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ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

TECHNICAL MEMORANDUM

TO: Andy Kallus, Washington State Department of Ecology

FROM: Larry Beard, P.E., Landau Associates

DATE: September 19, 2012

**RE: EMERGENCY ACTION CLEANUP PLAN
STORMWATER TRUNK LINE CLEANOUT AND REPAIR
NORTH MARINA AMERON/HULBERT SITE
EVERETT, WASHINGTON**

This technical memorandum presents the planned scope of work for an emergency cleanup action to be conducted at the North Marina Ameron/Hulbert site (Site) to clean out and repair the stormwater trunk line located along the north Site boundary. A remedial investigation/feasibility study (RI/FS) is currently underway for the Site under Agreed Order No. 6677 between the Port of Everett (Port), Ameron International and the Hulberts [the potentially liable parties (PLPs)], and the Washington State Department of Ecology (Ecology). A site location map is provided as Figure 1.

The RI/FS report is currently being prepared, but adoption of a Cleanup Action Plan is not scheduled to occur until late 2013 and implementation of the cleanup action is not scheduled to occur for several years. The trunk line discharges directly to marine surface water in the Port's 12th Street Marina (a.k.a., 12th Street Yacht Basin) and contains a large accumulation of solids with elevated concentrations of a number of hazardous substances. Although sediment quality data indicate that the accumulated solids have not impacted marine sediment, the trunk line provides a potential conduit for discharge of these solids to surface water and sediment. Additionally, the trunk line is in poor condition and leaks because it has holes. These holes could provide a conduit for contaminated soil or groundwater from the Site and the adjacent TC Systems Site ("TC Systems") to the north (which also drains to the trunk line) to enter the trunk line and discharge to marine surface water. Based on factors that include the schedule for final Site cleanup and the potential risk to marine surface water and sediment, an emergency action for cleanout and repair of the trunk line is needed to adequately protect human health and the environment.

This technical memorandum provides a brief summary of the condition of the trunk line, the emergency action plan for cleanout of accumulated solids in the trunk line, and repair of the trunk line to ensure that it does not become a conduit for release of contaminated soil or groundwater to marine surface water.

BACKGROUND

The stormwater trunk line is located near the north property boundary that separates the Site from TC Systems and includes the segment of storm drain pipe between SD-5 and CB-111, as shown on Figure 2. Portions of the trunk line are located on Port property and portions are located on the Norton Industries property to the north (which includes TC Systems), and stormwater from businesses located on both properties discharge to the trunk line, as shown on Figure 2. Solids collected from the trunk line, and the stormwater lateral containing catch basins SD-8 and SD-9, contain elevated concentrations of heavy metals, semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), heavy metals, and concentrations of dioxins/furans that would be considered a threat to human health or ecological receptors if discharged to marine sediment. Stormwater-trunk line solids analytical data are provided in Table 1.

Several catch basins and storm drain line laterals that discharge to the trunk line have been recently cleaned. Ameron International reportedly cleaned catch basins SD-15, SD-16, SD-9, and SD-13, as well as the trench drain and PVC tight line located to the east of the manufacturing building, in May 2012 using a vactor truck. At the time of the cleaning, there did not appear to be accumulated solids in the storm drain line laterals, so the laterals were not cleaned.

Norton Industries cleaned out the catch basins and storm drain lines that discharge to the trunk line from its property in November 2011, except for the storm drain line between its Buildings A and B (the buildings closest to West Marine View Drive). The catch basins were cleaned using a vactor truck and the storm drain lines were cleaned by a combination of jetting and vactoring the accumulated solids. Norton Industries plans to inspect and, if appropriate, clean the storm drain lines and catch basins between Buildings A and B concurrent with the trunk line cleanout. The Port is coordinating with Norton Industries so the work can be performed at the same time.

In addition to the potential discharge of stormwater-trunk line solids to marine surface water, the suspected poor condition of the trunk line poses a potential for contaminated soil and/or groundwater to enter the trunk line. Contaminants that have been identified as being present in soil and/or groundwater adjacent to the trunk line include heavy metals, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), and semivolatile organic compounds (SVOCs). Soil and groundwater can enter the trunk line through holes created by corrosion, as evidenced by the two previous failures of the pipe (discussed below).

