DP-11-17	SY-DP-11-17-F	SY-DP-12-15	SY-DP-12-15-F	SY-PL2-106A	SY-PL2-106A-F	SY-PL2-106B	SY-PL2-106B-F	SY-PL2-106C	SY-PL2-106C-F	SY-PL2-110C
			Location:	DP-SY-08	DP-SY-09	DP-SY-09	DP-SY-10	DP-SY-10 Re.	DP-SY-10	DP-SY-11	DP-SY-11	DP-SY-12	DP-SY-12	PL2-106A	PL2-106A	PL2-106B	PL2-106B	PL2-106C	PL2-106C	PL2-110C
			Depth (ft bgs):	15 - 15	15 - 15	15 - 15	18 - 18	18 - 18	18 - 18	17 - 17	17 - 17	15 - 15	15 - 15	8 - 28	8 - 28	39 - 49	39 - 49	82.5 - 92.5	82.5 - 92.5	82 - 92
			Sample Date:	3/7/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/14/2005	3/14/2005	3/14/2005	3/14/2005	3/14/2005	3/14/2005	3/16/2005
VOCs (µg/L)																				
Vinyl Chloride	EPA 8260B	0.731			0.2 U		0.6	2 U		0.8		2.5		14		0.2 U		0.2 UJ		0.2 UJ
Chloroethane	EPA 8260B				0.2 U		0.2 U	2 U		0.2 U		0.5		0.2 U		0.2 U		0.2 UJ		0.2 UJ
Methylene Chloride	EPA 8260B	190			0.3 U		0.3 U	3 U		0.3 U		0.3 U		0.3 U		0.3 U		0.3 UJ		0.3 UJ
Acetone	EPA 8260B				1 R		1 R	10 R		1 R		2.2 J		3 J		3.5 J		8.9 J		2.6 J
Carbon Disulfide	EPA 8260B				0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 UJ
1,1-Dichloroethene	EPA 8260B	0.382			0.2 U		0.4	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 UJ
1,1-Dichloroethane	EPA 8260B				0.2 U		13	15		1.9		1.2		0.9		0.2 U		0.2 UJ		0.2 UJ
trans-1,2-Dichloroethene	EPA 8260B	10000			0.2 U		3.3	6.8		0.4		0.2 U		1.5		0.2 U		0.2 UJ		0.2 UJ
cis-1,2-Dichloroethene	EPA 8260B	1550			0.2 U		50 ES	83		1.1		0.6		4.2		0.2 U		0.2 UJ		0.2 UJ
Chloroform	EPA 8260B	56.1			0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 UJ
1,2-Dichloroethane	EPA 8260B	11.7			0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.3		0.4		0.2 UJ		0.2 UJ
2-Butanone	EPA 8260B				1 U		1 U	10 U		1 U		1 U		1 U		1 U		1 UJ		1 UJ
1,1,1-Trichloroethane	EPA 8260B	206000			0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 UJ
Bromodichloromethane	EPA 8260B	5.52			0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 UJ
Trichloroethene	EPA 8260B	0.302			0.2 U		15	20		0.2 U		0.2 U		3		0.2 U		0.2 UJ		0.2 UJ
Benzene	EPA 8260B	4.48			0.2 U		0.2 U	2 U		0.3		0.2 U		0.3		0.2 U		0.2 UJ		0.2 UJ
Methyl isobutyl ketone	EPA 8260B				1 R		1 R	10 R		1 R		1 R		1 R		1 R		1 R		1 R
Tetrachloroethene	EPA 8260B	0.822			0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 UJ
Toluene	EPA 8260B	15000			0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 UJ
Ethylbenzene	EPA 8260B	2100			0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 J
Trichlorofluoromethane	EPA 8260B				0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 UJ
1,1,2-Trichlorotrifluoroethane	EPA 8260B				0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 UJ
m,p-Xylene	EPA 8260B				0.4 U		0.4 U	4 U		0.4 U		0.4 U		0.4 U		0.4 U		0.4 UJ		0.4 UJ
o-Xylene	EPA 8260B				0.2 U		0.2 U	2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 UJ		0.2 UJ
SVOCs (µg/L)																				
Phenol	EPA 8270C	275000			1 U															
2-Methylphenol	EPA 8270C	10200			1 U															
4-Methylphenol	EPA 8270C	1030			1 U															
2,4-Dimethylphenol	EPA 8270C	273			1 U															
Naphthalene	EPA 8270C	2440			1 U															
4-Chloro-3-methylphenol	EPA 8270C	18300			5 U															
Di-n-Butylphthalate	EPA 8270C	1440			1 U															
Naphthalene	EPA 8270SIM	2440			0.1 U															
Inorganics (Total) (µg/L)																				
Arsenic	EPA 200.8	0.2												38.4	0.5	4		4		
Cadmium	EPA 6010B	8.8												2 U	2 U	4 U		2 U		
Chromium	EPA 6010B													5 U	5 U	10 U		5 U		
Copper	EPA 200.8	3.1												1.7	0.5	2 U		2 U		
Lead	EPA 200.8	8.1												1 U	1 U	5 U		5 U		
Manganese	EPA 6010B	100												1310	812	255		274		
Mercury	EPA 1631E	0.025												0.025 U	0.025 U	0.025 UJ		0.025 U		
Nickel	EPA 200.8	8.2												1.8	0.6	7		5		
Silver	EPA 200.8	1.9												0.2 U	0.2 U	1 U		1 U		
Vanadium	EPA 6010B	2810												8	3 U	6 U		4		
Zinc	EPA 6010B	81												6 U	6 U	10 U		6 U		
Inorganics (Dissolved) (µg/L)																				
Arsenic	EPA 200.8	0.2		3.4 U		20.8		9.4		85		15.8		35.1		0.6		4		
Cadmium	EPA 6010B	8.8		2 U		2 U		2 U		2 U		2 U		2 U		2 U		4 U		
Chromium	EPA 6010B			5 U		5 U		5 U		8		5 U		5 U		5 U		10 U		
Chromium(VI)	A3500D	50																		
Copper	EPA 200.8	3.1		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		1.2		0.5 U		2 U		
Lead	EPA 200.8	8.1		1 U		1 U		1 U		1 U		1 U		1 U		1 U		5 U		
Manganese	EPA 6010B	100		673		1780		2290		1260		2210		1440		1010		255		
Mercury	EPA 1631E	0.025		0.025 UJ		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		
Nickel	EPA 200.8	8.2		1.1		1		1.8		4.9		2.5		1.8		1.1		7		
Silver	EPA 200.8	1.9		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		1 U		
Vanadium	EPA 6010B	2810		7		6		3 U		37		15		9		3 U		6 U		
Zinc	EPA 6010B	81		7		15		15		45		21 U		6 U		34		10 U		
Petroleum Hydrocarbons (µg/L)																				
TPH - Diesel Range	NWTPH-Dx	500																		
TPH - Motor Oil Range	NWTPH-Dx	500																		

Notes:
Dup. = Duplicate analysis
Re. = Reanalysis
Re. Ex. = Reextraction

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 1

Boeing Plant 2
Data Gap Investigation, South Yard Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID:	SY-PL2-110C-F	SY-PL2-11156A-1	SY-PL2-11156A-F-1	SY-PL2-112A	SY-PL2-112A	SY-PL2-112A-F	SY-PL2-112B	SY-PL2-112B-F	SY-PL2-113A	SY-PL2-113A	SY-PL2-113A-F	SY-PL2-115A	SY-PL2-115A	SY-PL2-115A-F	SY-PL2-116A	SY-PL2-116A-F
			Location:	PL2-110C	PL2-156A Dup.	PL2-156A Dup.	PL2-112A	PL2-112A Re.	PL2-112A	PL2-112B	PL2-112B	PL2-113A	PL2-113A Re.	PL2-113A	PL2-115A	PL2-115A Re.	PL2-115A	PL2-116A	PL2-116A
			Depth (ft bgs):	82 - 92	6 - 16	6 - 16	8.5 - 18.5	8.5 - 18.5	8.5 - 18.5	40 - 50	40 - 50	8 - 18	8 - 18	8 - 18	7.5 - 17.7	7.5 - 17.7	7.5 - 17.7	7.5 - 17.8	7.5 - 17.8
			Sample Date:	3/16/2005	3/11/2005	3/11/2005	3/16/2005	3/16/2005	3/16/2005	3/16/2005	3/16/2005	3/16/2005	3/16/2005	3/16/2005	3/15/2005	3/15/2005	3/15/2005	3/16/2005	3/16/2005
VOCs (µg/L)																			
Vinyl Chloride	EPA 8260B	0.731			6.7		7.4	10 U		0.2 U		5.3	5.1		5.2	4.8		2.8	
Chloroethane	EPA 8260B				0.2 U		320 ES	590		0.2 U		0.5	1 U		0.2 U	1 U		0.2 U	
Methylene Chloride	EPA 8260B	190			0.3 U		0.3	20 U		0.3 U		0.3 U	2 U		0.3 U	2 U		0.3 U	
Acetone	EPA 8260B				2 J		13 J	50 R		1 R		2.1 J	5 R		2.3 J	5 R		2.6 J	
Carbon Disulfide	EPA 8260B				0.2 U		0.2 U	10 U		0.2 U		0.2 U	1 U		0.2 U	1 U		0.2 U	
1,1-Dichloroethene	EPA 8260B	0.382			0.2 U		1.9	10 U		0.2 U		1.3	1.1		0.2	1 U		0.2 U	
1,1-Dichloroethane	EPA 8260B				3.9		46 ES	66		0.2 U		30 E	32		1.2	1.1		0.6	
trans-1,2-Dichloroethene	EPA 8260B	10000			0.4		0.8	10 U		0.2 U		0.2 U	1 U		0.3	1 U		0.2 U	
cis-1,2-Dichloroethene	EPA 8260B	1550			0.5		15	12		0.2 U		3.9	3.7		46 E	49		1.5	
Chloroform	EPA 8260B	56.1			0.2 U		0.2 U	10 U		0.2 U		0.2	1 U		0.2	1 U		0.2 U	
1,2-Dichloroethane	EPA 8260B	11.7			0.2 U		0.6	10 U		0.2 U		0.2 U	1 U		0.2 U	1 U		0.2 U	
2-Butanone	EPA 8260B				1 U		8.4	50 U		1 U		1 U	5 U		1 U	5 U		1 U	
1,1,1-Trichloroethane	EPA 8260B	206000			0.2 U		1.3	10 U		0.2 U		0.3	1 U		0.7	1 U		0.2 U	
Bromodichloromethane	EPA 8260B	5.52			0.2 U		0.2 U	10 U		0.2 U		0.2 U	1 U		0.2 U	1 U		0.2 U	
Trichloroethene	EPA 8260B	0.302			0.4		2.6	10 U		0.2 U		17 E	13		74 ES	110		0.2 U	
Benzene	EPA 8260B	4.48			0.4		1	10 U		0.2 U		5.3	4.6		0.2 U	1 U		0.2 U	
Methyl isobutyl ketone	EPA 8260B				1 UJ		1.3 J	50 U		1 U		1 R	5 U		1 U	5 U		1 R	
Tetrachloroethene	EPA 8260B	0.822			0.2 U		3.8	10 U		0.2 U		1.2	1 U		0.2	1 U		0.2 U	
Toluene	EPA 8260B	15000			0.2 U		22 E	18		0.2 U		0.2 U	1 U		0.2 U	1 U		0.2 U	
Ethylbenzene	EPA 8260B	2100			0.2 U		1	10 U		0.2 U		0.2 U	1 U		0.2 U	1 U		0.2 U	
Trichlorofluoromethane	EPA 8260B				0.2 U		0.2 U	10 U		0.2 U		0.2 U	1 U		0.2 U	1 U		0.2 U	
1,1,2-Trichlorotrifluoroethane	EPA 8260B				0.2 U		2.2	20 U		0.2 U		0.3	2 U		0.2 U	2 U		0.2 U	
m,p-Xylene	EPA 8260B				0.4 U		3.8	10 U		0.4 U		0.4 U	1 U		0.4 U	1 U		0.4 U	
o-Xylene	EPA 8260B				0.2 U		1.8	10 U		0.2 U		0.2 U	1 U		0.2 U	1 U		0.2 U	
SVOCs (µg/L)																			
Phenol	EPA 8270C	275000			1 U		1 U	60 U				1 U			1 U			1 U	
2-Methylphenol	EPA 8270C	10200			1 U		4.2	60 U				1 U			1 U			1 U	
4-Methylphenol	EPA 8270C	1030			1 U		35	60 U				1 U			1 U			1 U	
2,4-Dimethylphenol	EPA 8270C	273			1 U		100 E	97				1 U			1 U			1 U	
Naphthalene	EPA 8270C	2440			1 U		1.4	60 U				1 U			1 U			1 U	
4-Chloro-3-methylphenol	EPA 8270C	18300			5 U		1500 E	2500				5 U			5 U			5 U	
Di-n-Butylphthalate	EPA 8270C	1440			1 U		5.3	60 U				1 U			1 U			1 U	
Naphthalene	EPA 8270SIM	2440			0.27 U		2 UJ	10 U				0.1 U			0.1 U			0.1 U	
Inorganics (Total) (µg/L)																			
Arsenic	EPA 200.8	0.2			104		63.7			0.8		7.1			0.8			22.4	
Cadmium	EPA 6010B	8.8			2 U		2 U			2 U		2 U			2 U			2 U	
Chromium	EPA 6010B				5 U		5 U			5 U		5 U			21			5 U	
Copper	EPA 200.8	3.1			1 U		2.9 U			8.4 U		1.8 U			4.3			0.5 U	
Lead	EPA 200.8	8.1			1 U		1 U			1 U		1 U			1 U			1 U	
Manganese	EPA 6010B	100			4630		2100			496		580			96			3830	
Mercury	EPA 1631E	0.025			0.025 U		0.025 U			0.025 U		0.025 U			0.025 U			0.025 U	
Nickel	EPA 200.8	8.2			1 U		3.4			9.5		4.3			1.5			0.5	
Silver	EPA 200.8	1.9			0.2 U		0.2 U			0.2 U		0.2 U			0.2 U			0.2 U	
Vanadium	EPA 6010B	2810			10		9			5		7			3			3 U	
Zinc	EPA 6010B	81			6 U		6			29		6 U			6 U			6 U	
Inorganics (Dissolved) (µg/L)																			
Arsenic	EPA 200.8	0.2		6		99.8			59.1		0.7		8.9			0.2 U		22.2	
Cadmium	EPA 6010B	8.8		4 U		2 U			2 U		2 U		2 U			2 U		2 U	
Chromium	EPA 6010B			10 U		5 U			5 U		5 U		5 U			6		5 U	
Chromium(VI)	A3500D	50																	
Copper	EPA 200.8	3.1		2 U		0.5 U			0.5 U		0.5 U		0.5 U			1.3		0.5 U	
Lead	EPA 200.8	8.1		5 U		1 U			1 U		1 U		1 U			1 U		1 U	
Manganese	EPA 6010B	100		280		4890			2170		540		612			90		4200	
Mercury	EPA 1631E	0.025		0.025 U		0.025 U			0.025 U		0.025 U		0.025 U			0.025 U		0.025 U	
Nickel	EPA 200.8	8.2		5		1.1			2.2		2.4		3.8			1.2		0.6	
Silver	EPA 200.8	1.9		1 U		0.2 U			0.2 U		0.2 U		0.2 U			0.2 U		0.2 U	
Vanadium	EPA 6010B	2810		6 U		10			4		3 U		6			3 U		3 U	
Zinc	EPA 6010B	81		10 U		6 U			6 U		6 U		6 U			6 U		6 U	
Petroleum Hydrocarbons (µg/L)																			
TPH - Diesel Range	NWTPH-Dx	500					9800 E	8900				280			250 U			250 U	
TPH - Motor Oil Range	NWTPH-Dx	500					1300	2500 U				500 U			500 U			500 U	

Notes:
Dup. = Duplicate analysis
Re. = Reanalysis
Re. Ex. = Reextraction

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 1

Boeing Plant 2
Data Gap Investigation, South Yard Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID:	SY-PL2-117A	SY-PL2-117A	SY-PL2-117A-F	SY-PL2-120A	SY-PL2-120A-F	SY-PL2-151A	SY-PL2-151A-05202005	SY-PL2-151A-F	SY-PL2-151B	SY-PL2-151B-F	SY-PL2-151C	SY-PL2-151C-F	SY-PL2-152A	SY-PL2-152A-05202005	SY-PL2-152A-F
			Location:	PL2-117A	PL2-117A Re.	PL2-117A	PL2-120A	PL2-120A	PL2-151A	PL2-151A	PL2-151A	PL2-151B	PL2-151B	PL2-151C	PL2-151C	PL2-152A	PL2-152A	PL2-152A
			Depth (ft bgs):	7.9 - 17.9	7.9 - 17.9	7.9 - 17.9	8 - 18	8 - 18	6 - 16	6 - 16	6 - 16	45 - 50	45 - 50	75 - 80	75 - 80	6 - 16	6 - 16	6 - 16
			Sample Date:	3/16/2005	3/16/2005	3/16/2005	3/10/2005	3/10/2005	3/11/2005	5/20/2005	3/11/2005	3/11/2005	3/11/2005	3/11/2005	3/11/2005	3/15/2005	5/20/2005	3/15/2005
VOCs (µg/L)																		
Vinyl Chloride	EPA 8260B	0.731		4.3			0.2 U		0.2 U			0.2 U		0.2 U		2.9		
Chloroethane	EPA 8260B			0.4			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
Methylene Chloride	EPA 8260B	190		0.3 U			0.3 U		0.3 U			0.3 U		0.3 U		0.3 U		
Acetone	EPA 8260B			3.1 J			1 R		1.8 J			5.4 J		1 R		1 R		
Carbon Disulfide	EPA 8260B			0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
1,1-Dichloroethene	EPA 8260B	0.382		0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
1,1-Dichloroethane	EPA 8260B			13			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
trans-1,2-Dichloroethene	EPA 8260B	10000		0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		1.1		
cis-1,2-Dichloroethene	EPA 8260B	1550		4.9			0.2		2.8			0.2 U		0.2 U		1.2		
Chloroform	EPA 8260B	56.1		0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
1,2-Dichloroethane	EPA 8260B	11.7		0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
2-Butanone	EPA 8260B			1 U			1 U		1 U			1 U		1 U		1 U		
1,1,1-Trichloroethane	EPA 8260B	206000		1			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
Bromodichloromethane	EPA 8260B	5.52		0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
Trichloroethene	EPA 8260B	0.302		2.4			0.2 U		6.4			0.2 U		0.2 U		1.1		
Benzene	EPA 8260B	4.48		0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
Methyl isobutyl ketone	EPA 8260B			1 R			1 R		1 UJ			1 UJ		1 UJ		1 U		
Tetrachloroethene	EPA 8260B	0.822		0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
Toluene	EPA 8260B	15000		0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
Ethylbenzene	EPA 8260B	2100		0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
Trichlorofluoromethane	EPA 8260B			0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
1,1,2-Trichlorotrifluoroethane	EPA 8260B			0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
m,p-Xylene	EPA 8260B			0.4 U			0.4 U		0.4 U			0.4 U		0.4 U		0.4 U		
o-Xylene	EPA 8260B			0.2 U			0.2 U		0.2 U			0.2 U		0.2 U		0.2 U		
SVOCs (µg/L)																		
Phenol	EPA 8270C	275000		3.2	30 U		1 U			1 U							1 U	
2-Methylphenol	EPA 8270C	10200		3.6	30 U		1 U			1 U							1 U	
4-Methylphenol	EPA 8270C	1030		32	30 U		1 U			1 U							1 U	
2,4-Dimethylphenol	EPA 8270C	273		77	70		1 U			1 U							1 U	
Naphthalene	EPA 8270C	2440		1 U	30 U		1 U			1 U							1 U	
4-Chloro-3-methylphenol	EPA 8270C	18300		1000 E	1600		5 U			5 U							5 U	
Di-n-Butylphthalate	EPA 8270C	1440		1 U	30 U		1 U			1.4 U							1.6 U	
Naphthalene	EPA 8270SIM	2440		1.3 UJ	10 U		0.1 U			0.1 U							0.1 U	
Inorganics (Total) (µg/L)																		
Arsenic	EPA 200.8	0.2		55.3			46.7		5			4		6		0.4		
Cadmium	EPA 6010B	8.8		2			2 U		2 U			2 U		2 U		2 U		
Chromium	EPA 6010B			160			5 U		5 U			5 U		5 U		6		
Copper	EPA 200.8	3.1		52.4			3		1 U			1 U		2 U		2		
Lead	EPA 200.8	8.1		12			2 U		1 U			1 U		5 U		1 U		
Manganese	EPA 6010B	100		1780			937		811			839		764		475		
Mercury	EPA 1631E	0.025		0.0332			0.025 U		0.025 U			0.025 U		0.025 U		0.025 U		
Nickel	EPA 200.8	8.2		27.2			3		3			1 U		3		0.7		
Silver	EPA 200.8	1.9		0.2			0.5 U		0.2 U			0.2 U		1 U		0.2 U		
Vanadium	EPA 6010B	2810		104			6		3 U			3 U		5		3 U		
Zinc	EPA 6010B	81		215			6 U		6 U			6 U		6 U		19		
Inorganics (Dissolved) (µg/L)																		
Arsenic	EPA 200.8	0.2				40.3		3.8			4.5		4.4		5			0.4
Cadmium	EPA 6010B	8.8				2 U		2 U			2 U		2 U		2 U			2 U
Chromium	EPA 6010B					5 U		5 U			5 U		5 U		5 U			5 U
Chromium(VI)	A3500D	50						11 UJ			11 UJ							11 U
Copper	EPA 200.8	3.1				0.5 U		0.6			1		0.5 U		2 U			0.7
Lead	EPA 200.8	8.1				1 U		1 U			1 U		1 U		5 U			1 U
Manganese	EPA 6010B	100				1520		893			854		849		783			495
Mercury	EPA 1631E	0.025				0.025 U		0.025 U			0.025 U		0.025 U		0.025 U			0.025 U
Nickel	EPA 200.8	8.2				3.9		1.3			3		0.9		4			1.9
Silver	EPA 200.8	1.9				0.2 U		0.2 U			0.5 U		0.2 U		1 U			0.2 U
Vanadium	EPA 6010B	2810				3		3 U			3 U		3 U		5			3 U
Zinc	EPA 6010B	81				18		6 U			6 U		6 U		6 U			16
Petroleum Hydrocarbons (µg/L)																		
TPH - Diesel Range	NWTPH-Dx	500		380														
TPH - Motor Oil Range	NWTPH-Dx	500		500 U														

Notes:
Dup. = Duplicate analysis
Re. = Reanalysis
Re. Ex. = Reextraction

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 1

Boeing Plant 2
Data Gap Investigation, South Yard Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID: / Location: / Depth (ft bgs): / Sample Date:	SY-PL2-152B PL2-152B 45 - 50 3/15/2005	SY-PL2-152B-F PL2-152B 45 - 50 3/15/2005	SY-PL2-152C PL2-152C 80 - 85 3/15/2005	SY-PL2-152C-F PL2-152C 80 - 85 3/15/2005	SY-PL2-153A PL2-153A 6 - 16 3/9/2005	SY-PL2-153A-F PL2-153A 6 - 16 3/9/2005	SY-PL2-153B PL2-153B 45 - 50 3/9/2005	SY-PL2-153B-F PL2-153B 45 - 50 3/9/2005	SY-PL2-153C PL2-153C 80 - 85 3/9/2005	SY-PL2-153C-F PL2-153C 80 - 85 3/9/2005	SY-PL2-154A PL2-154A 6 - 16 3/10/2005	SY-PL2-154A-F PL2-154A 6 - 16 3/10/2005	SY-PL2-154B PL2-154B 45 - 50 3/10/2005	SY-PL2-154B-F PL2-154B 45 - 50 3/10/2005	SY-PL2-154C PL2-154C 80 - 85 3/10/2005	SY-PL2-154C-F PL2-154C 80 - 85 3/10/2005	SY-PL2-155A PL2-155A 6 - 16 3/14/2005
VOCs (µg/L)																				
Vinyl Chloride	EPA 8260B	0.731		0.2 U		0.2 UJ		1.2		0.2 UJ		0.2 UJ		2.9		0.2 U		0.2 UJ		4.7
Chloroethane	EPA 8260B			0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.3 J		0.2 U
Methylene Chloride	EPA 8260B	190		0.3 U		0.3 UJ		0.3 U		0.3 UJ		0.3 UJ		0.3 U		0.3 U		0.3 UJ		0.3 U
Acetone	EPA 8260B			2.7 J		1 R		1 R		1 R		1 R		3.4 J		1 R		1 R		8.1 J
Carbon Disulfide	EPA 8260B			0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.6 J		0.2 U		0.2 U		0.2 UJ		0.2 U
1,1-Dichloroethene	EPA 8260B	0.382		0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.2 U
1,1-Dichloroethane	EPA 8260B			0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		9		0.2 U		0.2 UJ		2.1
trans-1,2-Dichloroethene	EPA 8260B	10000		0.2 U		0.2 UJ		0.2		0.2 UJ		0.2 UJ		3.4		0.2 U		0.2 UJ		1.4
cis-1,2-Dichloroethene	EPA 8260B	1550		0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.3		0.2 U		0.2 UJ		1.8
Chloroform	EPA 8260B	56.1		0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.2 U
1,2-Dichloroethane	EPA 8260B	11.7		0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.2 U
2-Butanone	EPA 8260B			1 U		1 UJ		1 U		1 UJ		1 UJ		1 U		1 U		1 UJ		1 U
1,1,1-Trichloroethane	EPA 8260B	206000		0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.2 U
Bromodichloromethane	EPA 8260B	5.52		0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.2 U
Trichloroethene	EPA 8260B	0.302		0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.3
Benzene	EPA 8260B	4.48		0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.8
Methyl isobutyl ketone	EPA 8260B			1 U		1 UJ		1 R		1 R		1 R		1 R		1 R		1 R		1 R
Tetrachloroethene	EPA 8260B	0.822		0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.2 U
Toluene	EPA 8260B	15000		0.2		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.6 J		0.2 U
Ethylbenzene	EPA 8260B	2100		0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.2 U
Trichlorofluoromethane	EPA 8260B			0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.6		0.5 J		0.2 U
1,1,2-Trichlorotrifluoroethane	EPA 8260B			0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.2 U
m,p-Xylene	EPA 8260B			0.4 U		0.4 UJ		0.4 U		0.4 UJ		0.4 UJ		0.4 U		0.4 U		0.4 UJ		0.4 U
o-Xylene	EPA 8260B			0.2 U		0.2 UJ		0.2 U		0.2 UJ		0.2 UJ		0.2 U		0.2 U		0.2 UJ		0.2 U
SVOCs (µg/L)																				
Phenol	EPA 8270C	275000						1 U						1 U						1 U
2-Methylphenol	EPA 8270C	10200						1 U						1 U						1 U
4-Methylphenol	EPA 8270C	1030						1 U						1 U						1 U
2,4-Dimethylphenol	EPA 8270C	273						1 U						1 U						1 U
Naphthalene	EPA 8270C	2440						1 U						1 U						1 U
4-Chloro-3-methylphenol	EPA 8270C	18300						5 U						5 U						5 U
Di-n-Butylphthalate	EPA 8270C	1440						1 U						1 U						1 U
Naphthalene	EPA 8270SIM	2440						0.1 U						0.1 U						0.1 U
Inorganics (Total) (µg/L)																				
Arsenic	EPA 200.8	0.2		6.7		1.7		2.7		3		15		21.9		3.5		2 U		93.4
Cadmium	EPA 6010B	8.8		2 U		2 U		2 U		2 U		2 U		2 U		2 U		2 U		2 U
Chromium	EPA 6010B			5 U		13		22		5 U		5 U		5 U		5 U		5 U		5 U
Copper	EPA 200.8	3.1		0.5 U		0.9		4.2		1 U		1 U		2.8		0.5 U		2 U		1 U
Lead	EPA 200.8	8.1		1 U		1 U		1 U		2 U		2 U		1 U		1 U		5 U		1 U
Manganese	EPA 6010B	100		367		228		587		279		482		2170		366		338		3640
Mercury	EPA 1631E	0.025		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U
Nickel	EPA 200.8	8.2		0.8		3.4		0.7		2		2		0.9		0.9		4		1 U
Silver	EPA 200.8	1.9		0.2 U		0.2 U		0.2 U		0.5 U		0.5 U		0.2 U		0.2 U		1 U		0.2 U
Vanadium	EPA 6010B	2810		3		6		32		4		5		12		3 U		5		19
Zinc	EPA 6010B	81		6 U		6 U		6 U		6 U		6 U		6 U		6 U		6 U		6 U
Inorganics (Dissolved) (µg/L)																				
Arsenic	EPA 200.8	0.2			6.8		1.4		2.4		3		16		21.3		3.2		2 U	
Cadmium	EPA 6010B	8.8			2 U		2 U		2 U		2 U		2 U		2 U		2 U		2 U	
Chromium	EPA 6010B				5 U		11		6		5 U		5 U		5 U		5 U		5 U	
Chromium(VI)	A3500D	50							11 UJ						12 J					
Copper	EPA 200.8	3.1			0.5 U		0.8		0.7		1 U		1 U		0.5 U		0.5 U		2 U	
Lead	EPA 200.8	8.1			1 U		1 U		1 U		2 U		2 U		1 U		1 U		5 U	
Manganese	EPA 6010B	100			389		239		594		273		472		2070		374		351	
Mercury	EPA 1631E	0.025			0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.0604		0.025 U		0.025 U	
Nickel	EPA 200.8	8.2			0.9		3.1		0.6		2		2		0.8		0.9		4	
Silver	EPA 200.8	1.9			0.2 U		0.2 U		0.2 U		0.5 U		0.5 U		0.2 U		0.2 U		1 U	
Vanadium	EPA 6010B	2810			3		6		24		4		5		11		3 U		5	
Zinc	EPA 6010B	81			6 U		6 U		6 U		6 U		6 U		6 U		6 U		6 U	
Petroleum Hydrocarbons (µg/L)																				
TPH - Diesel Range	NWTPH-Dx	500																		
TPH - Motor Oil Range	NWTPH-Dx	500																		

Notes:
Dup. = Duplicate analysis
Re. = Reanalysis
Re. Ex. = Reextraction

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 1

Boeing Plant 2
Data Gap Investigation, South Yard Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID: / Location: / Depth (ft bgs): / Sample Date:	SY-PL2-155A-F PL2-155A 6 - 16 3/14/2005	SY-PL2-155B PL2-155B 45 - 50 3/14/2005	SY-PL2-155B-F PL2-155B 45 - 50 3/14/2005	SY-PL2-155C PL2-155C 80 - 85 3/14/2005	SY-PL2-155C-F PL2-155C 80 - 85 3/14/2005	SY-PL2-156A PL2-156A 6 - 16 3/11/2005	SY-PL2-156A-F PL2-156A 6 - 16 3/11/2005	SY-PL2-601A PL2-601A 5 - 20 3/14/2005	SY-PL2-601A-F PL2-601A 5 - 20 3/14/2005	SY-PL2-601B PL2-601B 45 - 50 3/15/2005	SY-PL2-601B-F PL2-601B 45 - 50 3/15/2005	SY-PL2-602A PL2-602A 6 - 21 3/15/2005	SY-PL2-602A-05202005 PL2-602A 6 - 21 5/20/2005	SY-PL2-602A-F PL2-602A 6 - 21 3/15/2005	SY-PL2-602B PL2-602B 44.5 - 49.5 3/15/2005	SY-PL2-602B-F PL2-602B 44.5 - 49.5 3/15/2005
VOCs (µg/L)																				
Vinyl Chloride	EPA 8260B	0.731			0.2 U		0.2 UJ		8.8		1.7		12		8.9			9.8		
Chloroethane	EPA 8260B				0.2 U		0.2 UJ		0.2 U		0.2 U		0.2 U		0.2 U			0.2 U		
Methylene Chloride	EPA 8260B	190			0.3 U		0.3 UJ		0.3 U		0.3 U		0.3 U		0.3 U			0.3 U		
Acetone	EPA 8260B				5.2 J		7.1 J		1.8 J		3.5 J		3.1 J		2.1 J			3.1 J		
Carbon Disulfide	EPA 8260B				0.2 U		0.2 UJ		0.2 U		0.2 U		1.7		0.2 U			0.2 U		
1,1-Dichloroethene	EPA 8260B	0.382			0.2 U		0.2 UJ		0.2 U		0.2 U		0.2 U		0.2 U			0.2 U		
1,1-Dichloroethane	EPA 8260B				0.2 U		0.2 UJ		4		0.2 U		0.2 U		0.2 U			0.2 U		
trans-1,2-Dichloroethene	EPA 8260B	10000			0.2 U		0.2 UJ		0.4		0.3		0.2 U		0.5			0.2 U		
cis-1,2-Dichloroethene	EPA 8260B	1550			0.2 U		0.2 UJ		0.6		6.3		0.2 U		0.9			0.2 U		
Chloroform	EPA 8260B	56.1			0.2 U		0.2 UJ		0.2 U		0.2 U		0.2		0.2 U			12		
1,2-Dichloroethane	EPA 8260B	11.7			0.2 U		0.2 UJ		0.2 U		0.2 U		0.4		0.2 U			0.2 U		
2-Butanone	EPA 8260B				1 U		1 UJ		1 U		1 U		1 U		1 U			1 U		
1,1,1-Trichloroethane	EPA 8260B	206000			0.2 U		0.2 UJ		0.2 U		0.2 U		0.2 U		0.2 U			0.2 U		
Bromodichloromethane	EPA 8260B	5.52			0.2 U		0.2 UJ		0.2 U		0.2 U		0.2 U		0.2 U			0.5		
Trichloroethene	EPA 8260B	0.302			0.2 U		0.2 UJ		0.4		5		0.2 U		0.7			0.6		
Benzene	EPA 8260B	4.48			0.2 U		0.2 UJ		0.4		0.2 U		0.2 U		2			0.2 U		
Methyl isobutyl ketone	EPA 8260B				1 R		1 R		1 UJ		1 UJ		1 U		1 U			1 U		
Tetrachloroethene	EPA 8260B	0.822			0.2 U		0.2 UJ		0.2 U		0.2 U		0.2 U		0.2 U			0.2 U		
Toluene	EPA 8260B	15000			0.2 U		0.2 UJ		0.2 U		0.2 U		0.2 U		0.2 U			0.2 U		
Ethylbenzene	EPA 8260B	2100			0.2 U		0.2 UJ		0.2 U		0.2 U		0.2 U		0.2 U			0.2 U		
Trichlorofluoromethane	EPA 8260B				0.2 U		0.2 UJ		0.2 U		0.2 U		0.2 U		0.2 U			0.2 U		
1,1,2-Trichlorotrifluoroethane	EPA 8260B				0.2 U		0.2 UJ		0.2 U		0.2 U		0.2 U		0.2 U			0.2 U		
m,p-Xylene	EPA 8260B				0.4 U		0.4 UJ		0.4 U		0.4 U		0.4 U		0.4 U			0.4 U		
o-Xylene	EPA 8260B				0.2 U		0.2 UJ		0.2 U		0.2 U		0.2 U		0.2 U			0.2 U		
SVOCs (µg/L)																				
Phenol	EPA 8270C	275000							1 U						1 U					
2-Methylphenol	EPA 8270C	10200							1 U						1 U					
4-Methylphenol	EPA 8270C	1030							1 U						1 U					
2,4-Dimethylphenol	EPA 8270C	273							1 U						1 U					
Naphthalene	EPA 8270C	2440							1 U						1 U					
4-Chloro-3-methylphenol	EPA 8270C	18300							5 U						5 U					
Di-n-Butylphthalate	EPA 8270C	1440							1 U						1 U					
Naphthalene	EPA 8270SIM	2440							0.36 U						0.1 U					
Inorganics (Total) (µg/L)																				
Arsenic	EPA 200.8	0.2			3.6		8		106		11.8		6.6		31.4			1.2		
Cadmium	EPA 6010B	8.8			2 U		4 U		2 U		2 U		2 U		2 U			2 U		
Chromium	EPA 6010B				5 U		10 U		5 U		5 U		5 U		5 U			5 U		
Copper	EPA 200.8	3.1			0.5 U		2 U		1 U		0.6		1.3		1.2			1		
Lead	EPA 200.8	8.1			1 U		5 U		1 U		1 U		1 U		1 U			1 U		
Manganese	EPA 6010B	100			516		396		4850		2130		412		3020			227		
Mercury	EPA 1631E	0.025			0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U			0.025 U		
Nickel	EPA 200.8	8.2			0.6		7		1 U		2.6		1.5		2.5			2.4		
Silver	EPA 200.8	1.9			0.2 U		1 U		0.2 U		0.2 U		0.2 U		0.2 U			0.2 U		
Vanadium	EPA 6010B	2810			3 U		6 U		10		3 U		3 U		4			4		
Zinc	EPA 6010B	81			6 U		10 U		6 U		6 U		7		10			953		
Inorganics (Dissolved) (µg/L)																				
Arsenic	EPA 200.8	0.2		94		3.3		9		98.8		12		6.6			30.3		1.1	
Cadmium	EPA 6010B	8.8		2 U		2 U		4 U		2 U		2 U		2 U			2 U		2 U	
Chromium	EPA 6010B			5 U		5 U		10 U		5 U		5 U		5 U			5 U		5 U	
Chromium(VI)	A3500D	50		11 UJ						11 UJ										
Copper	EPA 200.8	3.1		0.8		0.5 U		2 U		0.5 U		0.5 U		0.5 U			0.8		0.5 U	
Lead	EPA 200.8	8.1		1 U		1 U		5 U		1 U		1 U		1 U			1 U		1 U	
Manganese	EPA 6010B	100		3800		530		427		4820		2400		442			3170		261	
Mercury	EPA 1631E	0.025		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U			0.025 U		0.025 U	
Nickel	EPA 200.8	8.2		1		0.5		6		1		2.6		1.5			2.8		2.1	
Silver	EPA 200.8	1.9		0.2 U		0.2 U		1 U		0.2 U		0.2 U		0.2 U			0.2 U		0.2 U	
Vanadium	EPA 6010B	2810		18		3 U		6 U		10		3 U		3 U			4		3	
Zinc	EPA 6010B	81		6 U		6 U		10 U		6 U		6 U		6 U			6 U		717	
Petroleum Hydrocarbons (µg/L)																				
TPH - Diesel Range	NWTPH-Dx	500														260				
TPH - Motor Oil Range	NWTPH-Dx	500														500 U				

