TECHNICAL MEMORANDUM

LANDAU ASSOCIATES
ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

TO: Andy Kallus, Washington State Department of Ecology

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

DATE: May 3, 2011

RE: EMERGENCY ACTION CLEANUP PLAN
CRAFTSMAN DISTRICT BOATYARD EXPANSION AREA
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 Ameron/Hulbert site (Site) to address petroleum hydrocarbon soil contamination in a portion of the Site that is being redeveloped by the Port of Everett (Port) for the expansion of the Port's existing Craftsman District boatyard. A remedial investigation/feasibility study (RI/FS) is currently underway for the Site under Agreed Order No. 6677 between the Port, Ameron International and the Hulberts [the potentially liable parties (PLPs)], and the Washington State Department of Ecology (Ecology).

The initial phase of the RI field activities for the Site is complete, but data gaps remain and additional RI activities will be conducted prior to preparation of the RI/FS report, which is not scheduled to be completed for about 2 years. The boatyard expansion is being constructed over the next few months on an expedited schedule within the area shown on Figure 1. Ecology has determined that, based on factors including the schedule for construction of the boatyard expansion, an emergency action for partial cleanup of the boatyard expansion area is needed to adequately protect human health and the environment.

This technical memorandum provides a brief summary of the results of soil quality characterization completed in the boatyard expansion area, the emergency action plan for addressing shallow petroleum hydrocarbon soil contamination present in this area, and the compliance monitoring that will be conducted to confirm that the emergency action has been successfully completed.

BOATYARD EXPANSION AREA INVESTIGATION RESULTS

Based on the results of the RI, diesel- and oil-range petroleum hydrocarbons are present in shallow soil at concentrations greater than the Site preliminary screening levels (PSLs) of 2,000 milligrams per kilogram (mg/kg) established for the RI/FS, as shown on Figure 2 and presented in

Table 1[1]. As is indicated in Table 1 and on Figure 2, the soil PSLs for petroleum hydrocarbons are exceeded at two locations within the boatyard expansion area (M-FA-105 and M-GC-105). Laboratory analytical results and visual observations indicate that petroleum hydrocarbon soil contamination is limited to shallow soil over about a 20 ft by 30 ft area in the vicinity of sampling location M-GC-105 (West Area) and about a 15 ft by 20 ft area in the vicinity of M-FA-105 (East Area), as shown on Figure 3.

EMERGENCY ACTION

West Area soil contamination consists of a surficial layer of black, petroleum hydrocarbon-cemented sand and woodchips extending to a depth of approximately 0.5 ft below ground surface (BGS) and soil immediately below the surficial material to a depth of about 1.5 ft BGS that exceeded the diesel- and heavy oil-range petroleum hydrocarbons PSLs. Based on the characterization sampling and visual observation, the excavation will be extended to 2 ft BGS within the visually affected area. The total anticipated volume of soil to be removed from this area is approximately 40 cubic yards.

Petroleum hydrocarbon soil contamination in the East Area is likely limited to the upper 1 ft of soil, and no more than the upper 4 ft of soil. The excavation will initially be extended to about 1.5 ft below adjacent grades. The total anticipated volume of soil to be removed from this area is no more than 40 cubic yards based on a maximum excavation depth of 4 ft. Prior to East Area excavation, clean overburden material will be removed and stockpiled for reuse as excavation backfill. The clean overburden material consists of crushed rock placed in the East Area during the field investigation to provide access for sampling in an area of ponded water, and is separated from underlying contaminated soil by non-woven geotextile fabric. The crushed rock material was tested for heavy metals prior to import and did not exhibit concentrations above the PSLs established for the Site. A concrete slab is also present in the excavation area and will be demolished and transported to an offsite recycling facility prior to excavation of contaminated soil.

The impacted soil from these areas will be excavated and directly loaded into trucks for transport to Cemex in Everett, Washington for treatment using thermal desorption. The excavations will be backfilled following confirmation that the preliminary cleanup levels (PCLs) for the emergency action of 2,000 mg/kg for diesel- and oil-range petroleum hydrocarbons have been achieved using the clean overburden soil removed from the East Area.

