ADDENDUM NO. 1
SAMPLING AND ANALYSIS PLAN AND QUALITY ASSURANCE PROJECT PLAN

South State Street Manufactured Gas Plant
Remedial Investigation/Feasibility Study

Prepared for

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ACRONYMS AND ABBREVIATIONS

ARI	Analytical Resources, Inc.
bgs	below ground surface
City	City of Bellingham
cPAHs	carcinogenic polycyclic aromatic hydrocarbons
DMMP	Dredged Material Management Program
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ft	foot or feet
GPS	global positioning system
HASP	Health and Safety Plan
Herrenkohl	Herrenkohl Consulting LLC
HRGC/HRMS	high-resolution gas chromatography with high-resolution mass spectrometry
Landau Associates	Landau Associates, Inc.
LNR	Lummi Natural Resources Department
MDL	method detection limit
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
mg/kg OC	milligrams per kilogram normalized to organic carbon
mg/L	milligrams per liter
MGP	manufactured gas plant
MLLW	mean lower low water
MTCA	Model Toxics Control Act
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PID	photoionization detector
PRT	post-run tubing
PSE	Puget Sound Energy
PSEP	Puget Sound Estuary Program
QA/QC	quality assurance/quality control

QAPP	quality assurance project plan
RI/FS	remedial investigation and feasibility study
SAP	sampling and analysis plan
SIM	Selective Ion Monitoring
SMS	Sediment Management Standards
SSSMGP	South State Street Manufactured Gas Plant
TOC	total organic carbon
TPH	total petroleum hydrocarbons
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act

CERTIFICATION

I, Mark J. Herrenkohl, a licensed engineering geologist in the State of Washington, certify that I have reviewed the geosciences portions of this document.

Signature and Stamp of Geologist:

Name: Mark J. Herrenkohl Date: July 25, 2011

1 INTRODUCTION

This document is an addendum to the sampling and analysis plan (SAP) and quality assurance project plan (QAPP) for the South State Street Manufactured Gas Plant (SSSMGP) Site remedial investigation and feasibility study (RI/FS) in Bellingham, Washington. It outlines additional sampling and testing activities proposed for the SSSMGP Site, activities supplementary to work conducted under the August 6, 2010 Work Plans (Herrenkohl Consulting and Landau Associates 2010) based on recommendations in the *Remedial Investigation Interim Data Report* (Interim Data Report, Herrenkohl Consulting and Landau Associates 2011).

This addendum provides specific guidance for field methodology and quality assurance procedures that will be followed by Herrenkohl Consulting LLC (Herrenkohl Consulting), Landau Associates, Inc. (Landau Associates), and subcontractors. Herrenkohl Consulting and Landau Associates are conducting this work under contract with the City of Bellingham, Parks and Recreation Department (City), with direction from the Washington State Department of Ecology (Ecology) Toxics Cleanup Program. The addendum to the SAP and QAPP was prepared in accordance with an Agreed Order and Scope of Work negotiated between the City, Puget Sound Energy (PSE), and Ecology and signed April 30, 2010 (Document No. 7655), and was developed to meet the requirements of an RI/FS as defined by the Washington State Model Toxics Control Act (MTCA) Cleanup Regulation [Washington Administrative Code (WAC) 173-340; Ecology 2007].

Several documents are cited repeatedly in this addendum. Altogether, these documents are referred to as the Work Plans for the SSSMGP Site RI/FS:

