



TECHNICAL MEMORANDUM No. OF47-1

City Outfall Basin 47 Inline Solids Sampling

TO: Michael Romero, Oregon Department of Environmental Quality (DEQ)

FROM: Linda Scheffler, City of Portland, Bureau of Environmental Services (BES)
Dawn Sanders, BES

COPIES: Karen Tarnow, DEQ
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DATE: October 19, 2007

SUBJECT: **Portland Harbor Source Control Investigation**

Introduction

This technical memorandum (TM) summarizes the results of the City of Portland BES source control investigation of inline solids in the City Outfall Basin 47 stormwater conveyance system. Surface sediment samples collected by the Lower Willamette Group (LWG) in March 2004 detected concentrations of PCBs approximately 50 feet upstream of Outfall 47 (Integral, 2005). Based on the sediment data analytical results, EPA designated an area that includes Outfall 47 in 2005 as a preliminary area of potential concern (AOPC) for PCB Aroclor 1221 (EPA, 2005). In 2007, the LWG identified an area that includes Outfall 47 as an initial AOPC for PCBs, as well (Integral, 2007). The objectives of this source control investigation are to evaluate whether inline solids within Basin 47 may be contributing PCBs to river sediment and to assess whether the spatial distribution of PCBs within conveyance system solids indicates the presence of potential PCB sources within the basin.

This Basin 47 investigation, conducted in June 2006, is part of the City's ongoing source control program associated with the Portland Harbor City of Portland Outfalls Project. These investigation results are submitted pursuant to the August 13, 2003, Intergovernmental Agreement between DEQ and the City.

Background

Basin Physical System. Before completion of a combined sewer overflow (CSO) interceptor project in late 2006, the storm basin was comprised of two main branches – western and eastern. The current Basin 47 storm basin is limited to the 13-acre western branch which conveys stormwater runoff mainly from light industrial and commercial properties. The western basin

consists of a 27-inch-diameter storm line that collects discharges from North Port Center Way and adjacent properties and conveys it to the outfall via a 48-inch-diameter line. The western branch is a relatively new conveyance system, having been built in 1990 to serve an area that was filled in the early 1970s.

The eastern branch conveyed discharges from the northern portion of the Union Pacific Railroad (UPRR) Albina Rail Yard and North Going Street to Outfall 47 via a 43-inch-diameter line parallel to N. Going St. and a 48-inch diameter line west of the UPRR Albina Yard. There is a diversion point for a combined conveyance system into this storm system that serves a residential area generally east of North Greeley Avenue. The combined conveyance system was constructed in 1910 but originally discharged to the river approximately 2000 feet northwest of the current outfall location, in the area that was filled. To accommodate the fill activity, the City relocated the outfall system in 1968 to its current location. The western and eastern branches converged approximately 45 feet upstream of the outfall.

After completion of this source investigation, stormwater in the eastern branch was redirected to the Columbia Boulevard Wastewater Treatment Plant along with combined flows. Figure 1 displays the stormwater conveyance system in the vicinity of Outfall 47.

Stormwater Permits. The Federal Express facility discharges stormwater to Basin 47 under a general industrial National Pollutant Discharge Elimination System (NPDES) permit. UPRR also operates under a general industrial NPDES permit, though discharges from the portion of the facility within the eastern branch have not been regulated under this permit.

Identified Upland Cleanup Sites. According to the DEQ Environmental Cleanup Site Information (ECSI) database, there are no cleanup sites located within the current basin. A portion of the UPRR Albina Yard discharged to Basin 47 before completion of the CSO control project in 2006. The UPRR Albina Yard is being investigated under the DEQ Cleanup program.

In-river Sediment Sampling. The LWG collected one shallow sediment sample (LW2-G487) just upstream Outfall 47 during Round 2 of the Portland Harbor Remedial Investigation in 2004 (Integral, 2005). No samples were collected at or just downstream of Outfall 47. PCB Aroclors 1221, 1248, 1254 and 1260 were detected upstream of Outfall 47 at concentrations that exceeded applicable Portland Harbor Joint Source Control Strategy (JSCS) Bioaccumulation Screening Level Values (SLV) for upland soil and stormwater sediment (DEQ/EPA, 2005) but not the JSCS toxicity SLVs. The current bioaccumulation SLV for total PCBs is 0.39 micrograms per kilogram ($\mu\text{g}/\text{kg}$). The total PCB concentration of the LWG sample was 46.1 $\mu\text{g}/\text{kg}$.

Because Outfall 47 was within the area designated as an AOPC based on the sediment PCB detections, the City conducted inline solids sampling to evaluate whether Basin 47 is a potential pathway for discharge of PCBs to the river. The results of the inline solids sampling are summarized below.

Field Activities

The City coordinated with DEQ regarding this source control investigation before conducting this work. Inline solids were sampled at four locations on June 28, 2006 (see Figure 1). Target sampling locations were selected to represent inline solids above, at and below the industrial portions of the basin. Actual sampling locations were chosen based on inline solids availability. To represent the basin contributions above the industrialized portion of the basin, several

locations were accessed east of the rail yard in the vicinity of the intersection of N. Greeley Ave. and N. Going Street. Solids were not observed, and an alternate location was selected west of the rail corridor. This sampling location is believed to be upstream of all connections from the UPRR Albina Yard. Samples were collected using a stainless steel spoon and bowl, in accordance with BES Field Operations' Standard Operating Procedures. Photographs of the sampling locations and collected solids are included in Attachment A. Field notes taken during sampling activities are provided in Attachment B.

Sampling locations are described as follows:

Western Branch

Manhole AAT623: Inline solids were sampled at manhole AAT623, after clearing away driftwood that had accumulated at this location (see Photo 1). Manhole AAT623 is located upstream of the convergence of the western and eastern branches and downstream of all known connections. Solids were sandy in nature and did not have any odor.

Eastern Branch

Manhole AAQ090: Inline solids were sampled from a ledge above the 48-inch-diameter line at manhole AAQ090 because the line was flooded at the time of the sampling event (see Photos 3 and 4). Manhole AAQ090 is located in the eastern branch on the south side of N. Going Street, downstream of all known industrial connections. Solids in this location represent discharges from the eastern branch. The sample was comprised of fine sands and silt. A slight sheen was noted on the sample but no odors were detected.

Manhole AAT606 (18-inch line): Inline solids were sampled from an 18-inch lateral just upstream from manhole AAT606. This line is the diversion point from the combined line that discharges to the Swan Island pump station. No odor or visual evidence of contamination was detected in the sample. Abundant organic matter was observed along with fine sands and silt.

Manhole AAT606 (42-inch line): Inline solids were sampled from the 42-inch line approximately 5 to 10 feet upstream of manhole AAT606 (see Photo 6). UPRR is in the process of evaluating the configuration and points of connection for the on-site conveyance system in this area. Based on a review of City plumbing records and maps provided by UPRR (CH2M Hill, 2007), it appears that there are connections from the UPRR north yard upstream and downstream of this manhole. The sample was comprised of fine sands and silt. No odor or visual evidence of contamination was detected in the sample.

Summary of Results

The four inline solids samples obtained from the Basin 47 stormwater conveyance system were analyzed for PCB Aroclors, total organic carbon (TOC) and grain size. Table 1 summarizes the physical and chemical analytical data results. The laboratory analytical results and data review summary for the samples are provided in Attachment C.

The only detected PCBs were at manhole AAQ090. At this location, PCB Aroclor 1260 was detected at a concentration of 12 µg/kg, just above the detection limit and significantly less than the JSCS toxicity SLV of 200 µg/kg. Sample AAQ090 was collected from the portion of Basin 47 that was rerouted to the wastewater treatment plant in late 2006. PCBs were not detected at the other three locations and laboratory method reporting limits were below all JSCS toxicity SLVs.

Conclusions and Recommendations

Based on the results of analytical testing of inline solids samples, Basin 47 does not appear to be a pathway to the river for discharge of PCBs and there do not appear to be PCB sources within the basin. PCBs detected in the Willamette River sediment sample upstream of Outfall 47 included PCB Aroclors 1221, 1248, 1254 and 1260. Inline solids samples from Basin 47 were non-detect for all PCB Aroclors at all locations except for one detection of PCB Aroclor 1260 at a low concentration. Sample locations represent current and former portions of the Outfall 47 stormwater conveyance system.

Potential historical releases from the pre-1968 outfall location would not have settled in the area of elevated PCBs in sediment identified by LWG and EPA. The former outfall was farther downstream of the area of elevated PCBs and approximately 600 feet inland from the current shoreline in an area that has been filled. The current sampling suggests that there are no recent significant sources discharging to the conveyance system.

Due to the lack of PCBs in inline solids, the downsizing of Basin 47 through the City's CSO control project, and the stormwater pathway evaluation underway at the adjacent UPRR Albina Yard, the City does not propose further source investigation in the Basin 47 at this time.

References

- CH2M Hill. 2007. *Albina Rail Yard Stormwater Investigation Work Plan*. Prepared for DEQ on behalf of Union Pacific Railroad. March 15, 2007.
- DEQ. 2005. DEQ Site Summary Report. DEQ Environmental Cleanup Site Information Database (ECSI). Accessed November 2006. www.deq.state.or.us/wmc/ecsi/ecsiquery.htm.
- DEQ/EPA. 2005. Portland Harbor Joint Source Control Strategy, Final, dated December 2005, as amended July 2007.
- EPA. 2005. EPA Letter to Lower Willamette Group. Portland Harbor RI/FS – Identification of Round 3 Data Gaps. December 2, 2005.
- Integral. 2005. Portland Harbor RI/FS, Round 2A Sediment Site Characterization Report. Prepared for the Lower Willamette Group.
- Integral. 2007. Comprehensive Round 2 Site Characterization Summary and Data Gaps Analysis Report. Prepared for the Lower Willamette Group.

Table

Table 1 - *Summary of Chemical Analytical Results, Inline Solids Sampling, City Outfall Basin 47*

Figures

Figure 1 - *Basin 47, Inline Solids Sampling Locations*

Attachments

- Attachment A - *Field Photographs*
- Attachment B - *Field Notes*
- Attachment C - *Laboratory Results*

Table 1
Summary of Chemical Analytical Results
Inline Solids Sampling
City Outfall Basin 47

		Downstream ----- Upstream						
		Inline Solids	Inline Solids	Inline Solids	Inline Solids			
		Manhole AAT623	Manhole AAQ090	Manhole AAT606	Manhole AAT606			
		IL-47-AAT623-0606	IL-47-AAQ090-0606	Upstream in 18" line	Upstream in 42" line	JSCS	JSCS	
Class	Analyte	Units	6/28/2006	6/28/2006	6/28/2006	6/28/2006	SLV	SLV
						(Toxicity) ⁽¹⁾	(Bioaccumulation) ⁽²⁾	
Total Organic Carbon (TOC) (EPA 9060MOD)								
	TOC	mg/Kg	5870	23200	74100	8490	--	--
Grain Size (ASTM D421/422)								
	Gravel (>4750 µm)	Fract %	17	0.9	1	0.1		
	Coarse Sand (4750-2000 µm)	Fract %	5.6	1.6	0.7	1.2		
	Medium Sand (2000-425 µm)	Fract %	56.5	24.5	11	41		
	Fine Sand (425-75 µm)	Fract %	12.3	58.8	48.4	56.9		
	Silt (3.2-75 µm)	Fract %	6.2	11.2	32.2	0.8		
	Clay (<3.2 µm)	Fract %	2.5	3	6.5	0		
Polychlorinated Biphenyls (PCBs) (EPA 8082)								
	PCB Aroclor 1016	µg/Kg	10 U	10 U	10 U	10 U	530	--
	PCB Aroclor 1221	µg/Kg	20 U	20 U	20 U	20 U	--	--
	PCB Aroclor 1232	µg/Kg	10 U	10 U	10 U	10 U	--	--
	PCB Aroclor 1242	µg/Kg	10 U	10 U	10 U	10 U	--	--
	PCB Aroclor 1248	µg/Kg	10 U	10 U	10 U	10 U	1500	--
	PCB Aroclor 1254	µg/Kg	10 U	10 U	10 U	10 U	300	--
	PCB Aroclor 1260	µg/Kg	10 U	12	10 U	10 U	200	--
	PCB Aroclor 1262	µg/Kg	10 U	10 U	10 U	10 U	--	--
	PCB Aroclor 1268	µg/Kg	10 U	10 U	10 U	10 U	--	--
	Total PCBs	µg/Kg	ND	12	ND	ND	676	0.39

Notes:

Chemical units in micrograms per kilogram (µg/Kg) or milligrams per kilogram (mg/Kg) dry weight.