State Environmental Policy Act (SEPA) requirements for the Site emergency action were met by the environmental documentation conducted for the North Marina Redevelopment project. The 2005

[1] Slightly elevated soil concentrations of copper and arsenic are present in the boatyard expansion area and will be addressed in the RI/FS report.

draft environmental impact statement (EIS) for North Marina Redevelopment project addressed environmental cleanup conducted in conjunction with redevelopment, including cleanup that occurs within the Site. Because the boatyard expansion is an element of the North Marina Redevelopment, the EIS provides documentation on SEPA compliance for the emergency action.

COMPLIANCE MONITORING

Compliance monitoring in the West Area will consist of collection of one soil sample from the approximate center of each of the excavation sidewalls and one soil sample from the center of the base of the excavation. The samples will be analyzed for diesel- and heavy oil-range petroleum hydrocarbons by Method NWTPH-Dx.

Compliance monitoring in the East Area will consist of collection of one soil sample from the center of the base of the excavation. Sidewall samples will not be collected in the East Area because the impacted area was laterally bounded during characterization sampling (see Figure 2 locations M-FA-105a, M-FA-105b, M-FA-106, and M-FA-107). The confirmation sample will be analyzed for diesel- and heavy oil-range petroleum hydrocarbons by Method NWTPH-Dx.

If the petroleum hydrocarbon PCLs are not achieved following initial excavation in the East Area or West Area, the excavation will be extended vertically in 1-ft increments until the PCLs are met. If the petroleum hydrocarbons PCLs are not achieved in the sidewall samples collected in the West Area, the excavation will be extended laterally in about 5-ft increments until the PCLs are met.

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 lateral and vertical limits of the excavations, the volume of contaminated soil removed from each excavation, and the results of post-excavation compliance monitoring. Post-excavation compliance monitoring results will be used to represent current conditions in the boatyard area in the RI/FS. The summary technical memorandum will be included as an appendix to the RI/FS report.