- ***Work Plan*** for the RI/FS of the SSSMGP Site Bellingham, Washington. The Work Plan provides information on existing data for the SSSMGP Site and the sampling strategy and design to meet the data needs for completing the RI/FS. The Work Plan also describes the project management strategy for implementing and reporting RI/FS activities for the Site, including project team responsibilities and schedule.
- ***Sampling and Analysis Plan*** (Appendix B of the Work Plan) for the RI/FS of the SSSMGP Site, Bellingham, Washington. The SAP describes the procedures for conducting field activities and presents the proposed laboratory analyses for samples collected in the field.
- ***Quality Assurance Project Plan*** (QAPP; Appendix C of the Work Plan) for the RI/FS of the SSSMGP Site, Bellingham, Washington. The QAPP describes analytical method reporting limit goals, field and laboratory quality assurance/quality control (QA/QC) requirements and reporting requirements for the RI/FS for the Site.
- ***Project Health and Safety Plan*** (Appendix D of the Work Plan) for the RI/FS of the SSSMGP Site, Bellingham, Washington. The HASP has been prepared in accordance with WAC 173-340-810, applicable Washington Industrial Safety and Health Act (WISHA) regulations, and project requirements. It addresses those activities associated with work to be performed at the Site.

The Work Plan described an environmental investigation designed to meet the data needs for completing the RI/FS. Data collected in that investigation were summarized in the Interim Data Report. An evaluation of that data resulted in the identification of remaining data gaps and recommendations for additional investigation activities to fulfill the data needs for completing the RI/FS.

Although the Interim Data Report presented recommendations for the scope of work to be completed in the additional investigation, it did not present procedural details for sampling and analysis. Many of the procedures to be used in the additional investigation are already described in the SAP and QAPP; however, some modifications and additions to the SAP and QAPP are warranted for the proposed additional investigation.

Following this introduction, the document has been organized into three sections. Section 2 describes the field and analytical approach for the additional soil, soil vapor, and sediment investigations. Section 3 presents the field approach for conducting a bivalve reconnaissance within the intertidal areas of the Site. References are presented in Section 4.

Figures and tables are provided after the report text.

2 FIELD SAMPLING AND TESTING METHODS

Additional environmental investigation activities will be completed during the summer of 2011 to address data gaps identified in the Interim Data Report. Field investigation and laboratory analysis methods described in the SAP and QAPP will be used for the additional investigation, except for activities that warrant the use of new or modified methods. This section presents only those field sampling and laboratory testing methods that are not contained in the SAP and QAPP or that deviate from the methods described therein.

2.1 SOIL INVESTIGATION

As described in the Interim Data Report, the analysis of carcinogenic polycyclic aromatic hydrocarbons (cPAHs) was recommended for thirteen archived soil samples. Those samples include:

- GP-11-3.0-4.0
- GP-17-3.0-4.0
- GP-23-9.0-10.0
- GP-25-6.0-7.0
- GP-27-6.0-7.0
- GP-29-9.0-10.0
- GP-34-7.0-8.0 and -9.0-10.0
- GP-37-14.0-15.0
- GP-38-12.0-13.0
- GP-39-8.0-9.0 and -14.0-15.0
- GP-40-14.0-15.0.

Laboratory analysis of the soil samples for cPAHs will be conducted using the same analytical methods specified in the SAP and QAPP.[1]

2.2 SOIL VAPOR INVESTIGATION

As described in the Interim Data Report, soil vapor samples will be collected from five additional borings at the locations shown on Figure 1. This section describes sampling and analysis procedures that differ from those described in the SAP and QAPP.

[1] The list of archived soil samples for analysis is for information only, the analytical method is provided in the SAP and QAPP.

The three sample locations to be collected near the southwest Site boundary (SV-48, SV-49, and SV-50) will be sampled at multiple depths. Characterizing the vertical soil vapor concentration profile may be used as a basis for modifying, if appropriate, the vapor attenuation factor assumed in the development of preliminary screening levels. Based on previous investigations, the maximum observed zone of volatile contamination, as measured in the field by photoionization detector (PID) readings, was observed at a depth of 8 ft bgs in this area. Sampling will be performed to characterize the vertical profile above that zone of contamination, to the extent practicable. The following modifications to the procedures described in the SAP will provide the basis for collecting soil vapor samples at these three locations:

- Step 1 – First Sample
    - The probe rod will be driven to an initial depth of 4 ft bgs. Dedicated vapor sampling tubing (polyethylene) and a post-run tubing (PRT) adapter will be inserted into the rod bore and connected to the point holder.
    - The rod will be pulled back 1 ft (the sample interval will be from 3 ft to 4 ft bgs), leaving the expendable point at the bottom of the bore hole.
    - The surface will be sealed and leak checked, oxygen concentrations will be recorded, and the soil vapor sample will be collected in accordance with the methodology described in the SAP.
- Step 2 – Second Sample
    - The probe rod will then be advanced further to a depth of 6 ft bgs. Dedicated vapor sampling tubing (polyethylene) and a PRT adapter will be inserted into the rod bore and connected to the point holder.
    - The rod will be pulled back 1 ft (the sample interval will be from 5 ft to 6 ft bgs), leaving the expendable point at the bottom of the bore hole.
    - The surface will be re-sealed and leak checked, oxygen concentrations will be recorded, and the soil vapor sample will be collected in accordance with the methodology described in the SAP.
- Step 3 – Third Sample
    - The probe rod will then be advanced further to a depth of 8 ft bgs. Dedicated vapor sampling tubing (polyethylene) and a PRT adapter will be inserted into the rod bore and connected to the point holder.
    - The rod will be pulled back 1 ft (the sample interval will be from 7 ft to 8 ft bgs), leaving the expendable point at the bottom of the bore hole.
    - The surface will be re-sealed and leak checked, oxygen concentrations will be recorded, and the soil vapor sample will be collected in accordance with the methodology described in the SAP.

If bedrock or groundwater is encountered at depths shallower than 8 ft bgs in the three locations near the southwest Site boundary, then soil vapor sampling will be terminated at that time.

One soil vapor sample (SV-51) will be collected in the vicinity of soil boring GP-23. The sample will be collected using the same methodology described in the SAP, except that the sampling interval will be from 12 ft to 13 ft bgs to coincide with the zone immediately above the highest observed soil contamination in GP-23 (the sample depth may change based on field observations). If bedrock or groundwater is encountered at depths shallower than 13 ft bgs, then the soil vapor sample will be collected in the 1-ft interval immediately above bedrock or groundwater.

One soil vapor sample (SV-52) will be collected in the vicinity of soil boring GP-01. The sample will be collected using the same methodology described in the SAP, except that the sampling interval will be from 5 ft to 6 ft bgs due to shallow bedrock conditions in that area. If bedrock or groundwater is encountered at depths shallower than 6 ft bgs, then the soil vapor sample will be collected in the 1-ft interval immediately above bedrock or groundwater. Based on previous discussions with Ecology, soil vapor sampling will not be conducted at any depth shallower than 3 ft bgs.

2.3 SEDIMENT INVESTIGATION

As described in the Interim Data Report, representative sediment samples will be analyzed for dioxins/furans and polychlorinated biphenyls (PCBs) to support the evaluation of remedial alternatives in the FS (e.g., disposal options). Former pulp and paper operations associated with the Whatcom Waterway site is the likely source of dioxins/furans in Site sediments (RETEC 2006). The Cornwall Landfill Site may be a source of PCBs to the Site. The following archived sediment samples are proposed for additional analysis:

- SB-01-4.0-6.0
- SB-02-0-2.0
- SB-05-2.5-4.0
- SB-08-9.0-10
- SB-09-4.0-6.0.

These samples were previously analyzed for metals, PAHs, and TOC and will provide spatially representative dioxins/furans and PCB data for the Site. Information on the analytical methods and laboratory quality control for the analysis of dioxins/furans and PCBs in sediments is provided in the following subsections.

2.3.1 Laboratory Analysis

Archived sediment samples will be analyzed for dioxins/furans and PCBs following the analytical methods provided in Table 1 and described in the next subsections. Detailed analyte lists and method reporting limits are provided in Table 2.

