AECOM
710 Second Avenue, Suite 1000
Seattle, WA 98104

206.624.9349 tel
206.623.3793 fax

Memorandum

To	Brian Sato, Department of Ecology	Page 1
CC	Brian Gouran, Port of Bellingham	
Subject	Central Waterfront RI/FS Work Plan Addendum 2—Port of Bellingham, Washington	
From	Halah Voges (Anchor QEA) and Jason Palmer	
Date	April 13, 2012	

On behalf of the Port of Bellingham (Port), this memorandum presents a second Work Plan addendum for the RI/FS being conducted at the Central Waterfront site in Bellingham, Washington in accordance with the Washington State Department of Ecology (Ecology) Agreed Order DE 3441. The scope of work described in this addendum is the result of a collaborative process, including our March 30, 2012 meeting, between the Port and Ecology designed to identify potential near shore (upland and intertidal zone) sources of contamination causing the sheens observed along the southern shoreline of the Chevron subarea of the Central Waterfront Site. The intent of the investigation is to augment existing data from previous investigations and provide adequate information to allow for the development of potential interim remediation action(s) at the Chevron subarea shoreline.

Scope of Work

The scope of work described in this addendum includes surface and subsurface soil investigation in the upland and beach areas of the subarea described above. These investigations will be completed by hand-digging shallow test pits on the beach, beach hand auger sampling and direct push sampling immediately upland of the beach.

Beach Soil Sampling

The scope of the beach soil sampling is designed to evaluate the extent of petroleum impacts causing sheens along the shoreline. This will be accomplished using two methods: (1) hand-digging shallow test pits with a shovel and (2) hand auger or hand probe techniques. Up to 20 shallow test pits will be placed throughout the beach area for observational purposes and possible collection of samples for laboratory analysis. Information gleaned from the test pits will help inform the location of hand auger/hand probe borings. The hand auger or hand probe will be utilized at 8 locations. As shown in Figure 1, the beach hand auger/probe borings will be generally located between the land to the northwest and the dock to the northeast in the intertidal zone (between mean high water and mean lower low water). Two of these borings will be placed near the failing bulk head close to the mean lower low water elevation, while the other 6 hand borings will be located based on the test pit observations and spatial coverage.

Test pits will be dug by hand using a shovel to a depth of 1-2 feet and observed for evidence of petroleum sheen or lenses in the side walls. These qualitative observations will be recorded in field notes for documentation of field conditions. Hand borings will be completed by hand-hammering a lined, 5-foot long stainless steel sampler, normally used with a direct push rig. As the sampler is advanced, soil/sediment is driven into an inner 1.5-inch diameter, 5-foot long clear acetate liner. After being driven 4 to 5 feet, the sampler will be removed from the boring. All locations (shallow test pits and borings) will be filled with the native beach material, with a preference for un-impacted sands/soils at the surface to minimize sheens.

Two to three soil samples will be collected from each of the hand borings, and possibly one soil sample will be collected from up to 6 of the shallow test pits. Samples will be collected from 1-2 foot intervals exhibiting the strongest observed evidence of contamination (i.e. olfactory, PID, visual, sheen and/or "paper towel" test) and submitted for laboratory analysis of total petroleum hydrocarbons (TPH) as gasoline and diesel/heavy oil by NWTPH-G and NWTPH-Dx methods, respectively. We may also analyze one or more soil samples for total organic carbon (TOC) by EPA Method 9060M. The bottom interval of each boring may be sampled and submitted for laboratory analysis if it is observed to be free of contaminants.

Direct Push Subsurface Soil Sampling

An excavation along the shoreline was completed 2001 to remove surface and subsurface petroleum impacts that historically caused sheens at the same approximate location they are currently observed. Direct push borings and subsurface soil sampling are intended to confirm the lateral and vertical extent of the 2001 excavation, which was not well documented, and to provide information on the potential continuity of hydrocarbon impacts on the beach with upland sources that could be contributing to the observed sheens.