Notes:
Dup. = Duplicate analysis
Re. = Reanalysis
Re. Ex. = Reextraction

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 2

Boeing Plant 2
Data Gap Investigation, South Yard Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID: / Location: / Depth (ft bgs): / Sample Date:	DP-SY-1-1 DP-SY-01 0 - 1 3/8/2005	DP-SY-1-5 DP-SY-01 4 - 5 3/8/2005	DP-SY-1-10 DP-SY-01 9 - 10 3/8/2005	DP-SY-2-1 DP-SY-02 0 - 1 3/7/2005	DP-SY-2-5 DP-SY-02 4 - 5 3/7/2005	DP-SY-2-10 DP-SY-02 9 - 10 3/7/2005	DP-SY-3-1 DP-SY-03 0 - 1 3/7/2005	DP-SY-3-5 DP-SY-03 4 - 5 3/7/2005	DP-SY-3-10 DP-SY-03 9 - 10 3/7/2005	DP-SY-4-1 DP-SY-04 0 - 1 3/7/2005	DP-SY-4-5 DP-SY-04 4 - 5 3/7/2005	DP-SY-4-10 DP-SY-04 9 - 10 3/7/2005	DP-SY-5-1 DP-SY-05 0 - 1 3/7/2005	DP-SY-5-5 DP-SY-05 4 - 5 3/7/2005	DP-SY-5-10 DP-SY-05 9 - 10 3/7/2005	DP-SY-5-10 DP-SY-05 Re. 9 - 10 3/7/2005	DP-SY-6-1 DP-SY-06 0 - 1 3/7/2005	DP-SY-6-5 DP-SY-06 4 - 5 3/7/2005	DP-SY-6-10 DP-SY-06 9 - 10 3/7/2005	DP-SY-7-1 DP-SY-07 0 - 1 3/7/2005	DP-SY-7-5 DP-SY-07 4 - 5 3/7/2005	DP-SY-7-5 DP-SY-07 Re. 4 - 5 3/7/2005	DP-SY-7-10 DP-SY-07 9 - 10 3/7/2005	DP-SY-7-10 DP-SY-07 Re. 9 - 10 3/7/2005
VOCs (µg/kg)																												
Vinyl Chloride	EPA 8260B	4.59		1 U	1.2 U	1.3 U	1.2 U	1 U	1 U	1.3 U	1.1 U	9.5	1 U	1 U	6.5	1 U	1.2 U	11		1.1 U	1.2 U	1.4 U	1 U	1.1 U		1.1 U	
Chloroethane	EPA 8260B			1 U	1.2 U	1.3 U	1.2 U	1 U	1 U	1.3 U	1.1 U	1 U	1 U	1 U	1.4 U	1 U	1.2 U	1.3 U		1.1 U	1.2 U	1.4 U	1 U	1.1 U		1.1 U	
Methylene Chloride	EPA 8260B	828		2.1 U	2.5 U	2.6 U	2.3 U	2.1 U	2 U	2.6 U	2.1 U	2 U	2 U	2.1 U	2.7 U	5.7	2.4 U	2.6 U		2.2 U	2.4 U	2.8 U	2.1 U	2.3 U		2.3 U	
Acetone	EPA 8260B			5.2 U	150	56	5.9 U	5.2 U	47	6.4 U	5.3 U	26 U	5 U	5.2 U	34 U	5.1 U	6.1 U	110		9 U	6 U	74	5.3 U	8.1 U		11 U	
Carbon Disulfide	EPA 8260B			1 U	1.2 U	1.3 U	1.2 UJ	1 UJ	1 UJ	1.3 UJ	1.1 UJ	1 UJ	1 UJ	1 UJ	1.4 UJ	1 UJ	1.2 U	1.4		1.1 U	1.2 U	1.4 U	1 U	1.1 U		1.1 U	
1,1-Dichloroethane	EPA 8260B			1 U	1.2 U	1.3 U	1.2 U	1 U	1 U	1.3 U	1.1 U	1 U	1 U	1 U	1.4 U	1 U	1.2 U	1.3 U		1.1 U	1.2 U	1.4 U	1 U	1.1 U		1.1 U	
trans-1,2-Dichloroethene	EPA 8260B	899		1 U	1.2 U	1.3 U	1.2 U	1 U	1 U	1.3 U	1.1 U	1 U	1 U	1 U	1.4 U	1 U	1.2 U	1.9		1.1 U	1.2 U	1.4 U	1 U	1.1 U		1.1 U	
cis-1,2-Dichloroethene	EPA 8260B	794		1 U	1.2 U	1.3 U	1.2 U	1 U	2.5	1.3 U	1.1 U	1 U	1 U	1 U	1.4 U	1 U	1.2 U	48		1.1 U	1.2 U	1.4 U	1 U	1.1 U		1.1 U	
2-Butanone	EPA 8260B			5.2 U	37	11	5.9 U	5.2 U	13	6.4 U	5.3 U	6.2	5 U	5.2 U	9.3	5.1 U	6.1 U	19		5.5 U	6 U	13	5.2 U	5.6 U		5.7 U	
1,1,1-Trichloroethane	EPA 8260B	27,800		1 U	1.2 U	1.3 U	1.2 U	1 U	1 U	1.3 U	1.1 U	1 U	1 U	1 U	1.4 U	1 U	1.2 U	1.3 U		1.1 U	1.2 U	1.4 U	1 U	1.1 U		1.1 U	
Trichloroethene	EPA 8260B	2		1 U	1.2 U	1.3 U	2	1 U	1 U	1.6	4.5	1.7	1 U	1 U	1.4 U	3.7	4.5	19		1.1 U	1.2 U	1.4 U	1 U	1.1 U		1.1 U	
Benzene	EPA 8260B	25.3		1 U	1.2 U	1.3 U	1.2 U	1 U	1 U	1.3 U	1.1 U	1 U	1 U	1 U	1.4 U	1 U	1.2 U	1.3 U		1.1 U	1.2 U	1.4 U	1 U	1.1 U		1.1 U	
Tetrachloroethene	EPA 8260B	8.72		1 U	1.2 U	1.3 U	1.2 U	1 U	1 U	2.7	3.6	1 U	1.1	1.7	1.4 U	110	46	57		1.1 U	3.4	1.4 U	1 U	1.1 U		1.1 U	
Toluene	EPA 8260B	19,000		1 U	1.2 U	1.3 U	1.2 U	1 U	1 U	1.3 U	1.1 U	1 U	1 U	1 U	1.4 U	1 U	1.2 U	1.3 U		1.1 U	1.2 U	1.4 U	1 U	1.1 U		1.1 U	
SVOCs (µg/kg)																												
Naphthalene	EPA 8270C	24,800		66 U	65 U	66 U	70 U	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 U	63 U	64 U	
Hexachlorobutadiene	EPA 8270C	6,380		66 U	65 U	66 U	70 U	340	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 U	63 U	64 U	
2-Methylnaphthalene	EPA 8270C			66 U	65 U	66 U	70 U	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 U	63 U	64 U	
Acenaphthylene	EPA 8270C			66 U	65 U	66 U	75	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 U	63 U	64 U	
Acenaphthene	EPA 8270C	32,400		66 U	65 U	66 U	70 U	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 U	63 U	64 U	
Phenanthrene	EPA 8270C			66 U	65 U	66 U	70 U	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 U	63 U	64 U	
Anthracene	EPA 8270C	6,080,000		66 U	65 U	66 U	72	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 U	63 U	64 U	
Di-n-Butylphthalate	EPA 8270C	50,900		66 U	65 U	66 U	180	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		84	66 U	65 U	63 U	63 U	63 U	64 U	
Fluoranthene	EPA 8270C	44,000		66 U	65 U	66 U	510	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 U	63 U	64 U	
Pyrene	EPA 8270C	1,750,000		66 U	65 U	66 U	520	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66	66 U	65 U	63 U	63 U	63 U	64 U	
Benzo(a)anthracene	EPA 8270C	41.9		66 U	65 U	66 U	180	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 U	63 U	64 U	
bis(2-Ethylhexyl)phthalate	EPA 8270C	1,570		66 U	65 U	66 U	70 U	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		100	66 U	65 U	63 U	63 U	63 U	64 U	
Chrysene	EPA 8270C	46.6		66 U	65 U	66 U	240	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 U	63 U	64 U	
Benzo(b)fluoranthene	EPA 8270C	144		66 U	65 U	66 U	230	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 UJ	63 UJ	64 U	
Benzo(k)fluoranthene	EPA 8270C	144		66 U	65 U	66 U	210	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 UJ	63 UJ	64 U	
Benzo(a)pyrene	EPA 8270C	113		66 U	65 U	66 U	230	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 UJ	63 UJ	64 U	
Indeno(1,2,3-cd)pyrene	EPA 8270C	406		66 U	65 U	66 U	110	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 UJ	63 UJ	64 U	
Dibenz(a,h)anthracene	EPA 8270C	210		66 U	65 U	66 U	70 U	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 UJ	63 UJ	64 U	
Benzo(g,h,i)perylene	EPA 8270C			66 U	65 U	66 U	86	64 U	65 U	66 U	63 U	65 U	66 U	65 U	66 U	64 U	63 U	64 U		66 U	66 U	65 U	63 U	63 UJ	63 UJ	64 U	
Naphthalene	EPA 8270SIM	24,800		6.6 U	6.5 U	6.6 U	21 U	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	6.6 U	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	20 U	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
2-Methylnaphthalene	EPA 8270SIM			6.6 U	6.5 U	6.6 U	21 U	6.4 U	6.5 U	6.6 U	21	6.5 U	6.6 U	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	20 U	11	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Acenaphthylene	EPA 8270SIM			6.6 U	6.5 U	6.6 U	120	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	6.6 U	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	20 U	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Acenaphthene	EPA 8270SIM	32,400		6.6 U	6.5 U	6.6 U	59	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	6.6 U	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	20 U	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Phenanthrene	EPA 8270SIM			6.6 U	7.8	12	34	6.4 U	6.5 U	6.6 U	14	9.2	6.6 U	17	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	22	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Anthracene	EPA 8270SIM	6,080,000		6.6 U	6.5 U	6.6 U	99	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	6.6 U	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	20 U	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Fluoranthene	EPA 8270SIM	44,000		6.6 U	10	12	510	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	7.9	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	41	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Pyrene	EPA 8270SIM	1,750,000		13	13	9.9	580	6.4 U	6.5 U	6.6 U	6.3 U	7.2	8.6	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	53	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Benzo(a)anthracene	EPA 8270SIM	41.9		6.6 U	6.5 U	6.6 U	210	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	6.6 U	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	20 U	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Chrysene	EPA 8270SIM	46.6		7.3	7.8	10	240	6.4 U	6.5 U	6.6 U	6.3 U	11	9.3	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	30	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Benzo(b)fluoranthene	EPA 8270SIM	144		9.9 J	6.5 U	6.6 U	290	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	14	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	20 U	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Benzo(k)fluoranthene	EPA 8270SIM	144		8.6 J	8.4	6.6 U	170	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	11	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	20 U	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Benzo(a)pyrene	EPA 8270SIM	113		6.6 U	6.5 U	6.6 U	220	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	7.3	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	33	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406		6.6 U	6.5 U	6.6 U	95	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	9.9	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	20 U	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Dibenz(a,h)anthracene	EPA 8270SIM	210		6.6 U	6.5 U	6.6 U	30	6.4 UJ	6.5 UJ	6.6 UJ	6.3 UJ	6.5 U	6.6 UJ	6.5 UJ	6.6 UJ	6.4 UJ	6.3 U	6.4 U	6.4 U	20 U	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
Benzo(g,h,i)perylene	EPA 8270SIM			6.6 U	6.5 U	6.6 U	82	6.4 U	6.5 U	6.6 U	6.3 U	6.5 U	13	6.5 U	6.6 U	6.4 U	6.3 U	6.4 U	6.4 U	20 U	6.6 U	6.5 U	6.3 U	6.3 U	6.3 U	6.4 U	6.4 U
SVOCs (µg/kg)																												
Aroclor 1254	EPA 8082	33		130	33 U	32 U	230	33 U	32 U	90	32 U	49	330	80	33 U	33 U	32 U	33 U		230	32 U	32 U	33 U	33 U		33 U	
Aroclor 1260	EPA 8082	33		70 U	33 U	32 U	140	33 U	32 U	73	32 U	33 J	210	45	33 U	33 U	32 U	33 U		77 J	32 U	32 U	33 U	33 U		33 U	
Total PCB	EPA 8082	33		130	33 U	32 U	370	33 U	32 U	163	32 U	82 J	540	125	33 U	33 U	32 U	33 U		307 J	32 U	32 U	33 U	33 U		33 U	
Inorganics (mg/kg)																												
Aluminum	EPA 6010B			9080	19400	16700	13700	10000	22500	8830	8860	12600	9430	9520	10400	7750	10200	11800		10300	10700	16500	9070	8730		11600	
Arsenic	EPA 6010B	7.3		5 U	7 U	6 U	5 U	6 U	7 U	5 U	6 U	5 U	5 U	5 U	6 U	5 U	7 U	6 U		7	6 U	6 U	5 U	5 U		6 U	
Beryllium	EPA 6010B	222		0.1	0.3	0.2	0.14	0.1	0.3	0.1	0.1 U	0.2	0.1	0.1	0.1	0.1	0.1 U	0.1		0.1	0.1 U	0.2	0.1 U	0.1		0.1	
Cadmium	EPA 6010B	1.21		0.2 U	0.3	0.3	0.4	0.2 U	0.3 U	0.2 U	0.2 U	0.2	0.4	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U		4.3	0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	
Chromium	EPA 6010B			14.5	19	17	27.4 J	52.1 J	21.8 J	15.1 J	9 J	18 J	18.3 J	14 J	12.1 J	11.7 J	11.4 J	13.2 J		15.3 J	19.5 J	16.1 J	10.5 J	9.9 J		13.5 J	
Copper	EPA 6010B	36.4		12.2	30	24.4	32.9	13.5	31.5	12.8	10.8	20.6	17.7	12.9	13.6	9.1	13.2	15.5		25.1	12.8	24.2	11.3	9.2		16.5	
Lead	EPA 6010B	1,000		5	15	10	6	4	10	4	2	6	9	3	2	2 U	3	3 U		16	3	4	2	2 U		2 U	
Magnesium	EPA 6010B			3140	5040	4230	4670	2200	5460	3080	1930	3630	2650	2580	2370	2550	2150	2560		2950	2420	3640	2070	2200		2450	
Manganese	EPA 6010B	1,146		158	248	230	231	94.3	370	142	73.4	180	141	131	136	110	77.9	150		157	87.5	180	86.8	161		228	
Mercury	EPA 7471A	0.07		0.05 U	0.07 U	0.06 U	0.04	0.05 U	0.07	0.05	0.05 U	0.06	0.09	0.04 U	0.05 U	0.04 U	0.05 U	0.05 U		0.06 U	0.05 U	0.05 U	0.04 U	0.04 U		0.05 U	
Nickel	EPA 6010B	47.8		14	16	13	19.7	8	17	11	6	13	13	13	8	8.7	10	9		12	7	12	7	8		9	
Silver	EPA 6010B	0.323		0.3 U	0.4 U	0.4 U	0.3 U	0.3 U	0.4 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.4 U	0.3 U	0.4 U	0.4 U		7.1	0.4 U	0.4 U	0.3 U	0.3 U		0.4 U	
Vanadium	EPA 6010B	56,100		36	55.9	49.7	45.6	36.5	58.8	37.3	36.5	54.1	41.3	39.8	44.6	39.4	41.8	48		41.4	38.2	50	36.1	36.8		46.3	
Zinc	EPA 6010B	101		33.5	53.7	42.9	50.4	23.3	64.3	32.4	17	35.3	48.7	27.5	23.7	23.5	22.5	24.1		83.3	22.5	27.3	19.9	22.5		22.5	
Petroleum Hydrocarbons (mg/kg)																												
TPH - Diesel Range	NWTPH-Dx	2,000																										
TPH - Motor Oil Range	NWTPH-Dx	2,000																										

Notes:
Re. = Reanalysis

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 2

Boeing Plant 2
Data Gap Investigation, South Yard Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	DP-SY-8-1	DP-SY-8-5	DP-SY-8-5	DP-SY-8-10	DP-SY-9-1	DP-SY-9-5	DP-SY-9-10	DP-SY-10-1	DP-SY-10-5	DP-SY-10-10	DP-SY-11-1	DP-SY-11-5	DP-SY-11-10	DP-SY-12-1	DP-SY-12-5	DP-SY-12-10	SY-PL2-601A-1.5	SY-PL2-601A-5	SY-PL2-601A-10	SY-PL2-602A-1.5	SY-PL2-602A-5
			Location:	DP-SY-08	DP-SY-08	DP-SY-08 Re.	DP-SY-08	DP-SY-09	DP-SY-09	DP-SY-09	DP-SY-10	DP-SY-10	DP-SY-10	DP-SY-11	DP-SY-11	DP-SY-11	DP-SY-12	DP-SY-12	DP-SY-12	PL2-601A	PL2-601A	PL2-601A	PL2-602A	PL2-602A
			Depth (ft bgs):	0 - 1	4 - 5	4 - 5	9 - 10	0 - 1	4 - 5	9 - 10	0 - 1	4 - 5	9 - 10	0 - 1	4 - 5	9 - 10	0 - 1	4 - 5	9 - 10	0 - 1.5	3.5 - 5	8.5 - 10	0 - 1.5	3.5 - 5
			Sample Date:	3/7/2005	3/7/2005	3/7/2005	3/7/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/8/2005	3/1/2005	3/1/2005	3/1/2005	3/1/2005	3/1/2005
VOCs (µg/kg)																								
Vinyl Chloride	EPA 8260B	4.59		1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	1.2 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	2.2	1 U	1 U	1.2 U	1 U	1 U	1.2 U	1 U	1.1 U
Chloroethane	EPA 8260B			1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	1.2 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	3.9	1 U	1 U	1.2 U	1 U	1 U	1.2 U	1 U	1.1 U
Methylene Chloride	EPA 8260B	828		2.2 U	2.8 U	2.7 U	2.6 U	2 U	2.5 U	2.4 U	2.1 U	2.2 U	2.1 U	2.2 U	2.2 U	2.7 U	2 U	2.1 U	2.5 U	2 U	2 U	2.5 U	2 U	2.3 U
Acetone	EPA 8260B			5.4 U	78	140	64	6.2	6.3 U	120	5.4 U	5.4 U	7.5	6.4	6.9	210	5 U	5.6	37	5.1 U	6.1 U	6.1 U	5.1 U	5.7 U
Carbon Disulfide	EPA 8260B			1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	5.7	1.1 U	1.1 U	1 U	1.1 U	1.1 U	1.4 U	1 U	1 U	1.2 U	1 UJ	1 UJ	2.3 J	1 UJ	1.1 UJ
1,1-Dichloroethane	EPA 8260B			1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	1.2 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	6.1	1 U	1 U	4.6	1 U	1 U	1.2 U	1 U	1.1 U
trans-1,2-Dichloroethene	EPA 8260B	899		1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	1.2 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	1.4 U	1 U	1 U	1.2 U	1 U	1 U	1.2 U	1 U	1.1 U
cis-1,2-Dichloroethene	EPA 8260B	794		1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	1.2 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	3.4	1 U	1 U	2	1 U	1 U	1.2 U	1 U	3.3
2-Butanone	EPA 8260B			5.4 U	16	29	12	5 U	6.3 U	25	5.4 U	5.4 U	5.2 U	5.4 U	5.5 U	54	5 U	5.2 U	7.3	5 U	5 U	6.1 U	5.1 U	5.7 U
1,1,1-Trichloroethane	EPA 8260B	27,800		1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	1.2 U	1.1 U	1.1 U	1 U	1.2	1.1 U	1.4 U	1 U	1 U	1.2 U	1 U	1 U	1.2 U	1 U	1.1 U
Trichloroethene	EPA 8260B	2		1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	1.2 U	1.2	3.5	1 U	4	1.4	1.4 U	1 U	1 U	2.1	2	1.4	1.2 U	13	130
Benzene	EPA 8260B	25.3		1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	1.2 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	1.4 U	1 U	1 U	1.2 U	1 U	1 U	1.2 U	1 U	1.1 U
Tetrachloroethene	EPA 8260B	8.72		1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	1.2 U	1.1 U	2	1 U	3.1	1.1 U	1.4 U	1 U	1 U	1.2 U	1 U	1 U	1.2 U	1 U	3.7
Toluene	EPA 8260B	19,000		1.1 U	1.4 U	1.4 U	1.3 U	1 U	1.3 U	1.2 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	2.2	1 U	1 U	1.2 U	1 U	1 U	1.2 U	1 U	1.1 U
SVOCs (µg/kg)																								
Naphthalene	EPA 8270C	24,800		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Hexachlorobutadiene	EPA 8270C	6,380		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
2-Methylnaphthalene	EPA 8270C			65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Acenaphthylene	EPA 8270C			65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Acenaphthene	EPA 8270C	32,400		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Phenanthrene	EPA 8270C			65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Anthracene	EPA 8270C	6,080,000		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Di-n-Butylphthalate	EPA 8270C	50,900		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Fluoranthene	EPA 8270C	44,000		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Pyrene	EPA 8270C	1,750,000		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Benzo(a)anthracene	EPA 8270C	41.9		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
bis(2-Ethylhexyl)phthalate	EPA 8270C	1,570		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Chrysene	EPA 8270C	46.6		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Benzo(b)fluoranthene	EPA 8270C	144		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Benzo(k)fluoranthene	EPA 8270C	113		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Indeno(1,2,3-cd)pyrene	EPA 8270C	406		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Dibenz(a,h)anthracene	EPA 8270C	210		65 U	66 U		64 U	66 U	66 U	65 U													64 U	66 U
Benzo(g,h,i)perylene	EPA 8270C			65 U	66 U		64 U	66 U	66 U	65 U													64 UJ	66 UJ
Naphthalene	EPA 8270SIM	24,800		6.5 U	6.6 U		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
2-Methylnaphthalene	EPA 8270SIM			6.5 U	6.6 U		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Acenaphthylene	EPA 8270SIM			6.5 U	6.6 U		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Acenaphthene	EPA 8270SIM	32,400		6.5 U	6.6 U		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Phenanthrene	EPA 8270SIM			7.8	11		6.4 U	9.9	6.6 U	6.5 U													6.4 U	8.6
Anthracene	EPA 8270SIM	6,080,000		6.5 U	6.6 U		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Fluoranthene	EPA 8270SIM	44,000		13	21		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Pyrene	EPA 8270SIM	1,750,000		16	18		6.4 U	6.6	6.6 U	6.5 U													6.4 U	6.6 U
Benzo(a)anthracene	EPA 8270SIM	41.9		9.1	7.3		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Chrysene	EPA 8270SIM	46.6		12	8.6		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Benzo(b)fluoranthene	EPA 8270SIM	144		15	7.9		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Benzo(k)fluoranthene	EPA 8270SIM	144		15	5.3 J		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Benzo(a)pyrene	EPA 8270SIM	113		9.7	6.6 U		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	22
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406		6.5 U	6.6 U		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Dibenz(a,h)anthracene	EPA 8270SIM	210		6.5 U	6.6 U		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
Benzo(g,h,i)perylene	EPA 8270SIM			6.5 U	6.6 U		6.4 U	6.6 U	6.6 U	6.5 U													6.4 U	6.6 U
SVOCs (µg/kg)																								
Aroclor 1254	EPA 8082	33		63	32 U		33 U	33 U	33 U	33 U	32 U	33 U	33 U	33 U	33 U	33 U	33 U	33 U	32 U	33 U	32 U	32 U	33 U	33 U
Aroclor 1260	EPA 8082	33		41	32 U		33 U	33 U	33 U	33 U	32 U	33 U	33 U	33 U	33 U	33 U	33 U	33 U	32 U	33 U	32 U	32 U	33 U	33 U
Total PCB	EPA 8082	33		104	32 U		33 U	33 U	33 U	33 U	32 U	33 U	33 U	33 U	33 U	33 U	33 U	33 U	32 U	33 U	32 U	32 U	33 U	33 U
Inorganics (mg/kg)																								
Aluminum	EPA 6010B			10800	17200		16500	8840	10400	8400	9950	8560	11900	7630	8110	11400	7790	8320	8650	8730	8500	11900	7870	8400
Arsenic	EPA 6010B	7.3		6 U	8		7 U	6 U	6 U	6 U	5 U	5 U	6 U	5 U	5 U	6	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U
Beryllium	EPA 6010B	222		0.1	0.3		0.2	0.1 U	0.1 U	0.1 U	0.12	0.1 U	0.2	0.1	0.1	0.2	0.1 U	0.1 U	0.1 U	0.11	0.1 U	0.1	0.1	0.1
Cadmium	EPA 6010B	1.21		0.8	0.3 U		0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	EPA 6010B			15 J	19.5 J		15.8 J	10.1	11.4	10.5	13.4	10.9	17.1	13.5	11.7	13.7	12.2	14.3	12.9	11.4	10.6	13	12.5	10.3
Copper	EPA 6010B	36.4		25.3	32		25.4	12.2	13.7	13.1	13.1	11.6	22	9	9.4	23.8	11.7	9.9	9.9	12.2	9.2	14.2	9.5	13
Lead	EPA 6010B	1,000		9	11		4	2 U	3	2 U	4	2	3	2 U	3	4	3	2	2 U	9	2 U	2 U	5	2 U
Magnesium	EPA 6010B			2980	4750		3580	1970	2290	1920	3130	2170	3500	2410	2630	3610	2650	2750	2380	3070	2500	2560	2540	1970
Manganese	EPA 6010B	1,146		148	184		230	72	85.2	174	156	83.7	138	118	123	174	134	124	108	165	122	135	123	89
Mercury	EPA 7471A	0.07		0.08	0.1		0.07 U	0.05 U	0.06 U	0.05 U	0.04 U	0.04 U	0.06 U	0.05 U	0.05	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U
Nickel	EPA 6010B	47.8		12	15		12	6	9	7	12.3	7	11	8.3	8.2	11	8.6	9.5	8	10	7	9	8.6	8
Silver	EPA 6010B	0.323		2.1	0.4 U		0.4 U	0.3 U	0.4 U	0.3 U	0.3 U	0.3 U	0.4 U	0.3 U	0.3 U	0.4 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.4 U	0.3 U	0.3 U
Vanadium	EPA 6010B	56,100		42.5	58.7		49.1	40.2	38.9	43.5	41.1	37.5	52.5	38.7	37.1	50.5	38.5	41.8	38	43.2	40.1	48.8	42.1	35
Zinc	EPA 6010B	101		50.7	47		26.7	17.8	24.5	19.7	30.4	20.1	31.4	21.7	21.9	32.4	25.8	22.8	21.2	25.8	21.8	23.8	23.5	17.5
Petroleum Hydrocarbons (mg/kg)																								
TPH - Diesel Range	NWTPH-Dx	2,000																						
TPH - Motor Oil Range	NWTPH-Dx	2,000																						

Notes:
Re. = Reanalysis

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 3

Data Gap Investigation, 2-60s Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID: / Location: / Depth (ft bgs): / Sample Date:	2-60-DP-01-12-W / 2-60-DP-01 / 12 - 12 / 8/4/2005	2-60-DP-01-42-W / 2-60-DP-01 / 42 - 42 / 8/4/2005	2-60-DP-02-12-W / 2-60-DP-02 / 12 - 12 / 8/4/2005	2-60-DP-02-22-W / 2-60-DP-02 Duplicate / 12 - 12 / 8/4/2005	2-60-DP-02-42-W / 2-60-DP-02 / 42 - 42 / 8/4/2005	2-60-DP-03-12-W / 2-60-DP-03 / 12 - 12 / 8/5/2005	2-60-DP-03-42-W / 2-60-DP-03 / 42 - 42 / 8/5/2005	2-60-DP-04-12-W / 2-60-DP-04 / 12 - 12 / 8/8/2005	2-60-DP-04-42-W / 2-60-DP-04 / 42 - 42 / 8/8/2005	2-60-DP-05-12-W / 2-60-DP-05 / 12 - 12 / 8/8/2005	2-60-DP-05-42-W / 2-60-DP-05 / 42 - 42 / 8/9/2005	2-60-DP-06-12-W / 2-60-DP-06 / 12 - 12 / 8/9/2005	2-60-DP-06-12-W / 2-60-DP-06 Dilution / 12 - 12 / 8/9/2005	2-60-DP-06-42-W / 2-60-DP-06 / 42 - 42 / 8/9/2005
VOCs (µg/L)																		
Chloromethane	EPA 8260B	26.3		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3	1 U	0.3
Vinyl Chloride	EPA 8260B	0.731		0.2 U	0.2 U	0.2 U	0.2 U	0.2	0.2 U	0.3	0.2 U	0.4	0.2 U	0.2 U	0.2	1 U	0.2 U
Acetone	EPA 8260B			2.1 U	2.6 U	1 U	1.5 U	2 U	1.5 U	2.2 U	1.5	1.2	3.6	1.1 U	2.1 U	5 U	1.2 U
Carbon Disulfide	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
1,1-Dichloroethene	EPA 8260B	0.382		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3	1 U	0.2 U
1,1-Dichloroethane	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
trans-1,2-Dichloroethene	EPA 8260B	10000		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.6	2.3	0.2 U
cis-1,2-Dichloroethene	EPA 8260B	1550		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3	0.2 U	40 E	38	0.2 U
Chloroform	EPA 8260B	56.1		0.2 U	0.2 U	0.3	0.2	0.2 U	0.2 U	0.2 U	1.1	0.2 U	0.2	0.2 U	0.2 U	1 U	0.2 U
1,2-Dichloroethane	EPA 8260B	11.7		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
1,1,1-Trichloroethane	EPA 8260B	206000		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Trichloroethene	EPA 8260B	0.302		0.2	0.2 U	0.6	0.6	0.2 U	0.2	0.2 U	0.2 U	0.2 U	1.1	0.2 U	28 E	29	0.2 U
1,1,2-Trichloroethane	EPA 8260B	5		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Benzene	EPA 8260B	4.48		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Tetrachloroethene	EPA 8260B	0.822		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6.3	7.8	0.2 U
Toluene	EPA 8260B	15000		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Ethylbenzene	EPA 8260B	2100		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Trichlorofluoromethane	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
m,p-Xylene	EPA 8260B			0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2 U	0.4 U
o-Xylene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
1,3,5-Trimethylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
1,2,4-Trimethylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Isopropylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
n-Propylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
tert-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
sec-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
4-Isopropyltoluene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
n-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Naphthalene	EPA 8260B	2440		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.5 U	0.5 U
SVOCs (µg/L)																		
Naphthalene	EPA 8270D	2440									1 U	1 U	1 U	1 U	1 U		1 U
Di-n-Butylphthalate	EPA 8270D	1440									1.2	1 U	1 U	1	1.1		1.2
bis(2-Ethylhexyl)phthalate	EPA 8270D	3									23 U	1 U	1.1 U	1 U	1 U		1.4 U
Naphthalene	EPA 8270SIM	2440									0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
PCBs (µg/L)																		
Aroclor 1260	EPA 8082	0.01																
Total PCB	EPA 8082	0.01																
Inorganics (Total) (µg/L)																		
Aluminum	EPA 6010B																	
Arsenic	EPA 200.8	8																
Barium	EPA 6010B																	
Cobalt	EPA 6010B																	
Copper	EPA 200.8	8																
Iron	EPA 6010B																	
Lead	EPA 200.8	8.1																
Magnesium	EPA 6010B																	
Manganese	EPA 6010B	2000																
Mercury	EPA 1631E	0.025																
Molybdenum	EPA 6010B																	
Nickel	EPA 200.8	8.2																
Selenium	EPA 200.8	71																
Vanadium	EPA 6010B	2810																
Zinc	EPA 6010B	81																
Cyanide	EPA 335.2	5									5 U	5 U	5 U	5 U	5 U		5 U
Inorganics (Dissolved) (µg/L)																		
Aluminum	EPA 6010B			50 U	60	50 U	80	100	50 U	150	50 U	50 U	50 U	50 U	50 U		50 U
Arsenic	EPA 200.8	8		1.8	0.7	1.9	2	0.4	0.9	0.6	0.6	0.5 U	1.1	0.5	2.2		0.5 U
Barium	EPA 6010B			13	3 U	12	12	3	12	4	3 U	25	3 U	9	3		6
Cobalt	EPA 6010B			3	3 U	3 U	3	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U		3 U
Copper	EPA 200.8	8		5.7	1.6	4.9	4.6	1	3.1	1.6	1	1.2	8.5	0.5 U	7		0.6
Iron	EPA 6010B			390	4890	730	840	7180	420	4930	1310	43600	1050	26900	1370		13000
Lead	EPA 200.8	8.1		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U
Magnesium	EPA 6010B			46100	5100	31100	29600	9220	73500	12000	10900	27000	31100	57600	27100		21000
Manganese	EPA 6010B	2000		17	254	27	29	574	25	338	61	1440	315	2260	373		820
Mercury	EPA 1631E	0.025		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		0.025 U
Molybdenum	EPA 6010B			7	7	8	8	8	5	6	5 U	5 U	5	5 U	6		5 U
Nickel	EPA 200.8	8.2		3.2	6.7	3.7	4.1	5.5	4	7.5	2.2	1.8	6.3	2.2	37.8		7
Selenium	EPA 200.8	71		3	0.5 U	2	2	0.5 U	2	0.9	0.5 U	2 U	2 U	1.4	1.7		2 U
Vanadium	EPA 6010B	2810		15	3	14	13	3 U	7	6	12	3 U	9	3 U	15		3 U
Zinc	EPA 6010B	81		6 U	39	7	9	43	8	32	10	12	11	9	158		10
Petroleum Hydrocarbons (µg/L)																		
TPH - Gasoline Range	NWTPH-Gx	800																
TPH - Diesel Range	NWTPH-Dx-Cleaned	500																
Conventional Parameters (mg/L)																		
Nitrate (as Nitrogen)	EPA 300.0										3.6	1 U			4.7		0.5 U
Nitrite (as Nitrogen)	EPA 300.0										0.1 U	1 U			0.2		0.5 U
Ammonia (as Nitrogen)	EPA 350.1										0.038	0.682			0.037		1.76
Sulfate	EPA 300.0										25.6	47.1			316		91.8
Sulfide	EPA 376.2										0.05 U	0.05 U			0.05 U		0.05 U
Total Organic Carbon	EPA 415.1										1.5 U	3.03			7.44		4.83