The trunk line was installed sometime between the mid-1970s and the early 1980s. It is constructed of 24-inch diameter corrugated metal pipe (CMP), and contains a large accumulation of solids, as shown in the video survey images provided on Figures 3 and 4. Although camera surveys were attempted in 2008 and 2009, they could not be completed because of accumulated solids in the trunk line. The total volume of accumulated solids in the trunk line is estimated to be about 20 cubic yards (CY) based on the assumption that the trunk line between catch basins SD-5 and CB-111 is, on average, 25 percent full of solids.

The trunk line is in poor condition, likely due to corrosion following its installation. A tide gate was installed at the outfall in 2006, but does fully prohibit flow of marine water into the trunk line, and the flow of marine water into the trunk line was unrestricted prior to 2006. As a result, marine surface water has entered the trunk line at the outfall and, due to the relatively flat grade of the pipe, migrate upgradient almost the entire length of the line over an extended period of time prior to 2006, as still is able to migrate at least partially up the trunk line. Prolonged exposure to saline water likely accelerated the corrosion of the CMP, and sections of the trunk line failed in 2005 and 2008 at the locations shown on Figure 2. Observations made during subsequent repair of the failed sections confirmed that significant corrosion of the trunk line has occurred. Additionally, video survey of the western portion of the line following the 2008 failure indicated some deformation of the CMP, as shown on Figure 5. The resin-impregnated material proposed for use in lining the CMP is resistant to corrosion, so the trunk line will not be subject to corrosion from contact with marine surface water following implementation of the emergency action.

EMERGENCY ACTION

The emergency action will consist of: 1) cleaning the trunk line and the SD-8/SD-9 lateral of accumulated solids and, assuming the trunk line is sufficiently competent, 2) repairing the trunk line by slip-lining it with Cured-In-Place-Pipe (CIPP). The CIPP technology uses a resin-impregnated felt liner that is pulled through the existing line, inflated and cured with steam to slip line and reinforce the existing pipe. CIPP is less intrusive, does not require excavation and shoring, and is less expensive than digging a trench and installing a new pipe. However, the CIPP process requires that the existing pipe be sufficiently competent such that it does not exhibit significant deflection that will compromise the strength of the CIPP. The suitability of the trunk line for CIPP cannot be fully evaluated until after it has been cleaned out and a video survey conducted. If the post-cleanout video survey reveals that the condition of the pipe will not allow for use of CIPP, alternatives to repair of the trunk line would be evaluated as either part of the emergency action or the final cleanup action. If the slip lining is completed, a post-repair video survey will be conducted to document the condition of the pipe following repair.

The trunk line cleanout will be conducted by pressure jetting sections of the trunk line with water, starting at the upstream end at catch basin SD-5. Upstream of SD-5, the incoming stormwater lines are smaller diameter laterals that did not exhibit significant solids accumulation or corrosion when observed during sampling completed as part of the RI. The trunk line will be plugged at the downstream catch basin of each segment being cleaned to prevent solids from migrating farther downstream. Anticipated cleanout segments are: SD-5 to SD-6, SD-6 to SD-7, SD-9 to SD-8, SD-8 to the trunk line, and SD-7 to CB-111.

The solids will be jetted using high pressure water from the upstream end and removed from the downstream end using either a high capacity pumping system or a vactor truck. The water will be treated to remove solids and reused for the cleaning process to minimize the volume of water that ultimately has to be treated at the end of the cleanout process. The specific method of water treatment during cleaning will be the responsibility of the contractor, but the method is anticipated to be gravity separation, possibly assisted by filtration.

Because of the degraded condition of the pipe, the cleaning process, including the removal of the accumulated solids and the use of high pressure water, may further compromise the condition of the existing pipe. As a result, installation of the CIPP is considered an integral part of the emergency action.