JSCS = Portland Harbor Joint Source Control Strategy (DEQ/EPA Final December 2005, Amended July 2007).

SLV = Screening level value

-- = No JSCS SLV has been established

µm = microns

Fract % = Percent of soil retained in grain size category during grain size analysis.

U = The analyte was not detected above the reported sample quantification limit.

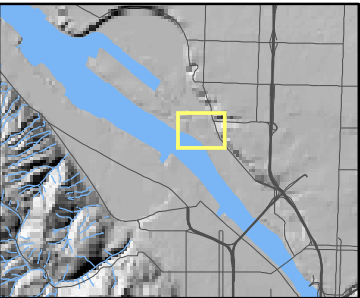
ND = Not detected at concentrations greater than the laboratory reporting limit.

Total PCBs = Sum of detected Aroclors.

⁽¹⁾ MacDonald PEC and other SQVs, Toxicity SLV for Soil/Catch Basin Sediment.

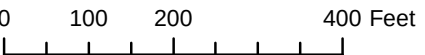
⁽²⁾ DEQ 2001 Bioaccumulative Sediment SLVs for Soil/Catch Basin Sediment.

See Attachment C for complete laboratory results.



Legend

- Storm Pipe
- Combined Pipe
- Taxlot
- City Outfall
- Non-City Outfall
- DEQ Environmental Cleanup Sites
- 1200Z Stormwater Permits
- Basin Boundary prior to 2007 included industrial areas east of current basin boundary.



Information contained on this map is accurate according to available records, however, the City of Portland makes no warranty, expressed or implied, as to the completeness or accuracy of the information published

Figure 1
Basin 47
Inline Solids
Sample Locations

Source: City of Portland BES Aerial photo 2006	ENVIRONMENTAL SERVICES CITY OF PORTLAND 1120 SW Fifth Avenue, Room 1000 Portland, Oregon 97204-2912
File Name: S:\gis\outfalls\outfall47\basin mapof47basin.mxd	Program Manager: Dawn Sanders Portland Harbor Superfund
Sheet No. 1 OF 1	Date Printed: Prepared by: Sara Gardner

Attachment A
Field Photographs



Photo 1 (June 2006). Looking downstream from manhole AAT623. Inline solids were collected at this location underneath the driftwood.



Photo 2 (June 2006). Solids collected from manhole AAT623.



Photo 3 (June 2006). Inside manhole AAQ090. The line was flooded, so a sample was collected from accumulated solids on the ledge above the floor of the manhole (see Photo 4).



Photo 4 (June 2006). A solids sample was collected on this ledge, above the flooded floor of manhole AAQ090.



Photo 5 (June 2006). Solids collected from manhole AAQ090.



Photo 6 (June 2006). Aboveground location of manhole AAT606 in the UPRR north yard. Two samples were collected at this location, one from the upstream 42-inch-diameter main line and one from an 18-inch-diameter lateral entering from the southwest.



Photo 7 (June 2006). Looking upstream from manhole AAT606 in the 42-inch-diameter line. Inline solids were collected approximately 5 to 10 ft upstream from the manhole.



Photo 8 (June 2006). Inline solids collected from the 42-inch-diameter line. This sample identification code is AAT606-W.



Photo 9 (June 2006). Looking downstream from manhole AAT606, where the 18-inch-diameter lateral enters the manhole from the southwest. Inline solids were collected from the 18-inch line.



Photo 10 (June 2006). Inline solids collected from the 18-inch-diameter lateral. This sample identification code is AAT606-S.

Attachment B

Field Notes



Page 1 of 3

Project IN LINE SED SAMP
Location Basin 47
Subject FIELD NOTES

Project No. 1000.001
Date 6-28-06
By MSP

0700 PREP MATERIALS FOR TODAY'S WORK.
0810 LEAVE FOR SWAN ISLAND
0830 ARRIVE SWAN ISLAND. FIRST SITE IS INSIDE THE WORKZONE
OF SI PUMP STATION. GO TO OFFICE T SIGN IT.
0900 LINDA ARRIVES. PROCEED UNDER ESCORT TO FIRST SITE
0930 ENTER AT 622. NO SEEDS HERE, EXCEPT FOR
SEEDS THAT FELL IN THROUGH THE MAN HOLE.
NO SAMPLES COLLECTED
0942 ~~DOOR DOWN~~ ENTERED AT 610. THIS MH IS
FLOODED. RANDY OBSERVES THAT THIS IS THE
1000 STORM LINE. IT LOOKS LIKE, AND IS, RIVEN
BACK UP.
1000 ENTER AT 622. LOTS OF DRIED WOOD AND A
METAL LADDER IN THE MH SHAFT. TAKE LADDER
OUT AND RANDY GOES IN. HE HEARS AN
ANIMAL DOWN THE LINE. DETERMINES THAT IT
IS A PAIR OF NUTRIAS. THEY DON'T SEEM TO BE A
THREAT SO WE PROCEED W/ OUR ASSESSMENT.
RANDY COLLECTS SEEDS FROM THE BOTTOM OF THE MH
ON THE DOWNSTREAM SIDE AFTER CLEANING AWAY THE
DISTURBED
1100 PROCEED TO NEXT SITES AT THE REDX FACILITY. ONE
MH IS COVERED W/ ASPHALT AND THE OTHER IS NOT FINDABLE
Attachments SO WE DECIDE TO AND HAVE LUNCH AND PLAN NEXT MOVE.



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Project In/line Sed Sample
Location AAQ 090 - 2800 N. Groing
Subject _____

Project No. _____
Date 6/28/06
By PCB

1248 Arrived on site @ MH AAQ 090. MH is deep, line is stormline downstream of diversion on N. Groing. MH smells of sanitary, likely residual from some previous overflow event.

1256 MSH enters MH. Standing on ledge. 18" of standing water w/ industrial odor, similar to that of Superior Tank Wash. Sediment on ledge, MSH thinks it's likely from road surface coming down through MH lid. Downstream line is 48", as is upstream. Pipe filled w/ water up to 18" as far as he can see up and downstream.

Evidence of surcharge; debris 6 rungs up from bottom, but could be from discharge from CB lateral

Sufficient sed. on ledge for sample. Linda wants to grab sample.

1309 MSH collects sed sample; composited in stainless steel bowl. Filled 2-4oz and 2-8oz jars. Photos taken.

1343 Arrived @ 2770 N. Groing; node AAT 607. Popped MH Lid, observed shallow base flow in line; likely to groundwater. MH shaft is made of brick. Bottom of pipe made of brick w/ concrete. Pipe diameter is 42" upstream. Reddish ~~sed~~ scaling from GW. Some sediment in upstream pipe in bottom of pipe. Appears sandy. Downstream pipe is same as upstream - 42" brick lined concrete - very old.

NEWER 18" circular concrete lateral connects into main @ MH ~ 18" above bottom of main. Sediment present in 18" line. MSH will collect sed samples from each line. Both upstream. No downstream samples.

Attachments



Page 13 of 14

Project _____
Location _____
Subject _____

Project No. _____
Date _____
By _____

1402 Sample collected from upstream in 42" line, 5'-10' upstream of node. IL-47-AAT606-0606-upstream 42" line.

1413 Sample collected from upstream in 18" lateral, 2'-4' upstream of node. IL-47-AAT606-0606-upstream 18" line.

1418 - 1432 Samples composited and placed in jars. Jars then put in cooler.

1440 RETURN TO WPCL TO SUBMIT SAMPLES.

1674 SAMPLES SUBMITTED TO WPCL LAB UNDER COC

Attachments



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SEDIMENT SAMPLING FIELD DATA SHEET

Date: 6/28/06 Time: 0930 Current Weather conditions: SUNNY 70's

Sampling Team Present: MSH/RLB/LAP

Basin: 47 Node: AAT622 Subbasin:

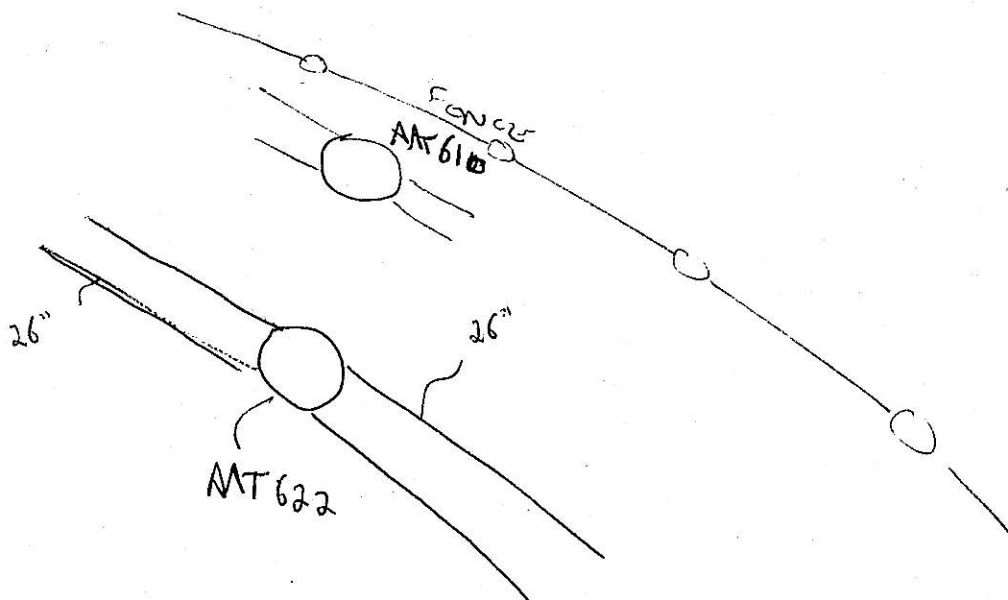
Sampling Location Description/Address: SWAN ISLAND PUMP STATION

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	<u>NO MUD.</u>
Does river appear to back up to this location? Describe rate/color/odor of flow:	<u>NO</u>
Are sediments observed in the line?	<u>YES, BUT PROBABLY MATERIAL THAT FELL INTO THE DRAFT. MINOR LOSS TRAP 4-OR 3AR</u>
Are sample-able quantities of sediments present in the line?	<u>NO</u>
Describe lateral extent of sample-able sediments present in the line:	<u>—</u>

SITE DIAGRAM: Include street intersections/laterals/MH's/driveways cuts and extent of solids accumulation

