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MEMORANDUM

To: Joyce Mercuri, Washington State Department of Ecology
Date: July 22, 2011, 2011

From: David Templeton and Joy Dunay, Anchor QEA
Project: 040289-02.06

Cc: Steve Misiurak, City of Gig Harbor
William Joyce, Salter Joyce Ziker, PLLC

Re: Eddon Boat Park Long-Term Monitoring Plan Year 3 Memorandum

This Long-Term Monitoring Plan (LTMP) Year Three (Year 3) memorandum for the Eddon Boat Park Site (Site) was prepared on behalf of the City of Gig Harbor (City) to comply with the requirements in the Washington State Department of Ecology- (Ecology-) approved LTMP (Anchor 2009). The LTMP complies with the requirements described in the Cleanup Action Plan (CAP; Anchor 2008), which is included as an exhibit to the Agreed Order (AO) DE 5597 (Ecology 2008).

The areas assessed in the LTMP are cap area SMU-3 and enhanced natural recovery (ENR) area SMU-2 (Figure 1). SMU-3 contained three of ten sample locations that exceeded the total mercury sediment quality standard (SQS) cleanup levels. Additionally, three samples in this area contained tributyltin (TBT) above benchmark values established by Ecology, as described in the CAP. As part of the cleanup action, this area was capped with 12 inches of sand and overlain by 6 inches of habitat mix. SMU-2 contained total mercury above the cleanup screening level (CSL) and TBT porewater above Site cleanup levels (0.15 micrograms per liter [$\mu\text{g/L}$]), and was dredged to 2 feet below mudline and then overdredged to remove possible contaminated residuals. Post-construction, one location in this area (SE-03) exceeded the TBT Site cleanup level; therefore, ENR material consisting of a 1-foot sand layer was placed, followed by a 6-inch habitat mix layer.

The objectives of the Year 3 monitoring event were to confirm chemical concentrations of total mercury, total organic carbon, and TBT in the sand layer of the cap and to visually inspect and photograph SMU-2 and SMU-3 to verify that the sediment cap has achieved its performance standard. The performance standard is met if the cap has remained in place, has

not substantially eroded over time by natural and anthropogenic forces, and contains chemical concentration of Site contaminants below SQS cleanup standards. This was assessed by collecting samples at three locations and by performing a visual inspection of the cap surface layer to confirm that the material (i.e., habitat mix) has remained in place. In addition, the visual inspection included the measurement of any accumulations of fine-grained material that have deposited on top of the surface layer (i.e., habitat mix) to determine if more than 2 centimeters (cm) of fine-grained material has accumulated.

Visual inspections were performed on May 18, 2011, between 0900 and 1100 hours. During this time, the tidal elevation ranged from +4.8 to -1.2 mean lower low water (MLLW). This allowed exposure of most of SMU-3 and part of SMU-2. Digital photographs were taken in each area from locations marked on Figure 2 and Figure 3. As shown in the photographs, the cap material is present in all areas with minimal (fewer than 2 cm) accumulation of fine-grained material. The visual inspection did not identify any areas of concern (i.e., areas where cap material is no longer present). Based on the visual survey and associated photographs, the cap and ENR areas are achieving performance standards and no additional remedial actions are recommended.

Chemical monitoring was performed on May 18, 2011, between 1100 and 1210 hours. During this time, the tidal elevation ranged from -1.2 to -3.1 MLLW. This allowed exposure of all proposed sampling locations. Cores were collected using a polycarbonate coring device that was penetrated approximately 1.5 feet below the mudline with a hammering device to reach the sand layer below the gravel surface within the cap material. The core was then extruded with a plunger and the sand layer was carefully segregated into a stainless steel bowl. The sand was then homogenized, placed in the appropriate laboratory sample containers, labeled, placed on ice, and delivered to the laboratory. The analyses performed were total mercury, total organic carbon, total solids, and TBT in bulk sediment (the material was too coarse to extract an adequate volume of porewater). No mercury or TBT were detected in any samples. Actual sample locations are presented in Figure 1. Chemical testing results are provided in Table 1.

Analytical data were validated using *U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Inorganics Data Review* (USEPA 2004) and *USEPA Contract Laboratory Program National Functional Guidelines for*

Organic Data Review (USEPA 1999). The laboratory report and data validation report are provided in Appendix A.