Stormwater solids and wastewater will be managed and disposed of in accordance with applicable regulations, including the following:

- EPA National Recommended Water Quality Criteria – Section 304 Clean Water Act
- EPA Water Quality Standards (National Toxics Rule) – 40 CFR 131
- Washington Water Pollution Control Act (Chapter 90.48 RCW) and the implementing regulations, Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC).
- Washington Solid Waste Handling Standards (Chapter 173-350 WAC)
- Washington Hazardous Waste Management Act and the implementing regulations, Dangerous Waste Regulations (Chapter 173-303 WAC) and the federal Resource Conservation and Recovery Act [RCRA; 40 CFR 261), to the extent that any dangerous wastes are discovered or generated during the cleanup action
- The federal Clean Water Act, with respect to in-water work associated with dredging or sediment capping
- Washington Clean Air Act (Chapter 70.94 WAC)
- Occupational Safety and Health Act (OSHA), 29 CFR Subpart 1910.120
- Washington Industrial Safety and Health Act (WISHA).

It is anticipated that stormwater solids will be managed as solid waste. Wastewater will likely be sent to either the city of Everett wastewater treatment plant or a waste management firm that treats and disposes of contaminated water, depending on water quality and acceptance of the water by the city of Everett.

Following cleanout, a video survey will be conducted of the trunk line to evaluate the effectiveness of the cleanout and the condition of the trunk line. As previously indicated, the trunk line CMP cannot exhibit excessive deflection or the CIPP will not develop adequate strength as a replacement pipe. Any buried manholes or other significant pipeline transitions would need to be exposed for installation of the CIPP. However, the CIPP process is capable of addressing blind laterals remotely using information collected during the video survey.

The video survey will be provided to the CIPP installation specialty contractors for evaluation, and to assist in preparing construction bids. If the trunk line is determined to be in too poor of a condition for slip lining using CIPP, no further work on the trunk line will be conducted as part of this emergency action and another approach to pipeline repair will be developed. Because of the proximity of the Bayside Marine building to the trunk line, and the greater logistical and design challenges associated with replacing the trunk line using conventional excavation methods, a significantly longer period of time would be required to design and implement a conventional pipeline replacement project.

Design and construction of both the trunk line cleanout and the CIPP repair will be implemented using performance-based specifications rather than detailed design plans and specifications. Separate performance-based specifications will be prepared for the cleanout and the repair of the trunk line because these two activities will utilize different contractors, and design and implementation of the trunk line repair is dependent on the condition of the trunk line, which cannot be assessed until the cleanout is completed.

If the cleanout and CIPP installation are both successfully implemented, the emergency action will be considered complete. However, if the CIPP installation cannot be completed because of the condition of the existing trunk line or for other reasons, further action may be required as part of the emergency action or as part of the final cleanup action.

The property owners that share the usage of trunk line (the Port and Norton Industries) are working to identify an appropriate stormwater filtration system or other solid reduction technology to be installed directly upstream of the trunk line out-fall. While this work is not directly affiliated with the Ecology emergency action, it is being planned separately in an effort to improve the overall quality of stormwater that is discharged from the trunk line to the Puget Sound. The Port will keep Ecology informed on this project as it is planned and ultimately implemented.

REPORTING

The results of the emergency action will be reported in a summary technical memorandum that includes a description of the emergency action activities, the volume of solids removed and disposed from the pipeline, the condition of the trunk line including a copy of the post-cleanout video and post-repair video survey, and any changes to the planned emergency action that were implemented based on conditions observed during construction. The summary technical memorandum will be submitted to Ecology and, depending on where the Site is in the cleanup process, will be included as an appendix to the RI/FS report or possibly the cleanup action plan.

REFERENCES

Stantec 2011. Initial Remedial Investigation Technical Memorandum. November 7.

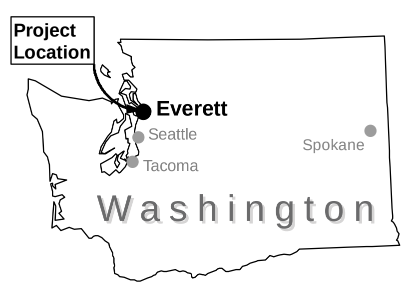
ATTACHMENTS

Figure 1: Site Plan
Figure 2: Video Survey Images – Photos 1 and 2
Figure 3: Video Survey Images – Photos 3 and 4
Figure 4: Video Survey Images – Photos 5 and 6
Table 1: Stormwater System Solids Analytical Results - Dry Weight