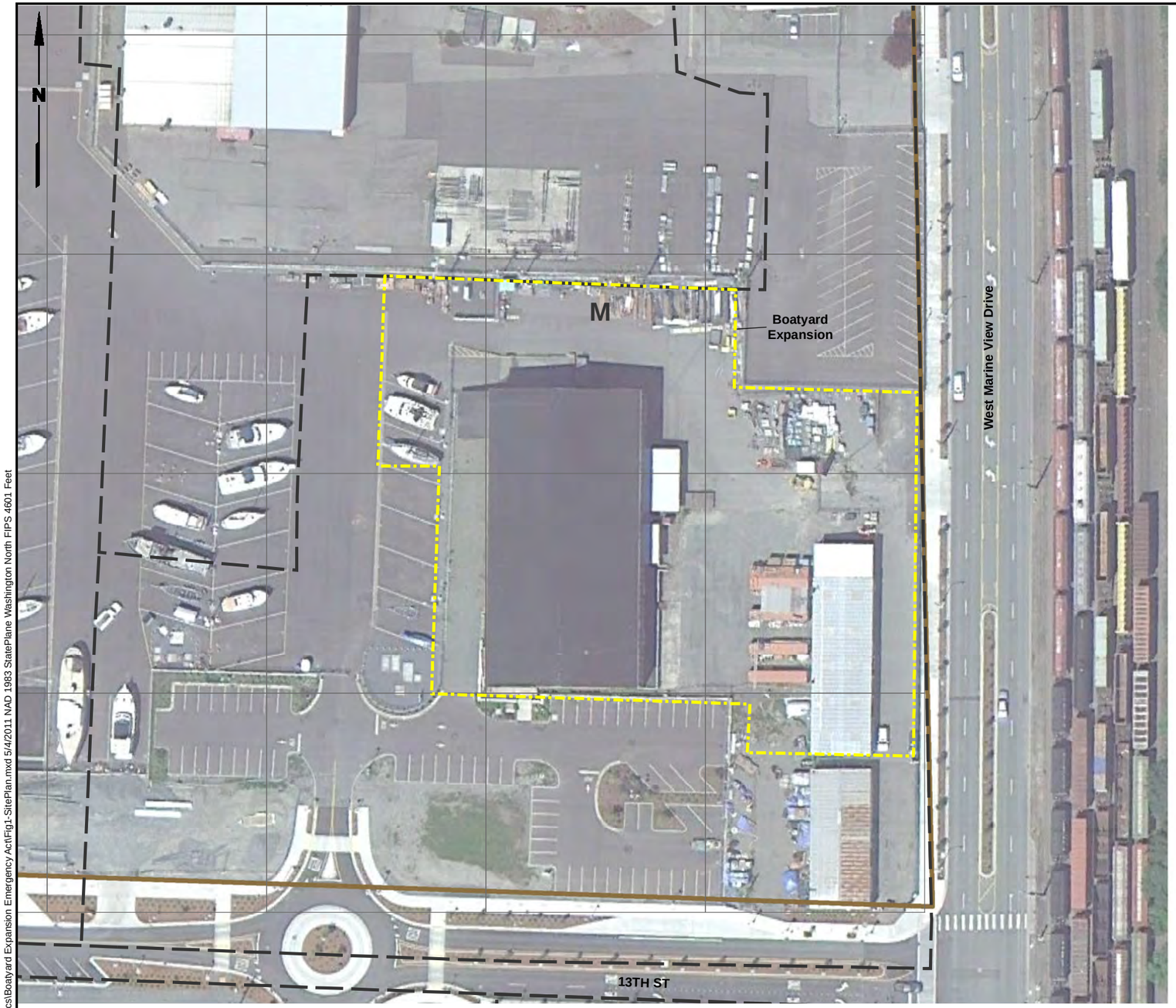
LIMITATIONS

This document was prepared for the exclusive use of the Port of Everett for specific application to the Craftsman District Boatyard Expansion Emergency Action. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of the Port and Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review

and authorization by the Port and Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

ATTACHMENTS

Figure 1: Site Plan
Figure 2: Craftsman District Soil Sample Locations and Exceedances of Preliminary Screening Levels
Figure 3: Emergency Action Cleanup Areas
Table 1: Soil Analytical Results



Legend

- Boatyard Expansion
- Approximate Ameron/Hulbert Site Boundary
- **M** - Area Designation

Note
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 80 160

Scale in Feet

Y:\Projects\147029\Mapdocs\Boatyard Expansion Emergency Act\Fig1-SitePlan.mxd 5/4/2011 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Data Source: Google Earth Pro (2011 Image)