Soil samples will be collected from five borings located immediately adjacent to the shoreline and one boring located approximately 25 feet upgradient of the shoreline, as shown in Figure 1. Sampling will be conducted to a proposed depth of 22 feet bgs or (deeper) until clean material is observed in the boring. The proposed sampling depth is based on a review of historic data collected previously in this area, as shown in Figures 2 and 3. These borings will be completed by direct push methods as described in Appendix A to the *Work Plan for a Remedial Investigation & Feasibility Study* (RETEC 2007).

Two to three soil samples will be collected from each boring from 1-2 foot intervals exhibiting the strongest observed evidence of contamination (i.e. olfactory, PID, visual, sheen and/or "paper towel" test) and at depth where soil is observed to be free of contaminants. Samples will be submitted for laboratory analysis of NWTPH-G, NWTPH-Dx and possibly TOC.

Additionally, based on field observations, a monitoring well may be installed in one of the upland borings using direct push methods and will utilize pre-packed ¾- to 1-inch diameter well screens that are 5 feet in length. The monitoring well will be installed and a flush mount monument will complete the well as described in Appendix A to the *Work Plan for a Remedial Investigation & Feasibility Study* (RETEC 2007).

Subsurface Utility Locate

Prior to initiating field work, all upland boring locations will be cleared for underground utilities by Washington State One Call, public utility locator, and by Applied Professional Services, Inc., a private utility locator. If the surveys indicate that a boring must be relocated to avoid utilities or any

other subsurface obstructions, the new location will be as close as practical to the original location to meet the original objective.

Survey

Prior to beach sampling, a licensed surveyor will mark the beach with elevation stakes for reference during the field investigation. Once field work has been completed, the same surveyor will survey all locations completed during the field effort for elevation and horizontal coordinates.

Investigation-Derived Waste

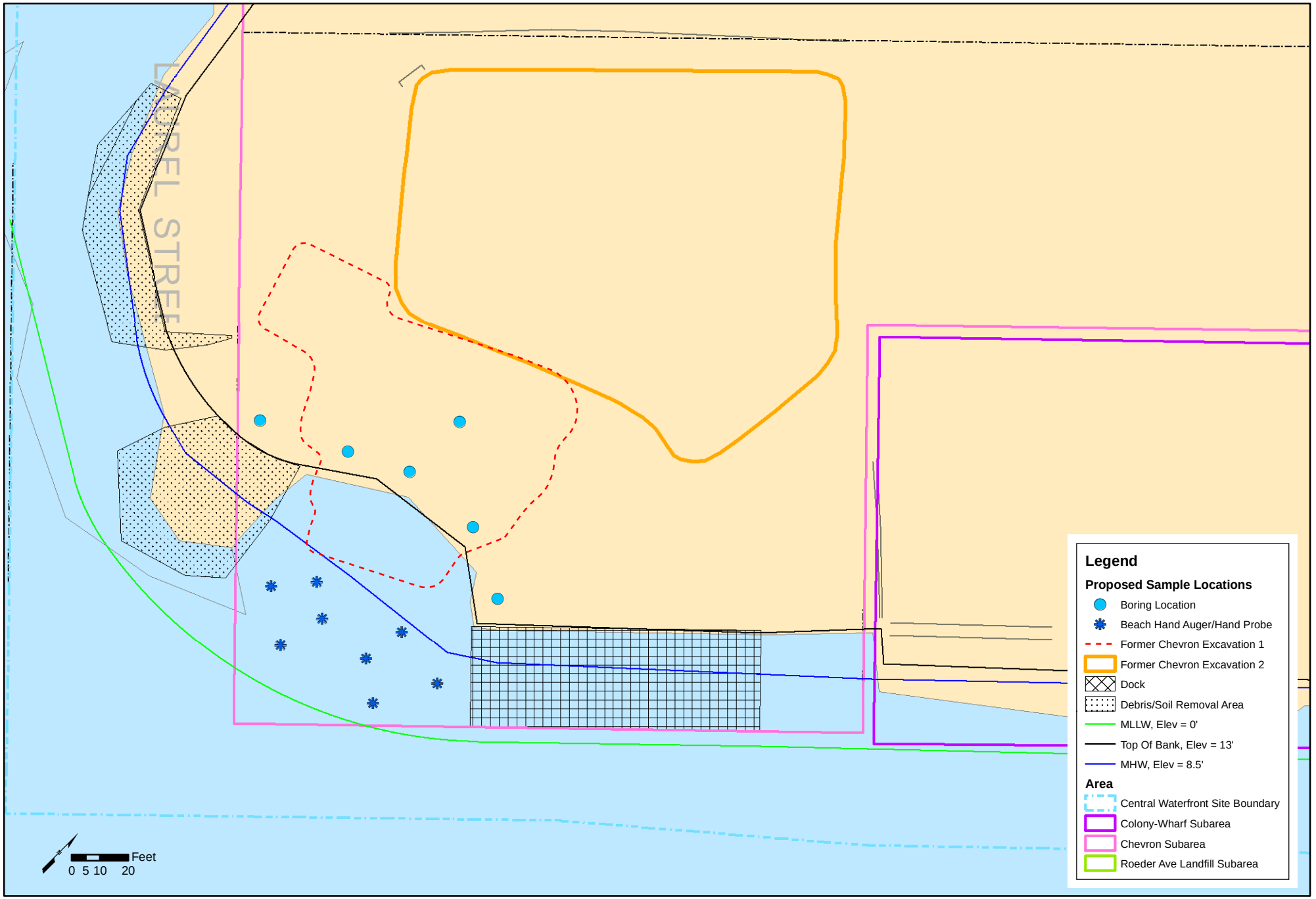
All residual soil/sediment and decontamination water will be collected into 15 or 55-gallon drums provided by the drilling company. The drums will be stored on site pending chemistry results. AECOM will then coordinate disposal of the material with the Port.