26"
up 26"





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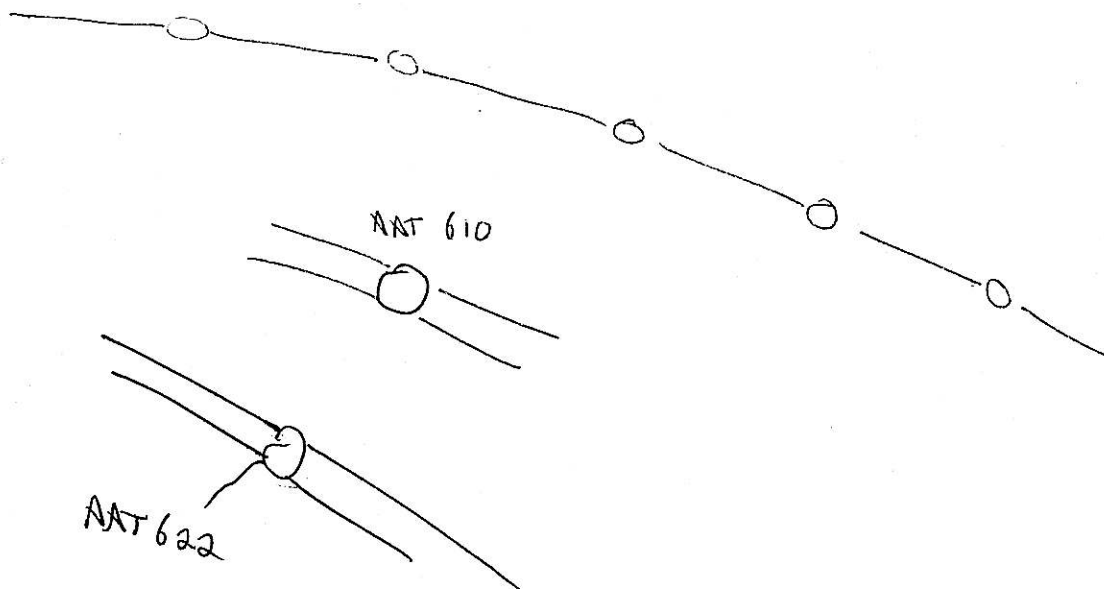
SEDIMENT SAMPLING FIELD DATA SHEET

Date: 6/25/06 Time: 0942 Current Weather conditions: SUNNY 70's
Sampling Team Present: MSH/LAP/RLB
Basin: 47 Node: AAT 610 Subbasin: _____
Sampling Location Description/Address: NEXT TO AAT622 ON SWAN ISLAND PUMP STATION SITE

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	<u>STANDING WATER 55" DEEP.</u> <u>WATER IS 4" OVER TOP OF OUTLET PIPE</u>
Does river appear to back up to this location? Describe rate/color/odor of flow:	<u>YES. AND IT IS AT THIS TIME</u>
Are sediments observed in the line?	<u>—</u>
Are sample-able quantities of sediments present in the line?	<u>—</u>
Describe lateral extent of sample-able sediments present in the line:	<u>—</u>

SITE DIAGRAM: Include street intersections/laterals/MH's/driveways cuts and extent of solids accumulation





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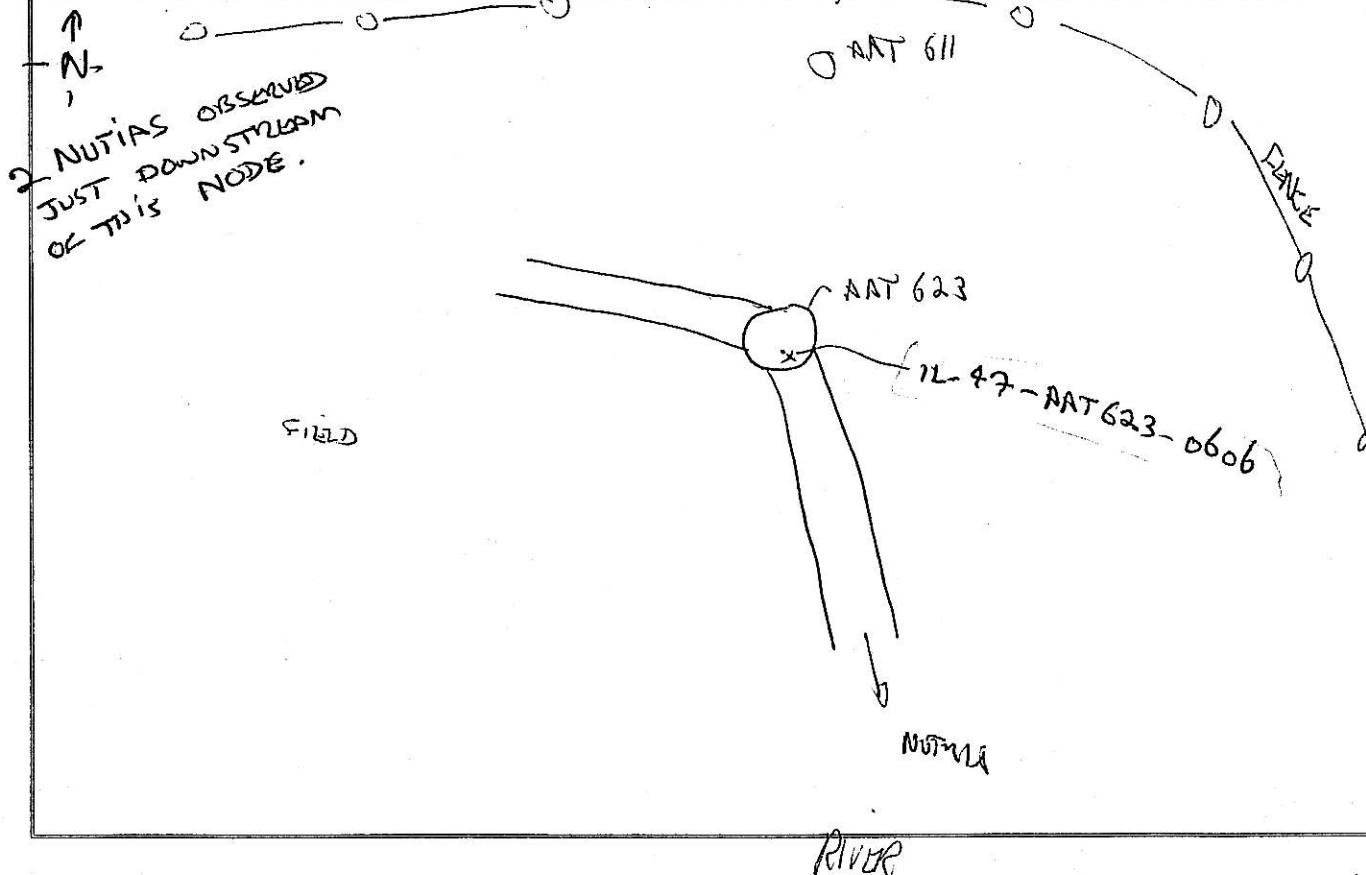
SEDIMENT SAMPLING FIELD DATA SHEET

Date: 6/28/06 Time: 1000 Current Weather conditions: SUNNY 70's
Sampling Team Present: MSH/RUB/LAP
Basin: 47 Node: AAT 623 Subbasin:
Sampling Location Description/Address: AT S END OF SWAN ISLAND PUMP STATION SITE

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	NO FLOWING WATER
Does river appear to back up to this location? Describe rate/color/odor of flow:	YES BUT NOT AT THIS TIME. LOTS OF DRIFTWOOD IN THE BOTTOM OF MP.
Are sediments observed in the line?	YES.
Are sample-able quantities of sediments present in the line?	YES
Describe lateral extent of sample-able sediments present in the line:	(NONE UP STREAM) SEDS COLLECTED AT MP. AFTER CLOSING PUMP DRIFTWOOD

SITE DIAGRAM: Include street intersections/laterals/MH's/draws/cuts and extent of solids accumulation



Date: 6-28-06		SECTION 2 - SAMPLE COLLECTION REPORT		Node: AAT 623	
Sampling Equipment:		☒ Stainless steel spoon & stainless steel bucket ☐ Other (Describe)			
Equipment Decontamination process:		☒ Per SOP7.01a ☐ Other (Describe)			
Sample date: 6-28-06		Sample time: 1028			
Sample Identification: (IL-XX-NNNNNN-mmyy) 1L-47-AAT623-0606					
Sample location description: (number of feet from node of entry)		AT NODE, SEDS FROM UNDERNATURAL DRIFTWOOD. POSSIBLE THAT SOME MATERIAL IS SOIL THAT HAS CALEN IN THROUGH M.U.			
Sample collection technique:		SS SPOON INTO BOWL.			
Describe Color of sample:		# BROWN/GREY			
Describe Texture/Particle size:		SANDS SLITS			
Describe visual or olfactory evidence of contamination:		NO			
Describe depth of solids in area where sample collected:		1/2-1/4"			
Describe amount and type of debris in sample:		—			
Compositing notes:		SAMPLES COMPOSITED PRIOR TO PUTTING INTO JARS			
Sample Jars Collected 2 4-oz 2 8-oz JARS					
If not enough sample to fill all of the jars, then fill jars in this order:		Metals	One 4oz glass jar		
		PAHs/SVOCs	One 4oz glass jar		
		PCBs	One 4oz glass jar		
		TPH (two jars)	Two 4oz glass jars		
		TOC	One 4oz glass jar		
Duplicate sample collected?		NO			
Duplicate sample fictitious identification # on COC:		1			
Samples placed in chilled cooler? ☒ Y/N					
Samples delivered to lab? ☒ Y/N		Lab ID Number: FO 060751			
Describe any deviations from standard procedures:					