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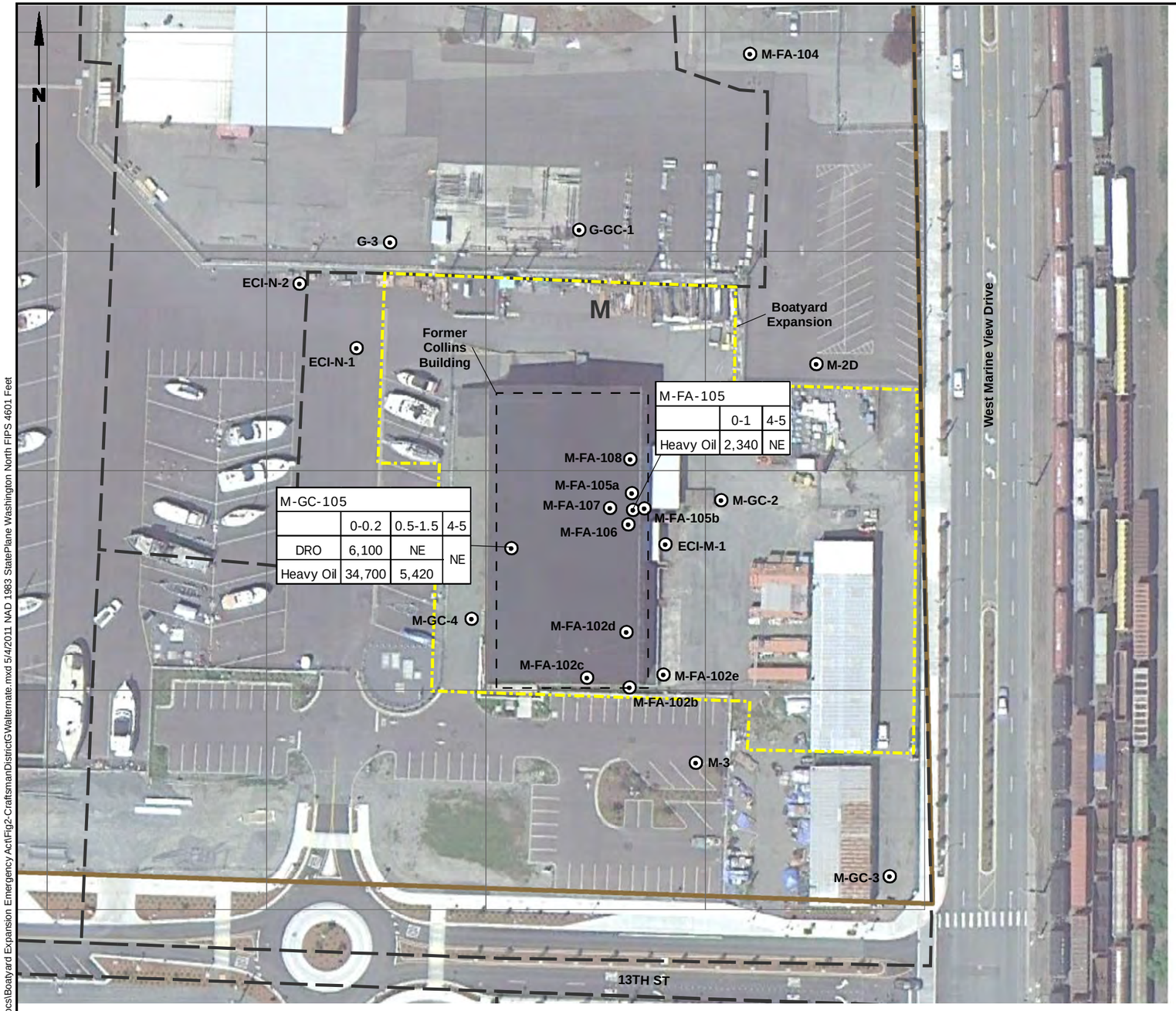
North Marina Ameron/Hulbert Site Boatyard Expansion Emergency Action Port of Everett, Washington	**Site Plan**	Figure 1



Legend

- Soil Boring Location
- Boatyard Expansion
- 150' Sample Grid
- Approximate Ameron/Hulbert Site Boundary
- M - Area Designation

Sample Location	
	Depth in Feet
Constituent	Result in mg/kg

0 80 160

Scale in Feet

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.
2. NE = No Exceedance
3. PSL = 2,000 mg/kg

Data Source: Google Earth Pro (2011 Image)

Y:\Projects\147029\Mapdocs\Boatyard Expansion Emergency Act\Fig2-CraftsmanDistrictGWalternate.mxd 5/4/2011 NAD 1983 StatePlane Washington North FIPS 4601 Feet

