TECHNICAL MEMORANDUM

LANDAU ASSOCIATES
ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

TO: Ms. Mary O'Herron, Washington State Department of Ecology

FROM: Larry Beard, L.H.G. and Evalyn Albright

DATE: November 29, 2006

RE: WELDCRAFT STEEL AND MARINE (GATE 2 BOATYARD) SITE SUPPLEMENTAL REMEDIAL INVESTIGATION WORK PLAN ADDENDUM

INTRODUCTION

This technical memorandum presents an addendum to the *Supplemental Remedial Investigation (RI) Work Plan, Weldcraft Steel and Marine (Gate 2 Boatyard) Site* dated April 21, 2006, to conduct supplemental site characterization activities at the Weldcraft Steel and Marine site in Bellingham, Washington. The RI activities are being conducted under Agreed Order DE 03TCPBE-5623 between the Port of Bellingham (Port) and the Washington State Department of Ecology (Ecology) for remedial action at the site. The site is owned by the Port and is currently occupied by its tenant, Seaview Boatyard. Figure 1 is a site plan showing existing site features and the investigation area.

The metals groundwater results from the recent sampling performed as part of the Supplemental RI indicate elevated concentrations of zinc and nickel in monitoring wells MW-10, MW-11, and MW-12, which were installed during the Supplemental RI field activities. These wells were installed as close as practical to the recently constructed galvanized sheetpile bulkhead and exhibited higher concentrations than observed in previously existing monitoring wells MW-3, MW-4, and MW-7 located about 20 ft farther upgradient. Copper is also more elevated in one of the new wells (MW-11), but copper concentrations for the other two well pairs are similar in the upgradient and downgradient wells.

The available groundwater data indicate that the elevated metals concentrations are not a background condition, and may result from corrosion of the galvanized sheetpile bulkhead and tieback anchors. This work plan addendum presents the scope of work for additional groundwater and surface water quality monitoring to further evaluate the cause of the elevated metals concentrations in the shoreline vicinity, and to develop an approach for achieving compliance with groundwater cleanup standards.

SCOPE OF WORK

The scope of work addressed in this work plan addendum includes the following activities:

- Collection of two additional rounds of groundwater samples at selected groundwater monitoring wells.

- Collection of groundwater samples from up to three weep hole locations at the base of the sheetpile bulkhead.

- Collect one background surface water quality sample from Squalicum Outer Harbor at distance from the site.

The following sections describe the methods and procedures that will be used for groundwater and surface water sample collection activities. Sample transport, handling, custody, and documentation procedures, equipment decontamination procedures, waste management, health and safety, quality assurance and quality control procedures will be conducted using procedures outlined in the Supplemental RI Work Plan.

Groundwater Sampling

Groundwater sampling activities will be performed using the procedures outlined in the Supplemental RI Work Plan (Landau Associates 2006). Groundwater elevation data will be collected from all onsite wells (MW-1 through MW-12) prior to collection of water quality samples. Groundwater samples will be collected, using low-flow sampling techniques, from monitoring wells MW-3, MW-4, MW-7, MW10, MW-11, and MW-12, and analyzed for dissolved copper, nickel, zinc, nitrate, and sulfate. In addition to the field parameters identified in the Supplemental RI Work Plan [pH, temperature, conductivity, dissolved oxygen (DO), and turbidity], oxidation/reduction potential (ORP) and ferrous iron data will be collected from each groundwater monitoring well prior to sample collection. Groundwater monitoring well locations are shown on Figure 1.

Groundwater quality monitoring will be conducted during both low and high tidal cycles to evaluate the impact of tidal stage on groundwater quality. The two sampling rounds will be conducted during the maximum high tide and minimum low tide during a "spring tide" tidal cycle; spring tides occur during the full moon and the new moon phases and represent the greatest tidal extremes within the lunar tidal cycle. The two sampling rounds will be conducted within a 24-hour time period during either a full moon or new moon phase.

Weep Hole Sampling

Groundwater samples will be collected from up to four weep holes located along the base of the sheetpile bulkhead. Three samples will be collected from weep holes located most directly downgradient from monitoring wells MW-10, MW-11, and MW-12. An additional sample will be collected from the weep hole located in the vicinity of the former marine railway well that discharges at a high flow rate, if this weep hole does not represent one of the three downgradient weep holes. Only one round of samples

will be conducted since the weep holes will be submerged during the high tide groundwater sampling event.

Groundwater samples will be collected by slowly filling laboratory supplied containers with water as it flows out of the bulkhead weep hole. Groundwater samples will be analyzed for dissolved copper, nickel, and zinc, nitrate, sulfate, gasoline-range petroleum hydrocarbons, benzene, toluene, ethylbenzene, and total xylenes. As part of the gasoline-range petroleum hydrocarbon analysis, quantification of trimethylbenzene (TMB) isomers using EPA Method 8260 will be requested. In addition, pH, temperature, conductivity, dissolved oxygen (DO), turbidity, ORP, and ferrous iron data will be collected in the field.