In conclusion, Year 3 monitoring was performed in accordance with the Ecology-approved LTMP. Visual inspection confirmed that the cap material is present in SMU-3 and shows no sign of erosion. As expected, fine-grained material is beginning to accumulate, and recolonization is evident. Similarly, the material placed in SMU-2 is present, has not eroded, and is showing signs of deposition. Chemical monitoring confirmed that Site contaminants are not migrating through the cap to the surface. This information confirms that the cleanup action is functioning as desired and in accordance with the CAP.

Per the LTMP, because Year 3 confirmation sampling confirmed that the cap performance standards are being met, no further sampling is required. Visual inspections will occur during spring low tides for the next 2 years.

Attachments

Table 1	Chemical Testing Results
Figure 1	Site Areas, Features, and Sampling Locations
Figure 2	SMU-3 Visual Inspection Results
Figure 3	SMU-2 Visual Inspection Results

Appendix

Appendix A	Laboratory Data Report
	Data Validation Report

References

Anchor Environmental, LLC (Anchor), 2008. Exhibit B. *Cleanup Action Plan for Eddon Boatyard Site*. Gig Harbor, Washington. June 2008.

Anchor, 2009. *Long-Term Monitoring Plan*. Gig Harbor, Washington. January 2009.

Washington State Department of Ecology (Ecology), 2008. *Agreed Order No. DE 5597*.

U.S. Environmental Protection Agency (USEPA), 1999. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*. USEPA, Office of Emergency and Remedial Response. USEPA 540/R-99/008. October 1999.

USEPA, 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. USEPA Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-04-004. October 2004.

**Table 1
Chemical Testing Results**

Location ID: Sample ID: Sample Date:	Sediment Management Standards		SE01	SE02	SE03
	Sediment Quality Standards	Cleanup Screening Levels	SMU3-SE01-051811 5/18/2011	SMU3-SE02-051811 5/18/2011	SMU2-SE03-051811 5/18/2011
Conventional Parameters (pct)					
Total solids	--	--	83	84.6	83.9
Total organic carbon	--	--	0.087	0.067	0.137
Metals (mg/kg)					
Mercury	0.41	0.59	0.03 U	0.02 U	0.02 U
Butyltins (µg/kg)					
Tributyltin (ion)	--	--	3.3 U	3.7 U	3.7 U
Butyltin (ion)	--	--	3.5 U	3.9 U	3.9 U
Dibutyltin (ion)	--	--	5.0 U	5.5 U	5.6 U

Notes:

Bold = Detected result

J = Estimated value

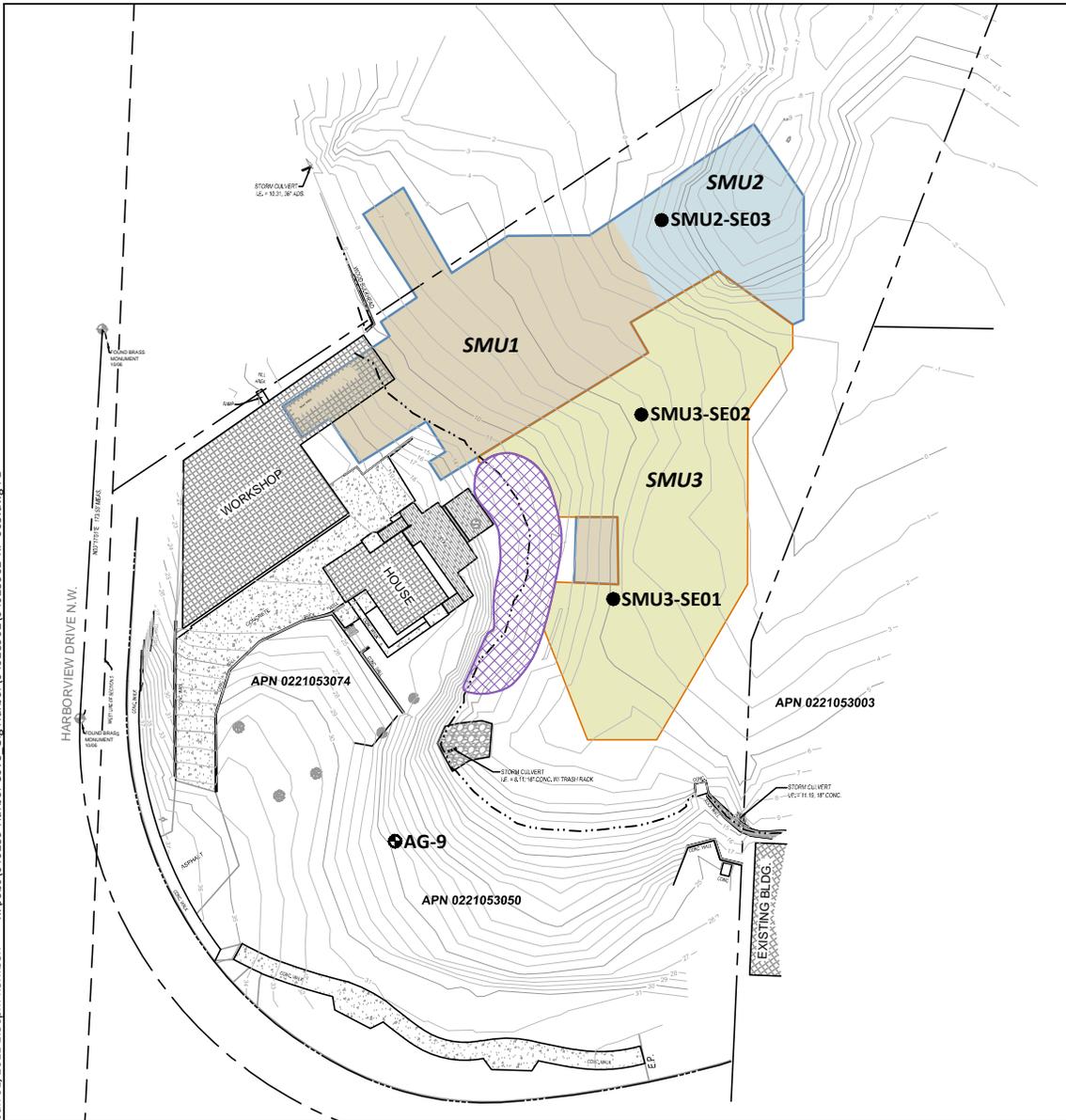
U = Compound analyzed, but not detected above detection limit