0 0.5 1

Miles

N



Data Source: ESRI 2008

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North Marina Ameron/Hulbert Site Port of Everett, Washington	**Vicinity Map**	Figure 1

Y:\Projects\147029\Mapdocs\500.650\MapDocs\Stormwater Trunkline Emergency Action Cleanup Plan TM\Figure 2 Site Plan.mxd 9/18/2012 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

- Stormwater Infrastructure
- Pipe Segment to be Cleaned
- Pipe Segment to be Cleaned and Repaired
- Stormwater Infrastructure Not Connected to Trunk Line
- Stormwater Infrastructure No Longer in Service
- Approximate Ameron/Hulbert Site Boundary
- G - Area Designation
- Asphalt Berms
- Trench Drains
- Approximate Location of Previous Trunk Line Repair

Notes

1. Data for the storm system alignment was obtained from a variety of sources including Reid Middleton plans dated 1996, information provided by Aspect Consulting, plans provided by the Port of Everett and a binding site plan for Norton Industries dated 1992.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 150 300

Scale in Feet

Data Source: Google Earth Pro (2011 Image)

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North Marina Ameron/Hulbert Site
Port of Everett, Washington

Site Plan

Figure
2

Photo 1. Contents of trunk line between catch basins SD-5 and SD-6.

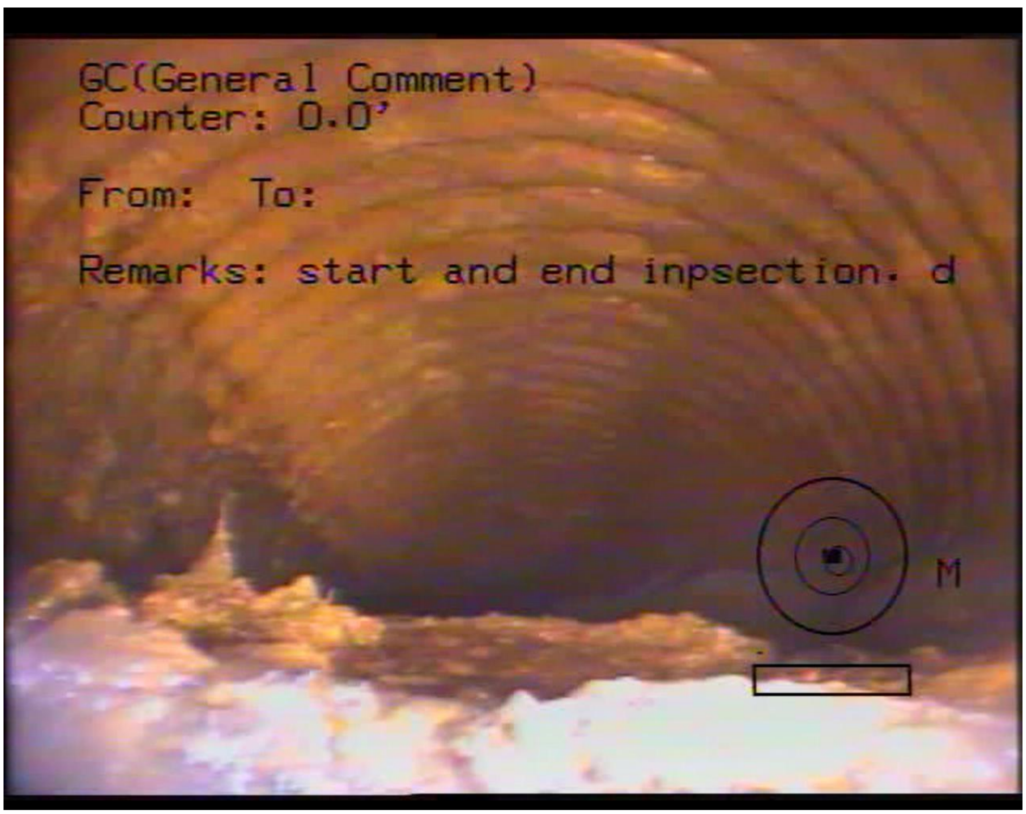

Photo 2. Video survey not completed due to accumulated solids in the trunk line between catch basins SD-5 and SD-6.