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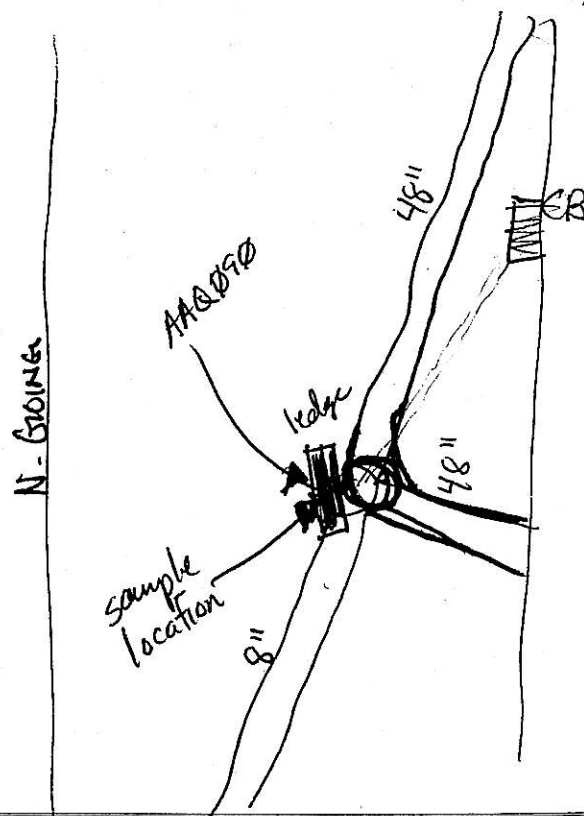
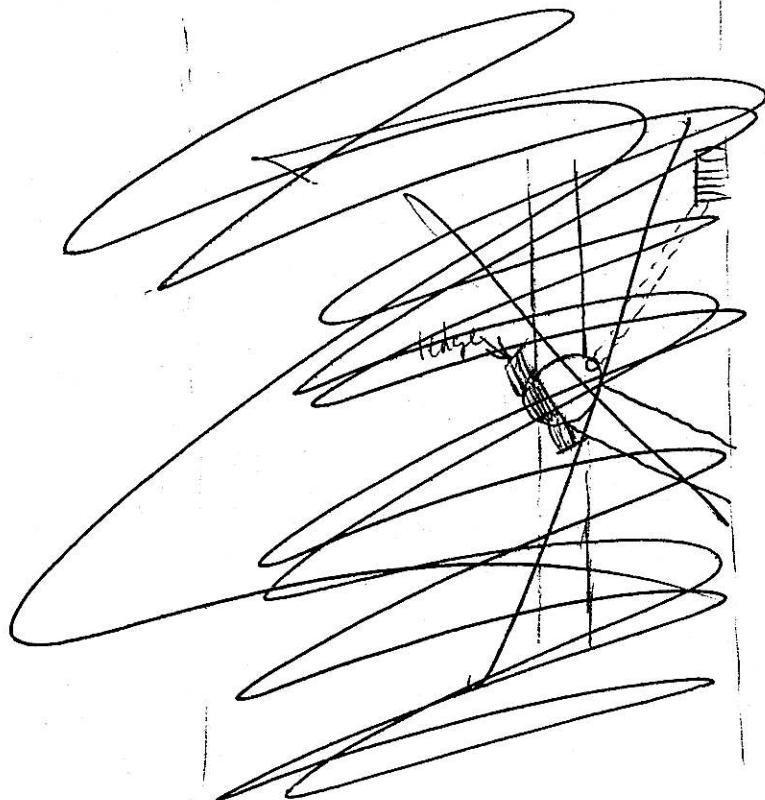
SEDIMENT SAMPLING FIELD DATA SHEET

Date: 6/28/06	Time: 1248	Current Weather conditions: Sunny, 80° F
Sampling Team Present: LAP/MT/H/PCB		
Basin: 47	Node: AAQ090	Subbasin:
Sampling Location Description/Address: Site is E ~ 2800 N. Groing.		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	Standing water w/ solvent/plastic industrial odor 18" deep (like Superior Tank Wash)
Does river appear to back up to this location? Describe rate/color/odor of flow:	Unknown.
Are sediments observed in the line?	No. Not in line. Seds observed on ledge above line
Are sample-able quantities of sediments present in the line?	Yes. From ledge, not line itself
Describe lateral extent of sample-able sediments present in the line:	Sample not collected from line, but from ledge above line directly below MBT ramp

SITE DIAGRAM: Include street intersections/laterals/MH's/driveways cuts and extent of solids accumulation



Date: 6/28/06		SECTION 2 - SAMPLE COLLECTION REPORT		Node: MQ090	
Sampling Equipment:		☒ Stainless steel spoon & stainless steel bucket ☐ Other (Describe)			
Equipment Decontamination process:		☒ Per SOP7.01a ☐ Other (Describe)			
Sample date: 6/28/06		Sample time: 1309			
Sample Identification: (IL-XX-NNNNNN-rrrrrr) IL-47-AAQ090-0606					
Sample location description: (number of feet from node of entry)		Sample collected in MH shaft on ledge above pipe			
Sample collection technique:		Stainless Steel Spoon into stainless steel bowl			
Describe Color of sample:		Dark gray - almost black			
Describe Texture/Particle size:		Fine sand & silt w/ some debris (styrofoam peanut)			
Describe visual or olfactory evidence of contamination:		Slight sheen/scum, but no petroleum odor			
Describe depth of solids in area where sample collected:		3/4"			
Describe amount and type of debris in sample:		Very little organic debris; very little plastic/styrofoam debris			
Compositing notes:		composited in stainless steel bowl			
Sample Jars Collected 2-4oz jars 2-8oz jars					
If not enough sample to fill all of the jars, then fill jars in this order:		Metals	One 4oz glass jar		
		PAHs/SVOCs	One 4oz glass jar		
		PCBs	One 4oz glass jar		
		TPH (two jars)	Two 4oz glass jars		
		TOC	One 4oz glass jar		
Duplicate sample collected?		No			
Duplicate sample fictitious identification # on COC:		—			
Samples placed in chilled cooler? Y/N					
Samples delivered to lab? Y/N		Lab ID Number: FO 060752			
Describe any deviations from standard procedures:					



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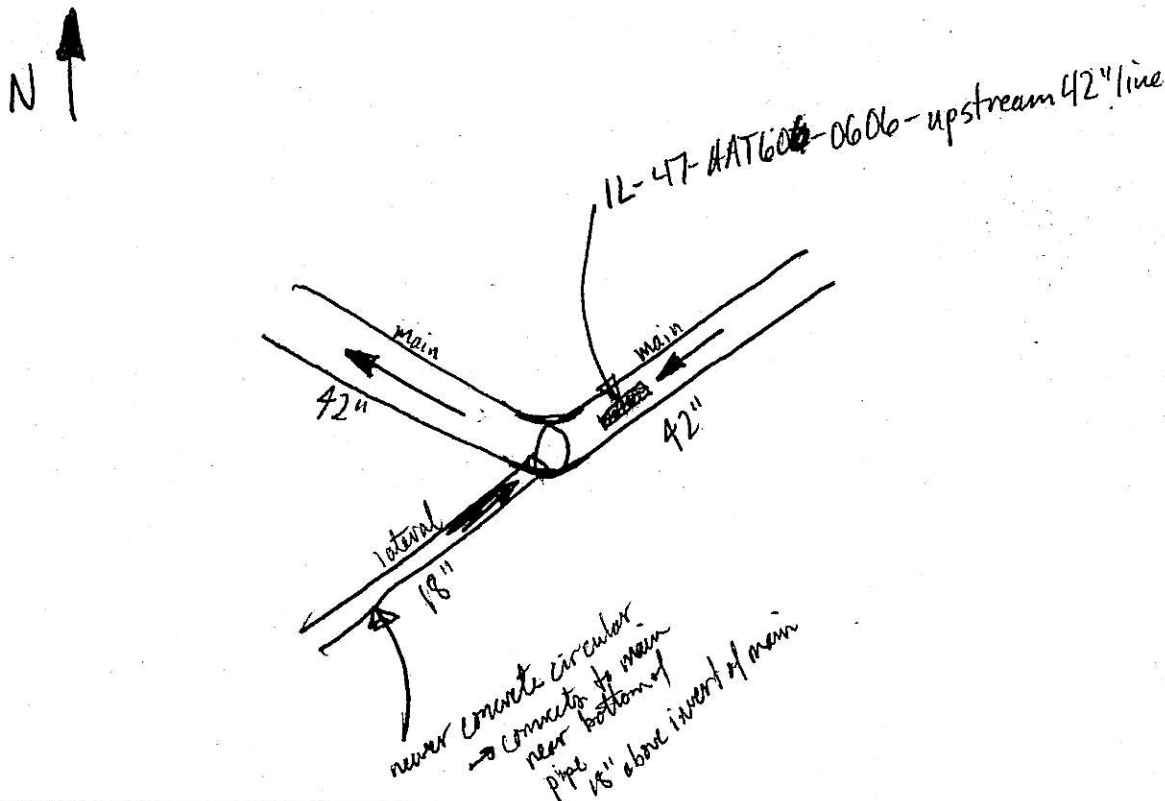
SEDIMENT SAMPLING FIELD DATA SHEET

Date: 6/28/06	Time: 1402	Current Weather conditions: Sunny, breezy, 80°F
Sampling Team Present: LAP/MTW/PCB		
Basin: 47	Node: AAT 6076006	Subbasin:
Sampling Location Description/Address: Node AAT 6006 - 2770 N. Groving upstream of MT in 42" line (5'-10' upstream of MT)		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	0.5" water flowing in line
Does river appear to back up to this location? Describe rate/color/odor of flow:	No
Are sediments observed in the line?	Yes
Are sample-able quantities of sediments present in the line?	Yes
Describe lateral extent of sample-able sediments present in the line:	6" wide continues upstream as far as can be seen.

SITE DIAGRAM: Include street intersections/laterals/MH's/driveways cuts and extent of solids accumulation



Date: 6/28/06		SECTION 2 - SAMPLE COLLECTION REPORT		Node: AAT606	
Sampling Equipment: A		☒ Stainless steel spoon & stainless steel bucket ☐ Other (Describe)			
Equipment Decontamination process:		☒ Per SOP7.01a ☐ Other (Describe)			
Sample date: 6/28/06		Sample time: 1402			
Sample Identification: (IL-XX-NNNNNN-mmyy)		IL-47-AAT⁶⁰⁶607-0606-UPSTREAM 42" LINE			
Sample location description: (number of feet from node of entry)		5'-10' upstream of MTH			
Sample collection technique:		Collected w/ ss spoon into ss bowl			
Describe Color of sample:		Dark Gray			
Describe Texture/Particle size:		Fine sand & silt			
Describe visual or olfactory evidence of contamination:		None			
Describe depth of solids in area where sample collected:		3/4" deep			
Describe amount and type of debris in sample:		None			
Compositing notes:		composited in ss bowl			
If not enough sample to fill all of the jars, then fill jars in this order:		Sample Jars Collected 2-4oz ^{amber} jars 2-8oz clear jars			
		Metals	One 4oz glass jar		
		PAHs/SVOCs	One 4oz glass jar		
		PCBs	One 4oz glass jar		
		TPH (two jars)	Two 4oz glass jars		
		TOC	One 4oz glass jar		
Duplicate sample collected?		No			
Duplicate sample fictitious identification # on COC:		-			
Samples placed in chilled cooler? (Y)N					
Samples delivered to lab? (Y)N		Lab ID Number: FO 060753			
Describe any deviations from standard procedures:					



CITY OF PORTLAND
ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
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Portland, OR 97203-5452