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 3

Data Gap Investigation, 2-60s Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID:	2-60-DP-07-12-W	2-60-DP-07-42-W	2-60-DP-08-12-W	2-60-DP-08-42-W	2-60-DP-09-12-W	2-60-DP-09-22-W	2-60-DP-09-42-W	2-60-DP-10-12-W	2-60-DP-10-42-W	2-60-DP-11-12-W	2-60-DP-11-42-W	2-60-DP-11-42-W	2-60-DP-12-12-W	2-60-DP-12-42-W
			Location:	2-60-DP-07	2-60-DP-07	2-60-DP-08	2-60-DP-08	2-60-DP-09	2-60-DP-09 Duplicate	2-60-DP-09	2-60-DP-10	2-60-DP-10	2-60-DP-11	2-60-DP-11	2-60-DP-11 Dilution	2-60-DP-12	2-60-DP-12
			Depth (ft bgs):	12 - 12	42 - 42	12 - 12	42 - 42	12 - 12	12 - 12	42 - 42	12 - 12	42 - 42	12 - 12	42 - 42	42 - 42	12 - 12	42 - 42
			Sample Date:	8/9/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/11/2005	8/11/2005	8/12/2005	8/12/2005	8/12/2005	8/11/2005	8/11/2005
VOCs (µg/L)																	
Chloromethane	EPA 8260B	26.3		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
Vinyl Chloride	EPA 8260B	0.731		0.2 U	1.4	0.2 U	2.8	0.2 U	0.2 U	2.2	0.2 U	3	0.2 U	14	15	0.2 U	0.9
Acetone	EPA 8260B			1.6	1.6 U	2.1 U	2.8 U	1 U	1 U	1.3	1 U	1	1 U	3 U	5 U	1.9	1.4
Carbon Disulfide	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
1,1-Dichloroethene	EPA 8260B	0.382		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
1,1-Dichloroethane	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	EPA 8260B	10000		0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.8	1 U	1	0.6
cis-1,2-Dichloroethene	EPA 8260B	1550		3.9	0.3	0.5	0.4	0.3	0.3	0.2 U	0.2 U	0.2 U	0.2 U	38 J	45	2.5	28 E
Chloroform	EPA 8260B	56.1		0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.4	0.2 U
1,2-Dichloroethane	EPA 8260B	11.7		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
1,1,1-Trichloroethane	EPA 8260B	206000		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3	0.2 U	0.8	0.2 U	1 U	0.5	0.2 U
Trichloroethene	EPA 8260B	0.302		10	0.2 U	0.2 U	0.2 U	1	1	0.2 U	0.4	0.2 U	0.2 U	0.2 U	1 U	5.1	0.2 U
1,1,2-Trichloroethane	EPA 8260B	5		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
Benzene	EPA 8260B	4.48		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1.1	1.2	0.2 U	0.2 U
Tetrachloroethene	EPA 8260B	0.822		1.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4	0.2 U	1 U	0.7	0.2 U
Toluene	EPA 8260B	15000		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
Ethylbenzene	EPA 8260B	2100		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
Trichlorofluoromethane	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
m,p-Xylene	EPA 8260B			0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2 U	0.4 U	0.4 U
o-Xylene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
1,2,4-Trimethylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
Isopropylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
n-Propylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
tert-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
sec-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
4-Isopropyltoluene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
n-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
Naphthalene	EPA 8260B	2440		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U
SVOCs (µg/L)																	
Naphthalene	EPA 8270D	2440		1 U	1 U	1 U	1 U	1 UJ	1 U	1 U							
Di-n-Butylphthalate	EPA 8270D	1440		1.1	1 U	1 U	1 U	1 UJ	1 U	1 U							
bis(2-Ethylhexyl)phthalate	EPA 8270D	3		1 U	1 U	1 U	1 U	1 UJ	1 U	1 U							
Naphthalene	EPA 8270SIM	2440		0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U							
PCBs (µg/L)																	
Aroclor 1260	EPA 8082	0.01															
Total PCB	EPA 8082	0.01															
Inorganics (Total) (µg/L)																	
Aluminum	EPA 6010B																
Arsenic	EPA 200.8	8															
Barium	EPA 6010B																
Cobalt	EPA 6010B																
Copper	EPA 200.8	8															
Iron	EPA 6010B																
Lead	EPA 200.8	8.1															
Magnesium	EPA 6010B																
Manganese	EPA 6010B	2000															
Mercury	EPA 1631E	0.025															
Molybdenum	EPA 6010B																
Nickel	EPA 200.8	8.2															
Selenium	EPA 200.8	71															
Vanadium	EPA 6010B	2810															
Zinc	EPA 6010B	81															
Cyanide	EPA 335.2	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U		5 U	5 U
Inorganics (Dissolved) (µg/L)																	
Aluminum	EPA 6010B			50 U	60	50 U	50 U	50 U	60	50 U	50 U	50 U	50 U	50 U		50	50 U
Arsenic	EPA 200.8	8		2.2	0.5 U	8.8	0.5 U	6.7	6.7	0.5 U	0.4	0.7	0.5	0.3		2.4	0.5 U
Barium	EPA 6010B			5	8	17	7	14	14	13	91	17	87	6		24	10
Cobalt	EPA 6010B			3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U		3 U	3 U
Copper	EPA 200.8	8		21	0.5 U	1.3	1.1	1.7	1.7	0.5 U	2.6	0.5 U	2.8	0.7		3.2	0.9
Iron	EPA 6010B			180	10700	13200	4910	7120	7420	6090	420	19900	180	16500		3090	10600
Lead	EPA 200.8	8.1		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
Magnesium	EPA 6010B			61100	20900	21100	18800	10900	11100	78000	42300	22800	70800	18500		40600	25000
Manganese	EPA 6010B	2000		983	576	590	747	523	531	532	176	625	147	372		542	294
Mercury	EPA 1631E	0.025		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		0.025 U	0.025 U
Molybdenum	EPA 6010B			5	5 U	5 U	5 U	5 U	5 U	5	6	5 U	5 U	5 U		5 U	5 U
Nickel	EPA 200.8	8.2		8.9	2.4	1.1	5.8	2.3	2.2	2.6	5.8	2.8	5.9	2.3		3.3	5
Selenium	EPA 200.8	71		3	2 U	0.5 U	2 U	0.5 U	0.5 U	2 U	0.5 U	1.6	0.9	1		2 U	2 U
Vanadium	EPA 6010B	2810		13	3 U	3 U	3	3 U	3 U	3 U	3 U	3 U	3 U	3 U		5	3 U
Zinc	EPA 6010B	81		7	13	8	23	6 U	6 U	11	9	18	6 U	7		7	14
Petroleum Hydrocarbons (µg/L)																	
TPH - Gasoline Range	NWTPH-Gx	800															
TPH - Diesel Range	NWTPH-Dx-Cleaned	500															
Conventional Parameters (mg/L)																	
Nitrate (as Nitrogen)	EPA 300.0							0.8	0.8	0.1 U			230	0.1 U			
Nitrite (as Nitrogen)	EPA 300.0							0.1 U	0.1 U	0.1 U			0.1 U	0.5 U			
Ammonia (as Nitrogen)	EPA 350.1							0.072	0.066	10			0.012	0.615			
Sulfate	EPA 300.0							66.9	66.8	0.3			226	47.4			
Sulfide	EPA 376.2							0.05 U	0.05 U	0.05 U			0.05 U	0.05 U			
Total Organic Carbon	EPA 415.1							3.45	3.52	9.99			5.92	5.8			

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 3

Data Gap Investigation, 2-60s Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID: / Location: / Depth (ft bgs): / Sample Date:	2-60-DP-12-42-W / 2-60-DP-12 Dilution / 42 - 42 / 8/11/2005	2-60-DP-13-12-W / 2-60-DP-13 / 12 - 12 / 8/11/2005	2-60-DP-13-42-W / 2-60-DP-13 / 42 - 42 / 8/11/2005	2-60-DP-13-42-W / 2-60-DP-13 Dilution / 42 - 42 / 8/11/2005	2-60-DP-14-12-W / 2-60-DP-14 / 12 - 12 / 8/12/2005	2-60-DP-14-42-W / 2-60-DP-14 / 42 - 42 / 8/12/2005	2-60-DP-15-12-W / 2-60-DP-15 / 12 - 12 / 8/12/2005	2-60-DP-15-42-W / 2-60-DP-15 / 42 - 42 / 8/12/2005	2-60-DP-16-12-W / 2-60-DP-16 / 12 - 12 / 8/15/2005	2-60-DP-16-42-W / 2-60-DP-16 / 42 - 42 / 8/15/2005	2-60-DP-17-13-W / 2-60-DP-17 / 13 - 13 / 9/2/2005	2-60-DP-18-12-W / 2-60-DP-18 / 12 - 12 / 8/5/2005	2-60-DP-18-12-W / 2-60-DP-18 Dilution / 12 - 12 / 8/5/2005	2-60-DP-19-12-W / 2-60-DP-19 / 12 - 12 / 8/5/2005
VOCs (µg/L)																		
Chloromethane	EPA 8260B	26.3		0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
Vinyl Chloride	EPA 8260B	0.731		0.6	0.2 U	3.8	3.7	0.5	0.5	0.2 U	0.2 U	0.2 U	0.7	0.2 U	0.2 U	0.6 U	0.2 U
Acetone	EPA 8260B			3 U	1.7	1.6	10 U	1 U	2.1 U	1.1 U	2.8 U	2 U	2.6 U	2.4	4.4 U	6.3 U	1.5 U
Carbon Disulfide	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
1,1-Dichloroethene	EPA 8260B	0.382		0.6 U	0.2 U	0.3	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2	0.6 U	0.2 U
1,1-Dichloroethane	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	6.6	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
trans-1,2-Dichloroethene	EPA 8260B	10000		0.7	0.2 U	1.2	2 U	0.2 U	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2	1.7	0.2 U
cis-1,2-Dichloroethene	EPA 8260B	1550		32	0.2 U	54 ES	90	0.6	0.2 U	0.2	0.2 U	1	0.2 U	0.2 U	26 E	27	0.2 U
Chloroform	EPA 8260B	56.1		0.6 U	0.3	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.8	0.2 U	0.6 U	0.2 U
1,2-Dichloroethane	EPA 8260B	11.7		0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
1,1,1-Trichloroethane	EPA 8260B	206000		0.6 U	0.6	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
Trichloroethene	EPA 8260B	0.302		0.6 U	4.6	0.2	2 U	0.2	0.2 U	1.9	0.2 U	0.2 U	0.2 U	0.8	8.7	8.2	1.3
1,1,2-Trichloroethane	EPA 8260B	5		0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
Benzene	EPA 8260B	4.48		0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
Tetrachloroethene	EPA 8260B	0.822		0.6 U	2.8	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
Toluene	EPA 8260B	15000		0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
Ethylbenzene	EPA 8260B	2100		0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
Trichlorofluoromethane	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
m,p-Xylene	EPA 8260B			1.2 U	0.4 U	0.4 U	4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	1.2 U	0.4 U
o-Xylene	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
1,3,5-Trimethylbenzene	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
1,2,4-Trimethylbenzene	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
Isopropylbenzene	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
n-Propylbenzene	EPA 8260B			0.6 UJ	0.2 U	0.2 U	2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
tert-Butylbenzene	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
sec-Butylbenzene	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
4-Isopropyltoluene	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
n-Butylbenzene	EPA 8260B			0.6 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U
Naphthalene	EPA 8260B	2440		1.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.5 U	0.5 U
SVOCs (µg/L)																		
Naphthalene	EPA 8270D	2440								1 U	1 U	1 U	1 U		1 U		1 U
Di-n-Butylphthalate	EPA 8270D	1440								1 U	1 U	12	1 U		1 U		1 U
bis(2-Ethylhexyl)phthalate	EPA 8270D	3								1 U	1.6	3.4	3.2		1 U		1 U
Naphthalene	EPA 8270SIM	2440								0.1 U	0.1 U	0.1 U	0.1 U		0.1 U		0.1 U
PCBs (µg/L)																		
Aroclor 1260	EPA 8082	0.01								0.073	0.016 J	0.053 J	0.01 U	0.01 U	0.01 U		0.017
Total PCB	EPA 8082	0.01								0.073	0.016 J	0.053 J	0.01 U	0.01 U	0.01 U		0.017
Inorganics (Total) (µg/L)																		
Aluminum	EPA 6010B																	
Arsenic	EPA 200.8	8																
Barium	EPA 6010B																	
Cobalt	EPA 6010B																	
Copper	EPA 200.8	8																
Iron	EPA 6010B																	
Lead	EPA 200.8	8.1																
Magnesium	EPA 6010B																	
Manganese	EPA 6010B	2000																
Mercury	EPA 1631E	0.025																
Molybdenum	EPA 6010B																	
Nickel	EPA 200.8	8.2																
Selenium	EPA 200.8	71																
Vanadium	EPA 6010B	2810																
Zinc	EPA 6010B	81																
Cyanide	EPA 335.2	5		5 U	5 U		5 U	5 U		5 U	5 U	5 U	5 U		64		5 U	
Inorganics (Dissolved) (µg/L)																		
Aluminum	EPA 6010B			50 U	50 U		50 U	50 U		50 U	50 U	50 U	50 U	50 U	50 U		70	
Arsenic	EPA 200.8	8		0.6	0.4		9.6	0.5 U		0.4	0.6	1.2	0.3	1	0.9		0.7	
Barium	EPA 6010B			3 U	5		12	11		10	8	26	4	3	3		3 U	
Cobalt	EPA 6010B			3 U	3 U		3 U	3 U		3 U	3 U	3 U	3 U	3 U	3 U		3	
Copper	EPA 200.8	8		3.3	0.6		2.8	0.5 U		4.3	0.8	1.6	0.5 U	5.4	2.7		5	
Iron	EPA 6010B			260	12000		6340	20700		60	29900	31000	14700	120	3240		210	
Lead	EPA 200.8	8.1		1 U	1 U		1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U		1 U	
Magnesium	EPA 6010B			25700	17200		13500	37700		15900	44500	49300	14800	12700	15200		6700	
Manganese	EPA 6010B	2000		17	236		541	1050		47	1300	1830	424	20	83		24	
Mercury	EPA 1631E	0.025		0.025 U	0.025 U		0.025 U	0.025 U		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		0.025 U	
Molybdenum	EPA 6010B			5 U	5 U		5 U	5		7	5 U	5 U	5 U	5 U	5 U		5	
Nickel	EPA 200.8	8.2		13.4	3.9		2.7	3.5		7.3	6.8	3	3.5	1.6	3.1		2.6	
Selenium	EPA 200.8	71		2 U	0.7		0.5	2 U		0.5 U	1.3	0.6	0.7	1.8	2.1		1.2	
Vanadium	EPA 6010B	2810		5	3 U		4	3 U		3 U	3 U	11	3 U	29	9		5	
Zinc	EPA 6010B	81		6	11		6 U	15		6	33	6 U	36	6 U	6 U		6 U	
Petroleum Hydrocarbons (µg/L)																		
TPH - Gasoline Range	NWTPH-Gx	800																
TPH - Diesel Range	NWTPH-Dx-Cleaned	500																
Conventional Parameters (mg/L)																		
Nitrate (as Nitrogen)	EPA 300.0			19.6	0.1 U					1.1	0.1 U							
Nitrite (as Nitrogen)	EPA 300.0			2 U	0.1 U					0.1 U	2 U							
Ammonia (as Nitrogen)	EPA 350.1			0.024	0.31					0.017	2.95							
Sulfate	EPA 300.0			55.4	96.7					112	148							
Sulfide	EPA 376.2			0.05 U	0.05 U					0.05 U	0.05 U							
Total Organic Carbon	EPA 415.1			3.17	5.29					4.96	5.65							

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 3

Data Gap Investigation, 2-60s Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID: / Location: / Depth (ft bgs): / Sample Date:	2-60-DP-20-12-W / 2-60-DP-20 / 12 - 12 / 8/8/2005	2-60-DP-21-12-W / 2-60-DP-21 / 12 - 12 / 8/23/2005	2-60-DP-22-12-W / 2-60-DP-22 / 12 - 12 / 8/16/2005	2-60-DP-23-12-W / 2-60-DP-23 / 12 - 12 / 8/16/2005	2-60-DP-24-12-W / 2-60-DP-24 / 12 - 12 / 8/16/2005	2-60-DP-24-22-W / 2-60-DP-24 Duplicate / 12 - 12 / 8/16/2005	2-60-DP-25-12-W / 2-60-DP-25 / 12 - 12 / 8/15/2005	2-60-DP-25-12-W / 2-60-DP-25 Dilution / 12 - 12 / 8/15/2005	2-60-DP-25-42-W / 2-60-DP-25 / 42 - 42 / 8/15/2005	2-60-DP-26-12-W / 2-60-DP-26 / 12 - 12 / 8/15/2005	2-60-DP-26-42-W / 2-60-DP-26 / 42 - 42 / 8/15/2005	2-60-PL2-310A-14-W / PL2-310A / 9 - 19 / 8/16/2005	2-60-PL2-311A-13-W / PL2-311A / 8 - 18 / 8/16/2005	2-60-PL2-311A-13-W / PL2-311A Dilution / 8 - 18 / 8/16/2005
VOCs (µg/L)																		
Chloromethane	EPA 8260B	26.3		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	10 UJ	15 UJ		
Vinyl Chloride	EPA 8260B	0.731		0.2 U	0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	2	0.2 U	0.4	10 U	15 U		
Acetone	EPA 8260B			1 U	2.6 U	1.4 U	2.1 U	1.4 U	1 U	4 U	30 U	1.7 U	6.4 U	2 U	50 U	75 U		
Carbon Disulfide	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2	10 U	15 U		
1,1-Dichloroethene	EPA 8260B	0.382		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	10 U	15 U		
1,1-Dichloroethane	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	10 U	15 U		
trans-1,2-Dichloroethene	EPA 8260B	10000		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2	0.2 U	0.2 U	10 U	15 U		
cis-1,2-Dichloroethene	EPA 8260B	1550		1.8	0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.5	6 U	0.2 U	0.8	0.2 U	10 U	15 U		
Chloroform	EPA 8260B	56.1		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.1	6 U	0.2 U	0.2 U	0.2 U	10 U	15 U		
1,2-Dichloroethane	EPA 8260B	11.7		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	10 U	15 U		
1,1,1-Trichloroethane	EPA 8260B	206000		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	10 U	15 U		
Trichloroethene	EPA 8260B	0.302		2.5	0.2 U	0.2 U	1.5	1.5	1.6	88 ES	250	0.2 U	7.4	0.2 U	10 U	15 U		
1,1,2-Trichloroethane	EPA 8260B	5		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6	6 U	0.2 U	0.2 U	0.2 U	10 U	15 U		
Benzene	EPA 8260B	4.48		0.2 U	0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	110	38		
Tetrachloroethene	EPA 8260B	0.822		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2	6 U	0.2 U	0.2 U	0.2 U	10 U	15 U		
Toluene	EPA 8260B	15000		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	31	67		
Ethylbenzene	EPA 8260B	2100		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	700	850		
Trichlorofluoromethane	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	10 U	15 U		
m,p-Xylene	EPA 8260B			0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	12 U	0.4 U	0.4 U	0.4 U	100	1900		
o-Xylene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	25	420		
1,3,5-Trimethylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	10 U	290		
1,2,4-Trimethylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	380	1200		
Isopropylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	51	64		
n-Propylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	170	130		
tert-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	10 U	15 U		
sec-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	10 U	15 U		
4-Isopropyltoluene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	10	15 U		
n-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6 U	0.2 U	0.2 U	0.2 U	17	29		
Naphthalene	EPA 8260B	2440		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	15 U	0.5 U	0.5 U	0.5 U	300	600		
SVOCs (µg/L)																		
Naphthalene	EPA 8270D	2440		1 U				1 U	1 U									
Di-n-Butylphthalate	EPA 8270D	1440		1 U				1 U	1 U									
bis(2-Ethylhexyl)phthalate	EPA 8270D	3		1.1 U				1 U	1 U									
Naphthalene	EPA 8270SIM	2440		0.1 U				0.1 U	0.1 U									
PCBs (µg/L)																		
Aroclor 1260	EPA 8082	0.01		0.01 U			0.01 U	0.01 U	0.01 U									
Total PCB	EPA 8082	0.01		0.01 U			0.01 U	0.01 U	0.01 U									
Inorganics (Total) (µg/L)																		
Aluminum	EPA 6010B														90	60		
Arsenic	EPA 200.8	8													7.6	7.5		
Barium	EPA 6010B														68	91		
Cobalt	EPA 6010B														3 U	3 U		
Copper	EPA 200.8	8													0.5 U	0.5 U		
Iron	EPA 6010B														9810	11100		
Lead	EPA 200.8	8.1													3	8		
Magnesium	EPA 6010B														46100	138000		
Manganese	EPA 6010B	2000													643	344		
Mercury	EPA 1631E	0.025													0.025 U	0.025 U		
Molybdenum	EPA 6010B														5 U	5 U		
Nickel	EPA 200.8	8.2													1.1	1.7		
Selenium	EPA 200.8	71													2 U	2 U		
Vanadium	EPA 6010B	2810													6	10		
Zinc	EPA 6010B	81													6 U	6 U		
Cyanide	EPA 335.2	5		5 U		5 U	5 U	5 U	5 U									
Inorganics (Dissolved) (µg/L)																		
Aluminum	EPA 6010B			60	50	50 U	50 U	50 U	50 U	460		50 U	50 U	170	50 U	50 U		
Arsenic	EPA 200.8	8		0.4	47	6.2	0.8	0.6	0.6	2.9		0.5 U	0.9	0.8	6.8	7.6		
Barium	EPA 6010B			3 U	20	6	3	10	10	29		22	52	8	68	87		
Cobalt	EPA 6010B			3 U	23	3 U	3 U	3 U	3 U	5		3 U	8	3 U	3 U	3 U		
Copper	EPA 200.8	8		1.6	0.5 U	0.5 U	1.4	2.6	2.7	74.6		0.5 U	8.8	0.5 U	0.5 U	0.5 U		
Iron	EPA 6010B			5260	87100	7840	50	180	170	2090		18800	150	12100	9630	6000		
Lead	EPA 200.8	8.1		1 U	1 U	1 U	1 U	1 U	1 U	2		1 U	1 U	1 U	3	3		
Magnesium	EPA 6010B			7390	30000	6430	5150	10300	10100	16200		33700	35800	8110	47500	135000		
Manganese	EPA 6010B	2000		58	2250	161	5	21	21	131		992	374	346	646	317		
Mercury	EPA 1631E	0.025		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.106		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
Molybdenum	EPA 6010B			5 U	5	5 U	5 U	5 U	5 U	8		5	24	5 U	5 U	5 U		
Nickel	EPA 200.8	8.2		1.7	3.1	0.8	2.2	2.8	2.8	27		3.6	7.2	10.4	1	1.4		
Selenium	EPA 200.8	71		0.6	1.6	0.5 U	0.5 U	0.5 U	0.5 U	2.4		2 U	1.1	0.9	2 U	2 U		
Vanadium	EPA 6010B	2810		3 U	16	3 U	3 U	3 U	3 U	21		3 U	6	4	6	8		
Zinc	EPA 6010B	81		7	18	6	6 U	6 U	6	27		22	10	66	6 U	6 U		
Petroleum Hydrocarbons (µg/L)																		
TPH - Gasoline Range	NWTPH-Gx	800													12000	24000 E	23000	
TPH - Diesel Range	NWTPH-Dx-Cleaned	500													380 J	540 J		
Conventional Parameters (mg/L)																		
Nitrate (as Nitrogen)	EPA 300.0															0.1 U		
Nitrite (as Nitrogen)	EPA 300.0															2 U		
Ammonia (as Nitrogen)	EPA 350.1															0.684		
Sulfate	EPA 300.0															1		
Sulfide	EPA 376.2															1.7		
Total Organic Carbon	EPA 415.1															10.4		

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 3

Data Gap Investigation, 2-60s Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID: / Location: / Depth (ft bgs): / Sample Date:	2-60-PL2-311A-13-WW PL2-311A Duplicate 8 - 18 8/16/2005	2-60-PL2-311A-13-WW PL2-311A Duplicate Dilution 8 - 18 8/16/2005	2-60-PL2-312A-13-W PL2-312A 8 - 18 8/17/2005	2-60-PL2-314A-13-W PL2-314A 8.5 - 18.5 8/24/2005	2-60-PL2-315A-13-W PL2-315A 8.5 - 18.5 8/18/2005	2-60-PL2-315B-45-W PL2-315B 40 - 50 8/18/2005	2-60-PL2-315B-45-W-08252005 PL2-315B 40 - 50 8/25/2005	2-60-PL2-316A-13-W PL2-316A 8 - 18 8/24/2005	2-60-PL2-316A-13-W PL2-316A Dilution 8 - 18 8/24/2005	2-60-PL2-316B-45-W PL2-316B 40 - 50 8/24/2005	2-60-PL2-316C-80-W PL2-316C 75 - 85 8/24/2005
VOCs (µg/L)														
Chloromethane	EPA 8260B	26.3		15 UJ		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
Vinyl Chloride	EPA 8260B	0.731		15 U		0.9	0.2 U	0.2 U	1.8		0.5	1 U	0.2 U	0.2 U
Acetone	EPA 8260B			75 U		3.7 U	1 U	2.1 J	1 U		1.8 U	5 U	3.5 U	2.3 U
Carbon Disulfide	EPA 8260B			15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
1,1-Dichloroethene	EPA 8260B	0.382		15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
1,1-Dichloroethane	EPA 8260B			15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	EPA 8260B	10000		15 U		0.2 U	0.2 U	0.5 J	0.2 U		1.1	1.2	0.2 U	0.2 U
cis-1,2-Dichloroethene	EPA 8260B	1550		15 U		0.3	0.2 U	15 J	0.2		36 E	37	0.2 U	0.2 U
Chloroform	EPA 8260B	56.1		15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
1,2-Dichloroethane	EPA 8260B	11.7		15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
1,1,1-Trichloroethane	EPA 8260B	206000		15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
Trichloroethene	EPA 8260B	0.302		15 U		0.2 U	0.2 U	10 J	0.2 U		8.5	8	0.2 U	0.2 U
1,1,2-Trichloroethane	EPA 8260B	5		15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
Benzene	EPA 8260B	4.48		41		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
Tetrachloroethene	EPA 8260B	0.822		15 U		0.2 U	0.2 U	3 J	0.2 U		1.2	1.2	0.2 U	0.2 U
Toluene	EPA 8260B	15000		67		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
Ethylbenzene	EPA 8260B	2100		900		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
Trichlorofluoromethane	EPA 8260B			15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
m,p-Xylene	EPA 8260B			2000		0.4 U	0.4 U	0.4 U	0.4 U		0.4 U	2 U	0.4 U	0.4 U
o-Xylene	EPA 8260B			440		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene	EPA 8260B			300		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
1,2,4-Trimethylbenzene	EPA 8260B			1300		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
Isopropylbenzene	EPA 8260B			69		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
n-Propylbenzene	EPA 8260B			130		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
tert-Butylbenzene	EPA 8260B			15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
sec-Butylbenzene	EPA 8260B			15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
4-Isopropyltoluene	EPA 8260B			15 U		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
n-Butylbenzene	EPA 8260B			29		0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	1 U	0.2 U	0.2 U
Naphthalene	EPA 8260B	2440		630		0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	2.5 U	0.5 U	0.5 U
SVOCs (µg/L)														
Naphthalene	EPA 8270D	2440												
Di-n-Butylphthalate	EPA 8270D	1440												
bis(2-Ethylhexyl)phthalate	EPA 8270D	3												
Naphthalene	EPA 8270SIM	2440												
PCBs (µg/L)														
Aroclor 1260	EPA 8082	0.01						0.01 U						
Total PCB	EPA 8082	0.01						0.01 U						
Inorganics (Total) (µg/L)														
Aluminum	EPA 6010B			70		50 U	190	50 U	50 U		550		50 U	250 U
Arsenic	EPA 200.8	8		7.5		7.6	0.9	1.6	0.5 U		1.7		0.7	1
Barium	EPA 6010B			93		3 U	5	3 U	9		4		16	130
Cobalt	EPA 6010B			3 U		3 U	3 U	3 U	3 U		3 U		3 U	20 U
Copper	EPA 200.8	8		0.5 U		4	8	9.5	0.5		7.1		0.5 U	1 U
Iron	EPA 6010B			15300		6810	660	50 U	15300		500		7380	18800
Lead	EPA 200.8	8.1		11		1 U	1 U	1 U	1 U		1 U		1 U	2 U
Magnesium	EPA 6010B			138000		7790	25100	16400	18900		6470		70200	531000
Manganese	EPA 6010B	2000		373		297	467	44	654		101		680	330
Mercury	EPA 1631E	0.025		0.025 U		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		0.025 U	0.025 U
Molybdenum	EPA 6010B			5		6	8	6	5 U		9		5	30
Nickel	EPA 200.8	8.2		1.6		1.8	4.7	2.1	0.8		3.2		0.7	5
Selenium	EPA 200.8	71		2 U		0.7	2.4	1	2 U		0.7		2.9	6
Vanadium	EPA 6010B	2810		12		19	6	27	3 U		17		3 U	20 U
Zinc	EPA 6010B	81		6 U		6 U	6 U	6	8		28		6 U	30 U
Cyanide	EPA 335.2	5					9	5 U	5 U		5 U		5 U	
Inorganics (Dissolved) (µg/L)														
Aluminum	EPA 6010B			50 U		50 U	50 U	50 U	50 U		50 U		50 U	250 U
Arsenic	EPA 200.8	8		6.6		7.4	1	1.6	0.5 U		1.5		0.9	3.7
Barium	EPA 6010B			85		3 U	4	3 U	10		3 U		16	110
Cobalt	EPA 6010B			3 U		3 U	3 U	3 U	3 U		3 U		3 U	20 U
Copper	EPA 200.8	8		0.5 U		2.8	7.7	9.2	0.5 U		6.3		0.5 U	1 U
Iron	EPA 6010B			5430		5320	590	50 U	17400		140		7040	16800
Lead	EPA 200.8	8.1		3		1 U	1 U	1 U	1 U		1 U		1 U	2 U
Magnesium	EPA 6010B			130000		8580	25500	16700	21200		6160		69000	517000
Manganese	EPA 6010B	2000		303		333	494	23	727		76		667	318
Mercury	EPA 1631E	0.025		0.025 U		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		0.025 U	0.025 U
Molybdenum	EPA 6010B			5 U		6	8	6	5 U		9		5 U	30
Nickel	EPA 200.8	8.2		1.8		1.9	5	2	0.8		3.2		1	5
Selenium	EPA 200.8	71		2 U		0.5	2.1	1	2 U		1 U		2	5
Vanadium	EPA 6010B	2810		8		19	5	27	3 U		14		3 U	20 U
Zinc	EPA 6010B	81		6 U		6 U	11	6 U	6 U		8		8	30 U
Petroleum Hydrocarbons (µg/L)														
TPH - Gasoline Range	NWTPH-Gx	800		25000 E	22000									
TPH - Diesel Range	NWTPH-Dx-Cleaned	500		470 J										
Conventional Parameters (mg/L)														
Nitrate (as Nitrogen)	EPA 300.0			0.1 U				12.1	0.1 U		0.1 U		0.1 U	
Nitrite (as Nitrogen)	EPA 300.0			2 U				0.1 U	1 U		0.1 U		1 U	
Ammonia (as Nitrogen)	EPA 350.1			0.661				0.015	1.61		0.084		7.97	
Sulfate	EPA 300.0			0.8				99.8	46.2		23.6		1 U	
Sulfide	EPA 376.2			1.17				0.05 U	0.05 U		0.05 U		0.05 U	
Total Organic Carbon	EPA 415.1			10.8				8.14	5.97		6.32		9.37	