Schedule

Field work is tentatively scheduled to be completed from May 3rd through May 9th. As discussed during the March 30 meeting, we will have best access to the area of the beach closest to the failing bulk head if work is coordinated with low tide events. Based on the tide table for Bellingham Bay, the following low tide elevations/times are predicted for this time period:

Date	Low tide elevation from tide chart (ft MSL)	Time	Activity Planned
Thursday - 5/3/12	0.7	9:44 AM	Mark locations for utility locate
Friday - 5/4/12	-0.6	10:23 AM	Survey elevations of beach, private utility locate
Monday - 5/7/12	-2.7	12:35 PM	Completion of upland borings
Tuesday - 5/8/12	-2.6	1:23 PM	Completion of shallow test pits and borings on the beach

As shown in the table, beach sampling has been scheduled to coincide with a seasonal low tide event.



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Port of Bellingham Central Waterfront (60139509)			**AECOM Proposed Sample Locations**
DATE: 04/03/12	DWRN:mvi/SEA	Revision: 0	**FIGURE 1**

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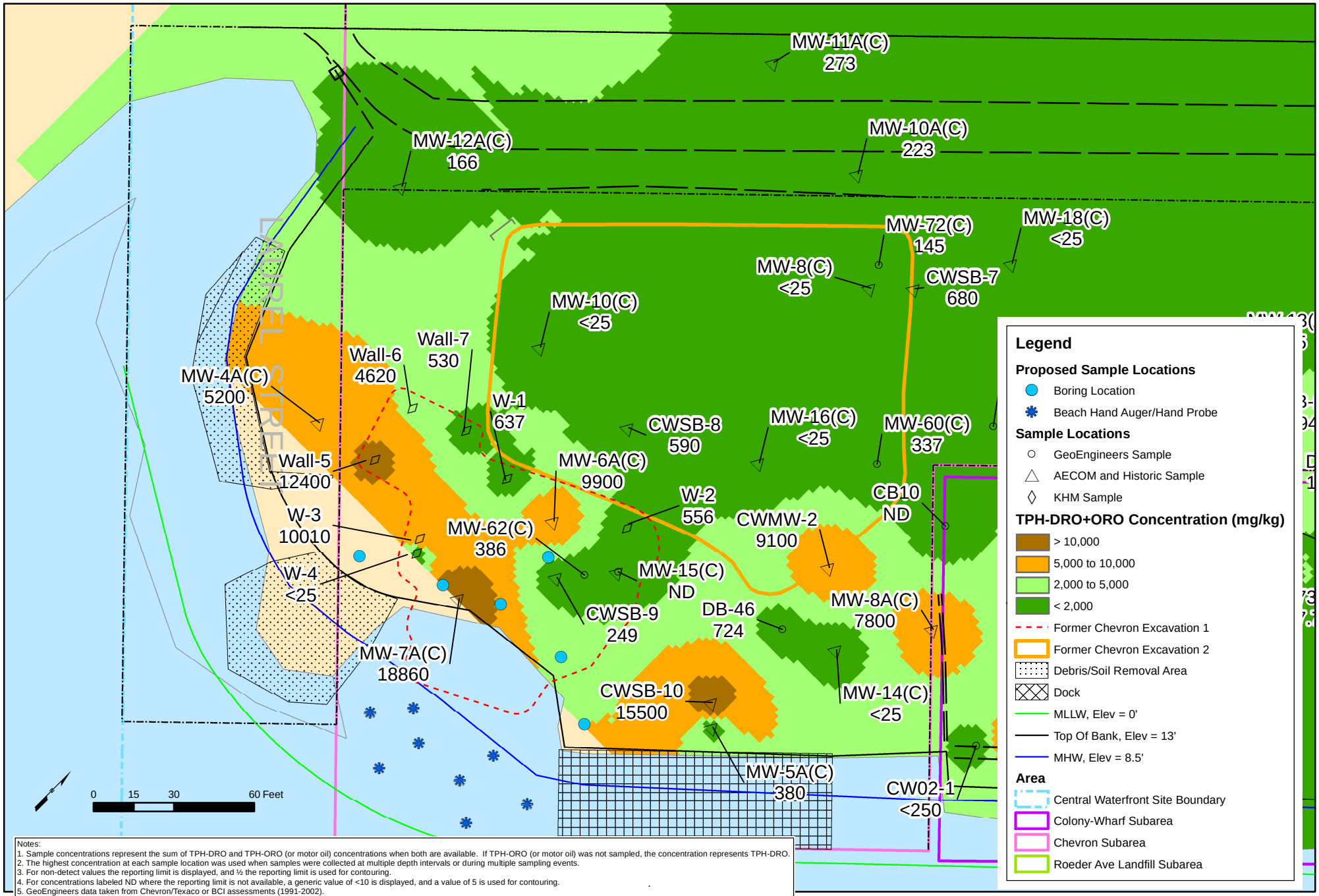

Notes:
1. Sample concentrations represent the sum of TPH-DRO and TPH-ORO (or motor oil) concentrations when both are available. If TPH-ORO (or motor oil) was not sampled, the concentration represents TPH-DRO.
2. The highest concentration at each sample location was used when samples were collected at multiple depth intervals or during multiple sampling events.
3. For non-detect values the reporting limit is displayed, and ½ the reporting limit is used for contouring.
4. For concentrations labeled ND where the reporting limit is not available, a generic value of <10 is displayed, and a value of 5 is used for contouring.
5. GeoEngineers data taken from Chevron/Texaco or BCI assessments (1991-2002).
6. GeoEngineers, KHM, and historic AECOM sample locations are approximate. These locations were approximate from previous figures.
7. Former Chevron Excavation 1 location approximate; digitized from "not to scale" pre-existing figure.
8. Top of Bank, MHW, and MLLW elevation contours represent approximate post-remediation (following placement of sediment cap) elevations.
9. Sediment cap thickness in the shoreline areas is approximately 6 feet.
10. Debris/Soil Removal Area locations represent shoreline remediation work planned for completion during Season 1 of the Whatcom Waterway cleanup effort.
* Denotes surveyed location, all other locations are approximate.

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Port of Bellingham Central Waterfront (60139509)		**Proposed Sample Locations Including TPH-DRO+ORO Soil Concentrations**
DATE: 02/27/12	DWRN:mvi/SEA	Revision: 0
		FIGURE 2