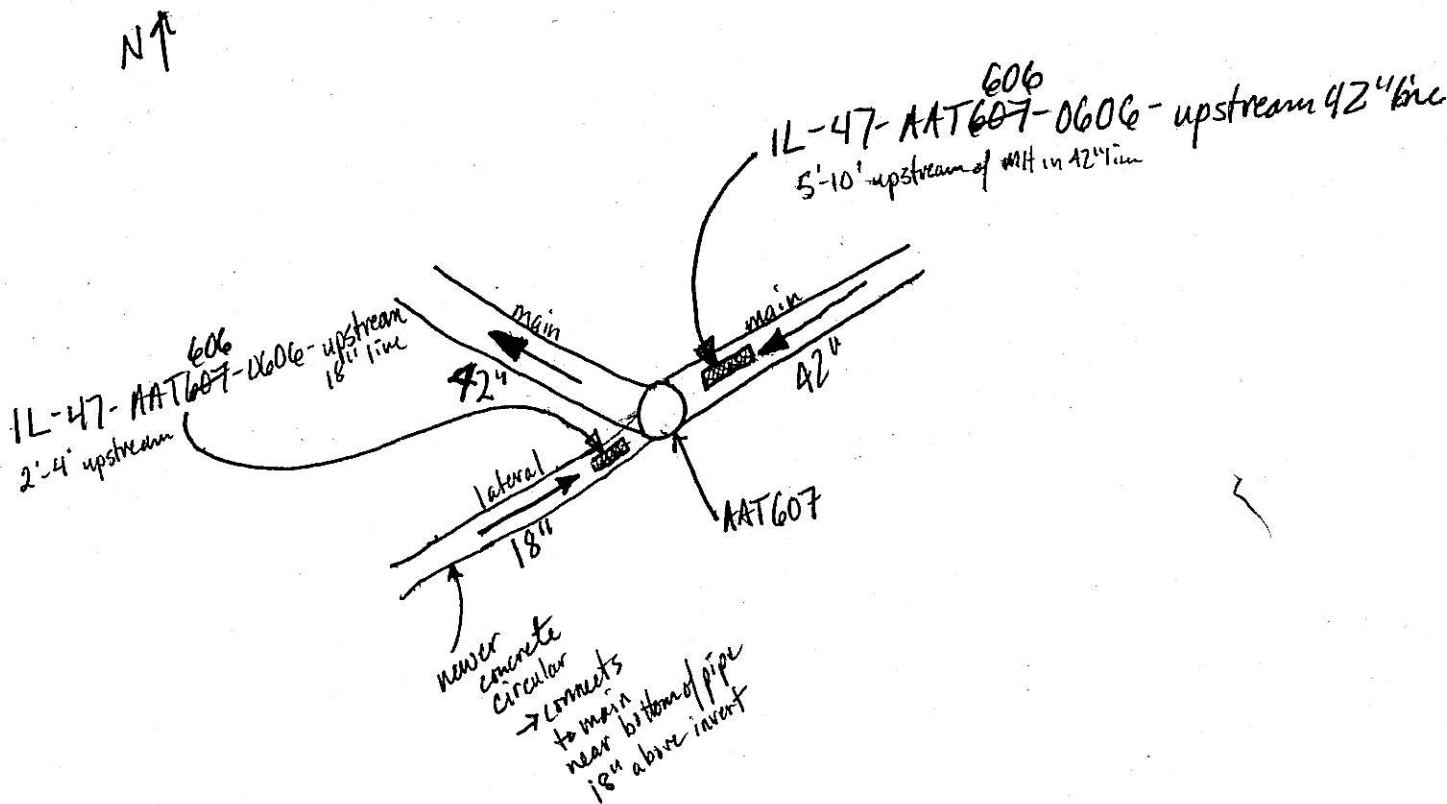
SEDIMENT SAMPLING FIELD DATA SHEET

Date: 6/28/06	Time: 1413	Current Weather conditions: Sunny, breezy 80°F
Sampling Team Present: LAP/MTM/RUB		
Basin: 47	Node: AAT607 606	Subbasin:
Sampling Location Description/Address: NODE AAT607- 2770 N. Goings upstream of MTH in 18" line - lateral		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	None
Does river appear to back up to this location? Describe rate/color/odor of flow:	No
Are sediments observed in the line?	Yes 1" thick
Are sample-able quantities of sediments present in the line?	Yes
Describe lateral extent of sample-able sediments present in the line:	6" wide as far as can see is upstream of MTH. Pipe may make a bend past 20' upstream.

SITE DIAGRAM: Include street intersections/laterals/MH's/driveways cuts and extent of solids accumulation



Date: 6/28/06		SECTION 2 - SAMPLE COLLECTION REPORT		Node: AAT606	
Sampling Equipment:		☒ Stainless steel spoon & stainless steel bucket ☐ Other (Describe)			
Equipment Decontamination process:		☒ Per SOP7.01a ☐ Other (Describe)			
Sample date: 6/28/06		Sample time: 1413			
Sample Identification: (IL-XX-NNNNNN-mmyy) IL-47-AAT606-0606-upstream 18" LWS					
Sample location description: (number of feet from node of entry)		2'-4' upstream of Mtt in 18" lateral			
Sample collection technique:		SS spoon into SS bowl			
Describe Color of sample:		Dark Gray / Black			
Describe Texture/Particle size:		Fine sandy-silt w/ organic debris			
Describe visual or olfactory evidence of contamination:		None			
Describe depth of solids in area where sample collected:		1" deep			
Describe amount and type of debris in sample:		Abundant organic debris (leaves, sticks, etc.)			
Compositing notes:		composited in SS bowl			
If not enough sample to fill all of the jars, then fill jars in this order:		Sample Jars Collected 2-4oz amber jars / 2-8oz clear jars			
		Metals	One 4oz glass jar		
		PAHs/SVOCs	One 4oz glass jar		
		PCBs	One 4oz glass jar		
		TPH (two jars)	Two 4oz glass jars		
		TOC	One 4oz glass jar		
Duplicate sample collected?		NO			
Duplicate sample fictitious identification # on COC:		—			
Samples placed in chilled cooler? YN					
Samples delivered to lab? YN		Lab ID Number FO 060754			
Describe any deviations from standard procedures:					

Attachment C
Laboratory Results



Water Solutions, Inc.

55 SW Yamhill Street, Suite 400 Portland, OR 97204
P: 503.239.8799 F: 503.239.8940
info@gsiwatersolutions.com www.gsiwatersolutions.com

Laboratory Data QA/QC Review Upland Source Control Investigation City Outfall Basin 47

To: File
From: Robyn Cook, GSI
Date: November 3, 2006

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses recently conducted by the City of Portland (City) in Outfall Basin 47. This includes a sampling round conducted in June, 2006. The results of the sampling and analysis are presented in the Technical Memorandum No. OF 47-1.

The laboratory analysis for these source control program samples were completed by the City's BES laboratory and two subcontracted laboratories. The following analyses were conducted each laboratory for each of the sampling rounds:

- BES Laboratory
 - o Polychlorinated Biphenyls (EPA Method 8082)
- Analytical Resources, Inc.
 - o Grain Size Analysis (ASTM D421/422)
- Test America
 - o Total Organic Carbon (EPA Method 9060MOD)

Attachment C of the Technical Memorandum No. OF 47-1 presents the BES laboratory LIMS summary report for all analyses associated with this Outfall Basin investigation and the subcontracted laboratory's data reports.

This QA/QC review is based upon the available documentation supplied from each laboratory. The QA/QC review of the analytical data consisted of reviewing the following for each laboratory report:

- Chain-of-custody complete and correct
- Analysis within holding times
- Chemicals of interest in method blanks
- Surrogate recoveries within accuracy control limits

- Laboratory duplicates within analytical accuracy control limits
- Laboratory blank spike recoveries within accuracy control limits
- Laboratory blank spike duplicate results within analytical precision control limits
- Matrix spike recoveries within accuracy control limits
- Matrix spike duplicate results within analytical precision control limits

The results of the laboratory report QA/QC review are presented below.

Chain-of-Custody

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

Analysis Holding Times

Polychlorinated Biphenyls (PCBs) Analyses

All samples were extracted and analyzed within the required holding times.

Total Organic Carbon Analyses

Only one sample had sufficient material for this analysis; this sample was analyzed within the required holding times.

Grain Size Analyses

One of the samples (AAT606-W) did not have sufficient fine material for this analysis, so the grain size was determined by sieving. The other three samples contained woody debris that may affect the grain size analysis. There are no required holding times for this analysis.

Method Blanks

Method blanks were processed during the laboratory analysis of PCBs and total organic carbon (TOC). No chemicals were detected in the method blanks associated with either analysis.

Surrogate Recoveries

Surrogate recoveries were completed during the laboratory analysis of PCBs. All surrogate recoveries were within laboratory control limits.

Laboratory Duplicates

A laboratory duplicate was processed during the analyses of TOC. The duplicate was outside of laboratory control limits due to a non-homogeneous sample matrix. No data are qualified.

Laboratory Control Sample Recoveries

Laboratory control samples were processed during the laboratory analyses of PCBs and TOC. All laboratory blank spike recoveries were within laboratory control limits.

Laboratory Control Sample Duplicates

Laboratory blank spike duplicates were processed during the laboratory analysis of PCBs. The relative percent difference (RPD) between the laboratory blank and the laboratory blank spike duplicates were within quality control limits for the analysis.

Matrix Spike Recoveries

Laboratory matrix spikes and matrix spike duplicates were processed during the laboratory analysis of PCBs and TOC. The RPDs between the matrix spike and the matrix spike duplicates were within quality control limits for both analyses.



City of Portland
Chain-of-Custody
Bureau of Environmental Services



Date: 6/28/06
Page: 1 of 1
Collected By: MJH/LAP
RUB

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
(503) 823-5696

Project Name: PORTLAND HARBOR INLINE SAMP			
File Number: 1020.001		Matrix: OTHER	
OUTFALL 47			
WPCL Sample I.D.	Location	Point Code	Sample Date
FO 060751	IL-47-AAT623-0606	47_1	28-Jun-06
FO 060752	IL-47-AAQ090-0606	47_2	28-Jun-06
FO 060753	IL-47-AAT606-0606 - W' upstream 42' line	47_3	28-Jun-06
FO 060754	IL-47-AAT606-0606 - S' upstream 18' line 1 1	47_4	28-Jun-06
per PHA 7/18/06			
Requested Analyses			
General		Metals	
Field Comments			
PCBs			
Total Organic Carbon			
Grain size			
Sample Type			
Sample Time			
Sample Date			
Relinquished By: 1.			
Signature: [Signature] Time: 1614			
Printed Name: MICHAEL HANSEN Date: 6-28-06			
Relinquished By: 2.			
Signature: [Signature] Time: 1614			
Printed Name: Rona Klueh Date: 6/28/06			
Relinquished By: 3.			
Signature: [Signature] Time: [Time]			
Printed Name: [Name] Date: [Date]			
Relinquished By: 4.			
Signature: [Signature] Time: [Time]			
Printed Name: [Name] Date: [Date]			



City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



LABORATORY ANALYSIS REPORT

Sample ID: **FO060751** Sample Collected: 6/28/2006 10:28 Sample Status: **COMPLETE AND VALIDATED**
Sample Received: 06/28/06

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-47-AAT623-0606

Report Page: Page 1 of 1

Sample Point Code: 47_1
Sample Type: GRAB
Sample Matrix: SEDIMENT

System ID: AK05667
EID File #: 1020.001
LocCode: PORTHARI
Collected By: MJH/LAP/RCB

Comments:

QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Grain size analysis may have been affected by the presence of woody matter in the sample, which may have broken down during the sieving process.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GC ANALYSIS					
POLYCHLORINATED BIPHENYLS (PCB)					
PCB 1016	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1221	<20	µg/Kg dry wt	20	EPA 8082	06/30/06
PCB 1232	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1242	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1248	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1254	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1260	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1262	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1268	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
OUTSIDE ANALYSIS					
TOTAL ORGANIC CARBON	5870	mg/Kg dry wt	50	EPA 9060 MOD	07/10/06
GRAIN SIZE BY ASTM - ARI					
Clay (<3.2 µm)	2.5	Fract %	0.1	ASTM D421/422	07/25/06
Coarse Sand (4750-2000 µm)	5.6	Fract %	0.1	ASTM D421/422	07/25/06
Fine Sand (425-75 µm)	12.3	Fract %	0.1	ASTM D421/422	07/25/06
Gravel (>4750 µm)	17.0	Fract %	0.1	ASTM D421/422	07/25/06
Medium Sand (2000-425 µm)	56.5	Fract %	0.1	ASTM D421/422	07/25/06
Silt (13-9 µm)	0.7	Fract %	0.1	ASTM D421/422	07/25/06
Silt (22-13 µm)	1.1	Fract %	0.1	ASTM D421/422	07/25/06
Silt (32-22 µm)	0.7	Fract %	0.1	ASTM D421/422	07/25/06
Silt (7-3.2 µm)	0.7	Fract %	0.1	ASTM D421/422	07/25/06
Silt (75-32 µm)	1.9	Fract %	0.1	ASTM D421/422	07/25/06
Silt (9-7 µm)	1.1	Fract %	0.1	ASTM D421/422	07/25/06