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 3

Data Gap Investigation, 2-60s Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID:	2-60-PL2-317AR-13-W	2-60-PL2-319A-13-W	2-60-PL2-325A-13-W	2-60-PL2-325A-13-W	2-60-PL2-325B-45-W	2-60-PL2-326A-13-W	2-60-PL2-326B-45-W	2-60-PL2-327A-13-W	2-60-PL2-327A-13-WW	2-60-PL2-327B-45-W	2-60-PL2-328A-13-W	2-60-PL2-328B-45-W
			Location:	PL2-317AR	PL2-319A	PL2-325A	PL2-325A Dilution	PL2-325B	PL2-326A	PL2-326B	PL2-327A	PL2-327A Duplicate	PL2-327B	PL2-328A	PL2-328B
			Depth (ft bgs):	8 - 18	8 - 18	8 - 18	8 - 18	40 - 50	8 - 18	40 - 50	8 - 18	8 - 18	40 - 50	8 - 18	40 - 50
			Sample Date:	8/17/2005	8/25/2005	8/17/2005	8/17/2005	8/17/2005	8/17/2005	8/17/2005	8/18/2005	8/18/2005	8/18/2005	8/24/2005	8/24/2005
VOCs (µg/L)															
Chloromethane	EPA 8260B	26.3		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	EPA 8260B	0.731		0.3	0.2 U	0.2 U	0.6 U	0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.3	0.2 U	3.8
Acetone	EPA 8260B			2.3 U	2.6	2 U	3 U	1.4 U	1.6 U	3.3 U	2.2	1.8	1.3	2 U	1.3 U
Carbon Disulfide	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	EPA 8260B	0.382		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	EPA 8260B	10000		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	EPA 8260B	1550		0.2	0.2 U	0.4	0.6 U	0.2 U	0.2 U	0.2 U	1.4	1.3	0.2 U	1.7	0.3
Chloroform	EPA 8260B	56.1		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	EPA 8260B	11.7		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	EPA 8260B	206000		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	EPA 8260B	0.302		0.7	0.2 U	28 E	29	0.2 U	4.4	0.2 U	7.4	6.5	0.2 U	2.8	0.2 U
1,1,2-Trichloroethane	EPA 8260B	5		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	EPA 8260B	4.48		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4
Tetrachloroethene	EPA 8260B	0.822		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.9	0.8	0.2 U	0.2 U	0.2 U
Toluene	EPA 8260B	15000		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	EPA 8260B	2100		0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
m,p-Xylene	EPA 8260B			0.4 U	0.4 U	0.4 U	1.2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
o-Xylene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trimethylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Isopropylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
n-Propylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
tert-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Isopropyltoluene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
n-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Naphthalene	EPA 8260B	2440		0.5 U	0.5 U	0.5 U	1.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SVOCs (µg/L)															
Naphthalene	EPA 8270D	2440													
Di-n-Butylphthalate	EPA 8270D	1440													
bis(2-Ethylhexyl)phthalate	EPA 8270D	3													
Naphthalene	EPA 8270SIM	2440													
PCBs (µg/L)															
Aroclor 1260	EPA 8082	0.01													
Total PCB	EPA 8082	0.01													
Inorganics (Total) (µg/L)															
Aluminum	EPA 6010B			50 U	390	50 U		50 U	50 U	50 U	340	260	50 U	50 U	70
Arsenic	EPA 200.8	8		4.8	1.5	0.7		0.5 U	2.6	0.5 U	0.7	0.6	0.3	1.4	0.4
Barium	EPA 6010B			7	5	14		18	3 U	14	4	3	3 U	5	7
Cobalt	EPA 6010B			3 U	3 U	3 U		3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Copper	EPA 200.8	8		2.2	2.7	6.4		0.5 U	14.6	0.5 U	13.6	13.5	0.5 U	5	0.5 U
Iron	EPA 6010B			5200	4720	50 U		19000	50 U	15700	1460	1220	10000	50 U	15400
Lead	EPA 200.8	8.1		1 U	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Magnesium	EPA 6010B			11900	16800	13000		40200	33500	63500	24000	21700	15200	11700	27700
Manganese	EPA 6010B	2000		300	204	2		1020	150	1900	379	340	707	46	999
Mercury	EPA 1631E	0.025		0.025 U	0.025 U	0.025 U		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Molybdenum	EPA 6010B			10	5	7		5 U	8	5 U	6	6	5 U	5	5 U
Nickel	EPA 200.8	8.2		1.7	3.5	1.7		0.9	8	1.3	8.2	8.3	0.6	2.7	0.7
Selenium	EPA 200.8	71		0.5 U	2 U	0.5		2 U	1	2 U	2 U	2 U	0.9	1.3	1.4
Vanadium	EPA 6010B	2810		3 U	9	3 U		3 U	23	3 U	17	15	3 U	18	3 U
Zinc	EPA 6010B	81		7	10	6 U		6 U	6 U	6 U	7	6 U	9	6 U	6 U
Cyanide	EPA 335.2	5				5 U			7	5 U	6	5 U	5 U	5 U	5 U
Inorganics (Dissolved) (µg/L)															
Aluminum	EPA 6010B			50 U	50 U	50 U		50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Arsenic	EPA 200.8	8		4	1.5	0.7		0.5 U	2	0.5 U	0.5 U	0.5 U	0.2	1.2	0.4
Barium	EPA 6010B			5	3	15		21	3 U	14	3 U	3 U	3	4	7
Cobalt	EPA 6010B			3 U	3 U	3 U		3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Copper	EPA 200.8	8		1.9	1.2	8.7		0.5 U	13.8	0.5 U	13	13.2	0.5 U	4.6	0.5 U
Iron	EPA 6010B			3630	4530	50 U		21300	50 U	15600	640	670	10000	50 U	14900
Lead	EPA 200.8	8.1		1 U	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Magnesium	EPA 6010B			11600	17800	14400		45700	31300	62900	22200	23800	15400	11800	27500
Manganese	EPA 6010B	2000		256	218	2		1160	141	1880	345	369	708	45	967
Mercury	EPA 1631E	0.025		0.025 U	0.025 U	0.025 U		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Molybdenum	EPA 6010B			10	6	8		5 U	8	5 U	6	6	5 U	5 U	5 U
Nickel	EPA 200.8	8.2		1.7	3.4	2		1	7.6	1.5	8.2	8.3	0.5	2.6	1
Selenium	EPA 200.8	71		0.5 U	2 U	0.6		2 U	2 U	2 U	2 U	2 U	0.8	1	0.5 U
Vanadium	EPA 6010B	2810		3 U	8	3 U		3 U	23	3 U	14	14	3 U	18	3 U
Zinc	EPA 6010B	81		6 U	8	9		6 U	9	6 U	6 U	6 U	6	19	9
Petroleum Hydrocarbons (µg/L)															
TPH - Gasoline Range	NWTPH-Gx	800													
TPH - Diesel Range	NWTPH-Dx-Cleaned	500													
Conventional Parameters (mg/L)															
Nitrate (as Nitrogen)	EPA 300.0			0.6		12.8		0.1 U	56	0.1 U					
Nitrite (as Nitrogen)	EPA 300.0			0.1 U		0.5 U		1 U	1 U	1 U					
Ammonia (as Nitrogen)	EPA 350.1			0.228		0.039		3.92	0.048	3.53					
Sulfate	EPA 300.0			28.4		67.5		0.1 U	244	18.8					
Sulfide	EPA 376.2			0.05 U		0.05 U		0.05 U	0.05 U	0.05 U					
Total Organic Carbon	EPA 415.1			4.37		7.01		7.07	9.56	6.19					

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 3

Data Gap Investigation, 2-60s Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID:	2-60-PL2-328B-45-WW	2-60-PL2-329A-13-W	2-60-PL2-329B-45-W	2-60-PL2-330A-13-W	2-60-PL2-330A-13-W	2-60-PL2-330B-45-W	2-60-PL2-331A-13-W	2-60-PL2-331A-13-WW	2-60-PL2-331B-45-W	2-60-PL2-332A-13-W	2-60-PL2-604A-13-W	2-60-PL2-605A-13-W
			Location:	PL2-328B Duplicate	PL2-329A	PL2-329B	PL2-330A	PL2-330A Dilution	PL2-330B	PL2-331A	PL2-331A Duplicate	PL2-331B	PL2-332A	PL2-604A	PL2-605A
			Depth (ft bgs):	40 - 50	8 - 18	40 - 50	8 - 18	8 - 18	40 - 50	8 - 18	8 - 18	40 - 50	8 - 18	13 - 13	13 - 13
			Sample Date:	8/24/2005	8/25/2005	8/25/2005	8/25/2005	8/25/2005	8/25/2005	8/25/2005	8/25/2005	8/25/2005	8/17/2005	8/30/2005	8/30/2005
VOCs (µg/L)															
Chloromethane	EPA 8260B	26.3		0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	EPA 8260B	0.731		4	0.2 U	3.7	0.2 U	0.6 U	3.6	0.2 U	0.2 U	3.1	0.2 U	0.2 U	0.5
Acetone	EPA 8260B			1.7 U	1 U	1 U	3	3 U	2.2 U	1.8	3	1.6	1.7 U	32 U	1 U
Carbon Disulfide	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	EPA 8260B	0.382		0.2 U	0.2 U	0.2 U	0.3	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.3	0.3	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	EPA 8260B	10000		0.2 U	0.2 U	0.2 U	1.2	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	EPA 8260B	1550		0.3	0.2 U	0.4	22 E	22	0.6	0.7	0.7	0.4	0.2 U	0.2 U	0.8
Chloroform	EPA 8260B	56.1		0.2 U	0.5	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4	0.2 U
1,2-Dichloroethane	EPA 8260B	11.7		0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	EPA 8260B	206000		0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	EPA 8260B	0.302		0.2 U	2.9 J	0.2 U	29	27	0.2 U	0.6	0.7	0.2 U	0.2 U	0.4 Y	1
1,1,2-Trichloroethane	EPA 8260B	5		0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	EPA 8260B	4.48		0.4	0.2 U	0.3	0.2 U	0.6 U	0.2	0.2 U	0.2 U	0.2 U	0.2 U	5	2.5
Tetrachloroethene	EPA 8260B	0.822		0.2 U	0.2 U	0.2 U	6.8	6.3	0.2 U	1.6	1.5	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	EPA 8260B	15000		0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	EPA 8260B	2100		0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5	0.2 U
Trichlorofluoromethane	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2	0.2 U
m,p-Xylene	EPA 8260B			0.4 U	0.4 U	0.4 U	0.4 U	1.2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.5	0.4 U
o-Xylene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4	0.2 U
1,3,5-Trimethylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trimethylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2	0.2 U
Isopropylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6	0.9
n-Propylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	3.2	0.2 U
tert-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1.1	0.5
4-Isopropyltoluene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
n-Butylbenzene	EPA 8260B			0.2 U	0.2 U	0.2 U	0.2 U	0.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 J	0.2 U
Naphthalene	EPA 8260B	2440		0.5 U	0.5 U	0.5 U	0.5 U	1.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.6
SVOCs (µg/L)															
Naphthalene	EPA 8270D	2440													
Di-n-Butylphthalate	EPA 8270D	1440													
bis(2-Ethyihexyl)phthalate	EPA 8270D	3													
Naphthalene	EPA 8270SIM	2440													
PCBs (µg/L)															
Aroclor 1260	EPA 8082	0.01			0.01 U		0.01 U								
Total PCB	EPA 8082	0.01			0.01 U		0.01 U								
Inorganics (Total) (µg/L)															
Aluminum	EPA 6010B			70	550	50 U	50 U	50 U	50 U	50 U	50 U	80	50 U	100	50
Arsenic	EPA 200.8	8		0.4	1.1	0.5 U	1.2	0.3	0.7	0.7	0.5 U	0.5	13	18.2	
Barium	EPA 6010B			7	4	8	3 U	6	24	25	7	41	12	49	
Cobalt	EPA 6010B			3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	5	
Copper	EPA 200.8	8		0.5 U	4.5	0.5 U	7.6	0.5 U	0.5 U	0.5 U	0.5 U	5.7	0.5	0.8	
Iron	EPA 6010B			15300	310	8150	50 U	3840	11700	12300	18700	50 U	8810	52500	
Lead	EPA 200.8	8.1		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Magnesium	EPA 6010B			27500	17200	26600	18700	20700	31200	32200	21900	18100	10100	34300	
Manganese	EPA 6010B	2000		983	84	416	79	607	746	774	488	906	860	1870	
Mercury	EPA 1631E	0.025		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	
Molybdenum	EPA 6010B			5 U	5 U	5 U	6	5 U	5	5	5 U	5 U	5 U	8	
Nickel	EPA 200.8	8.2		0.8	2	0.5 U	2.9	0.9	1.3	1.3	1	3	2.3	4.4	
Selenium	EPA 200.8	71		0.5 U	0.7	2 U	2 U	1	0.5 U	0.5 U	2 U	0.6	0.7	2.2	
Vanadium	EPA 6010B	2810		3 U	21	3 U	72	3	3 U	3 U	3 U	3 U	9	10	
Zinc	EPA 6010B	81		6 U	6 U	8	6 U	8	7	9	7	6 U	11	11	
Cyanide	EPA 335.2	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U				
Inorganics (Dissolved) (µg/L)															
Aluminum	EPA 6010B			50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	
Arsenic	EPA 200.8	8		0.4	0.8	0.5 U	1.1	0.2	0.6	0.6	0.5 U	0.5	12.8	17.8	
Barium	EPA 6010B			7	3 U	8	3 U	7	24	25	6	40	12	49	
Cobalt	EPA 6010B			3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	5	
Copper	EPA 200.8	8		0.5 U	4.4	0.5 U	7.2	0.6	0.5 U	0.5 U	0.5 U	5.6	0.5 U	0.7	
Iron	EPA 6010B			15200	50 U	8140	50 U	3660	11900	12500	18700	50 U	9180	53500	
Lead	EPA 200.8	8.1		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Magnesium	EPA 6010B			27900	16200	26900	19500	20500	31100	32900	22700	17200	10500	35100	
Manganese	EPA 6010B	2000		981	79	416	74	602	751	794	493	880	889	1920	
Mercury	EPA 1631E	0.025		0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	
Molybdenum	EPA 6010B			5 U	5 U	5 U	6	5 U	5	5	5 U	5 U	5 U	8	
Nickel	EPA 200.8	8.2		0.8	2	0.5 U	3.1	1.1	1.4	1.3	0.6	3.2	2.3	4.2	
Selenium	EPA 200.8	71		0.5 U	2 U	2 U	2 U	0.9	0.5 U	0.5 U	2 U	0.6	0.9	3.3	
Vanadium	EPA 6010B	2810		3 U	18	3 U	73	3 U	3 U	3 U	3 U	3 U	9	10	
Zinc	EPA 6010B	81		9	6 U	6 U	6 U	6	7	8	7	6 U	8	9	
Petroleum Hydrocarbons (µg/L)															
TPH - Gasoline Range	NWTPH-Gx	800										250 U	430	250 U	
TPH - Diesel Range	NWTPH-Dx-Cleaned	500										250 U	250 U	250 U	
Conventional Parameters (mg/L)															
Nitrate (as Nitrogen)	EPA 300.0												0.1 U		
Nitrite (as Nitrogen)	EPA 300.0												1 U		
Ammonia (as Nitrogen)	EPA 350.1												1.73		
Sulfate	EPA 300.0												19		
Sulfide	EPA 376.2												0.05 U		
Total Organic Carbon	EPA 415.1												7.41		

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 3

Data Gap Investigation, 2-60s Area
Detected Constituents in Groundwater Compared to SLs

Constituent	Analytical Method	2004 GW Screening Level	Sample ID: / Location: / Depth (ft bgs): / Sample Date:	2-60-PL2-606A-13-W / PL2-606A / 13 - 13 / 8/30/2005	2-60-PL2-606A-13-W PL2-606A Dilution / 13 - 13 / 8/30/2005
VOCs (µg/L)					
Chloromethane	EPA 8260B	26.3		0.2 U	5 U
Vinyl Chloride	EPA 8260B	0.731		0.2 U	5 U
Acetone	EPA 8260B			19	25 U
Carbon Disulfide	EPA 8260B			0.2 U	5 U
1,1-Dichloroethene	EPA 8260B	0.382		0.2 U	5 U
1,1-Dichloroethane	EPA 8260B			0.2 U	5 U
trans-1,2-Dichloroethene	EPA 8260B	10000		0.2 U	5 U
cis-1,2-Dichloroethene	EPA 8260B	1550		0.2 U	5 U
Chloroform	EPA 8260B	56.1		0.2 U	5 U
1,2-Dichloroethane	EPA 8260B	11.7		0.2 U	5 U
1,1,1-Trichloroethane	EPA 8260B	206000		0.2 U	5 U
Trichloroethene	EPA 8260B	0.302		0.2 U	5 U
1,1,2-Trichloroethane	EPA 8260B	5		0.2 U	5 U
Benzene	EPA 8260B	4.48		22 ES	47
Tetrachloroethene	EPA 8260B	0.822		0.2 U	5 U
Toluene	EPA 8260B	15000		20 ES	21
Ethylbenzene	EPA 8260B	2100		54 ES	830
Trichlorofluoromethane	EPA 8260B			0.2 U	5 U
m,p-Xylene	EPA 8260B			93 ES	400
o-Xylene	EPA 8260B			24 ES	32
1,3,5-Trimethylbenzene	EPA 8260B			16 S	21
1,2,4-Trimethylbenzene	EPA 8260B			29 ES	410
Isopropylbenzene	EPA 8260B			23 ES	76
n-Propylbenzene	EPA 8260B			18 ES	79
tert-Butylbenzene	EPA 8260B			14 S	5 U
sec-Butylbenzene	EPA 8260B			8.9	5 U
4-Isopropyltoluene	EPA 8260B			13	9.2
n-Butylbenzene	EPA 8260B			7.4	6.2 J
Naphthalene	EPA 8260B	2440		93 ES	430
SVOCs (µg/L)					
Naphthalene	EPA 8270D	2440			
Di-n-Butylphthalate	EPA 8270D	1440			
bis(2-Ethylhexyl)phthalate	EPA 8270D	3			
Naphthalene	EPA 8270SIM	2440			
PCBs (µg/L)					
Aroclor 1260	EPA 8082	0.01			
Total PCB	EPA 8082	0.01			
Inorganics (Total) (µg/L)					
Aluminum	EPA 6010B			270	
Arsenic	EPA 200.8	8		34.7	
Barium	EPA 6010B			74	
Cobalt	EPA 6010B			3 U	
Copper	EPA 200.8	8		0.7	
Iron	EPA 6010B			86800	
Lead	EPA 200.8	8.1		1 U	
Magnesium	EPA 6010B			20100	
Manganese	EPA 6010B	2000		5160	
Mercury	EPA 1631E	0.025		0.025 U	
Molybdenum	EPA 6010B			5 U	
Nickel	EPA 200.8	8.2		2.8	
Selenium	EPA 200.8	71		1.6	
Vanadium	EPA 6010B	2810		19	
Zinc	EPA 6010B	81		7	
Cyanide	EPA 335.2	5			
Inorganics (Dissolved) (µg/L)					
Aluminum	EPA 6010B			50 U	
Arsenic	EPA 200.8	8		35	
Barium	EPA 6010B			75	
Cobalt	EPA 6010B			3 U	
Copper	EPA 200.8	8		0.5 U	
Iron	EPA 6010B			89600	
Lead	EPA 200.8	8.1		1 U	
Magnesium	EPA 6010B			20800	
Manganese	EPA 6010B	2000		5290	
Mercury	EPA 1631E	0.025		0.025 U	
Molybdenum	EPA 6010B			5 U	
Nickel	EPA 200.8	8.2		2.9	
Selenium	EPA 200.8	71		1.9	
Vanadium	EPA 6010B	2810		18	
Zinc	EPA 6010B	81		6	
Petroleum Hydrocarbons (µg/L)					
TPH - Gasoline Range	NWTPH-Gx	800		9700	
TPH - Diesel Range	NWTPH-Dx-Cleaned	500		250 U	
Conventional Parameters (mg/L)					
Nitrate (as Nitrogen)	EPA 300.0				
Nitrite (as Nitrogen)	EPA 300.0				
Ammonia (as Nitrogen)	EPA 350.1				
Sulfate	EPA 300.0				
Sulfide	EPA 376.2				
Total Organic Carbon	EPA 415.1				

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 4

Data Gap Investigation, 2-60s Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	2-60-DP-01-01-S	2-60-DP-01-05-S	2-60-DP-01-9.5-S	2-60-DP-02-01-S	2-60-DP-02-05-S	2-60-DP-02-10-S	2-60-DP-03-01-S	2-60-DP-03-05-S	2-60-DP-03-10-S	2-60-DP-04-01-S	2-60-DP-04-01-S	2-60-DP-04-05-S	2-60-DP-04-05-S	2-60-DP-04-10-S	2-60-DP-04-10-S	2-60-DP-05-01-S	2-60-DP-05-01-S
			Location:	2-60-DP-01	2-60-DP-01	2-60-DP-01	2-60-DP-02	2-60-DP-02	2-60-DP-02	2-60-DP-03	2-60-DP-03	2-60-DP-03	2-60-DP-04	2-60-DP-04 Reanalysis	2-60-DP-04	2-60-DP-04 Reanalysis	2-60-DP-04	2-60-DP-04 Reanalysis	2-60-DP-05	2-60-DP-05 Reanalysis
			Depth (ft bgs):	1 - 1	5 - 5	9.5 - 9.5	1 - 1	5 - 5	10 - 10	1 - 1	5 - 5	10 - 10	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	1 - 1
			Sample Date:	8/4/2005	8/4/2005	8/4/2005	8/4/2005	8/4/2005	8/4/2005	8/5/2005	8/5/2005	8/5/2005	8/8/2005	8/8/2005	8/8/2005	8/8/2005	8/8/2005	8/8/2005	8/8/2005	8/8/2005
VOCs (µg/kg)																				
Methylene Chloride	EPA 8260B	828		2.5 U	4.3 U	3.5 U	2.9 U	3.6 U	2.6 U	9.6 U	8 U	6.9 U	2.6 UJ		7.3 U	4.2 UJ	3.8 UJ		2.3 UJ	
Acetone	EPA 8260B			9.2 U	7.4 U	6.4 U	9.1 U	6.4 U	6.1 U	9.1 U	26 U	11 U	5.3 U		6.8 U	7.2 U	5.9 U		5.3 U	
Carbon Disulfide	EPA 8260B			1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 U	1.4 U	1.2 U		1.1 U	
1,1-Dichloroethane	EPA 8260B			1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 U	1.4 U	1.2 U		1.1 U	
cis-1,2-Dichloroethene	EPA 8260B	794		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 U	1.4 U	1.2 U		1.1 U	
2-Butanone	EPA 8260B			5.1 U	5.9 U	6.4 U	5.1 U	6.4 U	5.1 U	5.9 U	5.6 U	5.8 U	5.3 U		6.8 U	6.9 U	5.9 U		5.3 U	
Trichloroethene	EPA 8260B	2		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 U	1.4 U	1.2 U		1.1 U	
Tetrachloroethene	EPA 8260B	8.72		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 U	1.4 U	1.2 U		1.1 U	
Toluene	EPA 8260B	19000		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 U	1.4 U	1.2 U		1.1 U	
Ethylbenzene	EPA 8260B	2520		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 U	1.4 U	1.2 U		1.1 U	
m,p-Xylene	EPA 8260B			1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 U	1.4 U	1.2 U		1.1 U	
o-Xylene	EPA 8260B			1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 U	1.4 U	1.2 U		1.1 U	
1,3,5-Trimethylbenzene	EPA 8260B	2470		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 UJ	1.4 UJ	1.2 U		1.1 U	
1,2,4-Trimethylbenzene	EPA 8260B	2360		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 UJ	1.4 UJ	1.2 U		1.1 U	
Isopropylbenzene	EPA 8260B	1270		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 UJ	1.4 UJ	1.2 U		1.1 U	
n-Propylbenzene	EPA 8260B	13600		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 UJ	1.4 UJ	1.2 U		1.1 U	
sec-Butylbenzene	EPA 8260B	7860		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 UJ	1.4 UJ	1.2 U		1.1 U	
4-Isopropyltoluene	EPA 8260B			1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 UJ	1.4 UJ	1.2 U		1.1 U	
n-Butylbenzene	EPA 8260B	4640		1 U	1.2 U	1.3 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U	1.1 U		1.4 UJ	1.4 UJ	1.2 U		1.1 U	
Naphthalene	EPA 8260B	24800		5.1 U	5.9 U	6.4 U	5.1 U	6.4 U	5.1 U	5.9 U	5.6 U	5.8 U	5.3 U		6.8 UJ	6.9 UJ	5.9 U		5.3 U	
SVOCs (µg/kg)																				
Naphthalene	EPA 8270D	24800											63 U		64 U		63 U		65 U	
2-Methylnaphthalene	EPA 8270D												63 U		64 U		63 U		65 U	
Acenaphthylene	EPA 8270D												63 U		64 U		63 U		65 U	
Dibenzofuran	EPA 8270D												63 U		64 U		63 U		65 U	
Phenanthrene	EPA 8270D												63 U		64 U		63 U		65 U	
Anthracene	EPA 8270D	6080000											63 U		64 U		63 U		65 U	
Di-n-Butylphthalate	EPA 8270D	50900											63 U		64 U		63 U		65 U	
Fluoranthene	EPA 8270D	44000											63 U		64 U		63 U		65 U	
Pyrene	EPA 8270D	1750000											63 U		64 U		63 U		65 U	
Benzo(a)anthracene	EPA 8270D	41.9											63 U		64 U		63 U		65 U	
bis(2-Ethylhexyl)phthalate	EPA 8270D	1570											63 U		64 U		370		65 U	
Chrysene	EPA 8270D	46.6											63 U		64 U		63 U		65 U	
Benzo(b)fluoranthene	EPA 8270D	144											63 U		64 U		63 U		65 U	
Benzo(k)fluoranthene	EPA 8270D	144											63 U		64 U		63 U		65 U	
Benzo(a)pyrene	EPA 8270D	113											63 U		64 U		63 U		65 U	
Indeno(1,2,3-cd)pyrene	EPA 8270D	406											63 U		64 U		63 U		65 U	
Dibenz(a,h)anthracene	EPA 8270D	210											63 U		64 U		63 U		65 U	
Benzo(g,h,i)perylene	EPA 8270D												63 U		64 U		63 U		65 U	
Naphthalene	EPA 8270SIM	24800											6.3 U		6.4 U		6.3 U		6.5 U	
2-Methylnaphthalene	EPA 8270SIM												6.3 U		6.4 U		6.3 U		6.5 U	
Acenaphthylene	EPA 8270SIM												6.3 U		6.4 U		6.3 U		6.5 U	
Phenanthrene	EPA 8270SIM												6.3 U		6.4 U		6.3 U		18	
Anthracene	EPA 8270SIM	6080000											6.3 U		6.4 U		6.3 U		6.5 U	
Fluoranthene	EPA 8270SIM	44000											7.6		6.4 U		6.3 U		52	
Pyrene	EPA 8270SIM	1750000											11		6.4 U		6.3 U		56	
Benzo(a)anthracene	EPA 8270SIM	41.9											6.3 U		6.4 U		6.3 U		33	
Chrysene	EPA 8270SIM	46.6											6.3 U		6.4 U		6.3 U		33	
Benzo(b)fluoranthene	EPA 8270SIM	144											6.3 UJ		6.4 UJ		6.3 UJ		26 J	
Benzo(k)fluoranthene	EPA 8270SIM	144											6.3 U		6.4 U		6.3 U		33	
Benzo(a)pyrene	EPA 8270SIM	113											6.3 U		6.4 U		6.3 U		33	
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406											6.3 U		6.4 U		6.3 U		14	
Dibenz(a,h)anthracene	EPA 8270SIM	210											6.3 U		6.4 UJ		6.3 U		6.5 U	
Benzo(g,h,i)perylene	EPA 8270SIM												6.3		6.4 U		6.3 U		18	
Dibenzofuran	EPA 8270SIM												6.3 U		6.4 U		6.3 U		6.5 U	
PCBs (µg/kg)																				
Aroclor 1254	EPA 8082	33																		
Aroclor 1260	EPA 8082	33																		
Total PCB	EPA 8082	33																		
Inorganics (mg/kg)																				
Aluminum	EPA 6010B			13300	15800	12700	15900	14100	15800	15000	10100	7150	8660		21600		11200		8880	
Arsenic	EPA 6010B	7.3		7	6	7 U	8	6 U	6	9	5 U	6 U	5 U		10		6 U		6	
Barium	EPA 6010B	93300		64.3	44.6	38.3	59.4	37.6	50.7	78.3	30.3	24.5	26.4		59.5		35.8		28.1	
Beryllium	EPA 6010B	222		0.17	0.1	0.1 U	0.19	0.1	0.1 U	0.2	0.1	0.1 U	0.1 U		0.2		0.1 U		0.1 U	
Cadmium	EPA 6010B	1.21		0.2 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U		0.3 U		0.2 U		0.2 U	
Chromium	EPA 6010B			16.8	13.5	16.5	20.1	15.5	18.7	15.6	10.8	8.2	13.3		16.9		15.3		12.6	
Cobalt	EPA 6010B			6.7	2.8	2	43.8	4.7	6.2	8.4	3.3	1.6	4		4.1		2.9		4.2	
Copper	EPA 6010B	36.4		20.4	15.5	22.6	28.1	14.9	24.8	25.7	12.5	8.4	9.9		29		16.2		13.7	
Iron	EPA 6010B			19400	12700	12100	19700	15900	19600	16300	7100	6040	11200		18200		13600		12000	
Lead	EPA 6010B	1000		3	3	3	5	3	3	22	2 U	3 U	4		5		4		37	
Magnesium	EPA 6010B			5840	2520	2050	5760	3280	3830	2940	1690	1370	2560		3550		2260		3050	
Manganese	EPA 6010B	1146		290	89	65	315	156	161	329	66.3	47.7	162		133		94.8		129	
Mercury	EPA 7471A	0.07		0.05 U	0.05 U	0.06	0.05 U	0.05 U	0.06 U	0.11	0.05 U	0.05 U	0.05 U		0.07 U		0.05 U		0.05 U	
Molybdenum	EPA 6010B			0.5	0.9	0.7 U	0.7	1.1	1	0.7	0.5 U	0.6 U	0.5 U		1.6		1.5		0.5 U	
Nickel	EPA 6010B	47.8		17.9	7	6	18.2	11	10	13	5	3	12		9		6		11	
Silver	EPA 6010B	0.323		0.3 U	0.4 U	0.4 U	5.3	0.3 U	0.4 U	0.4 U	0.3 U	0.4 U	0.3 U		0.4 U		0.3 U		0.3 U	
Thallium	EPA 7841	0.669		0.16	0.1 U	0.1 U	0.1	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U		0.1 U		0.1 U	
Tin	EPA 6010B			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U		1 U		1 U	
Vanadium	EPA 6010B	56100		43.9	46.7	35.5	44.8	48.3	54.6	46.6	33.2	20.9	38.7		59.7		48.8		40.1	
Zinc	EPA 6010B	101		33.8	19.7	15.5	41.5	26.5	25.9	62.4	19.4	12.9	26.4		28		20.9		94.9	
Total Solids (%)	EPA 160.3												95.3	95.3	70.4	70.4	89.1	89.1	94.6	94.6
Cyanide	EPA 335.2	0.202											0.26 U	0.13 UJ	0.35 U	0.18 UJ	0.28 U	0.14 UJ	0.26 U	0.13 UJ
Petroleum Hydrocarbons (mg/kg)																				
TPH - Gasoline Range	NWTPH-Gx	30																		
TPH - Diesel Range	NWTPH-Dx-Cleaned	2000																		
TPH - Motor Oil Range	NWTPH-Dx-Cleaned	2000																		