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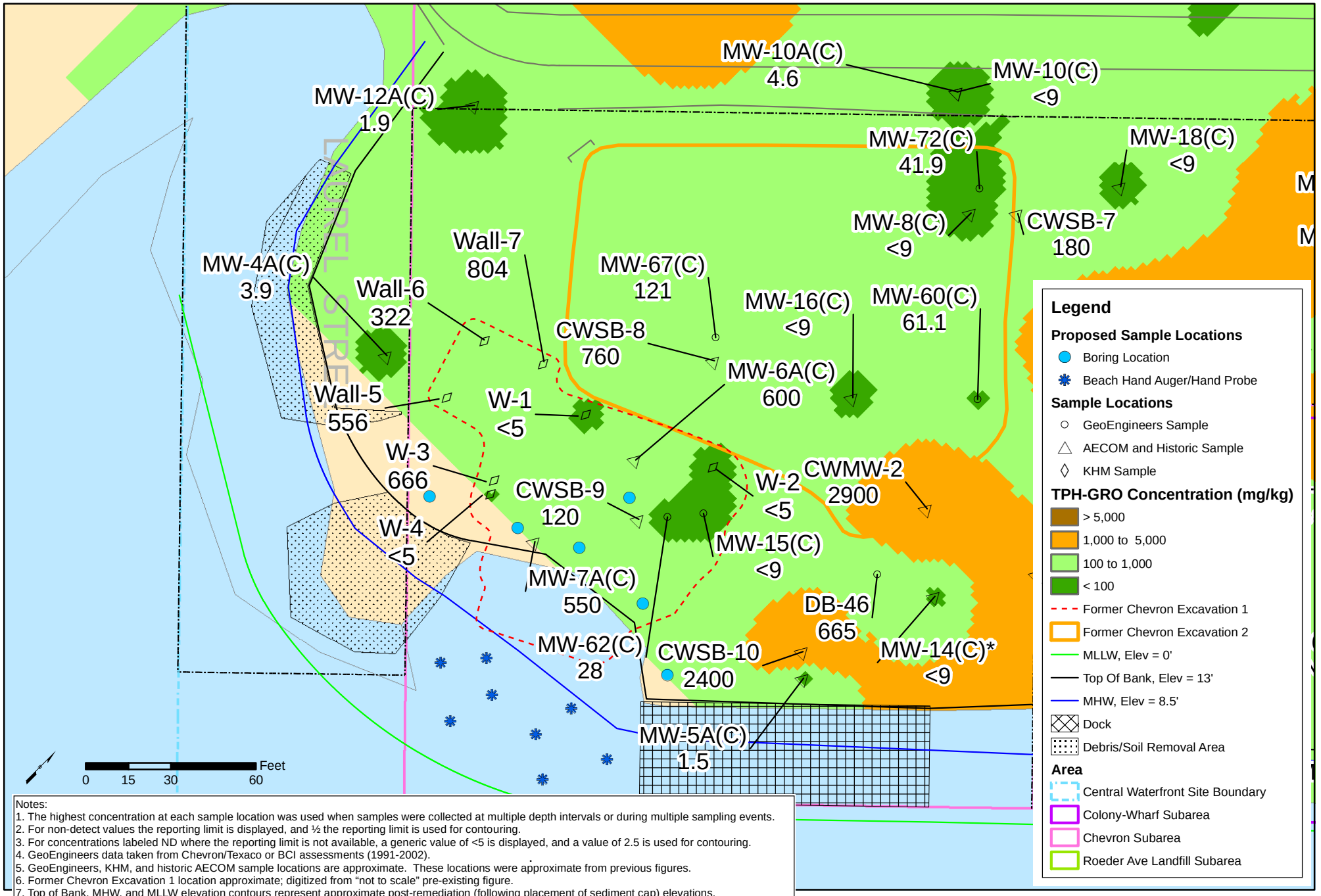

Notes:
1. The highest concentration at each sample location was used when samples were collected at multiple depth intervals or during multiple sampling events.
2. For non-detect values the reporting limit is displayed, and ½ the reporting limit is used for contouring.
3. For concentrations labeled ND where the reporting limit is not available, a generic value of <5 is displayed, and a value of 2.5 is used for contouring.
4. GeoEngineers data taken from Chevron/Texaco or BCI assessments (1991-2002).
5. GeoEngineers, KHM, and historic AECOM sample locations are approximate. These locations were approximate from previous figures.
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* Denotes surveyed location, all other locations are approximate.

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Port of Bellingham Central Waterfront (60139509)			**Proposed Sample Locations Including TPH-GRO Soil Concentrations**
DATE: 04/03/12	DWRN:mvi/SEA	Revision: 0	**FIGURE 3**

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