Photo 3. SD-8/SD-9 lateral near connection to trunk line.

Photo 4: SD-8/SD-9 lateral approaching connection to trunk line.

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Photo 5. Deformation of CMP observed during video survey completed following the 2008 pipe failure. Arrow indicates area where pipe appears to be crushed.

TABLE 1
STORMWATER SYSTEM SOLIDS ANALYTICAL RESULTS - DRY WEIGHT
AMERON/HULBERT SITE
PORT OF EVERETT

	CB-3 / SD-8	CB101	CB111	Dup of CB111	SD-3	SD-4	SD-7	SD-567-
				CB011				COMPOSITE
	MP28C/G	CHM101124-5	CHM101124-5	CHM101124-5	CHM101124-5	CHM101124-5	CHM101124-5	UC42E/UE04A/WG38752
		CHM101202-4						
	3/26/2008	11/24/2010	11/24/2010	11/24/2010	11/24/2010	11/24/2010	11/24/2010	12/22/2011
NWTPH-DX (mg/kg)								
Diesel Range Organics	**1,800**		20 U	20 U	**226**	**136**	20 U	**1,100**
Diesel (Fuel Oil)		20 U	20 U	20 U	20 U	20 U	**723**	
Mineral Oil		40 U	40 U	40 U	40 U	40 U	40 U	
Heavy Oil	**3,000**	50 U	50 U	50 U	**951**	**521**	50 U	**1,600**
NWTPH-HCID (mg/kg)								
Gasoline								26 U
Diesel								**>65**
Oil								**>130**
TOTAL METALS (mg/kg)								
Method SW6020/ SW6020/SW7471A								
Antimony	**300**	**0.776**	**70.4**	**64.6**	**2.67**	**3.51**	**5.46**	30 UJ
Arsenic	**1,700**	**8.37**	**568**	**550**	**19.2**	**28.1**	**25.2**	**40**
Barium								**405**
Beryllium	**0.4**							
Cadmium	**10.2**	**0.638**	**3.00**	**3.20**	**2.74**	**3.35**	**1.53**	**3**
Chromium	**338**	**31.9**	**193**	**227**	**113**	**215**	**96.9**	**106**
Copper	**1,700**	**65.3**	**734** J	**477** J	**147**	**161**	**85.5**	**176**
Lead	**1,510**	**7.93**	**321**	**308**	**264**	**239**	**42.7**	**90**
Mercury	**0.08**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.11**
Nickel	**185**							
Selenium	**1.3**							30 U
Silver	**3**							
Thallium	**0.7**							
Zinc	**8,110**	**5210**	**3180**	**2960**	**1760**	**1960**	**869**	2 U
Chromium, Hexavalent (mg/kg)								
Method SW7196			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	
TCLP METALS (mg/L)								
Method TCLP-SW6020/TCLP-SW7470A								
Antimony								0.5 U
Arsenic	**2.0**							0.5 U
Barium								**1.00**
Cadmium								0.02 U
Chromium								0.05 U
Copper								0.02 U
Lead	**0.6**							0.2 U
Mercury								0.0001 U
Selenium								0.5 U
Zinc								0.03 U
PCBs (mg/kg)								
Method SW8082								
Aroclor 1016		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.032 U
Aroclor 1221		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.032 U
Aroclor 1232		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.041 U
Aroclor 1242		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.032 U
Aroclor 1248		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.032 U
Aroclor 1254		0.1 U	0.1 U	0.1 U	**1.67**	0.1 U	0.1 U	**0.055**
Aroclor 1260		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.046**
Total PCBs		0.1 U	0.1 U	0.1 U	**1.67**	0.1 U	0.1 U	**0.101**
SEMIVOLATILES (mg/kg)								
Method SW8270C								
Phenol	0.26 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.18** J
Bis-(2-Chloroethyl) Ether	0.26 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.19 U
2-Chlorophenol	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
1,3-Dichlorobenzene	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
1,4-Dichlorobenzene	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
Benzyl Alcohol	1.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.96 U
1,2-Dichlorobenzene	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
2-Methylphenol	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
2,2'-Oxybis(1-Chloropropane)	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
4-Methylphenol	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
N-Nitroso-di-n-propylamine	1.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
Hexachloroethane	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
Nitrobenzene	0.26 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.19 U
Isophorone	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
2-Nitrophenol	1.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.19 U
2,4-Dimethylphenol	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
Benzoic Acid	2.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 **	0.2 U	1.9 U
bis(2-Chloroethoxy) Methane	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
2,4-Dichlorophenol	1.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.96 U
1,2,4-Trichlorobenzene	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
Naphthalene	0.26 U	0.1 U	0.1 U	0.1 U	**2.76**	0.1 U	0.1 U	**0.23**
4-Chloroaniline	1.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.96 U
Hexachlorobutadiene	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
4-Chloro-3-methylphenol	1.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.96 U
2-Methylnaphthalene	0.26 U	0.1 U	0.1 U	0.1 U	**0.832**	0.1 U	0.1 U	**0.18** J
Hexachlorocyclopentadiene	1.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.96 UJ
2,4,6-Trichlorophenol	1.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.96 U
2,4,5-Trichlorophenol	1.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.96 U
2-Chloronaphthalene	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
2-Nitroaniline	1.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.96 U
Dimethylphthalate	0.26 U	0.1 U	0.1 U	0.1 U	**0.919**	0.1 U	0.1 U	**0.46**
Acenaphthylene	0.26 U	0.1 U	0.1 U	0.1 U	**0.399**	**0.189**	0.1 U	0.19 U
3-Nitroaniline	1.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.96 U
Acenaphthene	0.26 U	0.1 U	0.1 U	0.1 U	**0.641**	0.1 U	0.1 U	0.88
2,4-Dinitrophenol	2.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1.9 UJ
4-Nitrophenol	1.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.96 U