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 4

Data Gap Investigation, 2-60s Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	2-60-DP-05-05-S	2-60-DP-05-05-S	2-60-DP-05-10-S	2-60-DP-05-10-S	2-60-DP-06-01-S	2-60-DP-06-01-S	2-60-DP-06-05-S	2-60-DP-06-05-S	2-60-DP-06-10-S	2-60-DP-06-10-S	2-60-DP-07-01-S	2-60-DP-07-01-S	2-60-DP-07-05-S	2-60-DP-07-05-S	2-60-DP-07-10-S	2-60-DP-07-10-S
			Location:	2-60-DP-05	2-60-DP-05 Reanalysis	2-60-DP-05	2-60-DP-05 Reanalysis	2-60-DP-06	2-60-DP-06 Reanalysis	2-60-DP-06	2-60-DP-06 Reanalysis	2-60-DP-06	2-60-DP-06 Reanalysis	2-60-DP-07	2-60-DP-07 Reanalysis	2-60-DP-07	2-60-DP-07 Reanalysis	2-60-DP-07	2-60-DP-07 Reanalysis
			Depth (ft bgs):	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10
			Sample Date:	8/8/2005	8/8/2005	8/8/2005	8/8/2005	8/9/2005	8/9/2005	8/9/2005	8/9/2005	8/9/2005	8/9/2005	8/9/2005	8/9/2005	8/9/2005	8/9/2005	8/9/2005	8/9/2005
VOCs (µg/kg)																			
Methylene Chloride	EPA 8260B	828		3.5 UJ	6 UJ	2.8 UJ		4.2 U		6.8 U	6.5 U	5.3 U		2.1 U		2.1 U		2.9 U	
Acetone	EPA 8260B			7.1 U	6.9 U	5.8 U		6.7 U		9 U	340 R	8.6 U		5.2 U		6.8 U		7.8 U	
Carbon Disulfide	EPA 8260B			1.4 U	1.4 U	1.2 U		1.1 U		1.3 U	1.4 U	1.2 U		1 U		1.1 U		1.3 U	
1,1-Dichloroethane	EPA 8260B			1.4 U	1.4 U	1.2 U		1.1 U		1.3 U	1.4 U	1.2 U		1 U		1.1 U		1.3 U	
cis-1,2-Dichloroethene	EPA 8260B	794		1.4 U	1.4 U	1.2 U		1.1 U		2.3	1.4 U	1.2 U		1 U		1.1 U		1.3 U	
2-Butanone	EPA 8260B			7.1 U	6.9 U	5.8 U		5.5 U		6.6 U	78 R	5.9 U		5.2 U		5.3 U		6.5 U	
Trichloroethene	EPA 8260B	2		1.4 U	1.4 U	1.2 U		1.1 U		2.5	1.7	1.2 U		1 U		1.1 U		1.3 U	
Tetrachloroethene	EPA 8260B	8.72		1.4 U	1.4 U	1.2 U		1.1 U		4	1.9	1.2 U		1 U		1.1 U		1.3 U	
Toluene	EPA 8260B	19000		1.4 U	1.4 U	1.2 U		1.1 U		1.3 U	1.4 U	1.2 U		1 U		1.1 U		1.3 U	
Ethylbenzene	EPA 8260B	2520		1.4 U	1.4 U	1.2 U		1.1 U		1.3 U	1.4 U	1.2 U		1 U		1.1 U		1.3 U	
m,p-Xylene	EPA 8260B			1.4 U	1.4 U	1.2 U		1.1 U		1.3 U	1.4 U	1.2 U		1 U		1.1 U		1.3 U	
o-Xylene	EPA 8260B			1.4 U	1.4 U	1.2 U		1.1 U		1.3 U	1.4 U	1.2 U		1 U		1.1 U		1.3 U	
1,3,5-Trimethylbenzene	EPA 8260B	2470		1.4 UJ	1.4 UJ	1.2 U		1.1 U		1.3 UJ	1.4 UJ	1.2 U		1 U		1.1 U		1.3 U	
1,2,4-Trimethylbenzene	EPA 8260B	2360		1.4 UJ	1.4 UJ	1.2 U		1.1 U		1.3 UJ	1.4 UJ	1.2 U		1 U		1.1 U		1.3 U	
Isopropylbenzene	EPA 8260B	1270		1.4 UJ	1.4 UJ	1.2 U		1.1 U		1.3 UJ	1.4 UJ	1.2 U		1 U		1.1 U		1.3 U	
n-Propylbenzene	EPA 8260B	13600		1.4 UJ	1.4 UJ	1.2 U		1.1 U		1.3 UJ	1.4 UJ	1.2 U		1 U		1.1 U		1.3 U	
sec-Butylbenzene	EPA 8260B	7860		1.4 UJ	1.4 UJ	1.2 U		1.1 U		1.3 UJ	1.4 UJ	1.2 U		1 U		1.1 U		1.3 U	
4-Isopropyltoluene	EPA 8260B			1.4 UJ	1.4 UJ	1.2 U		1.1 U		1.3 UJ	1.4 UJ	1.2 U		1 U		1.1 U		1.3 U	
n-Butylbenzene	EPA 8260B	4640		1.4 UJ	1.4 UJ	1.2 U		1.1 U		1.3 UJ	1.4 UJ	1.2 U		1 U		1.1 U		1.3 U	
Naphthalene	EPA 8260B	24800		7.1 UJ	6.9 UJ	5.8 U		5.5 U		6.6 UJ	6.9 UJ	5.9 U		5.2 U		5.3 U		6.5 U	
SVOCs (µg/kg)																			
Naphthalene	EPA 8270D	24800		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
2-Methylnaphthalene	EPA 8270D			65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Acenaphthylene	EPA 8270D			65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Dibenzofuran	EPA 8270D			65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Phenanthrene	EPA 8270D			65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Anthracene	EPA 8270D	6080000		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Di-n-Butylphthalate	EPA 8270D	50900		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Fluoranthene	EPA 8270D	44000		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Pyrene	EPA 8270D	1750000		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Benzo(a)anthracene	EPA 8270D	41.9		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
bis(2-Ethylhexyl)phthalate	EPA 8270D	1570		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Chrysene	EPA 8270D	46.6		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Benzo(b)fluoranthene	EPA 8270D	144		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Benzo(k)fluoranthene	EPA 8270D	144		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Benzo(a)pyrene	EPA 8270D	113		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Indeno(1,2,3-cd)pyrene	EPA 8270D	406		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Dibenz(a,h)anthracene	EPA 8270D	210		65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Benzo(g,h,i)perylene	EPA 8270D			65 U		63 U		63 U		66 U		65 U		63 U		64 U		64 U	
Naphthalene	EPA 8270SIM	24800		6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		6.3 U		6.4 U		6.4 U	
2-Methylnaphthalene	EPA 8270SIM			6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		6.3 U		6.4 U		6.4 U	
Acenaphthylene	EPA 8270SIM			6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		8.8		12		6.4 U	
Anthracene	EPA 8270SIM	6080000		6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		6.3 U		6.4 U		6.4 U	
Fluoranthene	EPA 8270SIM	44000		6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		16		15		6.4 U	
Pyrene	EPA 8270SIM	1750000		6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		24		18		6.4 U	
Benzo(a)anthracene	EPA 8270SIM	41.9		6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		12		8.3		6.4 U	
Chrysene	EPA 8270SIM	46.6		6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		14		9.6		6.4 U	
Benzo(b)fluoranthene	EPA 8270SIM	144		6.5 UJ		6.3 UJ		6.3 UJ		6.6 UJ		6.5 UJ		8.2 J		6.4 J		6.4 UJ	
Benzo(k)fluoranthene	EPA 8270SIM	144		6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		8.2		6.4		6.4 U	
Benzo(a)pyrene	EPA 8270SIM	113		6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		9.4		7.7		6.4 U	
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406		6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		6.3 U		6.4 U		6.4 U	
Dibenz(a,h)anthracene	EPA 8270SIM	210		6.5 U		6.3 UJ		6.3 U		6.6 U		6.5 U		6.3 U		6.4 U		6.4 U	
Benzo(g,h,i)perylene	EPA 8270SIM			6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		6.3		6.4 U		6.4 U	
Dibenzofuran	EPA 8270SIM			6.5 U		6.3 U		6.3 U		6.6 U		6.5 U		6.3 U		6.4 U		6.4 U	
PCBs (µg/kg)																			
Aroclor 1254	EPA 8082	33																	
Aroclor 1260	EPA 8082	33																	
Total PCB	EPA 8082	33																	
Inorganics (mg/kg)																			
Aluminum	EPA 6010B			9680		7490		9540		19600		12400		11000		13800		11400	
Arsenic	EPA 6010B	7.3		5 U		6 U		6		8		6 U		10		8		6 U	
Barium	EPA 6010B	93300		25.4		18.8		29.6		56		28.9		38.6		53.3		28.7	
Beryllium	EPA 6010B	222		0.1 U		0.1 U		0.1		0.2		0.1 U		0.1		0.2		0.1 U	
Cadmium	EPA 6010B	1.21		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U	
Chromium	EPA 6010B			13.1		9.5		17.5		15.7		15.1		16.6		22		15.4	
Cobalt	EPA 6010B			2.5		1.7		12.6		3.2		2.3		7.4		6.5		2.1	
Copper	EPA 6010B	36.4		10.1		8.8		15		22.2		22.9		15.8		18.4		18.6	
Iron	EPA 6010B			9980		9200		13400		15800		9010		14900		16100		9990	
Lead	EPA 6010B	1000		10		2 U		6		4		2 U		7		9		2 U	
Magnesium	EPA 6010B			2150		1720		3840		3140		2300		4740		4140		2140	
Manganese	EPA 6010B	1146		79.6		67.1		188		101		69.3		230		204		68.9	
Mercury	EPA 7471A	0.07		0.05 U		0.05 U		0.05 U		0.06 U		0.05 U		0.05 U		0.06 U		0.05 U	
Molybdenum	EPA 6010B			0.5 U		0.6 U		0.5 U		1.3		0.6 U		0.5 U		1.5		0.6 U	
Nickel	EPA 6010B	47.8		6		4		20		8		6		22		20		5	
Silver	EPA 6010B	0.323		0.3 U		0.3 U		3		0.4 U		0.4 U		0.3 U		0.4 U		0.4 U	
Thallium	EPA 7841	0.669		0.1 U		0.1 U		0.1 U		0.1 U		0.3		0.1 U		0.1 U		0.1 U	
Tin	EPA 6010B			1 U		1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Vanadium	EPA 6010B	56100		38.8		27.2		40		52		39.5		38.5		44.3		37.9	
Zinc	EPA 6010B	101		25.1		12		32.9		25.8		19.3		68.3		40.2		15.8	
Total Solids (%)	EPA 160.3			89.8	89.8	87.5	87.5	92	92	73.2	73.2	77.4	77.4	95.7	95.7	85.5	85.5	80	80
Cyanide	EPA 335.2	0.202		0.28 U	0.14 J	0.29 U	0.14 UJ	0.27 U	0.14 UJ	0.34 U	0.17 UJ	0.32 U	0.16 UJ	0.26 U	0.13 UJ	0.29 U	0.32 J	0.31 U	0.16 UJ
Petroleum Hydrocarbons (mg/kg)																			
TPH - Gasoline Range	NWTPH-Gx	30																	
TPH - Diesel Range	NWTPH-Dx-Cleaned	2000																	
TPH - Motor Oil Range	NWTPH-Dx-Cleaned	2000																	

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 4

Data Gap Investigation, 2-60s Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	2-60-DP-08-01-S	2-60-DP-08-01-S	2-60-DP-08-05-S	2-60-DP-08-05-S	2-60-DP-08-10-S	2-60-DP-08-10-S	2-60-DP-09-01-S	2-60-DP-09-01-S	2-60-DP-09-05-S	2-60-DP-09-05-S	2-60-DP-09-10-S	2-60-DP-09-10-S	2-60-DP-10-01-S	2-60-DP-10-01-S	2-60-DP-10-05-S	2-60-DP-10-05-S
			Location:	2-60-DP-08	2-60-DP-08 Reanalysis	2-60-DP-08	2-60-DP-08 Reanalysis	2-60-DP-08	2-60-DP-08 Reanalysis	2-60-DP-09	2-60-DP-09 Reanalysis	2-60-DP-09	2-60-DP-09 Reanalysis	2-60-DP-09	2-60-DP-09 Reanalysis	2-60-DP-10	2-60-DP-10 Reanalysis	2-60-DP-10	2-60-DP-10 Reanalysis
			Depth (ft bgs):	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	1 - 1	5 - 5	5 - 5
			Sample Date:	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/10/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005
VOCs (µg/kg)																			
Methylene Chloride	EPA 8260B	828		2.1 U		2.1 U		2.6 U		2.1 U		2 U		2.1 U		2.1 U		2.4 U	
Acetone	EPA 8260B			5.3 U		7.4		6.6 U		5.2 U		5.9		10		5.1 U		6.3	
Carbon Disulfide	EPA 8260B			1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
1,1-Dichloroethane	EPA 8260B			1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
cis-1,2-Dichloroethene	EPA 8260B	794		1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
2-Butanone	EPA 8260B			5.3 U		5.3 U		6.6 U		5.2 U		5 U		5.3 U		5.1 U		6 U	
Trichloroethene	EPA 8260B	2		1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
Tetrachloroethene	EPA 8260B	8.72		1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
Toluene	EPA 8260B	19000		1.1 U		1.1 U		1.3 U		1.1		2.2		1.1 U		1 U		1.2 U	
Ethylbenzene	EPA 8260B	2520		1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
m,p-Xylene	EPA 8260B			1.1 U		1.1 U		1.3 U		1 U		1.4		1.1 U		1 U		1.2 U	
o-Xylene	EPA 8260B			1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
1,3,5-Trimethylbenzene	EPA 8260B	2470		1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
1,2,4-Trimethylbenzene	EPA 8260B	2360		1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
Isopropylbenzene	EPA 8260B	1270		1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
n-Propylbenzene	EPA 8260B	13600		1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
sec-Butylbenzene	EPA 8260B	7860		1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
4-Isopropyltoluene	EPA 8260B			1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
n-Butylbenzene	EPA 8260B	4640		1.1 U		1.1 U		1.3 U		1 U		0.99 U		1.1 U		1 U		1.2 U	
Naphthalene	EPA 8260B	24800		5.3 U		5.3 U		6.6 U		5.2 U		5 U		5.3 U		5.1 U		6 U	
SVOCs (µg/kg)																			
Naphthalene	EPA 8270D	24800		130 U		65 U		64 U		66 U		66 U		64 U					
2-Methylnaphthalene	EPA 8270D			130 U		65 U		64 U		66 U		66 U		64 U					
Acenaphthylene	EPA 8270D			130 U		65 U		64 U		66 U		66 U		64 U					
Dibenzofuran	EPA 8270D			130 U		65 U		64 U		66 U		66 U		64 U					
Phenanthrene	EPA 8270D			130 U		65 U		64 U		66 U		66 U		64 U					
Anthracene	EPA 8270D	6080000		130 U		65 U		64 U		66 U		66 U		64 U					
Di-n-Butylphthalate	EPA 8270D	50900		130 U		65 U		64 U		66 U		66 U		64 U					
Fluoranthene	EPA 8270D	44000		130 U		65 U		64 U		66 U		66 U		64 U					
Pyrene	EPA 8270D	1750000		130 U		65 U		64 U		66 U		66 U		64 U					
Benzo(a)anthracene	EPA 8270D	41.9		130 U		65 U		64 U		66 U		66 U		64 U					
bis(2-Ethylhexyl)phthalate	EPA 8270D	1570		130 U		65 U		64 U		66 U		85		340					
Chrysene	EPA 8270D	46.6		130 U		65 U		64 U		66 U		66 U		64 U					
Benzo(b)fluoranthene	EPA 8270D	144		130 U		65 U		64 U		66 U		66 U		64 U					
Benzo(k)fluoranthene	EPA 8270D	144		130 U		65 U		64 U		66 U		66 U		64 U					
Benzo(a)pyrene	EPA 8270D	113		130 U		65 U		64 U		66 U		66 U		64 U					
Indeno(1,2,3-cd)pyrene	EPA 8270D	406		130 U		65 U		64 U		66 U		66 U		64 U					
Dibenz(a,h)anthracene	EPA 8270D	210		130 U		65 U		64 U		66 U		66 U		64 U					
Benzo(g,h,i)perylene	EPA 8270D			130 U		65 U		64 U		66 U		66 U		64 U					
Naphthalene	EPA 8270SIM	24800		13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
2-Methylnaphthalene	EPA 8270SIM			13 U		6.5 U		6.4 U		6.6		6.6 U		6.4 U					
Acenaphthylene	EPA 8270SIM			13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
Phenanthrene	EPA 8270SIM			13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
Anthracene	EPA 8270SIM	6080000		13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
Fluoranthene	EPA 8270SIM	44000		13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
Pyrene	EPA 8270SIM	1750000		13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
Benzo(a)anthracene	EPA 8270SIM	41.9		13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
Chrysene	EPA 8270SIM	46.6		13 U		6.5 U		6.4 U		6.6		6.6 U		6.4 U					
Benzo(b)fluoranthene	EPA 8270SIM	144		13 UJ		6.5 UJ		6.4 UJ		6.6 UJ		6.6 UJ		6.4 UJ					
Benzo(k)fluoranthene	EPA 8270SIM	144		13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
Benzo(a)pyrene	EPA 8270SIM	113		13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406		13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
Dibenz(a,h)anthracene	EPA 8270SIM	210		13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
Benzo(g,h,i)perylene	EPA 8270SIM			13 UJ		6.5 UJ		6.4 UJ		6.6 UJ		6.6 UJ		6.4 UJ					
Dibenzofuran	EPA 8270SIM			13 U		6.5 U		6.4 U		6.6 U		6.6 U		6.4 U					
PCBs (µg/kg)																			
Aroclor 1254	EPA 8082	33																	
Aroclor 1260	EPA 8082	33																	
Total PCB	EPA 8082	33																	
Inorganics (mg/kg)																			
Aluminum	EPA 6010B			8340		13300		13800		12200		12500		12900		12000		11200	
Arsenic	EPA 6010B	7.3		5 U		5		7 U		5		5 U		7		5 U		5 U	
Barium	EPA 6010B	93300		26.1		60.8		47.9		43.9		47.1		48		46		48	
Beryllium	EPA 6010B	222		0.1 U		0.2		0.2		0.2		0.17		0.2		0.1		0.1	
Cadmium	EPA 6010B	1.21		0.2 U		0.2 U		0.3 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U	
Chromium	EPA 6010B			11		33.4		14.2		26.9		35.2		24.4		25.9		19.2	
Cobalt	EPA 6010B			3.4		8		6.2		6.9		6.9		5.2		6.5		5.2	
Copper	EPA 6010B	36.4		9.2		15.4		21.7		17.1		12.4		18.3		12		13.2	
Iron	EPA 6010B			12400		19000		16600		17700		16500		20300		14900		13600	
Lead	EPA 6010B	1000		2 U		3		3		4		2		3		4		2	
Magnesium	EPA 6010B			2370		6570		2820		5970		6340		3320		5300		3500	
Manganese	EPA 6010B	1146		102		327		254		262		277		182		238		186	
Mercury	EPA 7471A	0.07		0.04 U		0.05 U		0.07		0.04 U		0.05 U		0.06		0.04 U		0.05 U	
Molybdenum	EPA 6010B			0.5 U		0.7		0.7 U		0.7		0.9		0.7		0.5 U		0.5 U	
Nickel	EPA 6010B	47.8		6		40		10		31		41		14		35		20	
Silver	EPA 6010B	0.323		0.3 U		0.3 U		0.4 U		0.3 U		0.3 U		0.4 U		0.3 U		0.3 U	
Thallium	EPA 7841	0.669		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U	
Tin	EPA 6010B			1 U		1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Vanadium	EPA 6010B	56100		40.9		45.1		53.1		45.3		42.1		54.7		39.1		44.5	
Zinc	EPA 6010B	101		21.7		34.7		25.7		35.9		29.8		29.1		33.2		27.5	
Total Solids (%)	EPA 160.3			95.9	95.9	96	96	74.4	74.4	95.5	95.5	96.6	96.6	90.4	90.4	96.2	96.2	92.6	92.6
Cyanide	EPA 335.2	0.202		0.26 U	0.13 UJ	0.26 U	0.13 UJ	0.34 U	0.17 UJ	0.26 U	0.13 UJ	0.26 U	0.13 UJ	0.28 U	0.14 UJ	0.26 U	0.13 UJ	0.27 U	0.13 UJ
Petroleum Hydrocarbons (mg/kg)																			
TPH - Gasoline Range	NWTPH-Gx	30																	
TPH - Diesel Range	NWTPH-Dx-Cleaned	2000																	
TPH - Motor Oil Range	NWTPH-Dx-Cleaned	2000																	

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 4

Data Gap Investigation, 2-60s Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	2-60-DP-10-10-S	2-60-DP-10-10-S	2-60-DP-11-01-S	2-60-DP-11-01-S	2-60-DP-11-05-S	2-60-DP-11-05-S	2-60-DP-11-10-S	2-60-DP-11-10-S	2-60-DP-12-01-S	2-60-DP-12-01-S	2-60-DP-12-05-S	2-60-DP-12-05-S	2-60-DP-12-10-S	2-60-DP-12-10-S	2-60-DP-13-01-S	2-60-DP-13-01-S
			Location:	2-60-DP-10	2-60-DP-10 Reanalysis	2-60-DP-11	2-60-DP-11 Reanalysis	2-60-DP-11	2-60-DP-11 Reanalysis	2-60-DP-11	2-60-DP-11 Reanalysis	2-60-DP-12	2-60-DP-12 Reanalysis	2-60-DP-12	2-60-DP-12 Reanalysis	2-60-DP-12	2-60-DP-12 Reanalysis	2-60-DP-13	2-60-DP-13 Reanalysis
			Depth (ft bgs):	10 - 10	10 - 10	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	1 - 1
			Sample Date:	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005
VOCs (µg/kg)																			
Methylene Chloride	EPA 8260B	828		2.2 U		2.1 U		2.1 U		2.2 UJ		2.1 U		2.2 U		2.5 U		2.1 U	
Acetone	EPA 8260B			5.5 U		5.4 U		5.5		6.6 J		5.5		8.2		8.2		6.7	
Carbon Disulfide	EPA 8260B			1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
1,1-Dichloroethane	EPA 8260B			1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
cis-1,2-Dichloroethene	EPA 8260B	794		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
2-Butanone	EPA 8260B			5.5 U		5.4 U		5.2 U		5.6 UJ		5.2 U		5.5 U		6.2 U		5.2 U	
Trichloroethene	EPA 8260B	2		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.6		1 U	
Tetrachloroethene	EPA 8260B	8.72		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
Toluene	EPA 8260B	19000		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
Ethylbenzene	EPA 8260B	2520		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
m,p-Xylene	EPA 8260B			1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
o-Xylene	EPA 8260B			1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
1,3,5-Trimethylbenzene	EPA 8260B	2470		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
1,2,4-Trimethylbenzene	EPA 8260B	2360		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
Isopropylbenzene	EPA 8260B	1270		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
n-Propylbenzene	EPA 8260B	13600		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
sec-Butylbenzene	EPA 8260B	7860		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
4-Isopropyltoluene	EPA 8260B			1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
n-Butylbenzene	EPA 8260B	4640		1.1 U		1.1 U		1 U		1.1 UJ		1 U		1.1 U		1.2 U		1 U	
Naphthalene	EPA 8260B	24800		5.5 U		5.4 U		5.2 U		5.6 UJ		5.2 U		5.5 U		6.2 U		5.2 U	
SVOCs (µg/kg)																			
Naphthalene	EPA 8270D	24800																	
2-Methylnaphthalene	EPA 8270D																		
Acenaphthylene	EPA 8270D																		
Dibenzofuran	EPA 8270D																		
Phenanthrene	EPA 8270D																		
Anthracene	EPA 8270D	6080000																	
Di-n-Butylphthalate	EPA 8270D	50900																	
Fluoranthene	EPA 8270D	44000																	
Pyrene	EPA 8270D	1750000																	
Benzo(a)anthracene	EPA 8270D	41.9																	
bis(2-Ethylhexyl)phthalate	EPA 8270D	1570																	
Chrysene	EPA 8270D	46.6																	
Benzo(b)fluoranthene	EPA 8270D	144																	
Benzo(k)fluoranthene	EPA 8270D	144																	
Benzo(a)pyrene	EPA 8270D	113																	
Indeno(1,2,3-cd)pyrene	EPA 8270D	406																	
Dibenz(a,h)anthracene	EPA 8270D	210																	
Benzo(g,h,i)perylene	EPA 8270D																		
Naphthalene	EPA 8270SIM	24800																	
2-Methylnaphthalene	EPA 8270SIM																		
Acenaphthylene	EPA 8270SIM																		
Phenanthrene	EPA 8270SIM																		
Anthracene	EPA 8270SIM	6080000																	
Fluoranthene	EPA 8270SIM	44000																	
Pyrene	EPA 8270SIM	1750000																	
Benzo(a)anthracene	EPA 8270SIM	41.9																	
Chrysene	EPA 8270SIM	46.6																	
Benzo(b)fluoranthene	EPA 8270SIM	144																	
Benzo(k)fluoranthene	EPA 8270SIM	144																	
Benzo(a)pyrene	EPA 8270SIM	113																	
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406																	
Dibenz(a,h)anthracene	EPA 8270SIM	210																	
Benzo(g,h,i)perylene	EPA 8270SIM																		
Dibenzofuran	EPA 8270SIM																		
PCBs (µg/kg)																			
Aroclor 1254	EPA 8082	33																	
Aroclor 1260	EPA 8082	33																	
Total PCB	EPA 8082	33																	
Inorganics (mg/kg)																			
Aluminum	EPA 6010B			11200		13200		9820		11800		10500		11500		15700		8080	
Arsenic	EPA 6010B	7.3		5 U		5 U		5 U		6 U		5 U		5 U		6 U		5 U	
Barium	EPA 6010B	93300		38.9		55.6		28.6		40.9		34.4		37.7		53.2		17.1	
Beryllium	EPA 6010B	222		0.1		0.16		0.1 U		0.1		0.11		0.1		0.2		0.1 U	
Cadmium	EPA 6010B	1.21		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U	
Chromium	EPA 6010B			18.1		28.5		13.1		12.6		17.8		10.9		15		11.3	
Cobalt	EPA 6010B			5.2		7.2		4		4.8		5.3		4.1		5.8		3.8	
Copper	EPA 6010B	36.4		11.5		11.3		10		13.5		10.4		12.7		21.2		8.9	
Iron	EPA 6010B			13500		15700		12600		13700		13600		12400		16400		11700	
Lead	EPA 6010B	1000		2		2		2 U		2 U		2		2 U		3		2 U	
Magnesium	EPA 6010B			3410		5650		2010		2400		4040		2120		2990		2110	
Manganese	EPA 6010B	1146		186		353		114		158		189		114		204		92.7	
Mercury	EPA 7471A	0.07		0.04 U		0.04 U		0.05 U		0.05 U		0.05 U		0.05 U		0.06 U		0.05 U	
Molybdenum	EPA 6010B			0.5		0.5 U		0.5 U		0.6 U		0.5 U		0.5 U		0.6 U		0.5 U	
Nickel	EPA 6010B	47.8		20		36.2		7		8		21.8		7		10		8	
Silver	EPA 6010B	0.323		0.3 U		0.3 U		0.3 U		0.3 U		0.3 U		0.3 U		0.4 U		0.3 U	
Thallium	EPA 7841	0.669		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U	
Tin	EPA 6010B			1 U		1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Vanadium	EPA 6010B	56100		43.7		41.3		50.9		47.6		38.5		44.7		52.7		44.1	
Zinc	EPA 6010B	101		26.1		28.1		23.4		26		25.7		21.8		28.1		21.3	
Total Solids (%)	EPA 160.3			75.4	75.4	90	90	85.6	85.6	88.6	88.6	93.1	93.1	76.4	76.4	86.3	86.3	96.5	96.5
Cyanide	EPA 335.2	0.202		0.33 U	0.16 UJ	0.28 U	0.14 UJ	0.29 U	0.15 UJ	0.28 U	0.14 UJ	0.27 U	0.13 UJ	0.33 U	0.16 UJ	0.29 U	0.14 UJ	0.26 U	0.13 UJ
Petroleum Hydrocarbons (mg/kg)																			
TPH - Gasoline Range	NWTPH-Gx	30																	
TPH - Diesel Range	NWTPH-Dx-Cleaned	2000																	
TPH - Motor Oil Range	NWTPH-Dx-Cleaned	2000																	

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 4

Data Gap Investigation, 2-60s Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	2-60-DP-13-05-S	2-60-DP-13-05-S	2-60-DP-13-10-S	2-60-DP-13-10-S	2-60-DP-14-01-S	2-60-DP-14-01-S	2-60-DP-14-05-S	2-60-DP-14-05-S	2-60-DP-14-10-S	2-60-DP-14-10-S	2-60-DP-15-01-S	2-60-DP-15-01-S	2-60-DP-15-05-S	2-60-DP-15-05-S	2-60-DP-15-10-S	2-60-DP-15-10-S
			Location:	2-60-DP-13	2-60-DP-13 Reanalysis	2-60-DP-13	2-60-DP-13 Reanalysis	2-60-DP-14	2-60-DP-14 Reanalysis	2-60-DP-14	2-60-DP-14 Reanalysis	2-60-DP-14	2-60-DP-14 Reanalysis	2-60-DP-15	2-60-DP-15 Reanalysis	2-60-DP-15	2-60-DP-15 Reanalysis	2-60-DP-15	2-60-DP-15 Reanalysis
			Depth (ft bgs):	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10
			Sample Date:	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005
VOCs (µg/kg)																			
Methylene Chloride	EPA 8260B	828		2.1 U		2.5 U		5.3		5.5		5.3		5.3		13	5.7 U	3.1	
Acetone	EPA 8260B			15		10		9.9		11		13		12		31	11	11	
Carbon Disulfide	EPA 8260B			1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		8.6	3.5	1.1 U	
1,1-Dichloroethane	EPA 8260B			1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 U	1.6 U	1.1 U	
cis-1,2-Dichloroethene	EPA 8260B	794		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 U	1.6 U	1.1 U	
2-Butanone	EPA 8260B			5.4 U		6.2 U		5.1 U		5.2 U		5.4 U		5.2 U		7.7 U	8.1 U	5.6 U	
Trichloroethene	EPA 8260B	2		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 U	1.6 U	1.1 U	
Tetrachloroethene	EPA 8260B	8.72		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 U	1.6 U	1.1 U	
Toluene	EPA 8260B	19000		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 U	1.6 U	1.1 U	
Ethylbenzene	EPA 8260B	2520		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 U	1.6 U	1.1 U	
m,p-Xylene	EPA 8260B			1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 U	1.6 U	1.1 U	
o-Xylene	EPA 8260B			1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 U	1.6 U	1.1 U	
1,3,5-Trimethylbenzene	EPA 8260B	2470		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 UJ	1.6 UJ	1.1 U	
1,2,4-Trimethylbenzene	EPA 8260B	2360		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 UJ	1.6 UJ	1.1 U	
Isopropylbenzene	EPA 8260B	1270		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 UJ	1.6 UJ	1.1 U	
n-Propylbenzene	EPA 8260B	13600		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 UJ	1.6 UJ	1.1 U	
sec-Butylbenzene	EPA 8260B	7860		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 UJ	1.6 UJ	1.1 U	
4-Isopropyltoluene	EPA 8260B			1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 UJ	1.6 UJ	1.1 U	
n-Butylbenzene	EPA 8260B	4640		1.1 U		1.2 U		1 U		1 U		1.1 U		1 U		1.5 UJ	1.6 UJ	1.1 U	
Naphthalene	EPA 8260B	24800		5.4 U		6.2 U		5.1 U		5.2 U		5.4 U		5.2 U		7.7 UJ	8.1 UJ	5.6 U	
SVOCs (µg/kg)																			
Naphthalene	EPA 8270D	24800												66 U		64 U		66 U	
2-Methylnaphthalene	EPA 8270D													66 U		64 U		66 U	
Acenaphthylene	EPA 8270D													66 U		64 U		66 U	
Dibenzofuran	EPA 8270D													66 U		64 U		66 U	
Phenanthrene	EPA 8270D													66 U		64 U		66 U	
Anthracene	EPA 8270D	6080000												66 U		64 U		66 U	
Di-n-Butylphthalate	EPA 8270D	50900												66 U		64 U		66 U	
Fluoranthene	EPA 8270D	44000												66 U		64 U		66 U	
Pyrene	EPA 8270D	1750000												66 U		64 U		66 U	
Benzo(a)anthracene	EPA 8270D	41.9												66 U		64 U		66 U	
bis(2-Ethylhexyl)phthalate	EPA 8270D	1570												67		800		140	
Chrysene	EPA 8270D	46.6												66 U		64 U		66 U	
Benzo(b)fluoranthene	EPA 8270D	144												66 U		64 U		66 U	
Benzo(k)fluoranthene	EPA 8270D	144												66 U		64 U		66 U	
Benzo(a)pyrene	EPA 8270D	113												66 U		64 U		66 U	
Indeno(1,2,3-cd)pyrene	EPA 8270D	406												66 U		64 U		66 U	
Dibenz(a,h)anthracene	EPA 8270D	210												66 U		64 U		66 U	
Benzo(g,h,i)perylene	EPA 8270D													66 U		64 U		66 U	
Naphthalene	EPA 8270SIM	24800												6.6 U		8.3		6.6 U	
2-Methylnaphthalene	EPA 8270SIM													16		17		6.6 U	
Acenaphthylene	EPA 8270SIM													6.6 U		6.4 U		6.6 U	
Phenanthrene	EPA 8270SIM													50		22		6.6 U	
Anthracene	EPA 8270SIM	6080000												6.6 U		6.4 U		6.6 U	
Fluoranthene	EPA 8270SIM	44000												6.6 U		6.4 U		6.6 U	
Pyrene	EPA 8270SIM	1750000												6.6 U		6.4 U		6.6 U	
Benzo(a)anthracene	EPA 8270SIM	41.9												6.6 U		6.4 U		6.6 U	
Chrysene	EPA 8270SIM	46.6												7.9		6.4 U		6.6 U	
Benzo(b)fluoranthene	EPA 8270SIM	144												6.6 UJ		6.4 UJ		6.6 UJ	
Benzo(k)fluoranthene	EPA 8270SIM	144												6.6 U		6.4 U		6.6 U	
Benzo(a)pyrene	EPA 8270SIM	113												6.6 U		6.4 U		6.6 U	
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406												6.6 U		6.4 U		6.6 U	
Dibenz(a,h)anthracene	EPA 8270SIM	210												6.6 UJ		6.4 UJ		6.6 UJ	
Benzo(g,h,i)perylene	EPA 8270SIM													6.6 UJ		6.4 UJ		6.6 UJ	
Dibenzofuran	EPA 8270SIM													8.6		6.4 U		6.6 U	
PCBs (µg/kg)																			
Aroclor 1254	EPA 8082	33												33 U		33 U		32 U	
Aroclor 1260	EPA 8082	33												33 U		33 U		32 U	
Total PCB	EPA 8082	33												33 U		33 U		32 U	
Inorganics (mg/kg)																			
Aluminum	EPA 6010B			9860		14000		7670		7480		7180		7220		11700		8430	
Arsenic	EPA 6010B	7.3		5 U		6 U		5 U		5 U		6		5 U		6 U		5 U	
Barium	EPA 6010B	93300		27.6		45.2		21.1		21.3		24.1		20.1		28.9		24.3	
Beryllium	EPA 6010B	222		0.1 U		0.2		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U	
Cadmium	EPA 6010B	1.21		0.4		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U	
Chromium	EPA 6010B			16.8		13.9		9.7		8.8		9.1		9.6		13.6		11.5	
Cobalt	EPA 6010B			4.7		4.8		4.9		3.4		4.8		3.7		3.9		4	
Copper	EPA 6010B	36.4		12.3		19.4		9.1		8.6		11		8.1		15		10.4	
Iron	EPA 6010B			12000		16000		11800		10400		14600		11300		14400		12600	
Lead	EPA 6010B	1000		4		3		2 U		2 U		2 U		2 U		4		2	
Magnesium	EPA 6010B			2520		2730		2260		1790		2280		2150		2560		2200	
Manganese	EPA 6010B	1146		112		144		105 J		77.5 J		250 J		103 J		104		106 J	
Mercury	EPA 7471A	0.07		0.05 U		0.05 U		0.04 U		0.05 U		0.04 U		0.05 U		0.05 U		0.05 U	
Molybdenum	EPA 6010B			1.5		0.6 U		0.5 U		0.5 U		0.5 U		0.5 U		0.6 U		0.5 U	
Nickel	EPA 6010B	47.8		16		10		8.5		5		8		7		8		7	
Silver	EPA 6010B	0.323		0.3 U		0.3 U		0.3 U		0.3 U		0.3 U		0.3 U		0.4 U		0.3 U	
Thallium	EPA 7841	0.669		0.1 U		0.1 U		0.12		0.1 U		0.1 U		0.1 U		0.2		0.1 U	
Tin	EPA 6010B			1 U		1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Vanadium	EPA 6010B	56100		36.6		50.9		38.3		45.4		42.1		37.2		43.2		42	
Zinc	EPA 6010B	101		28.2		24.1		36.2		46.6		22.3		21.1		25		25.5	
Total Solids (%)	EPA 160.3			85	85	83.4	83.4	97	97	94	94	91	91	93.5	93.5	83.7	83.7	83.6	83.6
Cyanide	EPA 335.2	0.202		0.29 U	0.15 UJ	0.3 U	0.15 UJ	0.26 U	0.13 UJ	0.27 U	0.13 UJ	0.27 U	0.14 UJ	0.27 U	0.13 UJ	0.3 U	0.15 UJ	0.3 U	0.15 UJ
Petroleum Hydrocarbons (mg/kg)																			
TPH - Gasoline Range	NWTPH-Gx	30																	
TPH - Diesel Range	NWTPH-Dx-Cleaned	2000																	
TPH - Motor Oil Range	NWTPH-Dx-Cleaned	2000																	