-- Not applicable

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

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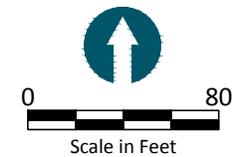


LEGEND:

-  Dredge And Backfill Boundary
-  Enhanced Natural Recovery Area
-  Cap Boundary
-  Existing Salt Marsh Vegetation Restricted Area (No Equipment, Dredging, or Material Placement Allowed)
-  Stormwater Outfall
-  Approximate Ordinary High Water Mark (OHWM)
-  Bathymetric/Topographic Contour (in Feet)
-  Confirmatory Sampling Location - Year 3 Monitoring (2011)

Sample ID	Northing	Easting
SMU2-SE03	736660.123	1122661.351
SMU3-SE01	736491.449	1122639.799
SMU3-SE02	736573.551	1122652.291

Datum: NAD 83 WA SOUTH

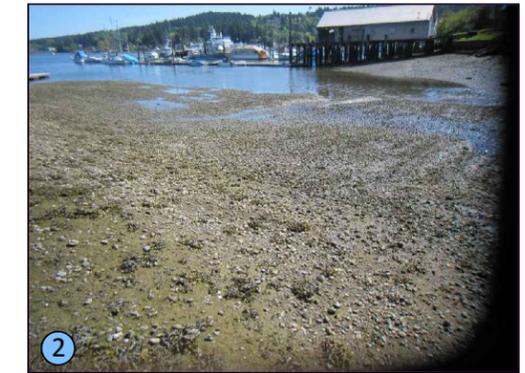
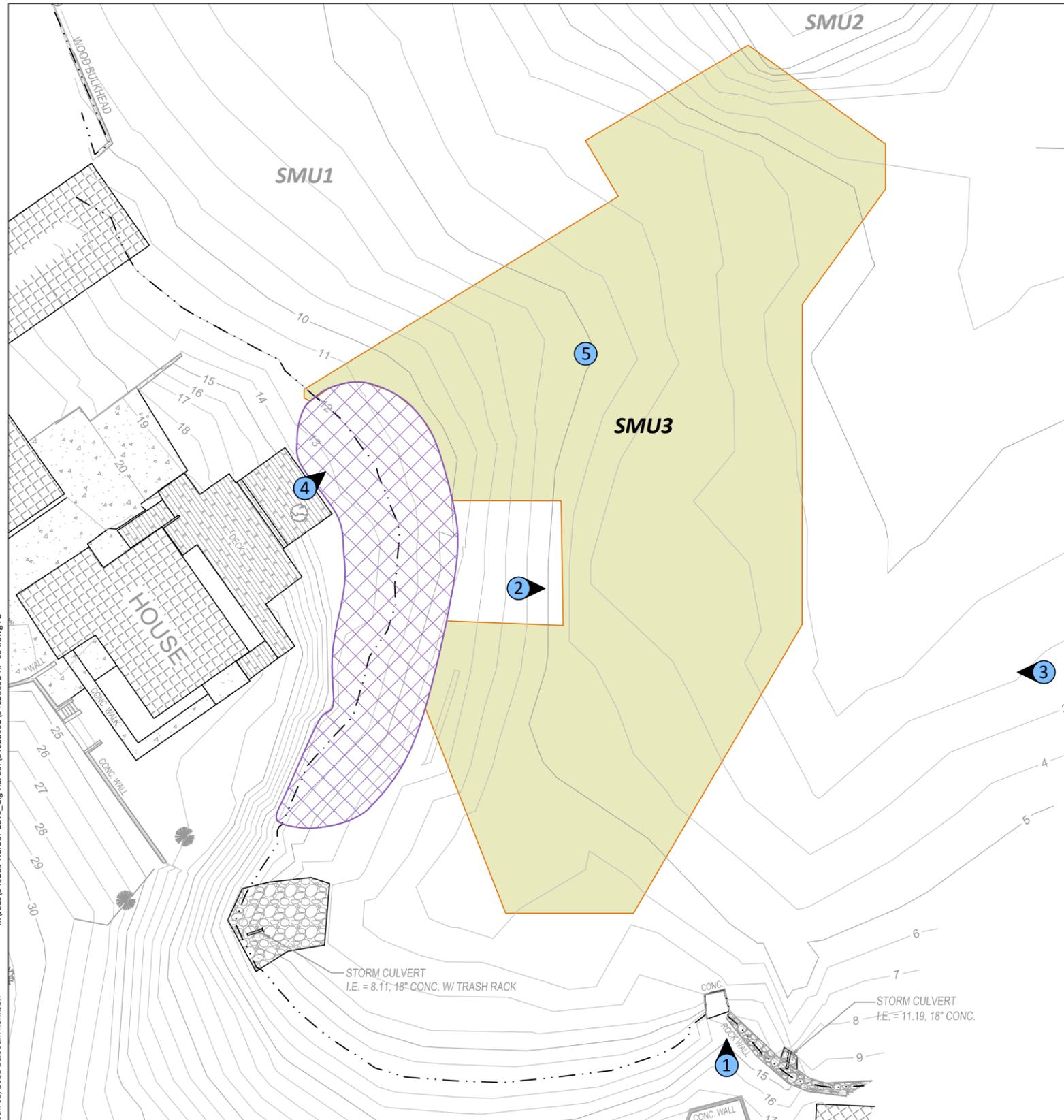


NOTE: Bathymetric and topographic survey by Prizm Surveying, Inc. dated 12/11/2008.

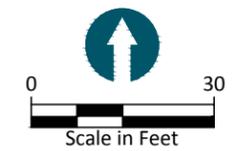


Figure 1
Site Areas, Features, and Sample Locations
Long-Term Monitoring Plan - Year 3 Report
Eddon Boat Park

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- LEGEND:**
-  Cap Boundary
 -  Existing Salt Marsh Vegetation Restricted Area (No Equipment, Dredging, or Material Placement Allowed)
 -  Stormwater Outfall
 -  Approximate Ordinary High Water Mark (OHWM)
 -  Bathymetric/Topographic Contour (in Feet)
 -  Photograph Location and Orientation