TABLE 1
STORMWATER SYSTEM SOLIDS ANALYTICAL RESULTS - DRY WEIGHT
AMERON/HULBERT SITE
PORT OF EVERETT

	CB-3 / SD-8 MP28C/G 3/26/2008	CB101 CHM101124-5 CHM101202-4 11/24/2010	CB111 CHM101124-5 11/24/2010	Dup of CB111 CB011 CHM101124-5 11/24/2010	SD-3 CHM101124-5 11/24/2010	SD-4 CHM101124-5 11/24/2010	SD-7 CHM101124-5 11/24/2010	SD-567- COMPOSITE UC42E/UE04A/WG38752 12/22/2011
Dibenzofuran	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.45**
2,6-Dinitrotoluene	1.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.96 U
2,4-Dinitrotoluene	1.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.96 U
Diethylphthalate	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
4-Chlorophenyl-phenylether	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
Fluorene	0.26 U	0.1 U	0.1 U	0.1 U	**5.39**	0.1 U	0.1 U	**0.85**
4-Nitroaniline	1.3 U							0.96 U
4,6-Dinitro-2-methylphenol	2.6 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1.9 U
N-Nitrosodiphenylamine	0.26 U							0.19 U
4-Bromophenyl-phenylether	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
Hexachlorobenzene	0.26 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.19 U
Pentachlorophenol	1.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.96 U
Phenanthrene	**0.34**	0.1 U	0.1 U	0.1 U	**27.3**	**0.390**	**0.231**	**4.5**
Carbazole	0.26 U	0.5 U	0.5 U	0.5 U	**2.05**	0.5 U	0.5 U	**0.40**
Anthracene	0.26 U	0.1 U	0.1 U	0.1 U	**1.87**	**0.126**	0.1 U	**1.4**
Di-n-butylphthalate	0.26 U	3.31 U	2.18 U	1.72 U	**8.03**	2.42 U	0.1 U	**0.23**
Fluoranthene	**0.44**	0.1 U	0.1 U	0.1 U	**27.4**	**0.567**	**0.255**	**5.2**
Pyrene	**0.51**	0.1 U	0.1 U	0.1 U	**16.5**	**0.541**	**0.278**	**3.4**
Butylbenzylphthalate	0.26 U	0.1 U	0.1 U	0.1 U	**4.75**	0.1 U	**0.255**	**2.8**
3,3'-Dichlorobenzidine	1.3 U							0.96 U
Benzo(a)anthracene	0.26 U	0.08 U	0.08 U	0.08 U	**1.54**	**0.264**	0.08 U	**1.9**
bis(2-Ethylhexyl)phthalate	**10**	**6.57**	**0.230**	**0.240**	**46.7**	**4.43**	**2.31**	**6.5**
Chrysene	**0.28**	0.08 U	0.08 U	0.08 U	**7.02**	**0.277**	0.08 U	**2.1**
Di-n-octyl phthalate	**0.7**	**6.96**	0.1 U	0.1 U	**5.32**	**0.290**	0.1 U	**0.34**
Benzo(a)pyrene	0.26 U	0.08 U	0.08 U	0.08 U	**1.54**	**0.239**	0.08 U	**1.7**
Indeno(1,2,3-cd)pyrene	0.26 U	0.08 U	0.08 U	0.08 U	**1.56**	0.08 U	0.08 U	**0.91**
Dibenz(a,h)anthracene	0.26 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	**0.52**
Benzo(g,h,i)perylene	0.26 U	0.08 U	0.08 U	0.08 U	**1.20**	0.08 U	0.08 U	**1.0**