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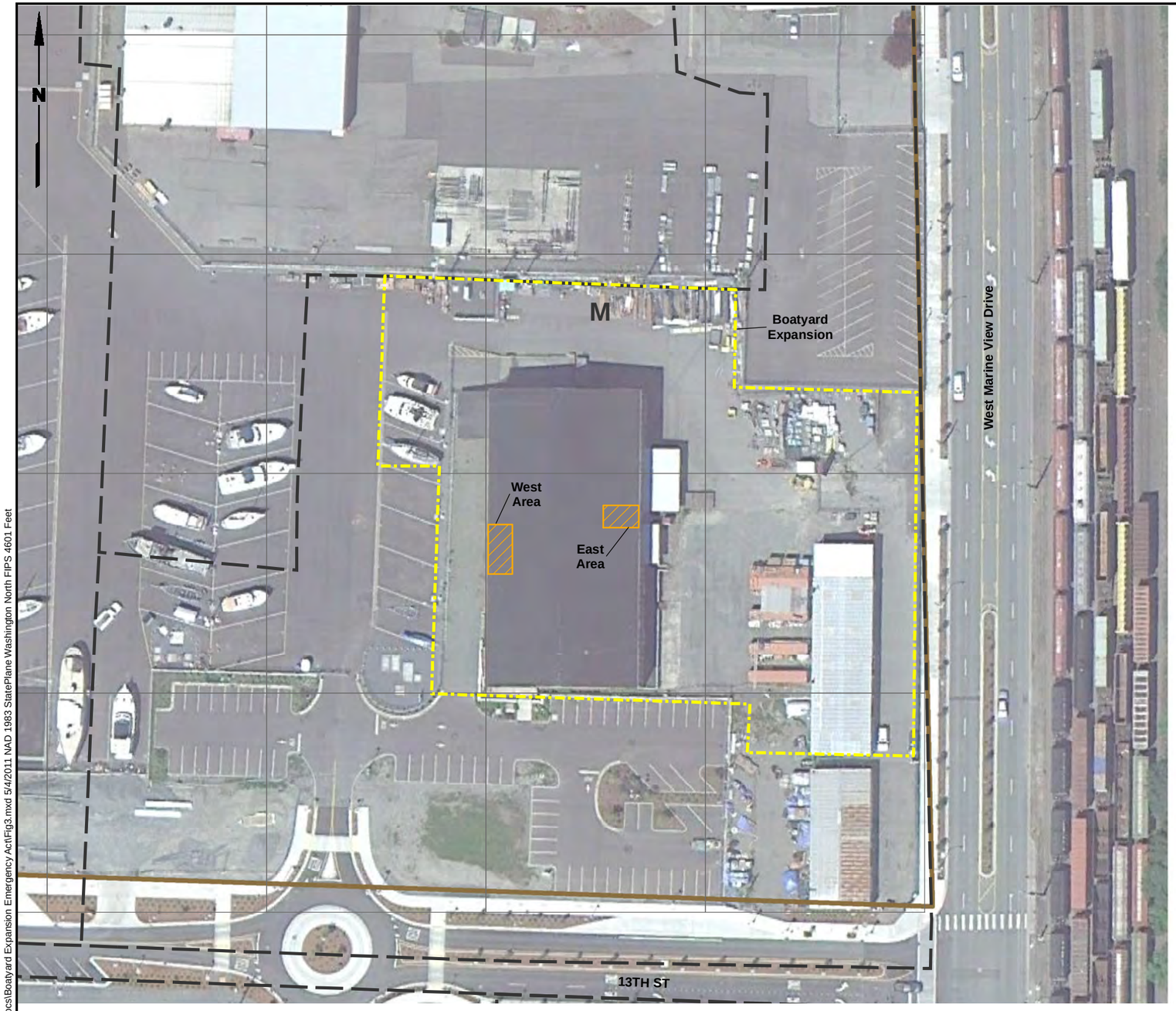
North Marina Ameron/Hulbert Site Boatyard Expansion Emergency Action Port of Everett, Washington	**Boatyard Expansion Area Soil Sample Locations and Exceedances of Preliminary Screening Levels**	Figure 2



Legend

- Boatyard Expansion
- Approximate Ameron/Hulbert Site Boundary
- M - Area Designation
- Approximate Location of Proposed Emergency Action Cleanup Areas

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 80 160

Scale in Feet

Y:\Projects\147029\Mapdocs\Boatyard Expansion Emergency Act\Fig3.mxd 5/4/2011 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Data Source: Google Earth Pro (2011 Image)

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North Marina Ameron/Hulbert Site Boatyard Expansion Emergency Action Port of Everett, Washington	**Emergency Action Cleanup Areas**	Figure 3