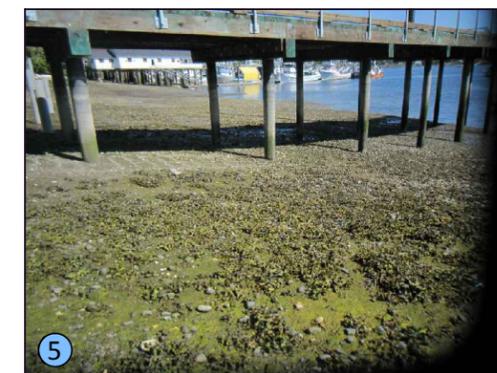
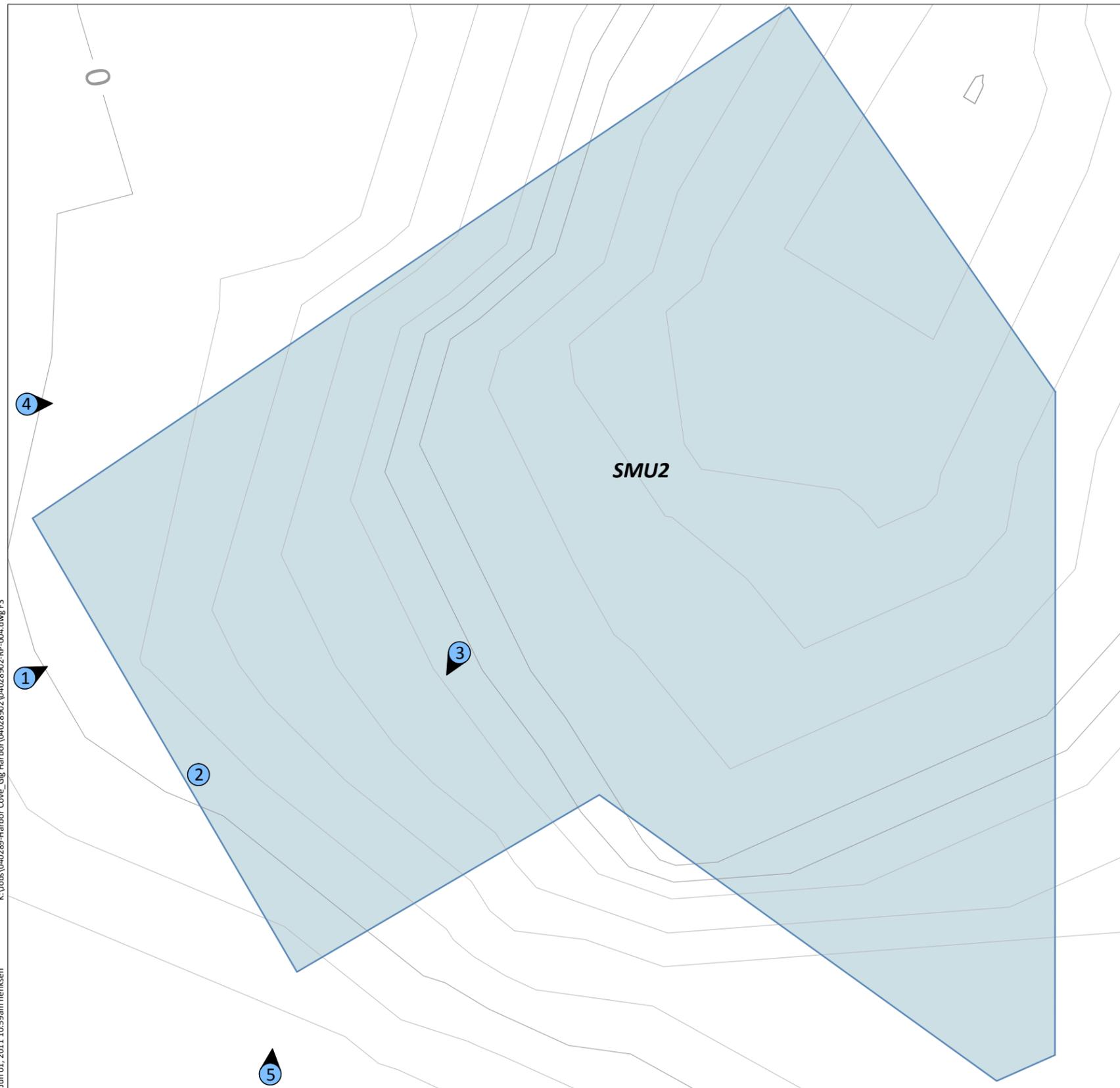


NOTE: Bathymetric and topographic survey by Prizm Surveying, Inc. dated 12/11/2008.



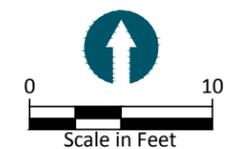
Figure 2
 SMU-3 Visual Inspection Results
 Long-Term Monitoring Plan - Year 3 Report
 Eddon Boat Park

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LEGEND:

-  Enhanced Natural Recovery Area
-  -16- Bathymetric/Topographic Contour (in Feet)
-  3 Photograph Location and Orientation



NOTE: Bathymetric and topographic survey by Prizm Surveying, Inc. dated 12/11/2008.