End of Report for Sample ID: FO060751



City of Portland
Water Pollution Control Laboratory
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LABORATORY ANALYSIS REPORT

Sample ID:	FO060752	Sample Collected:	6/28/2006 13:09	Sample Status:	COMPLETE AND
		Sample Received:	06/28/06		VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-47-AAQ090-0606

Report Page: Page 1 of 1

Sample Point Code: 47_2
Sample Type: GRAB
Sample Matrix: SEDIMENT

System ID: AK05668
EID File # : 1020.001
LocCode: PORTHARI
Collected By: MJH/LAP/RCB

Comments:

QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Grain size analysis may have been affected by the presence of woody matter in the sample, which may have broken down during the sieving process.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GC ANALYSIS					
POLYCHLORINATED BIPHENYLS (PCB)					
PCB 1016	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1221	<20	µg/Kg dry wt	20	EPA 8082	06/30/06
PCB 1232	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1242	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1248	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1254	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1260	12	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1262	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1268	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
OUTSIDE ANALYSIS					
TOTAL ORGANIC CARBON	23200	mg/Kg dry wt	50	EPA 9060 MOD	07/10/06
GRAIN SIZE BY ASTM - ARI					
Clay (<3.2 µm)	3.0	Fract %	0.1	ASTM D421/422	07/25/06
Coarse Sand (4750-2000 µm)	1.6	Fract %	0.1	ASTM D421/422	07/25/06
Fine Sand (425-75 µm)	58.8	Fract %	0.1	ASTM D421/422	07/25/06
Gravel (>4750 µm)	0.9	Fract %	0.1	ASTM D421/422	07/25/06
Medium Sand (2000-425 µm)	24.5	Fract %	0.1	ASTM D421/422	07/25/06
Silt (13-9 µm)	0.9	Fract %	0.1	ASTM D421/422	07/25/06
Silt (22-13 µm)	1.3	Fract %	0.1	ASTM D421/422	07/25/06
Silt (32-22 µm)	1.3	Fract %	0.1	ASTM D421/422	07/25/06
Silt (7-3.2 µm)	0.4	Fract %	0.1	ASTM D421/422	07/25/06
Silt (75-32 µm)	6.0	Fract %	0.1	ASTM D421/422	07/25/06
Silt (9-7 µm)	1.3	Fract %	0.1	ASTM D421/422	07/25/06

End of Report for Sample ID: FO060752



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Water Pollution Control Laboratory
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LABORATORY ANALYSIS REPORT

Sample ID: **FO060753** Sample Collected: 6/28/2006 14:02 Sample Status: **COMPLETE AND VALIDATED**
Sample Received: 06/28/06

Proj./Company Name: PORTLAND HARBOR INLINE SAMP Report Page: Page 1 of 1
Address/Location: IL-47-AAT606-0606-V
UPSTREAM 42 INCH LINE
Sample Point Code: 47_3 System ID: AK05669
Sample Type: GRAB EID File #: 1020.001
Sample Matrix: SEDIMENT LocCode: PORTHARI
Collected By: MJH/LAP/RCB

Comments:

QA/QC: Unless otherwise noted, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. LAB: Grain size analysis for this sample was by sieve only; the sample did not contain enough fines for the hydrometer portion of the analysis.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GC ANALYSIS					
POLYCHLORINATED BIPHENYLS (PCB)					
PCB 1016	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1221	<20	µg/Kg dry wt	20	EPA 8082	06/30/06
PCB 1232	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1242	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1248	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1254	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1260	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1262	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1268	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
OUTSIDE ANALYSIS					
TOTAL ORGANIC CARBON	8490	mg/Kg dry wt	50	EPA 9060 MOD	07/10/06
GRAIN SIZE BY SIEVE - ARI					
Coarse Sand (4750-2000 µm)	1.2	Fract %	0.1	ASTM D422	07/25/06
Fine Sand (150-75 µm)	3.1	Fract %	0.1	ASTM D422	07/25/06
Fine Sand (250-150 µm)	15.3	Fract %	0.1	ASTM D422	07/25/06
Fine Sand (425-250 µm)	38.5	Fract %	0.1	ASTM D422	07/25/06
Gravel (3/8 in-#4)	0.1	Fract %	0.1	ASTM D422	07/25/06
Medium Sand (2000-850 µm)	9.8	Fract %	0.1	ASTM D422	07/25/06
Medium Sand (850-425 µm)	31.2	Fract %	0.1	ASTM D422	07/25/06
Silt (<75)	0.8	Fract %	0.1	ASTM D422	07/25/06

End of Report for Sample ID: FO060753



City of Portland
Water Pollution Control Laboratory
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LABORATORY ANALYSIS REPORT

Sample ID: **FO060754** Sample Collected: 6/28/2006 14:13 Sample Status: **COMPLETE AND VALIDATED**
Sample Received: 06/28/06

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-47-AAT606-0606-S
UPSTREAM 18 INCH LINE
Sample Point Code: 47_4
Sample Type: GRAB
Sample Matrix: SEDIMENT

Report Page: Page 1 of 1
System ID: AK05670
EID File #: 1020.001
LocCode: PORTHARI
Collected By: MJH/LAP/RCB

Comments:

QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Grain size analysis may have been affected by the presence of woody matter in the sample, which may have broken down during the sieving process.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GC ANALYSIS					
POLYCHLORINATED BIPHENYLS (PCB)					
PCB 1016	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1221	<20	µg/Kg dry wt	20	EPA 8082	06/30/06
PCB 1232	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1242	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1248	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1254	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1260	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1262	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
PCB 1268	<10	µg/Kg dry wt	10	EPA 8082	06/30/06
OUTSIDE ANALYSIS					
TOTAL ORGANIC CARBON	74100	mg/Kg dry wt	50	EPA 9060 MOD	07/10/06
GRAIN SIZE BY ASTM - ARI					
Clay (<3.2 µm)	6.5	Fract %	0.1	ASTM D421/422	07/25/06
Coarse Sand (4750-2000 µm)	0.7	Fract %	0.1	ASTM D421/422	07/25/06
Fine Sand (425-75 µm)	48.4	Fract %	0.1	ASTM D421/422	07/25/06
Gravel (>4750 µm)	1.0	Fract %	0.1	ASTM D421/422	07/25/06
Medium Sand (2000-425 µm)	11.0	Fract %	0.1	ASTM D421/422	07/25/06
Silt (13-9 µm)	2.3	Fract %	0.1	ASTM D421/422	07/25/06
Silt (22-13 µm)	3.5	Fract %	0.1	ASTM D421/422	07/25/06
Silt (32-22 µm)	7.0	Fract %	0.1	ASTM D421/422	07/25/06
Silt (7-3.2 µm)	1.2	Fract %	0.1	ASTM D421/422	07/25/06
Silt (75-32 µm)	15.9	Fract %	0.1	ASTM D421/422	07/25/06
Silt (9-7 µm)	2.3	Fract %	0.1	ASTM D421/422	07/25/06

End of Report for Sample ID: FO060754

August 24, 2006

Jennifer Shackelford
City of Portland Water Pollution Laboratory
6543 N. Burlington Ave.
Portland, OR 97203

RE: Portland Harbor

Enclosed are the results of analyses for samples received by the laboratory on 06/29/06 15:55.
The following list is a summary of the Work Orders contained in this report, generated on 08/24/06 16:34.

If you have any questions concerning this report, please feel free to contact me.

<u>Work Order</u>	<u>Project</u>	<u>ProjectNumber</u>
PPF1260	Portland Harbor	36238

TestAmerica - Portland, OR



Howard Holmes, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



City of Portland Water Pollution Laboratory

6543 N. Burlington Ave.
Portland, OR 97203

Project Name:

Portland Harbor

Project Number:

36238

Project Manager:

Jennifer Shackelford

Report Created:

08/24/06 16:34

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FO 060751	PPF1260-01	Soil	06/28/06 10:28	06/29/06 15:55
FO 060752	PPF1260-02	Soil	06/28/06 13:09	06/29/06 15:55
FO 060753	PPF1260-03	Soil	06/28/06 14:02	06/29/06 15:55
FO 060754	PPF1260-04	Soil	06/28/06 14:13	06/29/06 15:55

TestAmerica - Portland, OR



Howard Holmes, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



City of Portland Water Pollution Laboratory
6543 N. Burlington Ave.
Portland, OR 97203

Project Name: **Portland Harbor**
Project Number: 36238
Project Manager: Jennifer Shackelford

Report Created:
08/24/06 16:34

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica - Seattle, WA

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PPF1260-01 (FO 060751)		Soil					Sampled: 06/28/06 10:28			
Total Organic Carbon	EPA 9060 mod.	5870	----	641	mg/kg dry	1x	6G27039	07/10/06 14:58	07/27/06 12:23	
PPF1260-02 (FO 060752)		Soil					Sampled: 06/28/06 13:09			
Total Organic Carbon	EPA 9060 mod.	23200	----	732	mg/kg dry	1x	6G27039	07/10/06 14:58	07/27/06 13:06	
PPF1260-03 (FO 060753)		Soil					Sampled: 06/28/06 14:02			
Total Organic Carbon	EPA 9060 mod.	8490	----	611	mg/kg dry	1x	6G27039	07/10/06 14:58	07/27/06 13:18	
PPF1260-04 (FO 060754)		Soil					Sampled: 06/28/06 14:13			
Total Organic Carbon	EPA 9060 mod.	74100	----	956	mg/kg dry	1x	6G27039	07/10/06 14:58	07/27/06 13:28	

TestAmerica - Portland, OR



Howard Holmes, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



City of Portland Water Pollution Laboratory
6543 N. Burlington Ave.
Portland, OR 97203

Project Name: **Portland Harbor**
Project Number: 36238
Project Manager: Jennifer Shackelford

Report Created:
08/24/06 16:34

Physical Parameters by APHA/ASTM/EPA Methods

TestAmerica - Seattle, WA

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PPF1260-01 (FO 060751)		Soil								Sampled: 06/28/06 10:28
Dry Weight	BSOPSPL003R0 8	78.0	----	1.00	%	1x	6G07020	07/07/06 08:36	07/08/06 00:00	
PPF1260-02 (FO 060752)		Soil								Sampled: 06/28/06 13:09
Dry Weight	BSOPSPL003R0 8	68.3	----	1.00	%	1x	6G07020	07/07/06 08:36	07/08/06 00:00	
PPF1260-03 (FO 060753)		Soil								Sampled: 06/28/06 14:02
Dry Weight	BSOPSPL003R0 8	81.8	----	1.00	%	1x	6G07020	07/07/06 08:36	07/08/06 00:00	
PPF1260-04 (FO 060754)		Soil								Sampled: 06/28/06 14:13
Dry Weight	BSOPSPL003R0 8	52.3	----	1.00	%	1x	6G07020	07/07/06 08:36	07/08/06 00:00	

TestAmerica - Portland, OR

Howard B. Holmes

Howard Holmes, Project Manager

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City of Portland Water Pollution Laboratory
6543 N. Burlington Ave.
Portland, OR 97203

Project Name: **Portland Harbor**
Project Number: 36238
Project Manager: Jennifer Shackelford