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 4

Data Gap Investigation, 2-60s Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	2-60-DP-16-01-S	2-60-DP-16-01-S	2-60-DP-16-05-S	2-60-DP-16-05-S	2-60-DP-16-10-S	2-60-DP-16-10-S	2-60-DP-17-1_0-S	2-60-DP-17-6_5-S	2-60-DP-17-6_5-S	2-60-DP-17-10_5-S	2-60-DP-18-01-S	2-60-DP-18-01-S	2-60-DP-18-01-S	2-60-DP-18-05-S	2-60-DP-18-05-S
			Location:	2-60-DP-16	2-60-DP-16 Reanalysis	2-60-DP-16	2-60-DP-16 Reanalysis	2-60-DP-16	2-60-DP-16 Reanalysis	2-60-DP-17	2-60-DP-17	2-60-DP-17 Reanalysis	2-60-DP-17	2-60-DP-18	2-60-DP-18 Reanalysis	2-60-DP-18 Reextraction	2-60-DP-18	2-60-DP-18 Reanalysis
			Depth (ft bgs):	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	6.5 - 6.5	6.5 - 6.5	10.5 - 10.5	1 - 1	1 - 1	1 - 1	5 - 5	5 - 5
			Sample Date:	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/12/2005	8/19/2005	9/2/2005	9/2/2005	9/2/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005
VOCs (µg/kg)																		
Methylene Chloride	EPA 8260B	828		2.7 U		7.2 U	5 U	3.5 U		2.1 U	2.7 U	7 U	2.4 U	8.1 U			6.6 U	
Acetone	EPA 8260B			5.7 U		420	370	18		8 U	440	480	44	8.2 U			11 U	
Carbon Disulfide	EPA 8260B			1.1 U		42	32	1.2 U		1.1 U	1.9	3.5 U	3.2	1.3 U			1.3 U	
1,1-Dichloroethane	EPA 8260B			1.1 U		3.2	1.3 J	1.2 U		1.1 U	1.4 U	3.5 U	1.2 U	1.3 U			1.3 U	
cis-1,2-Dichloroethene	EPA 8260B	794		1.1 U		11	7.3	1.2 U		1.1 U	1.4 U	3.5 U	1.2 U	1.3 U			1.3 U	
2-Butanone	EPA 8260B			5.7 U		68	66	6.1 U		5.3 U	82	85	10	6.6 U			6.3 U	
Trichloroethene	EPA 8260B	2		1.1 U		1.4 U	1.3 U	1.2 U		1.1 U	1.4 U	3.5 U	1.2 U	1.3 U			1.3 U	
Tetrachloroethene	EPA 8260B	8.72		1.1 U		1.4 U	1.3 U	1.2 U		1.1 U	1.4 U	3.5 U	1.2 U	1.3 U			1.3 U	
Toluene	EPA 8260B	19000		1.1 U		1.4 U	1.3 U	1.2 U		1.1 U	1.4 U	3.5 U	1.2 U	1.3 U			1.3 U	
Ethylbenzene	EPA 8260B	2520		1.1 U		1.4 U	1.3 U	1.2 U		1.1 U	1.4 U	3.5 U	1.2 U	1.3 U			1.3 U	
m,p-Xylene	EPA 8260B			1.1 U		1.4 U	1.3 U	1.2 U		1.1 U	1.4 U	3.5 U	1.2 U	1.3 U			1.3 U	
o-Xylene	EPA 8260B			1.1 U		1.4 U	1.3 U	1.2 U		1.1 U	1.4 U	3.5 U	1.2 U	1.3 U			1.3 U	
1,3,5-Trimethylbenzene	EPA 8260B	2470		1.1 U		1.4 UJ	1.3 UJ	1.2 U		1.1 U	1.4 UJ	3.5 U	1.2 U	1.3 U			1.3 U	
1,2,4-Trimethylbenzene	EPA 8260B	2360		1.1 U		1.4 UJ	1.3 UJ	1.2 U		1.1 U	1.4 UJ	3.5 U	1.2 U	1.3 U			1.3 U	
Isopropylbenzene	EPA 8260B	1270		1.1 U		1.4 UJ	1.3 UJ	1.2 U		1.1 U	1.4 UJ	3.5 U	1.2 U	1.3 U			1.3 U	
n-Propylbenzene	EPA 8260B	13600		1.1 U		1.4 UJ	1.3 UJ	1.2 U		1.1 U	1.4 U	3.5 U	1.2 U	1.3 U			1.3 U	
sec-Butylbenzene	EPA 8260B	7860		1.1 U		1.4 UJ	1.3 UJ	1.2 U		1.1 U	1.4 UJ	3.5 U	1.2 U	1.3 U			1.3 U	
4-Isopropyltoluene	EPA 8260B			1.1 U		1.4 UJ	1.3 UJ	1.2 U		1.1 U	1.4 UJ	3.5 U	1.2 U	1.3 U			1.3 U	
n-Butylbenzene	EPA 8260B	4640		1.1 U		1.4 UJ	1.3 UJ	1.2 U		1.1 U	1.4 UJ	3.5 U	1.2 U	1.3 U			1.3 U	
Naphthalene	EPA 8260B	24800		5.7 U		6.9 UJ	6.6 UJ	6.1 U		5.3 U	6.9 UJ	18 U	6 U	6.6 U			6.3 U	
SVOCs (µg/kg)																		
Naphthalene	EPA 8270D	24800		66 U		63 U		66 U						63 U		63 U	64 U	
2-Methylnaphthalene	EPA 8270D			66 U		63 U		66 U						63 U		63 U	64 U	
Acenaphthylene	EPA 8270D			66 U		63 U		66 U						63 U		63 U	64 U	
Dibenzofuran	EPA 8270D			66 U		63 U		66 U						63 U		63 U	64 U	
Phenanthrene	EPA 8270D			66 U		63 U		66 U						63 U		63 U	64 U	
Anthracene	EPA 8270D	6080000		66 U		63 U		66 U						63 U		63 U	64 U	
Di-n-Butylphthalate	EPA 8270D	50900		66 U		63 U		66 U						63 U		63 U	64 U	
Fluoranthene	EPA 8270D	44000		66 U		63 U		66 U						63 U		63 U	64 U	
Pyrene	EPA 8270D	1750000		66 U		63 U		66 U						63 U		63 U	64 U	
Benzo(a)anthracene	EPA 8270D	41.9		66 U		63 U		66 U						63 U		63 U	64 U	
bis(2-Ethylhexyl)phthalate	EPA 8270D	1570		66 U		63 U		66 U						63 U		63 U	64 U	
Chrysene	EPA 8270D	46.6		66 U		63 U		66 U						63 U		63 U	64 U	
Benzo(b)fluoranthene	EPA 8270D	144		66 U		63 U		66 U						63 U		63 U	64 U	
Benzo(k)fluoranthene	EPA 8270D	144		66 U		63 U		66 U						63 U		63 U	64 U	
Benzo(a)pyrene	EPA 8270D	113		66 U		63 U		66 U						63 U		63 U	64 U	
Indeno(1,2,3-cd)pyrene	EPA 8270D	406		66 U		63 U		66 U						63 U		63 U	64 U	
Dibenz(a,h)anthracene	EPA 8270D	210		66 U		63 U		66 U						63 U		63 U	64 U	
Benzo(g,h,i)perylene	EPA 8270D			66 U		63 U		66 U						63 U		63 U	64 U	
Naphthalene	EPA 8270SIM	24800		6.6 U		8.2		6.6 U						6.3 U			6.4 U	
2-Methylnaphthalene	EPA 8270SIM			6.6 U		19		6.6 U						6.3 U			6.4 U	
Acenaphthylene	EPA 8270SIM			6.6 U		6.3 U		6.6 U						11			6.4 U	
Phenanthrene	EPA 8270SIM			6.6 U		33		6.6						51			6.4 U	
Anthracene	EPA 8270SIM	6080000		6.6 U		6.3 U		6.6 U						8.2			6.4 U	
Fluoranthene	EPA 8270SIM	44000		6.6 U		13		6.6 U						36			6.4 U	
Pyrene	EPA 8270SIM	1750000		9.2		14		6.6 U						59			6.4 U	
Benzo(a)anthracene	EPA 8270SIM	41.9		6.6 U		6.3		6.6 U						20			6.4 U	
Chrysene	EPA 8270SIM	46.6		6.6 U		8.9		6.6 U						24			6.4 U	
Benzo(b)fluoranthene	EPA 8270SIM	144		6.6 UJ		6.3 UJ		6.6 UJ						17 J			6.4 UJ	
Benzo(k)fluoranthene	EPA 8270SIM	144		6.6 U		6.3 U		6.6 U						15			6.4 U	
Benzo(a)pyrene	EPA 8270SIM	113		6.6 U		6.3 U		6.6 U						18			6.4 U	
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406		6.6 U		6.3 U		6.6 U						11			6.4 U	
Dibenz(a,h)anthracene	EPA 8270SIM	210		6.6 UJ		6.3 UJ		6.6 UJ						6.3 U			6.4 U	
Benzo(g,h,i)perylene	EPA 8270SIM			6.6 UJ		6.3 UJ		6.6 UJ						15			6.4 U	
Dibenzofuran	EPA 8270SIM			6.6 U		8.2		6.6 U						6.3 U			6.4 U	
PCBs (µg/kg)																		
Aroclor 1254	EPA 8082	33		36		32 U		32 U		33 U	32 U		33 U	33 U			33 U	
Aroclor 1260	EPA 8082	33		33 U		32 U		32 U		33 U	32 U		33 U	33 U			33 U	
Total PCB	EPA 8082	33		36 J		32 U		32 U		33 U	32 U		33 U	33 U			33 U	
Inorganics (mg/kg)																		
Aluminum	EPA 6010B			9490		17000		17300		12600	17600		15200	12500			17700	
Arsenic	EPA 6010B	7.3		6		7		7		5 U	9		7	5 U			7	
Barium	EPA 6010B	93300		37.8		42.1		73.2		47.8	61.6		48	45.8			50	
Beryllium	EPA 6010B	222		0.1 U		0.3		0.2		0.2	0.2		0.1 U	0.2			0.2	
Cadmium	EPA 6010B	1.21		0.2 U		0.3 U		0.3 U		0.2 U	0.3 U		0.6	0.2 U			0.3 U	
Chromium	EPA 6010B			15.6		18.9		18		29.5	14		21.3	26			15.4	
Cobalt	EPA 6010B			4.9		6.7		6.5		6.7	10.3		21	6.3			4	
Copper	EPA 6010B	36.4		19.4		29.1		23.4		14	28		24.7	13.6			24.1	
Iron	EPA 6010B			13700		20300		16900		16100	13400		19100	16200			14800	
Lead	EPA 6010B	1000		6		7		6		6	12		3	5			3	
Magnesium	EPA 6010B			2970		4580		4290		5570	2930		2640	5550			2770	
Manganese	EPA 6010B	1146		141 J		219 J		177 J		287	90.7		133	261			109	
Mercury	EPA 7471A	0.07		0.05		0.06		0.07 U		0.05 U	0.06 U		0.06	0.04 U			0.05 U	
Molybdenum	EPA 6010B			0.6		0.7		0.8		0.5 U	1.7		1.5	0.5 U			0.8	
Nickel	EPA 6010B	47.8		15		14		13		33	9		8	34			8	
Silver	EPA 6010B	0.323		0.3 U		0.4 U		0.4 U		0.3 U	0.9		4.5	0.3 U			0.4 U	
Thallium	EPA 7841	0.669		0.1 U		0.1		0.1 U		0.1 UJ	0.2 J		0.1 U	0.1 U			0.1 U	
Tin	EPA 6010B			1 U		1 U		1 U		1 U	1 U		1 U	1 U			1 U	
Vanadium	EPA 6010B	56100		41.8		56.1		49		41.5	52.4		54.2	40.7			58.1	
Zinc	EPA 6010B	101		46.4		41.4		39.5		38.3	39.8		21.3	34.6			24.9	
Total Solids (%)	EPA 160.3			92.7	92.7	80.9	80.9	82.3	82.3					92.7	92.7		83.7	83.7
Cyanide	EPA 335.2	0.202		0.27 U	0.13 UJ	0.31 U	0.15 UJ	0.3 U	0.24 J					0.27 U	0.13 UJ		0.3 U	0.15 UJ
Petroleum Hydrocarbons (mg/kg)																		
TPH - Gasoline Range	NWTPH-Gx	30								34								
TPH - Diesel Range	NWTPH-Dx-Cleaned	2000																
TPH - Motor Oil Range	NWTPH-Dx-Cleaned	2000																

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 4

Data Gap Investigation, 2-60s Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	2-60-DP-18-05-S	2-60-DP-18-10-S	2-60-DP-18-10-S	2-60-DP-18-10-S	2-60-DP-19-01-S	2-60-DP-19-01-S	2-60-DP-19-01-S	2-60-DP-19-05-S	2-60-DP-19-05-S	2-60-DP-19-05-S	2-60-DP-19-10-S	2-60-DP-19-10-S	2-60-DP-19-10-S	2-60-DP-19-10-S
			Location:	2-60-DP-18 Reextraction	2-60-DP-18	2-60-DP-18 Reanalysis	2-60-DP-18 Reextraction	2-60-DP-19	2-60-DP-19 Reanalysis	2-60-DP-19 Reextraction	2-60-DP-19	2-60-DP-19 Reanalysis	2-60-DP-19 Reextraction	2-60-DP-19	2-60-DP-19 Dilution	2-60-DP-19 Reanalysis	2-60-DP-19 Reextraction
			Depth (ft bgs):	5 - 5	10 - 10	10 - 10	10 - 10	1 - 1	1 - 1	1 - 1	5 - 5	5 - 5	5 - 5	10 - 10	10 - 10	10 - 10	10 - 10
			Sample Date:	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005	8/5/2005
VOCs (µg/kg)																	
Methylene Chloride	EPA 8260B	828			3.5 U			2.1 UJ			7.2 U			8.2 U			
Acetone	EPA 8260B				9.3 U			5.4 UJ			5.7 U			7.2 U			
Carbon Disulfide	EPA 8260B				1.3 U			1.1 UJ			1.1 U			1.3 U			
1,1-Dichloroethane	EPA 8260B				1.3 U			1.1 UJ			1.1 U			1.3 U			
cis-1,2-Dichloroethene	EPA 8260B	794			1.3 U			1.1 UJ			1.1 U			1.3 U			
2-Butanone	EPA 8260B				6.5 U			5.4 UJ			5.7 U			6.3 U			
Trichloroethene	EPA 8260B	2			1.3 U			1.1 UJ			1.1 U			1.3 U			
Tetrachloroethene	EPA 8260B	8.72			1.3 U			1.1 UJ			1.1 U			1.3 U			
Toluene	EPA 8260B	19000			1.3 U			50 J			1.1 U			1.3 U			
Ethylbenzene	EPA 8260B	2520			1.3 U			15 J			1.1 U			1.3 U			
m,p-Xylene	EPA 8260B				1.3 U			51 J			1.1 U			1.3 U			
o-Xylene	EPA 8260B				1.3 U			14 J			1.1 U			1.3 U			
1,3,5-Trimethylbenzene	EPA 8260B	2470			1.3 U			1.1 UJ			1.1 U			1.3 U			
1,2,4-Trimethylbenzene	EPA 8260B	2360			1.3 U			1.1 UJ			1.1 U			1.3 U			
Isopropylbenzene	EPA 8260B	1270			1.3 U			1.1 UJ			1.1 U			1.3 U			
n-Propylbenzene	EPA 8260B	13600			1.3 U			1.1 UJ			1.1 U			1.3 U			
sec-Butylbenzene	EPA 8260B	7860			1.3 U			1.1 UJ			1.1 U			1.3 U			
4-Isopropyltoluene	EPA 8260B				1.3 U			1.1 UJ			1.1 U			1.3 U			
n-Butylbenzene	EPA 8260B	4640			1.3 U			1.1 UJ			1.1 U			1.3 U			
Naphthalene	EPA 8260B	24800			6.5 U			5.4 UJ			5.7 U			6.3 U			
SVOCs (µg/kg)																	
Naphthalene	EPA 8270D	24800		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
2-Methylnaphthalene	EPA 8270D			61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Acenaphthylene	EPA 8270D			61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Dibenzofuran	EPA 8270D			61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Phenanthrene	EPA 8270D			61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Anthracene	EPA 8270D	6080000		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Di-n-Butylphthalate	EPA 8270D	50900		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			92
Fluoranthene	EPA 8270D	44000		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Pyrene	EPA 8270D	1750000		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Benzo(a)anthracene	EPA 8270D	41.9		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
bis(2-Ethylhexyl)phthalate	EPA 8270D	1570		61 U	66 U		69 U	65 U		65 U	65 U		270	66 U			110
Chrysene	EPA 8270D	46.6		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Benzo(b)fluoranthene	EPA 8270D	144		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Benzo(k)fluoranthene	EPA 8270D	144		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Benzo(a)pyrene	EPA 8270D	113		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Indeno(1,2,3-cd)pyrene	EPA 8270D	406		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Dibenz(a,h)anthracene	EPA 8270D	210		61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Benzo(g,h,i)perylene	EPA 8270D			61 U	66 U		69 U	65 U		65 U	65 U		65 U	66 U			66 U
Naphthalene	EPA 8270SIM	24800			6.6 U			6.5 U			6.5 U			6.6 U			
2-Methylnaphthalene	EPA 8270SIM				6.6 U			6.5 U			6.5 U			6.6 U			
Acenaphthylene	EPA 8270SIM				6.6 U			6.5 U			6.5 U			6.6 U			
Phenanthrene	EPA 8270SIM				6.6 U			13			6.5 U			6.6 U			
Anthracene	EPA 8270SIM	6080000			6.6 U			6.5 U			6.5 U			6.6 U			
Fluoranthene	EPA 8270SIM	44000			6.6 U			6.5 U			7.2			7.3			
Pyrene	EPA 8270SIM	1750000			6.6 U			7.2			9.2			11			
Benzo(a)anthracene	EPA 8270SIM	41.9			6.6 U			6.5 U			7.2			8.6			
Chrysene	EPA 8270SIM	46.6			6.6 U			12			8.5			8.6			
Benzo(b)fluoranthene	EPA 8270SIM	144			6.6 UJ			6.5 UJ			7.8 J			7.3 J			
Benzo(k)fluoranthene	EPA 8270SIM	144			6.6 U			6.5 U			5.9 J			6 J			
Benzo(a)pyrene	EPA 8270SIM	113			6.6 U			6.5 U			7.2 J			8.6			
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406			6.6 U			6.5 U			6.5 U			6.6 U			
Dibenz(a,h)anthracene	EPA 8270SIM	210			6.6 U			6.5 U			6.5 U			6.6 U			
Benzo(g,h,i)perylene	EPA 8270SIM				6.6 U			6.5 U			6.5 U			6.6 U			
Dibenzofuran	EPA 8270SIM				6.6 U			6.5 U			6.5 U			6.6 U			
PCBs (µg/kg)																	
Aroclor 1254	EPA 8082	33			33 U			33 U			32 U			33 U	100 U		
Aroclor 1260	EPA 8082	33			33 U			55			33			370 E	400		
Total PCB	EPA 8082	33			33 U			55			33			370 E	400		
Inorganics (mg/kg)																	
Aluminum	EPA 6010B				13900			15200			12900			14800			
Arsenic	EPA 6010B	7.3			7 U			7			6			6 U			
Barium	EPA 6010B	93300			37.3			49.9			51.5			51.4			
Beryllium	EPA 6010B	222			0.1 U			0.2			0.1			0.1 U			
Cadmium	EPA 6010B	1.21			0.3 U			0.2 U			0.2 U			0.2 U			
Chromium	EPA 6010B				16.3			16.9			24			29			
Cobalt	EPA 6010B				2.7			4.1			4.4			4.4			
Copper	EPA 6010B	36.4			20.8			23			21.6			22.8			
Iron	EPA 6010B				14600			20600			15700			18000			
Lead	EPA 6010B	1000			3			7			13			12			
Magnesium	EPA 6010B				2540			3260			3240			3770			
Manganese	EPA 6010B	1146			80.6			140			155			156			
Mercury	EPA 7471A	0.07			0.06 U			0.05 U			0.04			0.05 U			
Molybdenum	EPA 6010B				0.7 U			1.3			1.1			0.9			
Nickel	EPA 6010B	47.8			6			11			14			18			
Silver	EPA 6010B	0.323			0.4 U			0.4 U			0.3 U			0.4 U			
Thallium	EPA 7841	0.669			0.1 U			0.1 U			0.1 U			0.1 U			
Tin	EPA 6010B				1 U			1 U			1 U			1 U			
Vanadium	EPA 6010B	56100			47.7			50.7			47.1			51.1			
Zinc	EPA 6010B	101			21.9			39.5			48			54.1			
Total Solids (%)	EPA 160.3				73.1	73.1		84.5	84.5		87.8	87.8		76		76	
Cyanide	EPA 335.2	0.202			0.34 U	0.17 UJ		0.3 U	0.15 UJ		0.28 U	0.14 UJ		0.33 U		0.16 UJ	
Petroleum Hydrocarbons (mg/kg)																	
TPH - Gasoline Range	NWTPH-Gx	30															
TPH - Diesel Range	NWTPH-Dx-Cleaned	2000															
TPH - Motor Oil Range	NWTPH-Dx-Cleaned	2000															

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 4

Data Gap Investigation, 2-60s Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	2-60-DP-20-01-S	2-60-DP-20-01-S	2-60-DP-20-05-S	2-60-DP-20-05-S	2-60-DP-20-10-S	2-60-DP-20-10-S	2-60-DP-21-1_0-S	2-60-DP-21-04_5-S	2-60-DP-21-09_5-S	2-60-DP-22-01-S	2-60-DP-22-01-S	2-60-DP-22-05-S	2-60-DP-22-05-S	2-60-DP-22-10-S	2-60-DP-22-10-S	2-60-DP-23-01-S
			Location:	2-60-DP-20	2-60-DP-20 Reanalysis	2-60-DP-20	2-60-DP-20 Reanalysis	2-60-DP-20	2-60-DP-20 Reanalysis	2-60-DP-21	2-60-DP-21	2-60-DP-21	2-60-DP-22	2-60-DP-22 Reanalysis	2-60-DP-22	2-60-DP-22 Reanalysis	2-60-DP-22	2-60-DP-22 Reanalysis	2-60-DP-23
			Depth (ft bgs):	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	4.5 - 4.5	9.5 - 9.5	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1
			Sample Date:	8/8/2005	8/8/2005	8/8/2005	8/8/2005	8/8/2005	8/8/2005	8/19/2005	8/23/2005	8/23/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005
VOCs (µg/kg)																			
Methylene Chloride	EPA 8260B	828		4.7 UJ		3.5 UJ		2.8 UJ		2.2 U	2.1 U	2.4 U	2.1 U		5.2 U		2.3 UJ		2.1 U
Acetone	EPA 8260B			7.7 U		5.6 U		6.2 U		5.4 U	5.3 U	110	5.3 U		5.2 U		5.9 UJ		5.3 U
Carbon Disulfide	EPA 8260B			1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
1,1-Dichloroethane	EPA 8260B			1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
cis-1,2-Dichloroethene	EPA 8260B	794		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
2-Butanone	EPA 8260B			6.2 U		5.6 U		6.2 U		5.4 U	5.3 U	28	5.3 U		5.2 U		5.9 UJ		5.3 U
Trichloroethene	EPA 8260B	2		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
Tetrachloroethene	EPA 8260B	8.72		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
Toluene	EPA 8260B	19000		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
Ethylbenzene	EPA 8260B	2520		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
m,p-Xylene	EPA 8260B			1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
o-Xylene	EPA 8260B			1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
1,3,5-Trimethylbenzene	EPA 8260B	2470		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
1,2,4-Trimethylbenzene	EPA 8260B	2360		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
Isopropylbenzene	EPA 8260B	1270		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
n-Propylbenzene	EPA 8260B	13600		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
sec-Butylbenzene	EPA 8260B	7860		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
4-Isopropyltoluene	EPA 8260B			1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
n-Butylbenzene	EPA 8260B	4640		1.2 U		1.1 U		1.2 U		1.1 U	1.1 U	1.2 U	1.1 U		1 U		1.2 UJ		1.1 U
Naphthalene	EPA 8260B	24800		6.2 U		5.6 U		6.2 U		5.4 U	5.3 U	6 U	5.3 U		5.2 U		5.9 UJ		5.3 U
SVOCs (µg/kg)																			
Naphthalene	EPA 8270D	24800		65 U		64 U		65 U											
2-Methylnaphthalene	EPA 8270D			65 U		64 U		65 U											
Acenaphthylene	EPA 8270D			65 U		64 U		65 U											
Dibenzofuran	EPA 8270D			65 U		64 U		65 U											
Phenanthrene	EPA 8270D			65 U		64 U		65 U											
Anthracene	EPA 8270D	6080000		65 U		64 U		65 U											
Di-n-Butylphthalate	EPA 8270D	50900		65 U		64 U		65 U											
Fluoranthene	EPA 8270D	44000		65 U		64 U		65 U											
Pyrene	EPA 8270D	1750000		65 U		64 U		65 U											
Benzo(a)anthracene	EPA 8270D	41.9		65 U		64 U		65 U											
bis(2-Ethylhexyl)phthalate	EPA 8270D	1570		65 U		64 U		65 U											
Chrysene	EPA 8270D	46.6		65 U		64 U		65 U											
Benzo(b)fluoranthene	EPA 8270D	144		65 U		64 U		65 U											
Benzo(k)fluoranthene	EPA 8270D	144		65 U		64 U		65 U											
Benzo(a)pyrene	EPA 8270D	113		65 U		64 U		65 U											
Indeno(1,2,3-cd)pyrene	EPA 8270D	406		65 U		64 U		65 U											
Dibenz(a,h)anthracene	EPA 8270D	210		65 U		64 U		65 U											
Benzo(g,h,i)perylene	EPA 8270D			65 U		64 U		65 U											
Naphthalene	EPA 8270SIM	24800		6.5 U		6.4 U		6.5 U											
2-Methylnaphthalene	EPA 8270SIM			6.5 U		6.4 U		6.5 U											
Acenaphthylene	EPA 8270SIM			6.5 U		6.4 U		6.5 U											
Phenanthrene	EPA 8270SIM			11		6.4 U		6.5 U											
Anthracene	EPA 8270SIM	6080000		6.5 U		6.4 U		6.5 U											
Fluoranthene	EPA 8270SIM	44000		18		6.4 U		6.5 U											
Pyrene	EPA 8270SIM	1750000		39		6.4 U		6.5 U											
Benzo(a)anthracene	EPA 8270SIM	41.9		20		6.4 U		6.5 U											
Chrysene	EPA 8270SIM	46.6		26		6.4 U		6.5 U											
Benzo(b)fluoranthene	EPA 8270SIM	144		20 J		6.4 UJ		6.5 UJ											
Benzo(k)fluoranthene	EPA 8270SIM	144		25		6.4 U		6.5 U											
Benzo(a)pyrene	EPA 8270SIM	113		34		6.4 U		6.5 U											
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406		18		6.4 U		6.5 U											
Dibenz(a,h)anthracene	EPA 8270SIM	210		7.8		6.4 U		6.5 U											
Benzo(g,h,i)perylene	EPA 8270SIM			23		6.4 U		6.5 U											
Dibenzofuran	EPA 8270SIM			6.5 U		6.4 U		6.5 U											
PCBs (µg/kg)																			
Aroclor 1254	EPA 8082	33		33 U		32 U		33 U											33 U
Aroclor 1260	EPA 8082	33		33 U		32 U		33 U											33 U
Total PCB	EPA 8082	33		33 U		32 U		33 U											33 U
Inorganics (mg/kg)																			
Aluminum	EPA 6010B			14800		15000		17700		10400	11000	12100	13000		12600		11300		8900
Arsenic	EPA 6010B	7.3		10		6		9		5 U	6	6 U	5 U		5 U		6 U		5 U
Barium	EPA 6010B	93300		67.9		39.4		46.5		42.2	37.1	41.2	49.6		47.6		40.7		28.1
Beryllium	EPA 6010B	222		0.2		0.1		0.1 U		0.14	0.1	0.1	0.17		0.2		0.1		0.1
Cadmium	EPA 6010B	1.21		0.2 U		0.2 U		0.3 U		0.2 U	0.2 U	0.3 U	0.2 U		0.2 U		0.2 U		0.2 U
Chromium	EPA 6010B			14.9		12.7		19.5		37.1	13.6	13.9	27.1		28.1		12.2		13.2
Cobalt	EPA 6010B			6.2		4.5		2.9		6.6	5.3	5	8.8		6.6		4.8		4.8
Copper	EPA 6010B	36.4		20.8		17.2		35.5		11.5	12.7	15.6	17.9		11.6		17.4		13.7
Iron	EPA 6010B			16900		13800		27500		15500	15000	15700	16400		14700		13500		12600
Lead	EPA 6010B	1000		19		3		4		2	3	4	8		2 U		2		15
Magnesium	EPA 6010B			3050		2370		2880		6160	3020	2390	6020		5830		2630		2730
Manganese	EPA 6010B	1146		289		152		81.3		324	144	208	318		263		145		150
Mercury	EPA 7471A	0.07		0.04		0.11		0.06 U		0.04 U	0.04 U	0.06 U	0.05 U		0.05 U		0.04 U		0.04 U
Molybdenum	EPA 6010B			0.6 U		0.7		1.5		0.5 U	0.5 U	0.6 U	0.5 U		0.6		0.6 U		0.5 U
Nickel	EPA 6010B	47.8		11		7		6		37.4	10	9	36.5		38		9		12
Silver	EPA 6010B	0.323		0.4 U		0.3 U		0.4 U		0.3 U	0.3 U	0.4 U	0.3 U		0.3 U		0.3 U		0.3 U
Thallium	EPA 7841	0.669		0.2		0.1 U		0.2		0.1 U	0.3	0.1	0.1 U		0.1 U		0.1 U		0.1
Tin	EPA 6010B			1 U		1 U		1 U		1 U	1 U	1 U	1 U		1 U		1 U		1 U
Vanadium	EPA 6010B	56100		49.3		49		68.6		36	43	45	43.2		35.8		44		40.4
Zinc	EPA 6010B	101		72.6		22.9		18.9		29.4	33.7	25	34.4		28.1		25.3		32.1
Total Solids (%)	EPA 160.3			80.1	80.1	80.3	80.3	72.6	72.6				94.7	94.7	94.3	94.3	86.3	86.3	92.4
Cyanide	EPA 335.2	0.202		0.56	0.34 J	0.31 U	0.16 UJ	0.34 U	0.17 UJ				0.26 U	0.13 UJ	0.27 U	0.13 UJ	0.29 U	0.14 UJ	0.27 U
Petroleum Hydrocarbons (mg/kg)																			
TPH - Gasoline Range	NWTPH-Gx	30																	
TPH - Diesel Range	NWTPH-Dx-Cleaned	2000																	
TPH - Motor Oil Range	NWTPH-Dx-Cleaned	2000																	