1-Methylnaphthalene	0.26 U	0.1 U	0.1 U	0.1 U	**0.503**	0.1 U	0.1 U	**0.19** J
Total Benzofluoranthenes								**2.9**
1,2-Dinitrobenzene		0.1 U	0.1 U	0.1 U	**1.47**	0.1 U	0.1 U	
1,3-Dinitrobenzene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
1,4-Dinitrobenzene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
2,3,4,6-Tetrachlorophenol		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
2,3,5,6-Tetrachlorophenol		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
3-Methylphenol (m-cresol)		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Aniline		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	
Azobenzene		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Benzo(b)fluoranthene	**0.27**	0.08 U	0.08 U	0.08 U	**4.80**	**0.315**	0.08 U	
Benzo(k)fluoranthene	0.26 U	0.08 U	0.08 U	0.08 U	**1.99**	0.08 U	0.08 U	
bis (2-Ethylhexyl) adipate		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Diphenylamine		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
cPAH TEQ	**0.030**	0.08 U	0.08 U	0.08 U	**2.60**	**0.30**	0.08 U	**2.34**
CONVENTIONALS (%)								
Total Solids (EPA160.3)		**64.63**	**79.03**	**79.34**	**40.86**	**60.72**	**33.55**	**38.60**
Total Organic Carbon (SW9060A; Plumb 1981)		**4.19**	**0.469**	**0.457**	**13.2**	**3.00**	**6.39**	**4.57**
pH								**7.01**
DIOXIN/FURANS (pg/g)								
Method 1613								
2,3,7,8-TCDD								**0.510** J
1,2,3,7,8-PECDD								**3.77** J
1,2,3,4,7,8-HXCDD								**8.62**
1,2,3,6,7,8-HXCDD								**24.8**
1,2,3,7,8,9-HXCDD								**18.1**
1,2,3,4,6,7,8-HPCDD								**385**
OCDD								**2,810**
2,3,7,8-TCDF								**1.92**
1,2,3,7,8-PECDF								**1.37** UJ
2,3,4,7,8-PECDF								**1.84** UJ
1,2,3,4,7,8-HXCDF								**4.92** J
1,2,3,6,7,8-HXCDF								**4.10** UJ
1,2,3,7,8,9-HXCDF								**0.305** UJ
2,3,4,6,7,8-HXCDF								**3.68** J
1,2,3,4,6,7,8-HPCDF								**62.1**
1,2,3,4,7,8,9-HPCDF								**3.43** J
OCDF								**137**
TOTAL TETRA-DIOXINS								**17.9**
TOTAL PENTA-DIOXINS								**31.8**
TOTAL HEXA-DIOXINS								**197**
TOTAL HEPTA-DIOXINS								**1,020**
TOTAL TETRA-FURANS								**46.9**
TOTAL PENTA-FURANS								**51.1**
TOTAL HEXA-FURANS								**113**
TOTAL HEPTA-FURANS								**165**
TOTAL (TEQ ND=0)								**15.9**
TOTAL (TEQ ND=1/2 DL)								**16.0**

U = Indicates the compound was undetected at the reported concentration.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
Bold = Detected compound.