Report Created:
08/24/06 16:34

Conventional Chemistry Parameters by APHA/EPA Methods - Laboratory Quality Control Results
TestAmerica - Seattle, WA

QC Batch: 6G27039 Soil Preparation Method: General Preparation

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (6G27039-BLK1)							Extracted: 07/27/06 11:46							
Total Organic Carbon	EPA 9060 mod.	ND	---	500	mg/kg wet	1x	--	--	--	--	--	--	07/27/06 11:46	
LCS (6G27039-BS1)							Extracted: 07/07/06 14:58							
Total Organic Carbon	EPA 9060 mod.	35300	---	500	mg/kg wet	1x	--	29900	118%	(72-130)	--	--	07/27/06 12:13	
Duplicate (6G27039-DUP1)							QC Source: PPF1260-01		Extracted: 07/10/06 14:58					
Total Organic Carbon	EPA 9060 mod.	3970	---	641	mg/kg dry	1x	5870	--	--	--	38.6% (35)	--	07/27/06 12:40	Q-14
Matrix Spike (6G27039-MS1)							QC Source: PPF1260-01		Extracted: 07/10/06 14:58					
Total Organic Carbon	EPA 9060 mod.	18400	---	641	mg/kg dry	1x	5870	9000	139%	(40-160)	--	--	07/27/06 12:51	

TestAmerica - Portland, OR


Howard Holmes, Project Manager

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City of Portland Water Pollution Laboratory

6543 N. Burlington Ave.
Portland, OR 97203

Project Name: **Portland Harbor**

Project Number: 36238

Project Manager: Jennifer Shackelford

Report Created:

08/24/06 16:34

Physical Parameters by APHA/ASTM/EPA Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

QC Batch: 6G07020

Soil Preparation Method: Dry Weight

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

Blank (6G07020-BLK1)

Extracted: 07/07/06 08:36

Dry Weight	BSOPSPL00 3R08	100	---	1.00	%	1x	--	--	--	--	--	--	07/08/06 00:00	
------------	-------------------	-----	-----	------	---	----	----	----	----	----	----	----	----------------	--

TestAmerica - Portland, OR

Howard B. Holmes

Howard Holmes, Project Manager

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City of Portland Water Pollution Laboratory

6543 N. Burlington Ave.
Portland, OR 97203

Project Name: **Portland Harbor**

Project Number: 36238

Project Manager: Jennifer Shackelford

Report Created:

08/24/06 16:34

Notes and Definitions

Report Specific Notes:

- Q-14 - Visual examination indicates the RPD and/or matrix spike recovery is outside the control limit due to a non-homogeneous sample matrix.

Laboratory Reporting Conventions:

- DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
- ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
- NR/NA - Not Reported / Not Available
- dry - Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
- wet - Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
- RPD - RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
- MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
- MDL* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
- Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
- Reporting - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and Limits percent solids, where applicable.
- Electronic - Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy*. Signature Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica - Portland, OR



Howard Holmes, Project Manager

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

July 25, 2006

Mr. Howard Holmes
Test America, Inc.
9405 SW Nimbus Ave.
Beaverton, OR 97008

**Subject: Project No.: PPF1260;
ARI Project No.: JO72**

Dear Mr. Holmes;

The following pages provide the information you requested. The report consists of tables, plots, and a narrative describing the testing methods. Please call me to discuss any questions, or comments you may have on the data or its presentation.

Best Regards,
Analytical Resources Incorporated

Harold Benny
Geotechnical Division Manager
206-695-6246
harolddb@arilabs.com

Enclosures

cc: File JO72



Client: Test America

Project No.: JO72

Client Project: PPF1260

Case Narrative

1. The samples were submitted for grain size distribution according to ASTM D421/D422.
2. Upon visual examination of the samples, we determined that sample PPF1260-03 did not contain enough fines for the hydrometer portion of the analysis. Particle size distribution for this sample was deduced from a sieve-only analysis.
3. Samples PPF1260-01, PPF1260-02 and PPF1260-04 contained woody matter, which may have broken down during the sieving process, affecting grain size analysis.
4. On sample PPF1260-01 there was a disconnect between the sieve and hydrometer data. Curve fitting was used to smoothly mate the two portions of the curve. This may have been caused by a lower than expected specific gravity for the finer portion of the material.
5. The data is provided in summary tables and plots.
6. There were no other noted anomalies in the samples or methods on this project.

Approved by: Taylor McKenzie
Title: Lead Technician

Date: 7/25/06

SUBCONTRACT ORDER

TestAmerica - Portland, OR

PPF1260

S.I.C. 1a-yes

J072

SENDING LABORATORY:

TestAmerica - Portland, OR
9405 SW Nimbus Ave.
Beaverton, OR 97008
Phone: (503) 906-9200
Fax: (503) 906-9210
Project Manager: Howard Holmes

RECEIVING LABORATORY:

Rosa Environmental & Geotechnical Laboratory/ARI
4611 S. 134th Place Suite 100
Tukwila, WA 98168
Phone : (206) 695-6200
Fax: (206) 695-6201

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: PPF1260-01	Soil	Sampled:06/28/06 10:28	J072 A	
Grain Size (ASTM) - SUB	07/13/06 23:59	12/25/06 10:28		
Containers Supplied:				
8 oz. jar (A)				
Sample ID: PPF1260-02	Soil	Sampled:06/28/06 13:09	J072 B	
Grain Size (ASTM) - SUB	07/13/06 23:59	12/25/06 13:09		
Containers Supplied:				
8 oz. jar (A)				
Sample ID: PPF1260-03	Soil	Sampled:06/28/06 14:02	J072 C	
Grain Size (ASTM) - SUB	07/13/06 23:59	12/25/06 14:02		
Containers Supplied:				
8 oz. jar (A)				
Sample ID: PPF1260-04	Soil	Sampled:06/28/06 14:13	J072 D	
Grain Size (ASTM) - SUB	07/13/06 23:59	12/25/06 14:13		
Containers Supplied:				
8 oz. jar (A)				

Released By

Date

Received By

Date

Released By

Date

Received By

Date

Cooler Receipt Form

ANALYTICAL
RESOURCES
INCORPORATED



RI Client: Test America Project Name: _____
OC NO.: _____ Delivered By: UPS
Tracking NO.: _____ Date: 7/6/00
RI Job No.: _____ Lims NO.: _____

Preliminary Examination Phase:

1. Were intact, properly signed and dated custody seals attached

To the outside of the cooler? YES ☐ NO ☒

2. Were custody papers included with the cooler YES ☒ NO ☐

3. Were custody papers properly filled out (ink, signed etc.)? YES ☒ NO ☐

4. Complete custody forms and attach all shipping documents OK ☒ NA ☐

Cooler Accepted BY: B. Zyl Date: 7/6/00 Time: 1100

Log-IN Phase:

5. Was a temperature blank include in the cooler? YES ☐ NO ☒

6. Record Cooler Temperature..... 5.1 °C

7. What kind of packing material was used? BW

8. Was sufficient ice used (if appropriate)? YES ☒ NO ☐

9. Were all bottles sealed in separate plastic bags? YES ☒ NO ☐

10. Did all bottles arrive in good condition (unbroken)? YES ☒ NO ☐

11. Were all bottle labels complete and legible? YES ☒ NO ☐

12. Did all bottle labels and tags agree with custody papers? YES ☒ NO ☐

13. Were all bottles used correct for the requested analyses? YES ☒ NO ☐

14. Do any of the analyses (bottles) require preservative?

(If so, Preservation checklist must be attached) YES ☐ NO ☒

15. Were all VOA vials free of air bubbles? YES ☐ NO ☒

16. Was sufficient amount of sample sent in each bottle? YES ☒ NO ☐

17. Notify Project Manager of any discrepancies or concerns..... OK ☒ NA ☐

Cooler Opened By: B. Zyl Date: 7/6/00 Time: 1100

Explain any discrepancies or negative responses:

Test America
PPF1260

Percent Finer Than Indicated Size, By ASTM D422

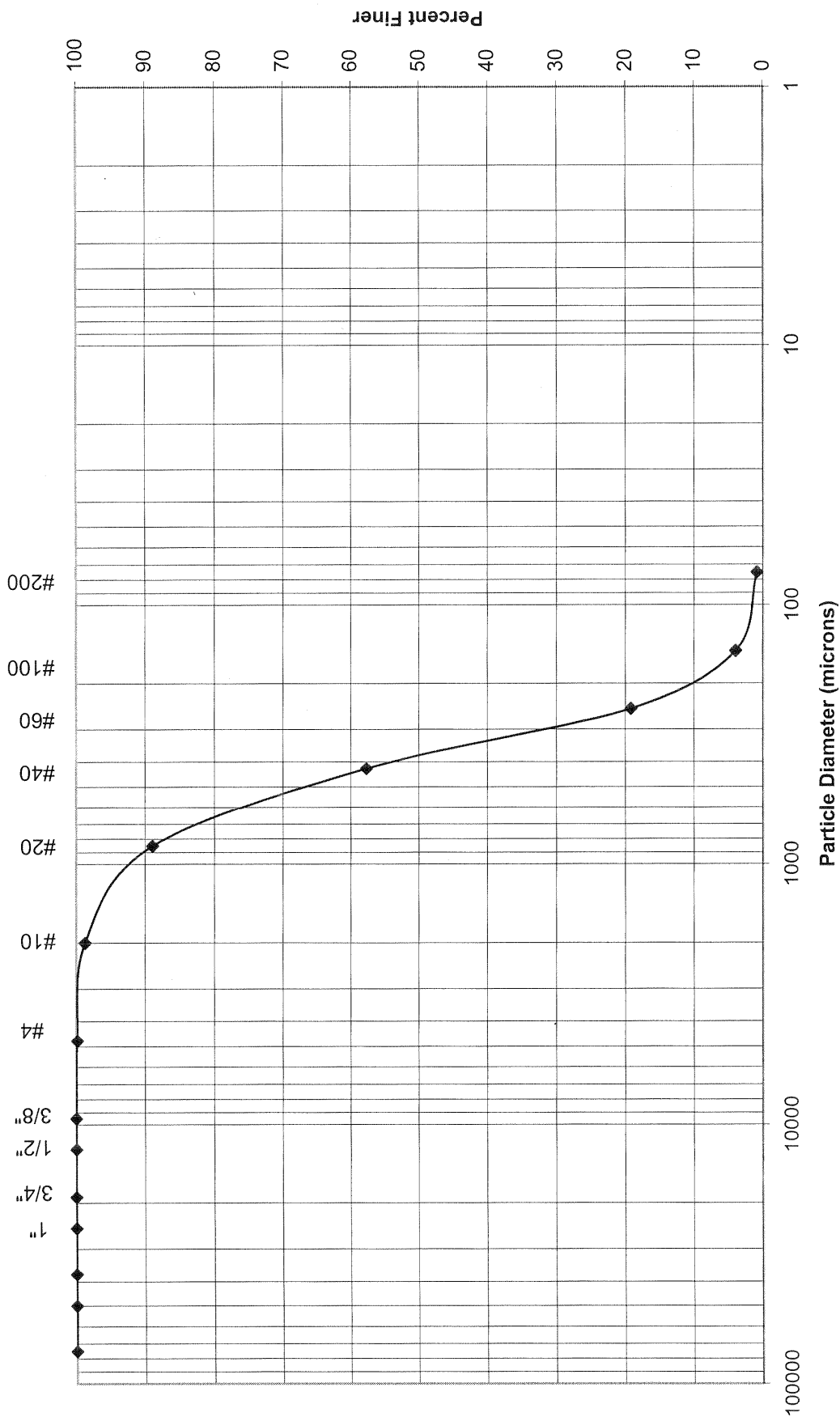
Sample ID	Moisture Content (%)	3/8"	#4	#10	#20	#40	#60	#100	#200
PPF1260-03	24.7	100.0	99.9	98.7	88.9	57.7	19.2	3.9	0.8