Surface Water Quality Sampling

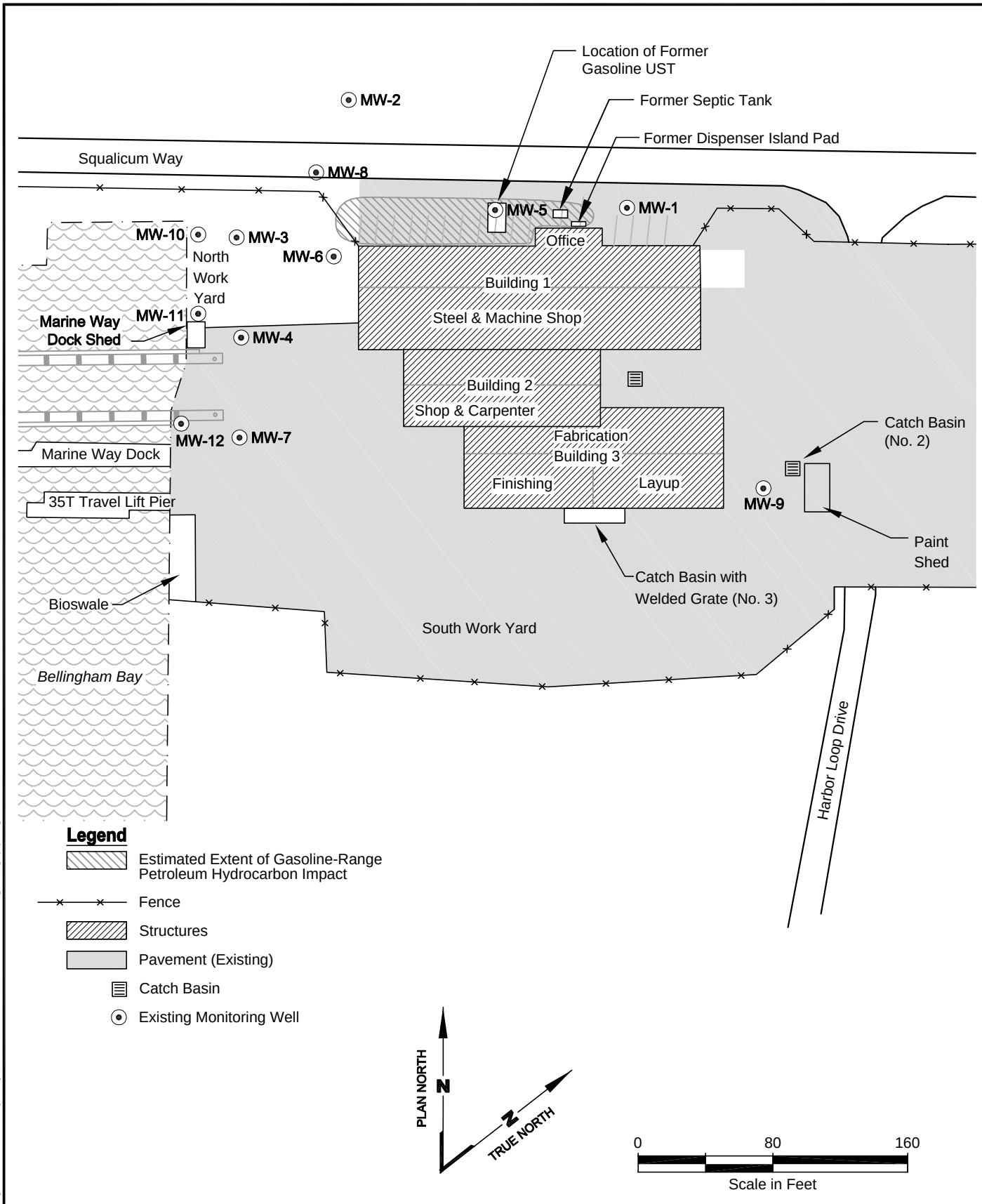
One surface water quality sample will be collected from Squalicum Outer Harbor at a location distant from the site to assist in evaluating the influence of surface water on groundwater quality. The specific sampling location has not been selected, but will be located about 500 ft from the site to ensure that it is not affected by site groundwater discharge.

The surface water sample will be collected by lowering a capped, unpreserved, laboratory-supplied sample bottle beneath the water surface to avoid entraining any surface debris in the sample. The bottle will then be slowly uncapped and allowed to fill, and will be recapped prior to removal from the water. The full sample bottle will be used to fill laboratory-provided sample bottles containing the appropriate preservative, as applicable. The same field parameters will be measured for surface water as described above for groundwater samples, and the surface water quality sample will be tested for the same analytical parameters as groundwater samples.

REPORTING

The results of this investigation will be presented with other supplemental RI data in the revised RI/FS report. The revised RI/FS report will also address Ecology comments from the previous draft.

LDB/rgm



Port of Bellingham/Gate 2 Boatyard | V:\0010\024\270\DWP Addendum\Fig1.dwg (A) "Figure 1" 11/29/2006

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Port of Bellingham Gate 2 Boatyard Bellingham, Washington	**Supplemental RI WP Addendum**	Figure **1**