TABLE 1
SOIL ANALYTICAL RESULTS
PROPOSED CRAFTSMAN DISTRICT EXPANSION AREA
AMERON/HULBERT RI/FS
PORT OF EVERETT

	Preliminary Screening Level	M-FA-102c (0-1) SP04B 3/28/2011	M-FA-102d (0-1) SP04C 3/28/2011	M-FA-102e (0-1) SP04D 3/28/2011	M-FA-105 (0-1) CHM110202-5/CHM110131-4 1/28/2011	M-FA-105 (4-5) CHM110207-1 1/28/2011	M-FA-105a (0-1) SO09A 03/18/2011	M-FA-105b (0-1) SO09B 03/18/2011	M-FA-106(0-1) CHM101202-16/CHM110131-4 12/2/2010	M-FA-107 (0-1) CHM110131-4 1/28/2011	M-FA-108 (0-1) CHM110131-4 1/28/2011	M-GC-105 (0-0.2) CHM110131-4/CHM110202-5 1/29/2011	Dup of M-GC-105 (0-0.2) M-GC-10502 (0-0.2) CHM110131-4/CHM110202-5 1/29/2011
NWTPH-HCID (µg/L)													
Gasoline	30/100				20 U				20 U	20 U	20 U	20 U	20 U
Mineral Spirits	2,000				30 U				30 U	30 U	30 U	30 U	30 U
Kerosene	2,000				50 U				50 U	50 U	50 U	50 U	50 U
Diesel Range Organics (DRO)	2,000				50 U				50 U	50 U	50 U	50 U	50 U
Diesel (Fuel Oil)	2,000				**D**				50 U	50 U	50 U	**D**	**D**
Mineral Oil	4,000				100 U				100 U	100 U	100 U	100 U	100 U
Heavy Oil	2,000				100 U				100 U	100 U	100 U	100 U	100 U
Heavy Oil Range Organics	2,000				**D**				100 U	100 U	100 U	**D**	**D**
NWTPH-Dx (mg/kg)													
Diesel Range Organics (DRO)	2,000	**6.0**	**22**	**5.4**	**153**	20 U	**33**	5.6 U				**6100**	
Diesel (Fuel Oil)	2,000				20 U	20 U						20 U	
Mineral Oil	4,000				40 U	40 U							
Heavy Oil	2,000				50 U	50 U						50 U	
Heavy Oil Range Organics	2,000	**12**	**75**	**11**	**2340**	50 U	**260**	**44**				**34700**	
EXTRACTABLE PETROLEUM HYDROCARBONS (mg/kg)													
Aromatic Hydrocarbons													
C8-C10					**38.5** J								
C10-C12					**2.97** J								
C12-C16					**18.0** J								
C16-C21					**104** J								
C21-C34					**597** J								
Aliphatic Hydrocarbons													
C8-C10					**30.1** J								
C10-C12					**3.66** J								
C12-C16					**23.5** J								
C16-C21					**370** J								
C21-C34					**1200** J								

TABLE 1
SOIL ANALYTICAL RESULTS
PROPOSED CRAFTSMAN DISTRICT EXPANSION AREA
AMERON/HULBERT RI/FS
PORT OF EVERETT

	M-GC-105 (0.5-1.5) CHM110207-1 1/29/2011	M-GC-105 (4-5) CHM110209-8 1/29/2011
NWTPH-HCID (µg/L)		
Gasoline		
Mineral Spirits		
Kerosene		
Diesel Range Organics (DRO)		
Diesel (Fuel Oil)		
Mineral Oil		
Heavy Oil		
Heavy Oil Range Organics		
NWTPH-Dx (mg/kg)		
Diesel Range Organics (DRO)	**872**	
Diesel (Fuel Oil)	20 U	20 U
Mineral Oil	40 U	40 U
Heavy Oil	50 U	50 U
Heavy Oil Range Organics	**5420**	
EXTRACTABLE PETROLEUM HYDROCARB(		
Aromatic Hydrocarbons		
C8-C10		
C10-C12		
C12-C16		
C16-C21		
C21-C34		
Aliphatic Hydrocarbons		
C8-C10		
C10-C12		
C12-C16		
C16-C21		
C21-C34		

D = Indicates detection at or above the listed reporting limit
U = Indicates the compound was undetected at the reported concentration.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
Bold = Detected compound.
Boxed value indicates exceedance of preliminary screening level.