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 4

Data Gap Investigation, 2-60s Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	2-60-DP-23-01-S	2-60-DP-23-05-S	2-60-DP-23-05-S	2-60-DP-23-10-S	2-60-DP-23-10-S	2-60-DP-24-01-S	2-60-DP-24-01-S	2-60-DP-24-05-S	2-60-DP-24-05-S	2-60-DP-24-10-S	2-60-DP-24-10-S	2-60-DP-25-01-S	2-60-DP-25-05-S	2-60-DP-25-10-S	2-60-DP-26-01-S	2-60-DP-26-05-S
			Location:	2-60-DP-23 Reanalysis	2-60-DP-23	2-60-DP-23 Reanalysis	2-60-DP-23	2-60-DP-23 Reanalysis	2-60-DP-24	2-60-DP-24 Reanalysis	2-60-DP-24	2-60-DP-24 Reanalysis	2-60-DP-24	2-60-DP-24 Reanalysis	2-60-DP-25	2-60-DP-25	2-60-DP-25	2-60-DP-26	2-60-DP-26
			Depth (ft bgs):	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	1 - 1	5 - 5	5 - 5	10 - 10	10 - 10	1 - 1	5 - 5	10 - 10	1 - 1	5 - 5
			Sample Date:	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/16/2005	8/15/2005	8/15/2005	8/15/2005	8/15/2005	8/15/2005
VOCs (µg/kg)																			
Methylene Chloride	EPA 8260B	828			2.2 U		2.4 U		1.9 U		2 U		2.2 U		2.1 U	2.1 U	2.5 U	2.1 U	2.1 U
Acetone	EPA 8260B				5.5 U		5.9 U		4.8 U		4.9 U		9.5		5.2 U	6.1	6.2 U	18	5.5
Carbon Disulfide	EPA 8260B				1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
1,1-Dichloroethane	EPA 8260B				1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
cis-1,2-Dichloroethene	EPA 8260B	794			1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
2-Butanone	EPA 8260B				5.5 U		5.9 U		4.8 U		4.9 U		5.5 U		5.2 U	5.4 U	6.2 U	5.3 U	5.2 U
Trichloroethene	EPA 8260B	2			1.1 U		1.2		0.96 U		0.98 U		1.1 U		3.7	5.7	8.4	1.1 U	1 U
Tetrachloroethene	EPA 8260B	8.72			1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
Toluene	EPA 8260B	19000			1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
Ethylbenzene	EPA 8260B	2520			1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
m,p-Xylene	EPA 8260B				1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
o-Xylene	EPA 8260B				1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
1,3,5-Trimethylbenzene	EPA 8260B	2470			1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
1,2,4-Trimethylbenzene	EPA 8260B	2360			1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
Isopropylbenzene	EPA 8260B	1270			1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
n-Propylbenzene	EPA 8260B	13600			1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
sec-Butylbenzene	EPA 8260B	7860			1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
4-Isopropyltoluene	EPA 8260B				1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
n-Butylbenzene	EPA 8260B	4640			1.1 U		1.2 U		0.96 U		0.98 U		1.1 U		1 U	1.1 U	1.2 U	1.1 U	1 U
Naphthalene	EPA 8260B	24800			5.5 U		5.9 U		4.8 U		4.9 U		5.5 U		5.2 U	5.4 U	6.2 U	5.3 U	5.2 U
SVOCs (µg/kg)																			
Naphthalene	EPA 8270D	24800							65 U		66 U		61 U						
2-Methylnaphthalene	EPA 8270D								65 U		66 U		61 U						
Acenaphthylene	EPA 8270D								65 U		66 U		61 U						
Dibenzofuran	EPA 8270D								65 U		66 U		61 U						
Phenanthrene	EPA 8270D								65 U		66 U		61 U						
Anthracene	EPA 8270D	6080000							65 U		66 U		61 U						
Di-n-Butylphthalate	EPA 8270D	50900							65 U		66 U		61 U						
Fluoranthene	EPA 8270D	44000							65 U		66 U		61 U						
Pyrene	EPA 8270D	1750000							65 U		66 U		61 U						
Benzo(a)anthracene	EPA 8270D	41.9							65 U		66 U		61 U						
bis(2-Ethylhexyl)phthalate	EPA 8270D	1570							65 U		320		92						
Chrysene	EPA 8270D	46.6							65 U		66 U		61 U						
Benzo(b)fluoranthene	EPA 8270D	144							65 U		66 U		61 U						
Benzo(k)fluoranthene	EPA 8270D	144							65 U		66 U		61 U						
Benzo(a)pyrene	EPA 8270D	113							65 U		66 U		61 U						
Indeno(1,2,3-cd)pyrene	EPA 8270D	406							65 U		66 U		61 U						
Dibenz(a,h)anthracene	EPA 8270D	210							65 U		66 U		61 U						
Benzo(g,h,i)perylene	EPA 8270D								65 U		66 U		61 U						
Naphthalene	EPA 8270SIM	24800							6.5 U		6.6 U		6.1 U						
2-Methylnaphthalene	EPA 8270SIM								6.5 U		6.6 U		6.1 U						
Acenaphthylene	EPA 8270SIM								6.5 U		6.6 U		6.1 U						
Phenanthrene	EPA 8270SIM								6.5 U		7.9		7.3						
Anthracene	EPA 8270SIM	6080000							6.5 U		6.6 U		6.1 U						
Fluoranthene	EPA 8270SIM	44000							6.5 U		6.6 U		6.1 U						
Pyrene	EPA 8270SIM	1750000							6.5 U		6.6 U		8						
Benzo(a)anthracene	EPA 8270SIM	41.9							6.5 U		6.6 U		6.1 U						
Chrysene	EPA 8270SIM	46.6							6.5 U		11		9.8						
Benzo(b)fluoranthene	EPA 8270SIM	144							6.5 UJ		6.6 UJ		6.1 UJ						
Benzo(k)fluoranthene	EPA 8270SIM	144							6.5 U		6.6 U		6.1 U						
Benzo(a)pyrene	EPA 8270SIM	113							6.5 U		6.6 U		6.1 U						
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406							6.5 U		6.6 U		6.1 U						
Dibenz(a,h)anthracene	EPA 8270SIM	210							6.5 U		6.6 U		6.1 U						
Benzo(g,h,i)perylene	EPA 8270SIM								6.5 UJ		6.6 UJ		6.1 UJ						
Dibenzofuran	EPA 8270SIM								6.5 U		6.6 U		6.1 U						
PCBs (µg/kg)																			
Aroclor 1254	EPA 8082	33			33 U		33 U		33 U		33 U		33 U						
Aroclor 1260	EPA 8082	33			33 U		33 U		33 U		33 U		33 U						
Total PCB	EPA 8082	33			33 U		33 U		33 U		33 U		33 U						
Inorganics (mg/kg)																			
Aluminum	EPA 6010B				8650		10500		8190		8470		12300		8200	9150	9960	12500	9980
Arsenic	EPA 6010B	7.3			5 U		8		5 U		5 U		7		5 U	5 U	5 U	5 U	5 U
Barium	EPA 6010B	93300			27.3		59.3		25.8		20.9		32.1		20.2	37.9	32.9	53.7	37.1
Beryllium	EPA 6010B	222			0.1 U		0.2		0.14		0.1 U		0.2		0.1 U	0.1 U	0.1 U	0.13	0.1 U
Cadmium	EPA 6010B	1.21			0.2 U		0.4		0.2 U		0.2 U		0.2 U		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	EPA 6010B				10.8		12.6		10.2		13.1		18.8		11.1	12.5	14	25.3	21.4
Cobalt	EPA 6010B				4.1		5.7		4.1		3.8		5.6		4.9	7.3	5.1	6.8	20.6
Copper	EPA 6010B	36.4			10		23.1		11		10.5		23.1		12.4	14.2	13.9	11.7	16.7
Iron	EPA 6010B				12300		15200		11800		12100		17900		12300	12400	13600	15700	13500
Lead	EPA 6010B	1000			2		30		3		2 U		6		2	10	2 U	2	5
Magnesium	EPA 6010B				2190		2770		2430		2570		3930		2510	2220	2240	5520	3150
Manganese	EPA 6010B	1146			143		274		119		120		168		118	162	161	272	165
Mercury	EPA 7471A	0.07			0.04 U		0.06		0.05 U		0.05 U		0.06 U		0.04 U	0.05	0.05 U	0.04 U	0.05 U
Molybdenum	EPA 6010B				0.5 U		0.6 U		0.5 U		0.6		1.2		0.5 U	0.5 U	0.6	0.5 U	0.8
Nickel	EPA 6010B	47.8			7		12		7.8		8		12		9	8	8	35.3	17
Silver	EPA 6010B	0.323			0.3 U		0.4 U		0.3 U		0.3 U		0.4 U		0.3 U	0.3 U	0.3 U	0.3 U	2.9
Thallium	EPA 7841	0.669			0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Tin	EPA 6010B				1 U		6		1 U		1 U		1 U		1 U	1 U	1 U	1 U	1 U
Vanadium	EPA 6010B	56100			43.5		45.4		38.6		40.1		50.8		43.8	44.5	51.2	37.2	40.9
Zinc	EPA 6010B	101			24.6		57.8		26.4		22.3		37		24.6	42.4	23.7	31.1	31.7
Total Solids (%)	EPA 160.3		92.4	93.2		79.6		96.1		94		77.5							
Cyanide	EPA 335.2	0.202	0.14 UJ	0.27 U	0.13 UJ	0.31 U	0.16 UJ	0.26 U	0.13 UJ	0.26 U	0.13 UJ	0.32 U	0.16 UJ						
Petroleum Hydrocarbons (mg/kg)																			
TPH - Gasoline Range	NWTPH-Gx	30																	
TPH - Diesel Range	NWTPH-Dx-Cleaned	2000																	
TPH - Motor Oil Range	NWTPH-Dx-Cleaned	2000																	

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 4

Data Gap Investigation, 2-60s Area
Detected Constituents in Soil Compared to SLs

Constituent	Analytical Method	2004 Soil Screening Level	Sample ID:	2-60-DP-26-10-S	2-60-PL2-604A-0_7-S	2-60-PL2-604A-5_0-S	2-60-PL2-604A-5_0-S	2-60-PL2-604A-09_0-S	2-60-PL2-605A-8_5-S	2-60-PL2-605A-10-S	2-60-PL2-606A-1_5-S	2-60-PL2-606A-2_5-S	2-60-PL2-606A-5_2-S	2-60-PL2-606A-10-S	2-60-PL2-606A-10-S
			Location:	2-60-DP-26	PL2-604A	PL2-604A	PL2-604A Dilution	PL2-604A	PL2-605A	PL2-605A	PL2-606A	PL2-606A	PL2-606A	PL2-606A	PL2-606A Reanalysis
			Depth (ft bgs):	10 - 10	0.7 - 0.7	5 - 5	5 - 5	9 - 9	8.5 - 8.5	10 - 10	1.5 - 1.5	2.5 - 2.5	5.2 - 5.2	10 - 10	10 - 10
			Sample Date:	8/15/2005	8/19/2005	8/19/2005	8/19/2005	8/23/2005	8/19/2005	8/19/2005	8/19/2005	8/19/2005	8/19/2005	8/19/2005	8/19/2005
VOCs (µg/kg)															
Methylene Chloride	EPA 8260B	828		2.4 U	2 U	2.1 U		2.2 U	2.3 U	2.4 U	3.2 U	2.2 U	2.9 U	320 UJ	1300 UJ
Acetone	EPA 8260B			6.1 U	5.1 U	6.1 U		28 U	9.4 U	15 U	6.5 U	5.5 U	5.6 U	800 UJ	3200 UJ
Carbon Disulfide	EPA 8260B			1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	160 UJ	640 UJ
1,1-Dichloroethane	EPA 8260B			1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	160 UJ	640 UJ
cis-1,2-Dichloroethene	EPA 8260B	794		1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	160 UJ	640 UJ
2-Butanone	EPA 8260B			6.1 U	5.1 U	5.2 U		5.4 U	5.6 U	6 U	5.3 U	5.5 U	5.6 U	800 UJ	3200 UJ
Trichloroethene	EPA 8260B	2		1.7	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	160 UJ	640 UJ
Tetrachloroethene	EPA 8260B	8.72		1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	160 UJ	640 UJ
Toluene	EPA 8260B	19000		1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	160 UJ	640 UJ
Ethylbenzene	EPA 8260B	2520		1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	3.6	9400 J	13000 J
m,p-Xylene	EPA 8260B			1.2 U	1.1	1 U		1.1 U	1.1 U	1.2 U	1.4	1.1 U	3.6	11000 J	14000 J
o-Xylene	EPA 8260B			1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	490 J	650 J
1,3,5-Trimethylbenzene	EPA 8260B	2470		1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	2000 J	2300 J
1,2,4-Trimethylbenzene	EPA 8260B	2360		1.2 U	3.6	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	17000 J	57000 J
Isopropylbenzene	EPA 8260B	1270		1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	5200 J	6800 J
n-Propylbenzene	EPA 8260B	13600		1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	6000 J	6100 J
sec-Butylbenzene	EPA 8260B	7860		1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	3400 J	4700 J
4-Isopropyltoluene	EPA 8260B			1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	7400 J	10000 J
n-Butylbenzene	EPA 8260B	4640		1.2 U	1 U	1 U		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	6700 J	9700 J
Naphthalene	EPA 8260B	24800		6.1 U	5.1 U	5.2 U		5.4 U	5.6 U	52	5.3 U	5.5 U	6.9	17000 J	38000 J
SVOCs (µg/kg)															
Naphthalene	EPA 8270D	24800													
2-Methylnaphthalene	EPA 8270D														
Acenaphthylene	EPA 8270D														
Dibenzofuran	EPA 8270D														
Phenanthrene	EPA 8270D														
Anthracene	EPA 8270D	6080000													
Di-n-Butylphthalate	EPA 8270D	50900													
Fluoranthene	EPA 8270D	44000													
Pyrene	EPA 8270D	1750000													
Benzo(a)anthracene	EPA 8270D	41.9													
bis(2-Ethylhexyl)phthalate	EPA 8270D	1570													
Chrysene	EPA 8270D	46.6													
Benzo(b)fluoranthene	EPA 8270D	144													
Benzo(k)fluoranthene	EPA 8270D	144													
Benzo(a)pyrene	EPA 8270D	113													
Indeno(1,2,3-cd)pyrene	EPA 8270D	406													
Dibenz(a,h)anthracene	EPA 8270D	210													
Benzo(g,h,i)perylene	EPA 8270D														
Naphthalene	EPA 8270SIM	24800													
2-Methylnaphthalene	EPA 8270SIM														
Acenaphthylene	EPA 8270SIM														
Phenanthrene	EPA 8270SIM														
Anthracene	EPA 8270SIM	6080000													
Fluoranthene	EPA 8270SIM	44000													
Pyrene	EPA 8270SIM	1750000													
Benzo(a)anthracene	EPA 8270SIM	41.9													
Chrysene	EPA 8270SIM	46.6													
Benzo(b)fluoranthene	EPA 8270SIM	144													
Benzo(k)fluoranthene	EPA 8270SIM	144													
Benzo(a)pyrene	EPA 8270SIM	113													
Indeno(1,2,3-cd)pyrene	EPA 8270SIM	406													
Dibenz(a,h)anthracene	EPA 8270SIM	210													
Benzo(g,h,i)perylene	EPA 8270SIM														
Dibenzofuran	EPA 8270SIM														
PCBs (µg/kg)															
Aroclor 1254	EPA 8082	33													
Aroclor 1260	EPA 8082	33													
Total PCB	EPA 8082	33													
Inorganics (mg/kg)															
Aluminum	EPA 6010B			11400	17600	13300		16800	11200	15500	12600	11600	11000	13300	
Arsenic	EPA 6010B	7.3		6 U	7	8		7	6 U	7 U	5 U	6	6	6 U	
Barium	EPA 6010B	93300		37	64.5	68		55.2	34.8	51.6	49.3	46.7	45.9	46.8	
Beryllium	EPA 6010B	222		0.1 U	0.2	0.2		0.2	0.1 U	0.2	0.2	0.1	0.1	0.1	
Cadmium	EPA 6010B	1.21		0.2 U	0.2 U	0.2 U		0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.2 U	0.3 U	
Chromium	EPA 6010B			13.6	24	23.2		26.5	11.6	15.4	32	16.3	12.2	12.9	
Cobalt	EPA 6010B			4.5	7.5	6		9.6	4.2	5.4	6.7	4.8	4.8	4.1	
Copper	EPA 6010B	36.4		14	27.1	24.9		24.1	15.1	20.3	14.7	17.7	17	19.1	
Iron	EPA 6010B			13200	20000	15800		22200	12200	15000	16200	13200	13000	12400	
Lead	EPA 6010B	1000		2 U	3	11		4	2 U	3	9	9	8	12	
Magnesium	EPA 6010B			2260	6300	12600		7510	2170	2870	5830	2760	2470	2410	
Manganese	EPA 6010B	1146		152	283	260		348	120	126	269	165	168	125	
Mercury	EPA 7471A	0.07		0.05 U	0.05 U	0.05 U		0.05 U	0.04 U	0.06 U	0.05 U	0.04 U	0.04	0.06 U	
Molybdenum	EPA 6010B			0.6 U	0.5 U	0.8		0.5 U	0.6 U	0.7	0.5 U	0.6 U	0.6 U	0.6 U	
Nickel	EPA 6010B	47.8		8	24	20		33	8	11	35	13	9	8	
Silver	EPA 6010B	0.323		0.3 U	0.3	0.3 U		0.3 U	0.3 U	0.4 U	0.3 U	0.3 U	0.3 U	0.4 U	
Thallium	EPA 7841	0.669		0.1 U	0.1 UJ	0.1 UJ		0.1	0.1 UJ	0.1 UJ	0.1 U	0.1 U	0.2	0.1	
Tin	EPA 6010B			1 U	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Vanadium	EPA 6010B	56100		46.6	52.1	47.3		54	42	51.2	38.6	43.3	44.2	47.5	
Zinc	EPA 6010B	101		23.3	38.9	70.1		41.9	28.4	32.7	40.6	40.7	37	25.8	
Total Solids (%)	EPA 160.3														
Cyanide	EPA 335.2	0.202													
Petroleum Hydrocarbons (mg/kg)															
TPH - Gasoline Range	NWTPH-Gx	30			9.9	6.5 U		19 J	7 U	8.4 U	6 U	6.9 U	7.1 U	3900 J	
TPH - Diesel Range	NWTPH-Dx-Cleaned	2000			76	87	97	7.7 J	6.2 U	6.5 U	5.4 U	5.6 U	5.6 U	330	
TPH - Motor Oil Range	NWTPH-Dx-Cleaned	2000			230 J	380 E	540	26 J	12 UJ	13 UJ	21 J	11 UJ	11 UJ	26 U	

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 5
Summary of Facility Information
Lower Duwamish Early Action Area 4

Facility name	Physical Address	Mailing Address	Phone Number	Facility Owner. (Address and phone number listed if different from physical address.)	Facility Operator. (Address and phone number listed if different from owner.)	Property Owner (Listed if different from facility owner/operator)	Regulatory Contact
Boeing Plant 2	7755 East Marginal Way South, Seattle, WA 98108	P.O. Box 3707 M/S 63-41, Seattle, WA 98108	(425) 865-5601	Boeing Commercial Airplane Group P.O. Box 9707 MS 5R-14, Seattle, WA 98124 and The Boeing Company Office of the General Council 100 N Riverside, Chicago, Il 60606	Integrated Defense and Space Division The Boeing Space Co. P.O. Box 3707 M/C 80-RX	The Boeing Company P.O. Box 3707, Seattle, WA 98124	Mr. William Ernst Company Energy & Enviro. Affairs The Boeing Company P.O. Box 3707 MC 1W-12 Seattle, WA 98124-2207 (425) 891-7724 Mr. Michael Verhaar (425) 237-9228 (Public contact)
Jorgensen Forge Corporation	8531 East Marginal Way South, Tukwila, WA 98108	Same as physical address	(206) 762-1100	Jorgensen Forge Corporation			Mr. Ron Altier (206) 676-9249
King Co. International Airport (Boeing Field)	7277 Perimeter Rd South, Seattle, WA 98108. (Note: also listed as 6505 Perimeter Road South, Seattle.)	P.O. Box 80245, Seattle, WA 98108	(206) 296-7380	Department of Construction and Facilities Management P.O. Box 80245 Seattle, WA 98108	Operations and Compliance (206) 296-7334 7299 Perimeter Rd S., Seattle, WA, 98108.	King County	Mr. Rick Renaud (206) 296-7427

Table 6

Regulatory Database Listings for Facilities in EAA-4

Lower Duwamish Waterway EAA-4

Site of Concern	Address	Industrial Stormwater General Permit	UST list (#UST/Status)	LUST list (No. Reported Release/Status)	Hazardous Waste Facility (RCRA SITE ID)	CSCSL	NPDES and State Waste Discharge
Boeing Plant 2	7755 East Marginal Way South, Seattle	SO3000482D	Not Listed	Not Listed	WAD009256819	Site ID 2100	Not Listed
Jorgensen Forge	8531 East Marginal Way South, Tukwila	SO3003231C	3 removed	Soil & groundwater reported cleaned up	WAD000602813	Site ID 2382	Not Listed
King County International Airport	7277 Perimeter Road South, Seattle	SO3000343D	5 closed	2 Reported Cleaned Up	WAD980986848 (For Airport Maintenance: 6518 Ellis Ave South) Discharge Authorization #4109-01	Not Listed	Not Listed

Notes:
NPDES: National Pollutandt Discharge Elimination System
UST List: Ecology's Underground Storgae Tank List
LUST list: Ecology's Leaking Underground Storage Tank List
CSCSL: Ecology's Suspected and Confirmed Contaminated Sites List
RCRA: Resource Conservation and Recovery Act

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Table 7

Toxics Release Inventory Summary

Lower Duwamish Waterway Early Action Area-4

Boeing Plant 2 TRI Data: Release Reports

Chemical	Date	Total On-site disposal or other releases	Total Off-site disposal or other releases	Total On- and Off- site disposal or other releases
Certain Glycol Ethers	2004	255	5	260
Diethanolamine		0	0	0
Naphalene		0	0	0
Certain Glycol Ethers	2003	255	0	255
Diethanolamine		0	0	0
Naphalene		0	0	0
Certain Glycol Ethers	2002	500	0	500
Diethanolamine		0	0	0
Methyl Ethyl Ketone		500	5	505
Naphalene		5	0	5
Certain Glycol Ethers	2001	500	0	500
Diethanolamine		5	0	5
Methyl Ethyl Ketone		500	5	505
Methyl Isobutyl Ketone		500	0	500
Naphalene		250	0	250
Certain Glycol Ethers	2000	255	5	260
Diethanolamine		0	0	0
Methyl Ethyl Ketone		1522	5	1527
Methyl Isobutyl Ketone		500	250	750
Naphalene		250	0	250
Certain Glycol Ethers	1999	500	0	500
Diethanolamine		0	0	0
Methyl Ethyl Ketone		1000	5	1005
Methyl Isobutyl Ketone		500	5	505
Naphalene		250	0	250
Certain Glycol Ethers	1998	10	10	20
Freon 113		250	0	250
Methyl Ethyl Ketone		1,850	255	2,105
Methyl Isobutyl Ketone		100	255	1,255
Naphalene		250	0	250
Certain Glycol Ethers	1997	255	0	255
Methyl Ethyl Ketone		4,850	.	4,850
Naphthalene		250	0	250
Toluene		755	0	755
Certain Glycol Ethers	1996	255	0	255
Methyl Ethyl Ketone		6,450	0	6,450
Naphthalene		250	0	250
Toluene		755	0	755
Chlorodifluoromethane	1995	9,200	0	9,200
Freon 113		3,700	0	3,700
Methyl Ethyl Ketone		4,350	5	4,355
Naphthalene		18	0	18
Toluene		1,850	0	1,850
Certain Glycol Ethers	1994	250	0	250
Chlorodifluoromethane		24000	0	24000
Freon 113		1300	0	1300
Methyl Ethyl Ketone		5700	250	5950
Naphthalene		250	0	250
Nitric Acid		0	250	250
Toluene		1205	250	1455
Trichloroethylene		9800	0	9800

Boeing Plant 2 TRI Data: Release Reports

Chemical	Date	Total On-site disposal or other releases	Total Off-site disposal or other releases	Total On- and Off- site disposal or other releases
Certain Glycol Ethers	1993	250	.	250
Dichloromethane		255	0	255
Freon 113		3600	0	3600
Methyl Ethyl Ketone		14935	250	15185
Naphthalene		250	.	250
Sulfuric Acid (1994 And After "acid aerosols" only)		250	250	500
Toluene		1000	5	1005
Trichloroethylene		36000	0	36000
Chromium Compounds (except chromite ore mined in the transvaal region)	1992	110	3390	3500
Freon 113		2100	0	21000
Methyl Ethyl Ketone		25800	890	26690
Naphthalene		440	0	440
Nitric Acid		1300	970	2270
Sulfuric Acid (1994 And After "acid aerosols" only)		700	1200	1900
Toluene		25150	2330	27480
Trichloroethylene		67000	0	67000
Xylenes (mixed isomers)		54090	250	54340
1,1,1-Trichloroethane	1991	10200	.	10200
Acetone		9800	.	9800
Chromium Compounds (except chromite ore mined in the transvaal region)		250	18800	19050
Freon 113		19200	.	19200
Hydrochloric Acid (1995 and after "acid aerosols" only)		250	.	250
Hydrogen Fluoride		250	.	250
Methyl Ethyl Ketone		95000	.	95000
Methyl Isobutyl Ketone		10250	.	10250
Nitric Acid		750	.	750
Sulfuric Acid (1994 And After "acid aerosols" only)		250	.	250
Toluene		56100	.	56100
Trichloroethylene		447000	.	447000
Xylenes (mixed isomers)		107000	.	107000
1,1,1-Trichloroethane	1990	3480	0	3480
Acetone		22500	0	22500
Chromium Compounds (except chromite ore mined in the transvaal region)		723	57660	58383
Ethylene Glycol		17400	12000	29400
Freon 113		37800	0	37800
Hydrochloric Acid (1995 and after "acid aerosols" only)		440	0	440
Hydrogen Fluoride		600	0	600
Methyl Ethyl Ketone		253000	0	253000
Naphthalene		470	0	470
Nitric Acid		9600	0	9600
Styrene		140	0	140
Sulfuric Acid (1994 And After "acid aerosols" only)		2600	.	2600
Tetrachloroethylene		12300	0	12300
Toluene		145000	.	145000
Trichloroethylene		440000	0	440000
Xylenes (mixed isomers)		147000	0	147000

Boeing Plant 2 TRI Data: Release Reports

Chemical	Date	Total On-site disposal or other releases	Total Off-site disposal or other releases	Total On- and Off- site disposal or other releases
1,1,1-Trichloroethane	1989	5700	0	5700
Acetone		3550	0	3550
Chromium Compounds (except chromite ore mined in the transvaal region)		460	28284	28744
Ethylene Glycol		250	10200	10450
Freon 113		31000	0	31000
Hydrochloric Acid (1995 and after "acid aerosols" only)		500	0	500
Hydrogen Fluoride		250	0	250
Methyl Ethyl Ketone		164,000	0	164,000
Methyl Isobutyl Ketone		28,000	0	28,000
Naphthalene		750	0	750
Nitric Acid		500	0	500
Sulfuric Acid (1994 And After "acid aerosols" only)		500	.	500
Toluene		84,000	0	84,000
Trichloroethylene		216,000	85,000	301,000
Xylenes (mixed isomers)		132,000	0	132,000
1,1,1-Trichloroethane	1988	43,250	0	43,250
Acetone		34,750	0	34,750
Chromium Compounds (except chromite ore mined in the transvaal region)		500	4,175	4,675
Hydrochloric Acid (1995 and after "acid aerosols" only)		500	.	500
Hydrogen Fluoride		250	31,000	31,250
M-Xylene		34,500	0	34,500
Methyl Ethyl Ketone		95,000	250	95,000
Methyl Isobutyl Ketone		13,750	0	14,000
Nitric Acid		500	0	500
O-Xylene		11,750	0	11,750
P-Xylene		14,000	0	14,000
Sodium Hydroxide (Solution)		250	0	250
Sulfuric Acid (1994 And After "acid aerosols" only)		500	0	500
Toluene		24,000	0	24,000
Trichloroethylene		682,000	750	682,750
Xylenes (mixed isomers)		119,750	750	120,500

Key:
Total Off-site disposal or other releases: a discharge of a toxic chemical to the environment that occurs as a result of a facility's transferring a waste containing a TRI chemical off-site disposal or other release, as reported in Section 6 of the TRI Form R.
Total On- and Off-Site Disposal and other releases: the sum of total on-site disposal or other release and total off-site disposal or
POTW = Publicly Owned Treatment works
"." means the facility left that particular cell blank in its Form R submission (a zero in a cell demotes either that the facility reported "0" or "NA" in its Form R submission
All measurements are in pounds

TRI Data: Waste Transfer Reports

Chemical	Date	Transfers to Recycling	Transferred to Energy Recovery	Transfers to treatment	Transfers to POTWs (Non Metals)	POWs (Metal and Metal Compounds)	Other Off-site Transfers	Transfers Off-Site for Disposal or Other Releases	Total Transfers Off-site for Further Waste Management
Certain Glycol Ethers	2004	0	10	15	0	.	0	5	30
Diethanolamine		0	10	10	0	.	0	0	20
Naphalene		0	0	0	0	.	0	0	0
Certain Glycol Ethers	2003	0	10	10	0	.	0	0	20
Diethanolamine		0	10	10	0	.	0	0	20
Naphalene		0	0	0	0	.	0	0	0
Certain Glycol Ethers	2002	0	10	10	0	.	0	0	20
Diethanolamine		0	10	255	0	.	0	0	265
Methyl Ethyl Ketone		0	260	10	0	.	0	5	275
Naphalene		0	0	5	0	.	0	0	5
Certain Glycol Ethers	2001	0	10	10	0	.	0	0	20
Diethanolamine		0	500	500	0	.	0	0	1000
Methyl Ethyl Ketone		0	10	15	0	.	0	5	30
Methyl Isobutyl Ketone		0	500	755	0	.	0	0	1255
Naphalene		0	1000	250	0	.	0	0	1250
Certain Glycol Ethers	2000	0	10	15	0	.	0	5	30
Diethanolamine		0	500	500	0	.	0	0	1000
Methyl Ethyl Ketone		0	10	20	0	.	0	5	35
Methyl Isobutyl Ketone		0	500	500	0	.	0	250	1250
Naphalene		0	0	0	0	.	0	0	0
Certain Glycol Ethers	1999	0	0	5	.	.	0	0	5
Diethanolamine		0	0	750	.	.	0	0	750
Methyl Ethyl Ketone		0	20	510	.	.	0	5	535
Methyl Isobutyl Ketone		0	15	505	.	.	0	5	525
Naphalene		0	0	0	0	.	0	0	0
Certain Glycol Ethers	1998	0	20	265	.	.	0	10	295
Freon 113		250	0	505	.	.	0	0	755
Methyl Ethyl Ketone		5	510	1005	0	.	.	255	1775
Methyl Isobutyl Ketone		0	265	755	.	.	0	255	1275
Naphalene		0	0	0	0	.	0	0	0
Certain Glycol Ethers	1997	0	250	10	.	.	0	0	260
Methyl Ethyl Ketone		250	500	505	0	.	.	.	1255
Naphthalene		0	0	0	.	.	0	0	0
Toluene		255	505	500	0	.	.	0	1260
Certain Glycol Ethers	1996	0	505	505	0	.	0	0	1010
Methyl Ethyl Ketone		250	755	250	0	.	.	0	1255
Naphthalene		5	250	0	0	.	0	0	255
Toluene		5	750	250	0	.	.	0	1005
Chlorodifluoromethane	1995	0	0	0	.	.	0	0	0
Freon 113		0	0	1500	0	.	0	0	1500
Methyl Ethyl Ketone		255	1005	1255	0	.	0	5	2520
Naphthalene		0	10	0	0	.	0	0	10
Toluene		250	760	510	0	.	0	0	1520
Certain Glycol Ethers	1994	5	10	10	0	.	0	0	25
Chlorodifluoromethane		0	0	0	0	.	0	0	0
Freon 113		500	0	510	0	.	0	0	1010
Methyl Ethyl Ketone		1600	2400	265	0	.	0	250	4515
Naphthalene		0	10	5	0	.	0	0	15
Nitric Acid		0	0	11305	0	.	0	250	11555
Toluene		500	750	515	0	.	0	250	2015
Trichloroethylene		22000	0	1000	0	.	0	0	23000

TRI Data: Waste Transfer Reports

Chemical	Date	Transfers to Recycling	Transferred to Energy Recovery	Transfers to treatment	Transfers to POTWs (Non Metals)	POWs (Metal and Metal Compounds)	Other Off-site Transfers	Transfers Off-Site for Disposal or Other Releases	Total Transfers Off-site for Further Waste Management
Certain Glycol Ethers		.	.	.	0	.	.	.	0
Dichloromethane		0	0	760	0	.	.	0	760
Freon 113		3200	0	1755	0	.	0	0	4955
Methyl Ethyl Ketone		500	750	500	0	.	.	250	2000
Naphthalene	1993	.	.	.	0	.	.	.	0
Sulfuric Acid (1994 And After "acid aerosols" only)		0	0	750	0	.	.	250	1000
Toluene		750	1000	750	0	.	.	5	2505
Trichloroethylene		5110	0	6000	0	.	.	0	11110
Chromium Compounds (except chromite ore mined in the transvaal region)		200	320	880	0	140	.	3250	4790
Freon 113		130	580	120	0	.	.	0	830
Methyl Ethyl Ketone		850	4510	2230	0	.	.	890	8480
Naphthalene	1992	6	0	0	0	.	.	0	6
Nitric Acid		0	0	41024	0	.	.	970	41994
Sulfuric Acid (1994 And After "acid aerosols" only)		0	0	3000	0	.	.	1200	4200
Toluene		410	6735	1493	0	.	.	2330	10968
Trichloroethylene		25180	23865	3830	0	.	.	0	52875
Xylenes (mixed isomers)		900	2020	1180	0	.	.	250	4350
1,1,1-Trichloroethane		250	.	3100	0	.	.	.	3350
Acetone		.	.	750	0	.	.	.	750
Chromium Compounds (except chromite ore mined in the transvaal region)		.		750	.	250	.	18500	19550
Freon 113		1200	.	750	0	.	.	.	1950
Hydrochloric Acid (1995 and after "acid aerosols" only)		.	.	1250	0	.	.	.	1250
Hydrogen Fluoride	1991	.	.	1250	0	.	.	.	1250
Methyl Ethyl Ketone		.	.	20000	0	.	.	.	20000
Methyl Isobutyl Ketone		.	.	250	0	.	.	.	250
Nitric Acid		.	.	18450	5	.	.	.	18455
Sulfuric Acid (1994 And After "acid aerosols" only)		.	.	6000	0	.	.	.	6000
Toluene		.	.	4800	0	.	.	.	4800
Trichloroethylene		7200	.	25000	0	.	.	.	32200
Xylenes (mixed isomers)		.	.	1900	0	.	.	.	1900
1,1,1-Trichloroethane		0	0	7600	0	.	.	0	7600
Acetone		0	0	1821	0	.	.	0	1821
Chromium Compounds (except chromite ore mined in the transvaal region)		.	.	.	.	660	.	57000	57660
Ethylene Glycol		0	0	0	0	.	.	12000	12000
Freon 113		0	0	2000	0	.	.	0	2000
Hydrochloric Acid (1995 and after "acid aerosols" only)		0	0	6510	150	.	.	0	6660
Hydrogen Fluoride	1990	0	0	6600	230	.	.	0	6830
Methyl Ethyl Ketone		0	0	3121	0	.	.	0	6121
Naphthalene		0	0	0	0	.	.	0	0
Nitric Acid		0	0	72000	4000	.	.	0	76000
Styrene			0	0	0	.	.	0	0
Sulfuric Acid (1994 And After "acid aerosols" only)		.	.	13800	1100	.	.	.	14900
Tetrachloroethylene		0	0	2145	0	.	.	0	2145
Toluene		.	.	2821	0	.	.	.	2821
Trichloroethylene		0	0	66000	0	.	.	0	66000
Xylenes (mixed isomers)		0	0	13000	0	.	.	0	13000

TRI Data: Waste Transfer Reports

Chemical	Date	Transfers to Recycling	Transferred to Energy Recovery	Transfers to treatment	Transfers to POTWs (Non Metals)	POWs (Metal and Metal Compounds)	Other Off-site Transfers	Transfers Off-Site for Disposal or Other Releases	Total Transfers Off-site for Further Waste Management
1,1,1-Trichloroethane		0	0	2500	0	.	.	0	2500
Acetone		0	0	23000	0	.	.	0	23000
Chromium Compounds (except chromite ore mined in the transvaal region)		.	.	.	.	660	.	27624	28284
Ethylene Glycol		0	0	0	0	.	.	10200	10200
Freon 113		0	0	1000	0	.	.	0	1000
Hydrochloric Acid (1995 and after "acid aerosols" only)		0	0	12130	150	.	.	0	12280
Hydrogen Fluoride	1989	0	0	1600	200	.	.	0	16200
Methyl Ethyl Ketone		0	0	35000	0	.	.	0	35000
Methyl Isobutyl Ketone		0	0	410	0	.	.	0	410
Naphthalene		0	0	0	0	.	.	0	0
Nitric Acid		0	0	46000	5500	.	.	0	465500
Sulfuric Acid (1994 And After "acid aerosols" only)		.	.	112850	1400	.	.	.	114250
Toluene		0	0	6200	0	.	.	0	6200
Trichloroethylene		0	0	0	0	.	.	85000	85000
Xylenes (mixed isomers)		0	0	9000	0	.	.	0	9000
1,1,1-Trichloroethane		0	0	750	0	.	.	0	750
Acetone		0	0	250	0	.	.	0	250
Chromium Compounds (except chromite ore mined in the transvaal region)		.	.	.	.	675	.	3500	4175
Hydrochloric Acid (1995 and after "acid aerosols" only)		.	.	19200	0	.	.	.	19200
Hydrogen Fluoride		0	0	0	0	.	.	31000	31000
M-Xylene		0	0	750	0	.	.	0	750
Methyl Ethyl Ketone	1988	100000	0	0	0	.	.	0	100000
Methyl Isobutyl Ketone		0	0	0	0	.	.	250	250
Nitric Acid		0	0	330000	0	.	.	0	330000
O-Xylene		0	0	250	0	.	.	0	250
P-Xylene		0	0	750	0	.	.	0	750
Sodium Hydroxide (Solution)		0	0	98000	250	.	.	0	98250
Sulfuric Acid (1994 And After "acid aerosols" only)		0	0	115000	0	.	.	0	115000
Toluene		0	0	3000	0	.	.	0	3000
Trichloroethylene		0	0	0	0	.	.	750	750
Xylenes (mixed isomers)		0	0	0	0	.	.	750	750

Key

Transfers to Recycling: the total among of toxic chemical in the waste stream transferred from the facility to an off-site location during the
Transferred to Energy Recovery: the total amount of the toxic chemical in the waste stream transferred from the facility to an off-site
Transfers to treatment: the total amount of toxic chemical in the waste stream transferred from the facility to an off-site location during the
Transfers to POWs: the total amount of the toxic chemical in the waste stream transferred from the facility to all POTWs during the
Other Off-Site Transfers: toxic chemicals in waste that were reported as transferred off-site for which the off-site activity was not specified
Transfers Off-Site for Disposal or Other Releases: sum of transfers to underground injection, RCRA Subtitle C landfills, other landfills,
Total Transfers Off-Site of Further Waste Management: the sum of transfers to recycling, transfers to energy recovery, transfers to
POTW = Publicly Owned Treatment works
"." means the facility left that particular cell blank in its Form R submission (a zero in a cell demotes either that the facility reported "0" or "NA" in its Form R submission