Test America
PPF1260

Percent Retained in Each Size Fraction, By ASTM D422

Sieve Size (microns)	3/8-#4	4750-2000	2000-850	850-425	425-250	250-150	150-75	<75
PPF1260-03	0.1	1.2	9.8	31.2	38.5	15.3	3.1	0.8

Grain Size Distribution By ASTM D422



—◆— PPF1260-03

Test America
PPF1260

Percent Finer (Passing) Than the Indicated Size

Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#20 (850)	#40 (425)	#60 (250)	#100 (150)	#200 (75)	32	22	13	9	7	3.2	1.3
PPF1260-01	100.0	83.0	77.4	62.3	21.0	14.1	11.2	8.7	6.8	6.1	5.0	4.3	3.2	2.5	0.7
PPF1260-02	100.0	99.1	97.5	90.7	73.0	51.9	33.0	14.2	8.3	7.0	5.6	4.8	3.5	3.0	1.3
PPF1260-04	100.0	99.0	98.3	95.3	87.2	71.5	55.4	38.8	22.9	15.9	12.3	10.0	7.6	6.5	2.3

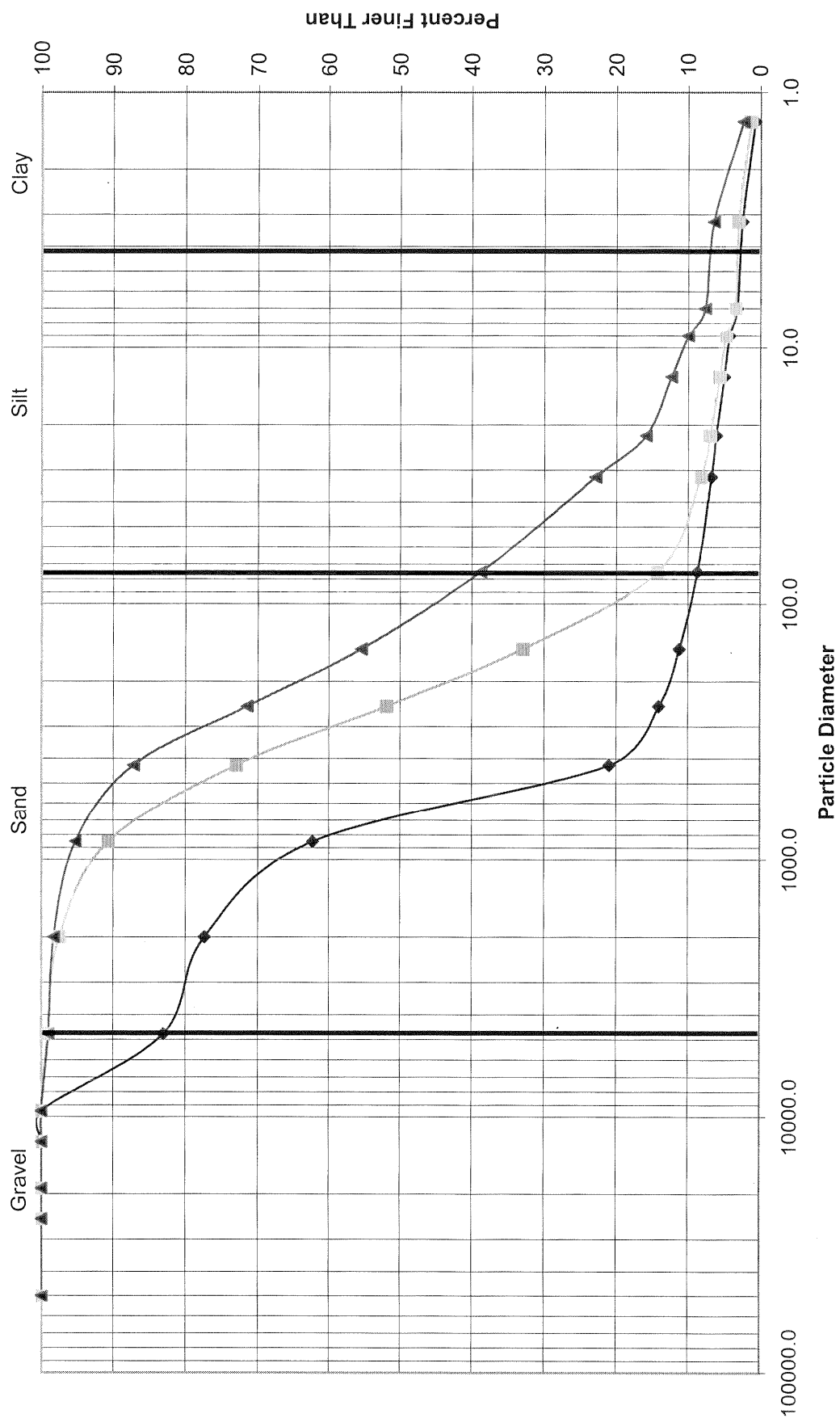
Testing performed according to ASTM D421/D422

Test America
PPF1260

Percent Retained in Each Size Fraction

Description	% Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Very Coarse Silt	% Coarse Silt	% Medium Silt	% Fine Silt	% Fine Silt	% Very Fine Silt	% Clay
Particle Size (microns)	> 4750	4750-2000	2000-425	425-75	75-32	32-22	22-13	13-9	9-7	7-3.2	<3.2
PPF1260-01	17.0	5.6	56.5	12.3	1.9	0.7	1.1	0.7	1.1	0.7	2.5
PPF1260-02	0.9	1.6	24.5	58.8	6.0	1.3	1.3	0.9	1.3	0.4	3.0
PPF1260-04	1.0	0.7	11.0	48.4	15.9	7.0	3.5	2.3	2.3	1.2	6.5

Grain Size Distribution by Hydrometer



—◆— PPF1260-01

—■— PPF1260-02

—▲— PPF1260-04

CHAIN OF CUSTODY REPORT

Work Order #: **PPF1260**

CLIENT: City of Portland				INVOICE TO: Charles Lytle												TURNAROUND REQUEST in Business Days * Organic & Inorganic Analyses ☒ 7 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ <1 STD. Petroleum Hydrocarbon Analyses ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ <1 STD. OTHER Specify: _____ * Turnaround Requests less than standard may incur Rush Charges.					
REPORT TO: Jennifer Shackelford				P.O. NUMBER: 36238																	
ADDRESS:																					
PHONE: FAX:				PRESERVATIVE																	
PROJECT NAME: Portland Harbor																					
PROJECT NUMBER: Inline Samp.				REQUESTED ANALYSES																	
SAMPLED BY:																					
CLIENT SAMPLE IDENTIFICATION		SAMPLING DATE/TIME		TOC	Grain Size													MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1 FO 060751		6/28/06 1028		X	X													S	2		
2 FO 060752		1309		X	X													S	2		
3 FO 060753		1402		X	X													S	2		
4 FO 060754		1413		X	X													S	2		
5																					
6																					
7																					
8																					
9																					
10																					
RELEASED BY: Jeremy Blittner FIRM: City of Portland				DATE: 6/29/06				RECEIVED BY: [Signature]				DATE: 6/29/06									
PRINT NAME: Jeremy Blittner				TIME: 12:10				PRINT NAME: Bob F				TIME: 12:10									
RELEASED BY:				DATE:				RECEIVED BY:				DATE:									
PRINT NAME:				TIME:				PRINT NAME:				TIME:									
ADDITIONAL REMARKS:																TEMP: 4.7	PAGE 1 OF 1				

CHAIN OF CUSTODY REPORT

Work Order #: PPF1260

CLIENT: <u>City of Portland</u>		INVOICE TO: <u>Charles Lytle</u>										TURNAROUND REQUEST in Business Days * Organic & Inorganic Analyses ☒ 7 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ <1 STD. Petroleum Hydrocarbon Analyses ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ <1 STD. OTHER Specify: _____ * Turnaround Requests less than standard may incur Rush Charges.					
REPORT TO: <u>Jennifer Shackelford</u>		P.O. NUMBER: <u>36238</u>															
PHONE: _____ FAX: _____		PRESERVATIVE															
PROJECT NAME: <u>Portland Harbor</u>																	
PROJECT NUMBER: <u>Inline Samp.</u>		REQUESTED ANALYSES															
SAMPLED BY:																	
CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	TOC	Grain Size											MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA W/O ID
1 FO 060751	6/28/06 1028	X	X											S	2		
2 FO 060752	1309	X	X											S	2		
3 FO 060753	1402	X	X											S	2		
4 FO 060754	1413	X	X											S	2		
5																	
6																	
7																	
8																	
9																	
10																	
RELEASED BY: <u>Jeremy Blittner</u> FIRM: <u>City of Portland</u>		DATE: <u>6/29/06</u>		TIME: <u>12:10</u>		RECEIVED BY: <u>Bob F</u>		DATE: <u>6/29/06</u>		TIME: <u>12:10</u>		FIRM: <u>TAP</u>		DATE: <u>lab</u>		TIME: <u>15:55</u>	
ADDITIONAL REMARKS																	

TAT: _____

Non-Conformances?

Circle Y or N

(If Y, see other side)

TEST AMERICA SAMPLE RECEIPT CHECKLIST

Received By:

(applies to temp at receipt)

Date: 6/24/06

Time: 12:10

Initials: JS

Logged-in By:

Date: 6/29/06

Initials: JS

Unpacked/Labeled By:

Date: 6/30

Initials: SM

Cooler ID: _____ (____ of ____)

Work Order No. DPF1000

Client: C of Portland

Project: Portland Harbor Inland Sample

Container Type:

1 Cooler

Box

None/Other _____

COC Seals:

Ship. Container

On Bottles

X None

Sign By

Date

Packing Material

Bubble Bags

Foam Packs

X None/Other Other _____

Styrofoam

Refrigerant:

Gel Ice Pack

Y Loose Ice

None/Other _____

None

Received Via: Bill#

Fed Ex

UPS

DHL

Senvoy

GS

Client

X NCA Courier

Mid Valley

TDP

Other _____

Cooler Temperature (IR): 7.7°C Plastic Glass (Frozen filters, Tedlars and aqueous Metals exempt)
(circle one)

Temperature Blank? _____°C or NA

Trip Blank?

Y or N or NA

Sample Containers:

Intact?

Provided by NCA?

Correct Type?

#Containers match COC?

IDs/time/gate match COC?

Hold Times in hold?

Y or N

Y or N

Y or N

Y or N

Y or N

Y or N

ID

Metals Preserved?

Client QAPP Preserved?

Adequate Volume?

(for tests requested)

Water VOAs: Headspace? Y or N or NA

Comments:

ID

Y or N or NA

Y or N or NA

Y or N

Y or N or NA

PROJECT MANAGEMENT

Is the Chain of Custody complete?

Y or N If N, circle the items that were incomplete

Comments/Problems _____

Total access set up?

Has client been contacted regarding non-conformances?

Y or N

Y or N

If Y, _____/_____
Date Time

PM Initials: _____ Date: _____ Time: _____