TRI Data: Waste Quantity Reports

Chemical	Date	Recycled On-site	Recycled Off-site	Energy Recovery On-site	Energy-Recovery Off-site	Treated On-site	Treated Off-site	Total Other Off-Site Disposal or Other Releases	Total Production-related Waste Managed	Non-production related Waste Managed
Certain Glycol Ethers	2004	0	0	0	1	158	1	0	163	0
Diethanolamine		0	0	0	9	0	0	0	180	0
Naphalene		0	0	0	0	0	0	0	0	0
Certain Glycol Ethers	2003	0	0	0	6	96	0	0	108	0
Diethanolamine		0	0	0	16	0	0	0	31	0
Naphalene		0	0	0	0	0	0	0	0	0
Certain Glycol Ethers	2002	0	0	0	3	0	3	167	173	0
Diethanolamine		0	0	0	19	0	19	0	38	0
Methyl Ethyl Ketone		0	0	0	40	0	7	127	174	0
Naphalene		0	0	0	0	0	1	5	6	0
Certain Glycol Ethers	2001	0	0	0	6	0	5	80	91	0
Diethanolamine		0	0	0	44	0	44	2	90	0
Methyl Ethyl Ketone		0	0	0	20	0	13	433	466	0
Methyl Isobutyl Ketone		0	0	0	52	0	195	264	511	0
Naphalene		0	0	0	87	0	109	16	212	0
Certain Glycol Ethers	2000	0	0	0	6	0	11	26	43	0
Diethanolamine		0	0	0	38	0	38	0	76	0
Methyl Ethyl Ketone		0	0	0	21	0	24	1383	1428	0
Methyl Isobutyl Ketone		0	0	0	52	0	46	325	423	0
Naphalene		0	0	0	0	0	0	16	16	0
Certain Glycol Ethers	1999	0	0	0	0	0	5	49	54	0
Diethanolamine		0	0	0	0	0	71	0	71	0
Methyl Ethyl Ketone		0	0	0	11	0	36	860	907	0
Methyl Isobutyl Ketone		0	0	0	25	0	79	640	744	0
Naphalene		0	0	0	0	0	0	14	14	0
Certain Glycol Ethers	1998	0	0	0	10	0	65	10	85	0
Freon 113		0	120	0	0	0	260	350	730	0
Methyl Ethyl Ketone		0	2	0	91	0	220	1700	2013	0
Methyl Isobutyl Ketone		0	0	0	19	0	360	570	949	0
Naphalene		0	0	0	0	0	0	15	15	0
Certain Glycol Ethers	1997	0	0	0	12	0	13	22	47	0
Methyl Ethyl Ketone		0	37	0	930	0	110	4700	5777	0
Naphthalene		0	0	0	0	0	0	15	15	0
Toluene		0	29	0	370	0	29	1700	2128	0
Certain Glycol Ethers	1996	0	0	0	41	0	160	15	216	0
Methyl Ethyl Ketone		0	47	0	620	0	30	6400	7097	0
Naphthalene		0	5	0	38	0	0	15	58	0
Toluene		0	9	0	570	0	12	740	1331	0
Chlorodifluoromethane	1995	0	0	0	0	0	0	9200	9200	8600
Freon 113		0	0	0	0	0	310	3700	4010	0
Methyl Ethyl Ketone		0	330	0	460	0	710	4300	5800	0
Naphthalene		0	0	0	3	0	0	18	21	0
Toluene		0	57	0	160	0	110	1700	2027	0
Certain Glycol Ethers	1994	0	2	0	8	0	2	43	55	0
Chlorodifluoromethane		0	0	0	0	0	0	24000	24000	0
Freon 113		0	63	0	0	0	90	1300	1453	0
Methyl Ethyl Ketone		0	1500	0	2100	0	310	5700	9610	0
Naphthalene		0	0	0	5	0	20	18	25	0
Nitric Acid		0	0	0	0	0	11000	21	11021	0
Toluene		0	610	0	360	0	72	1300	2342	0
Trichloroethylene		0	22000	0	0	0	500	9800	32300	0

TRI Data: Waste Quantity Reports

Chemical	Date	Recycled On-site	Recycled Off-site	Energy Recovery On-site	Energy-Recovery Off-site	Treated On-site	Treated Off-site	Total Other Off-Site Disposal or Other Releases	Total Production-related Waste Managed	Non-production related Waste Managed
Certain Glycol Ethers	1993	0	0	0	0	0	0	70	70	0
Dichloromethane		0	0	0	0	0	80	130	210	0
Freon 113		0	3000	0	0	0	1200	3600	7800	0
Methyl Ethyl Ketone		0	450	0	280	0	750	15000	16480	0
Naphthalene		0	0	0	0	0	0	400	400	0
Sulfuric Acid (1994 And After "acid aerosols" only)		0	0	0	0	1200	630	290	2120	0
Toluene		0	650	0	270	0	630	1100	2650	0
Trichloroethylene		0	5300	0	0	0	6000	36000	47300	0
Chromium Compounds (except chromite ore mined in the transvaal region)	1992	0	200	0	350	0	2700	1800	5050	0
Freon 113		0	130	0	570	0	130	21000	21830	0
Methyl Ethyl Ketone		5600	850	0	4500	0	2300	27000	40250	0
Naphthalene		0	6	0	0	0	0	440	446	0
Nitric Acid		0	0	0	0	20000	41000	2200	63200	0
Sulfuric Acid (1994 And After "acid aerosols" only)		0	0	0	0	30000	3000	1900	34900	0
Toluene		0	400	0	7000	0	1500	27000	35900	0
Trichloroethylene		0	25000	0	24000	0	3800	67000	119800	0
Xylenes (mixed isomers)		0	910	0	2000	0	1200	54000	58110	0
1,1,1-Trichloroethane	1991	0	350	0	0	0	2700	10000	13050	410
Acetone		0	0	0	0	0	900	9800	10700	61
Chromium Compounds (except chromite ore mined in the transvaal region)		0	0	0	0	0	20000	40	20040	.
Freon 113		0	1200	0	0	0	570	19000	20770	0
Hydrochloric Acid (1995 and after "acid aerosols" only)		0	0	0	0	12000	800	33	12833	0
Hydrogen Fluoride		0	0	0	0	11000	600	29	11629	62
Methyl Ethyl Ketone		15000	0	0	0	0	19000	94000	128000	213
Methyl Isobutyl Ketone		0	0	0	0	0	12	10000	10012	0
Nitric Acid		0	0	0	0	310000	18000	810	328810	490
Sulfuric Acid (1994 And After "acid aerosols" only)		0	0	0	0	98000	5900	260	104160	0
Toluene		0	0	0	0	0	4500	56000	60500	250
Trichloroethylene		0	7200	0	0	0	24000	440000	471200	910
Xylenes (mixed isomers)		0	0	0	0	0	1900	108000	109900	0

Key

Recycled On-site: the amount of the toxic chemical recycled on-site during the calendar year for which the report was submitted. Data from

Recycled Off-site: the total amount of the toxic chemical sent off-site for recycling during the calendar year for which the report was submitted.

Energy Recovery On-site: the total amount of the toxic chemical in waste burned for energy recovery on-site during the calendar year for which

Energy Recovery Off-site: the total amount of the toxic chemical in waste sent off-site to be burned for energy recovery during the calendar year

Treated On-site: the total amount of the toxic chemical treated on-site during the calendar year for which the report was submitted. Data from

Treated Off-site: the total amount of the toxic chemical sent for treatment off-site during the calendar year for which the report was submitted.

Total On-Site Disposal to Class I UI Wells...: the total amount of the toxic chemical treated on-site during the calendar year for which the report

Total Other On-Site Disposal or other Releases: the total amount of the toxic chemical disposed of or released to production related events by

Treated Off-site Disposal to Class I Underground Injection Wells...: the total amount of the toxic chemical transferred for disposal or release

Other Off-Site Disposal or Other Releases: the total amount of the toxic chemical transferred for disposal or release dur to production related

Total Production-related Waste Managed: the sum of recycled on-site, recycled off-site, energy recovery on-site, energy recovery off-site,

Non-production related Waste Managed: the total amount of the toxic chemical released directly to the environment or sent off-site for

NOTE:

All measurements are in pounds

Table 8

Boeing Plant 2 Facility
South Yard Area
Summary of RCRA Units

RCRA Unit	Unit Description	Years of Use	Function	Soil Samples	Groundwater Samples	Analytes
SWMU 2-104.71	Central Waste Storage Area	1981 to 1993	TSD unit	above ground closure only, no soil samples collected	above ground closure only, no soil samples collected	Not Applicable
SWMU 2-91.70	Deactivated Waste Oil and Coolant Storage	1950s Hazardous WMU; 1993 sump decommissioned and removed	Temporary storage for waste oil and coolant	1989 to 1995: 40 locations sampled to 15 ft bgs	1989 to 1995: 7 monitoring wells	VOCs, SVOCs, PCBs, TPHs, Metals
SWMU 78.B	Oil/Water Separator at Building 2-87	1940s to 1992, IM conducted in 1999	Oil removal from stormwater runoff	IM conducted in 1999, TPH and PCBs detected but below MTCA and TSCA standards	None	Not Applicable
AOC 2-84.62	Machine Pit	1940s to 1990s, IM completed in 2000	Collect coolant, lubricating, and hydraulic oils	8 samples	None	Metals and PCBs
OA-3	Former UST PL-23	1951 to 1992 (removed), IM conducted in 1998	1000 gallon gasoline storage	Soil samples collected during RFI and three samples collected during IM	None	TPH and BTEX
SWMU 79.A	Cisterns 1, 2, 3	1950 to 1955, 1986: decommissioned	Dispose of process wastes	1987 to 1998: numerous soil samples	1988 to 1995: 6 monitoring wells	VOCs, SVOCs, PCBs, TPHs, Metals
SWMU 79.B	Cistern 4	1950 to 1955, 1986: decommissioned	Dispose of process wastes	1987 to 1998: Numerous soil samples	1988 to 1996: 13 monitoring wells	VOCs, SVOCs, PCBs, TPHs, Metals
SWMU 79.C	Cistern 5	1950 to 1955	Dry well	1985: 1 boring 1994: 1 boring	1988 & 1992: 1 well	VOCs, SVOCs, Metals
SWMU 2-87.65	Machine Pit	Removed in 1999	Collect coolant, lubricating, and hydraulic oils	1992 & 1995: Samples from several borings	1992: 3 wells & 1 Geoprobe	VOCs, SVOCs, PCBs, Petroleum Hydrocabrons, Metals
OA 16	Central Waste Storage Area (includes SWMU 2-104.71)	Unknown	Store materials from reclamation yard	1994: 4 borings 1999: 5 grab samples	None	VOCs, SVOCs, PCBs, Petroleum Hydrocabrons, Metals
SWMU 2-78.1	Oil/Water Separator	1940s to current	Oil removal from stormwater runoff	1994: 3 samples from 1 boring	None	TPHs
SWMU 78.5	Oil/Water Separator	1940s to current	Oil removal from stormwater runoff	Several samples from seven borings from 1.8 to 11 ft bgs	None	VOCs, SVOCs, PCBs, Metals
SWMU 2-80.56	Sink Sump	mid-1970s to 1993	Plaster objects and solvents	1994: 1 boring 3.5 to 11.5 ft bgs 1998: 3 borings	1994: 1 geoprobe 1995: 1 geoprobe	VOCs, Metals
SWMU 2-80.57	Generator Sump	Decommissioned 1993	Collected coolant that dripped from generators	1995: 2 soil borings 0.5 to 6.0 ft bgs	1992 to 1995: 5 samples from two downgradient wells	VOCs, PCBs, TPHs, Metals
SWMU 2-89.68	Reclamation Yard	1942 to 1996	Store metal shavings, film, bulk metal, empty drums, paints	1991 to 1994: 39 soil borings (or samples?) and test pits from 0.5 to 90 ft bgs	1988 to 1996: Samples from 14 monitoring wells and 18 geoprobe locations in South Yard and on Jorgensen Forge property	VOCs, SVOCs, TPHs (soil only), Metals
AOC 2-80.58	Deactivated Sump and Quench Tank 2nd Containment	1960s to 1980s	Tanks held metal parts, soil and water during quench process	1994: 2 soil borings 1.5 to 12 ft bgs	None	PCBs, TPHs, Metals
AOC 2-86.63	Wet Paint Booth	Built date unknown; tank removed and converted to dry system in 1992	Tank contained paint waste and process chemicals of paint, lacquers, solvents, and isocyanate	1993 to 1994: 2 soil borings 1.5 to 11 ft bgs	1992 to 1994: 2 monitoring wells upgradient and downgradient of unit	VOCs, SVOCs, TPHss, Metals
OA 10	Former UST PL-20	1957 to 1986	Kerosene UST	7 Soil borings sampled from 5 to 17.5 ft bgs	4 Geoprobes	TPHs-gasoline & diesel

Notes:

ft bgs	feet below ground surface
PCBs	Polychlorinated biphenyls
SVOCs	Semivolatile organic compounds
TPHs	Total petroleum hydrocarbons
UST	Underground storage tank
VOCs	Volatile organic comounds

Source: Environmental Partners, Inc.; Floyd/Snider; Golder Associates, Inc. 2005.

Table 9

Boeing Plant 2 Facility
2-60s Area
Summary of RCRA Units

RCRA Unit	Unit Description	Years of Use	Function	Soil Samples	Groundwater Samples	Analyte Groups
SWMU 77.B	PCB Retention Tank (UST)	1980 - 1986	Secondary containmnet for leaks and storm water runoff	1994: 3 samples from one boring, from 1.5 to 11 feet bgs	None	PCBs, TPH
AOC 2-62.46	Sump on south side of 2-62	Unknown	Unknown	Composite samples from three test trenches, and a grab and composite sample from area surrounding old pipe	None	VOCs, SVOCs, PCBs, PAHs, metals, & TPH
SWMU 78.C	Oil/Water Separator	1940s - 2002	Collect stormwater runoff and remove any mixed residual oils and other petroleum hydrocarbons	Samples from one boring from 5 to 12 feet bgs	None	VOCs, SVOCs, PCBs, metals, & TPH
OA 9 (SWMU 2-78.6)	Former USTs PL-16,-17, and -18	1950 - 1986	Gasoline USTs	1993-1995: samples from ten borings from 1.5 to 16.5 feet bgs	1993-1996: samples from four wells & three Geoprobes	VOCs, SVOCs, PCBs, TPH, and metals.
OA 12	Southern portion of Bld 2-63 and area between buildings 2-63 and 2-65	N/A	Unknown	1993 & 1994: samples from seven borings	1993-1995: samples from two wells 1994: sample from three Geoprobes	VOCs, TPH, As, cyanide and Cu
AOC 2-62.45	Paint Booth and sump	1945 - current	Used to paint a variety of airplane parts.	1993 & 1995: samples from five borings from 1 to 15 feet bgs	1993-1995: samples from ten monitoring points	VOCs, SVOCs, PCBs, TPH, and metals
SWMU 2-63.47	Dilute chrome tank	Unknown-1990s	Hold wastewater produced in model-making processes	Samples from one boring at 2, 8 and 11 feet bgs	None	Metals
SWMU 2-64.48	Underground Waste Tank	1970 - tank removal date unknown	Initially an oil/water separator, then held oily condensate water	1993 &1994: samples from three borings from 1.5 to 12.5 feet bgs	None	VOCs, SVOCs, PCBs, TPH, and metals
SWMU 2-64.49	Air compressor, sump and accumulation area	1954 - system partially inactive at present	Trenches and sump collect air compressor condensate	1993 &1994:twelve samples from four borings from 1.5 to 12.5 feet bgs	1994: samples from three Geoprobe locations from 12 to 13 feet bgs	VOCs, SVOCs, PCBs, TPH, and metals
SWMU 2-65.50	Machine Pit	Prior to 1993 - 2002	Hold coolants, lubricating oils, and hydraulic oils that drip from an adjacent parts grinding machine.	1993: samples from two borings from 1.5 to 12.5 feet bgs	None	PCBs, TPH & metals
SWMU 2-62.43	Tank Line	1980s-decommission date unknown	Pre-treating metal parts prior to painting	Three samples from one boring from 1.5 to 10 feet bgs	None	Metals, including hexavalent chromium and cyanide
SWMU 2-70.55	Steam clean area and steel tank	1981(?) - 1998	Collect steam cleaning wastewater	1993 and 1994: two samples in vicinity 1998: four locations within excavation site	Groundwater analyzed as part of site-wide RFI Work Plan	VOCs, BNAs, PCBs, TPH and metals
SWMU 77.A	PCB Retention Tank (UST)	1980 - 1986	Secondary containment for transformers and stormwater runoff	1999-samples from one boring	None	VOCs, PCBs, and TPH

Notes:

ft bgs	feet below ground surface
PCBs	Polychlorinated biphenyls
SVOCs	Semivolatile organic compounds
TPHs	Total petroleum hydrocarbons
UST	Underground storage tank
VOCs	Volatile organic comounds

Source: Environmental Partners, Inc.; Floyd/Snider; Golder Associates, Inc. 2005.

Table 10

Boeing Plant 2 Facility
2-66 Area
Summary of RCRA Units

RCRA Unit	Unit Description	Years of Use	Function	Soil Samples	Groundwater Samples	Analytes
AOC 2-108.73	Paint booth sump	1956 - 1993	Contained overflow from the wet paint booth (AOC 2-108.72)	2 soil borings	None	VOCs and Metals
AOC 2-108.72	Two wet paint booths	1956 - 1993	Booths used to collect overspray from paint spraying.	1994: 3 samples from SB-10801 and 10802.	None	VOCs, SVOCs, TPH and Inorganics
OA 17.13	One below-grade transformer vaults and a blind sump	1940s - 2002	Contained transformers and a sump to remove groundwater	One boring, two samples collected	2 samples collected from locations near unit	PCBs and TPH
OA 1	Building 2-66 Southwest	N/A	Area includes a sheet pile enclosure, and a former 15,000 gallon diesel UST	1988 and 1990 - 1994: 84 historical and RFI soil borings in OA 1 and OA 2. 21 additional borings completed during SW Bank Corrective Measures Evaluation	1991 - 1996: samples from vicinity of OA-1 and OA-2	VOCs, SVOCs, PCBs, TPH and Inorganics
OA 2	Building 2-66 Soil	N/A	Originally defined as fill material containing inorganics mixed with ash, metal and wood debris	1988 and 1990 - 1994: 84 historical and RFI soil borings in OA 1 and OA 2. 21 additional borings completed during SW Bank Corrective Measures Evaluation	1991 - 1996: samples from vicinity of OA-1 and OA-2	VOCs, SVOCs, PCBs, TPH and Inorganics
AOC 2-66.52	Machine Pit	1990 - 1992	Secondary containment of coolant and oil associated with adjacent machine	Samples from four borings	None	VOCs, SVOCs, PCBs, Metals, and TPH
AOC 2-66.53	TCE Degreaser	1945 - 1993	Remove oil from metal parts	1992, 1993, 1994, & 1995: samples from six borings from 1 to 12 feet bgs	1991-1996: samples from 11 wells and 12 Geoprobe locations	VOCs, PCBs, TPH, and Metals
OA 14	Building 2-49 Machine Pits	1940s - 1991	Contained a large hydraulic press that was used to manufacture aircraft parts	1993: samples from seven borings 1994 & 1995: six borings	None	VOCs, SVOCs, PCBs, TPH, and Metals
OA 11	Building 2-72 Area	N/A	Area included an electrical transformer station	1988, 1991, 1994, 1995 & 2003: samples from 73 borings. 19 additional borings completed during Phase II Transformer PCB Investigation.	1991, 1992, 1994, 1995, 1996 & 2003: samples from 14 wells & four Geoprobe locations. 2 replacement wells added during Phase II Transformer PCB Investigation.	VOCs, SVOCs, PCBs, TPH, and Metals
OA 19	Outfall #12 and Building 2-49 Stretch Press Pit	1970 - 1991	Contained press machine used to form aircraft parts	1993, 1995: samples from 4 borings	1994 - 1996: samples from two well locations	VOCs, SVOCs, PCBs, TPH and Inorganics

Notes:

ft bgs	feet below ground surface
PCBs	Polychlorinated biphenyls
SVOCs	Semivolatile organic compounds
TPHs	Total petroleum hydrocarbons
UST	Underground storage tank
VOCs	Volatile organic compounds

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 11

Boeing Plant 2 Facility
2-40s Area
Summary of RCRA Units

RCRA Unit	Unit Description	Years of Use	Function	Soil Samples	Groundwater Samples	Analytes
OA 17	Seven below-grade transformer vaults and a blind sump	1940s - 2002	Contained transformers and a sump to remove groundwater	Seven borings, two samples collected from each	Nine samples collected from locations near unit	PCBs and TPH
SWMU 2-41.30	Manhole Vault	N/A	Sub-grade vault of undetermined purpose	1995: Two samples from locations near unit in 1995	Three samples collected from locations near unit	VOCs, SVOCs, PCBs, TPH and Metals
SWMU 2-41.34	Tunnel Area	N/A	Soil beneath the floor of a tunnel in Building 2-41 in which a section of the Underflow Flume (SWMU 2-41.36) is located	1994: Samples from two borings advanced through the floor of the tunnel	None	VOCs, BNAs, and Metals
SWMU 2-41.33	Deactivated Anodic Tank Line	1941 - 1993	Series of tanks used for plating, pickling, and anodizing	1993 - 1997: Samples from 17 borings prior to IM; four confirmatory samples collected following IM in 1997 2003: Samples from four borings	1993 - 1996: Samples collected from three monitoring wells and five downgradient Geoprobe locations 2003: Samples collected from four borings	VOCs, SVOCs, BNAs, TPHs, and Metals
SWMU 2-41.36	Underflow Flume	1941 - 1987	Convey rinse waters and exhaust from the anodic tank line	1994: Samples from three borings prior to 1997 IM	None	VOCs, BNAs, and Metals
OA 13	Building 2-44 Steam Drain	N/A	Reportedly collected steam condensate; exact use and process history are unknown	Samples from five borings	1993 & 1994: Downgradient well location sampled twice	VOCs, BNAs, TPHs, PCBs, and Metals
OA 18	Building 2-40 East Parking Lot Area	N/A	Used in the 1940's as an airplane tow path between Plant 2 and King County International Airport	1994 - 2003: Samples from 28 borings	1994 - 1996: Samples from four monitoring wells and nine Geoprobe locations	VOCs, BNAs, PCBs, TPHs, and Metals
OA 7	Building 2-40 Soil	N/A	No known process associated with unit	1993 & 1994: Samples from five borings	1994: Samples from two Geoprobe locations	VOCs, BNAs, PCBs, TPHs, and Metals
AOC 2-41.32	Deactivated Paint Booths and Sump	1956 - 1990's	Used to collect and contain paint overspray	Samples from three borings	Sample from one borehole	VOCs and Metals
SWMU 2-41.31	Machine Pits	N/A	Secondary containment of coolant and oil associated with adjacent machine(s)	1994 - 1995: Samples from nine borings during RFI Samples from 15 additional locations following RFI	1994 - 1996: Samples from two monitoring wells and 20 Geoprobe locations during RFI Samples from 15 additional locations following RFI	VOCs, SVOCs, PCBs, and TPHs
SWMU 2-41.35	Quench Tanks	1940 - 1992	Series of three tanks used for cooling heated metal parts	1995: Samples from five borings	1995: Sample from one Geoprobe location	Metals
AOC 2-41.29	TCE Degreaser	1941 - 1993	Remove oil from metal parts	1993: Samples from one boring	1993: Sample from one monitoring well (completed soil boring)	VOCs, TPHs, and Metals

Notes:

ft bgs	feet below ground surface
BNAs	Base Neutral Acids
IM	Interim Measures
PCBs	Polychlorinated biphenyls
SVOCs	Semivolatile organic compounds
TPHs	Total petroleum hydrocarbons
VOCs	Volatile organic compounds

Source: Environmental Partners, Inc.; Golder Associates, Inc. 2006.

Table 12

Summary of Potential Pollutant Sources Identified in the 2007 SWPPP

Lower Duwamish Waterway EAA-4

OUTSIDE MATERIAL STORED IN TANKS			
ID No.and or Description	**Location (nearest building)**	**Capacity (gallons)**	**Contents**
APL-001	2-13	600,000	Jet A Fuel (To be reactivated February 2007)
APL-002	2-13	500,000	Inactive
APL-016	2-123	2,000	Diesel
APL-0636	2-15	500	Diesel
UPL-007	2-16	30,000	Jet A Fuel
UPL-008	2-17	30,000	Jet A Fuel
UPL-063	2-05	15,000	Unleaded Gas
UPL-064	2-05	15,000	Diesel
UPL-065	2-36	1,000	Diesel
APL-043 Generator Day Tank	2-31	50	Diesel
APL-026 Geneartor Day Tank	2-81	70	Diesel
APL-030 Generator Day Tank	2-88	70	Diesel
APL-016 Generator Day Tank	2-123	50	Diesel

OUTSIDE MATERIALS STORED IN CONTAINERS			
ID No.and or Description	**Location (nearest building)**	**Capacity (gallons)**	**Contents**
Material Storage Shed SARA No. 78	2-15	15 containers (ranging from 5 - 55 gal.)	various chemicals, such as anti-freeze and gear grease
Material Storage Shed SARA No. 78	2-80\2-81	5 - 5 gallon containers	various chemicals, such as lacquer thinner and wood finisher
Vault 37	2-15	2,716	mineral oil
Vault 20	2-36	1,730	mineral oil
Vault 9	2-59	1,250	mineral oil
Vault 19	2-80	1,094	mineral oil
Vault 10	2-84	8,856	mineral oil
Vault I (28)	2-117	9,076	mineral oil
Seattle City Light	1-123	1,309	mineral oil

OUTSIDE WASTE STORED IN CONTAINERS			
ID No. and/or Description	**Location (nearest building)**	**Capacity (gallons)**	**Contents**
Satellite Accumulation Area	2-80\2-81	N/A	cloths and rages contaminated with oil, coolants, and fuels

LOADING AND/OR UNLOADING AREAS	
Location	**Description of Acvitivy**
2-05 (UPL-063/064)	Dispensing of Bulk Vehicle Fuel
2-13 (APL-001)	Receiving of Bulk Jet Fuel
2-15 (UPL-007/008)	Receiving of Bulk Jet Fuel
2-31	Receiving of Hazardous Materials
2-122	Receiving of Hazardous Materials
2-122	Wastewater Handling (Transfer/Shipment)
2-122	Receiving of Hazardous Materials
1-210	Shipping of Containerized Dangerous Waste

OUTSIDE WASTE STORED IN TANKS			
ID No.and or Description	**Location (nearest building)**	**Capacity (gallons)**	**Contents**
APL-220	2-83	5,000	Wind Tunnel Wash Water
APL-162	2-15	2,500	Steam Clean Wash Water
APL-517	2-15	1,000	Used Motor Oil
APL-658	2-13	360	Oily Water
UPL-783	2-123	7,000	Water and Hydraulic Oil (secondary containment)
UPL-784	2-122	12,000	Water and Hydraulic Oil (secondary containment)
APL-211	2-123	10,000	Waste Water
APL-212	2-124	10,000	Waste Water
APL-213	2-125	1,000	Waste Water

REGULATED PARTICULATE GENERATING SOURCES		
Activity	**Location**	**Control Device**
MR&D Machine Shop	2-10	Cyclone/Baghouse
Boilers No. 1 and No. 2	2-15, South	Boiler Efficiency Considered Adequate
Boilers No. 3 and No. 4	2-15, South	Boiler Efficiency Considered Adequate
Spray Coating Booth	2-122, Column Q5	Dry Filter
Woodworking System	2-88	Cyclone/Baghouse
Spray Coating Booth	2-88	Dry Filter

Table 13

Summary of Stormwater Outfalls to EAA-4, Boeing Plant 2

Lower Duwamish Waterway - EAA-4

Outfall Letter	Former Outfall Identifier	Latitude (Degrees, Minutes, Seconds)	Longitude (Degrees, Minutes, Seconds)	Outfall Diameter (Inches)	Outfall Elevation	Receives Drainage Primarily From	Drainage Basin # (see Figures 23 and 24)	Drainage Basin Area (Acres)
A	36	47, 32, 4	122, 19, 14	Twin 30	N/A	Parking and roof around 2-122 building	2	19.9
B	35	47, 31, 58	122, 19, 5	18	N/A	Pavement around 2-10 building and minor pavement area	3	5.7
C	34	47, 31, 56	122, 19, 2	8	6.69	Roof area from 2-10 building	6	0.7
D	32A	47, 31, 55	122, 19, 0	10	6.69	Roof area from 2-10 building	7	1.1
E	30	47, 31, 54	122, 18, 29	6	7.4	Roof area from 2-10 building	8	0.9
F	29	47, 31, 53	122, 18, 27	8	7.03	Roof area from 2-10 building	9	0.9
G	28B	47, 31, 53	122, 18, 26	10	6.97	Roof area from 2-10 building	10	1.1
H	28A	47, 31, 52	122, 18, 25	6	N/A	Roof area from 2-10 building and minor pavement area	11	0.3
I	28	47, 31, 50	122, 18, 53	24	2.98	Vehicle maintenance area and fueling island and parking lot of former BOC gases property	4, 5, 12, 14	13.1
J	27	47, 31, 48	122, 18, 20	12	N/A	16th Ave South (public) and pavement around 2-22 and 2-25 buildings	13, 16B, 16C, 17-20	4.9
K	26A	47, 31, 48	122, 18, 50	4	N/A	Small paved area under bridge	16A	0.4
L		47, 31, 47	122, 18, 49	12	1.59	Roof and small parking area from 2-40's complex	25	5.8
M	26 and 23	47, 31, 46	122, 18, 47	6	4.91	Roof and small parking area from 2-40's complex	26A	1.1
N	17B	47, 31, 46	122, 18, 47	10	4.91	Roof and small parking area from 2-40's complex	26B	3.1
O		47, 31, 45	122, 18, 45	10	5.6	Roof and small parking area from 2-40's complex	27	2.6
P		47, 31, 44	122, 18, 43	6	3.48	Roof and small parking area from 2-40's complex	28	3.4
Q	16	47, 31, 44	122, 18, 42	10	5.55	Roof and small parking area from 2-40's complex	29	3.5
R	15	47, 31, 44	122, 18, 42	6	3.03	Roof and small parking area from 2-40's complex	30	0.2
S		47, 31, 43	122, 18, 41	6	4.73	Roof and small parking area from 2-40's complex	31A	0.2
T	14A	47, 31, 43	122, 18, 41	6	N/A	Roof and small parking area from 2-40's complex	31B	0.2
U	14	47, 31, 42	122, 18, 40	6	?	Roof and small parking area from 2-40's complex	31C	0.2
V	13	47, 31, 41	122, 18, 38	10	5.58	Roof and small parking area from 2-40's complex and limited pavement from transportation corridor	32	6.3
W	12	47, 31, 40	122, 18, 37	8	5.22	Roof area from 2-49 building	33	0.6
~~X~~	~~11~~	-	-	~~15~~	~~N/A~~	~~Rerouted to Line Z~~	-	-
~~Y~~	~~10~~	-	-	~~18~~	~~1.5~~	~~Rerouted to Line Z~~	-	-
Z	9A	47, 31, 38	122, 18, 34	36	1.43	Pavement and roof areas in South Yard, section of E. Marginal Way S., parking areas along E. Marginal Way, drainage from 2-60s roadways, and rerouted X and Y basin stormwater.	34, 35, 36, 37, 39	47.9

Source: Boeing 2007a, Boeing 2007b and Golder 2006a

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Table 14
Summary of PCB Results as Aroclors for Catch Basin Sampling, Summer 2005
Lower Duwamish Water Way EAA-4

Associated Boeing Stormwater Outfall	Catch Basin ID	Sample ID	Total PCBs (µg/kg)	Qualifier
A	2-453	2-453	160	U
A	2-436	2-436	260	J
B	3-307	3-307	940	
I	4-285	4-285 Insert	3100	
I	4-285	4-285 Bottom	360	
I	4-343	4-343 Insert	500	
I	4-345	4-345 Insert	1620	
I	4-291A	4-291A	510	
I	4-300	4-300	1510	
J	18-505A	18-505A	290	J
J	18-249	18-249	850	
V	2-44 Gate	2-44 Gate Valve	130	J
X	34-230	34-230	2,600,000	
X	34-230	34-230 A	110,000	
X	34-230	NA	107,000	
X	34-233	34-233	650,000	J
X	34-234	34-234 Insert	12,800	J
X	34-234	34-234 Bottom	8,900	
X	34-215	34-215 Insert	510,000	
X	34-215	34-215 Bottom	660,000	
X	34-220	34-220	18,500	
X	34-206	34-206	3,930	
X	34-201	34-201 Insert	35,000	
X	34-201	34-201	14,200	
X	34-202	34-202	8,200	
X	34-235	34-235	22,000	
Y	35-224	35-224	37,000	
Y	35-224	35-224 Pipe	12,700	
Y	35-225	35-225 Insert	30,000	
Y	35-225	35-225 Bottom	35,000	
Y	35-214	35-214 Insert	134,000	
Y	35-214	35-214 Bottom	87,000	
Y	35-204	35-204	8,800	
Z	36-131	36-131	116	

Key:
J = The analyte was positively identified. The associated numerical value is approximate concentration of the analyte in the sample based on diluted concentrations, when available.
U = Indicates that compound was undetected at the reported concentration.

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Appendix A:
Photolog of the Jorgensen Shoreline

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EAA-4 PHOTOGRAPHIC LOG: 1	
Client name: WA Dept. of Ecology	**Site Location:** Jorgensen bank along the Lower Duwamish Waterway
Description: View of the Jorgensen Forge from the LDW.	

EAA-4 PHOTOGRAPHIC LOG: 2	
Client name: WA Dept. of Ecology	**Site Location:** Jorgensen bank along the Lower Duwamish Waterway
Description: Locations of contaminated soils along shoreline.	

EAA-4 PHOTOGRAPHIC LOG: 3	
Client name: WA Dept. of Ecology	**Site Location:** Jorgensen bank along the Lower Duwamish Waterway
Description: PCB-containing waste piles, along the Jorgensen shoreline.	

EAA-4 PHOTOGRAPHIC LOG: 4	
Client name: WA Dept. of Ecology	**Site Location:** Jorgensen bank along the Lower Duwamish Waterway
Description: Jorgensen Waste Piles. Scrap metal waste in circle.	

EAA-4 PHOTOGRAPHIC LOG: 5	
Client name: WA Dept. of Ecology	**Site Location:** Jorgensen bank along the Lower Duwamish Waterway
Description: Close up of scrap metal waste	