Based on the review of data collected to date, additional laboratory analysis was also recommended for seventeen archived sediment samples. Those samples include:

- SB-06-8.0-9.0 (PAHs, TOC)
- SB-07-7.5-9.0, -10-11.5, and -12.5-14 ft (PAHs, TOC)
- SB-08-12.5-14, -14-15.5, and -15.5-17 [PAHs, Sediment Management Standards (SMS) metals, TOC]
- SB-09-6.0-8.0 and -8.0-10 (PAHs, TOC)
- SB-10-8.0-10, -12-14, and -14-15.5 (PAHs, TOC)
- SB-11-6.0-8.0, -8.0-10, and -12 to 14 (PAHs, TOC)
- SB-12-12.5-14 and -15-16.5 (PAHs, TOC).

Selected samples (pending availability of sample volume) will also be analyzed for grain size distribution. Laboratory analysis of the sediment samples for PAHs (low-level), TOC, SMS metals, and grain size will be conducted using the same analytical methods specified in the SAP and QAPP.[2]

2.3.1.1 Dioxins and Furans

Chlorinated dioxins and furans in sediment samples will be extracted with toluene in a Soxhlet/Dean Stark extractor. Cleanup procedures will include sulfuric acid cleanup and silica/carbon column cleanup. Additional cleanup procedures (e.g., silica gel) will be used if necessary to remove interferences. Samples will be analyzed by high-resolution gas chromatography with high-resolution mass spectrometry (HRGC/HRMS). EPA Method 1613B requires isotopically labeled analogs of target analytes to be spiked into each sample before extraction. Target analytes are quantified relative to the labeled analog and therefore their calculated concentration compensates for extraction and cleanup efficiencies.

As described in EPA Method 1613B, detection limits are calculated on an individual compound and sample basis and depend on the signal-to-background ratio for the specific labeled isomer. Concentrations will be reported to the sample-specific reporting limits (Table 2).

2.3.1.2 PCBs

PCB Aroclors in sediment samples will be analyzed using EPA SW-846 Method 8082A with modifications recommended by PSEP (1997) to allow lower reporting limits. Modifications will include the use of a larger sample volume, corresponding to 25 g of dry sediment, and a final extract volume of 5 mL. Samples will be extracted by sonication. Extracts will be cleaned using sulfuric acid cleanup, silica gel cleanup, and sulfur cleanup, as necessary. Samples will be analyzed by gas chromatography with electron capture detector (GC/ECD).

[2] The list of archived sediment samples for analysis of PAHs, TOC, SMS metals, and grain size is for information only, the analytical methods are provided in the SAP and QAPP.

2.3.2 Laboratory Quality Control and Reporting

Laboratory QC procedures for dioxins/furans and PCB analysis will be completed by the laboratory as required for each analytical protocol and as indicated in the QAPP for semivolatile organics in sediments (Herrenkohl Consulting and Landau Associates 2010 and references therein).

Laboratory reporting requirements are also provided in the QAPP.

3 BIVALVE RECONNAISSANCE

A semi-quantitative clam survey of the intertidal zone pocket beach located at the SSSMGP Site (Figure 1) will be conducted to help determine the need and efficacy of including clam tissue sampling and testing in support of completing the RI. The bivalve reconnaissance is being conducted to support the aquatic risk evaluation (refer to Section 7.1.4 in the Work Plan). An initial step is to confirm the presence or absence of clams in the intertidal area of the Site. If results of the survey indicate that clam tissue sampling and testing is warranted, an additional addendum to the SAP and QAPP will be written describing appropriate sampling and analytical methods, respectively.

The objectives of this clam survey are as follows:

- Determine whether clams are present in the intertidal zone of the Site pocket beach;
- Determine what species of clams are present;
- Provide a semi-quantitative population estimate for each species of clam present; and
- Evaluate the physical suitability of the intertidal zone to support clam populations.

Two main types of clams may be present at the Site which will require different survey techniques. The first type of clam includes horse clams (*Tresus capax* and *T. nuttallii*) and geoduck clams (*Panopea abrupta*). These clams cannot be readily surveyed using excavation techniques because they may be buried relatively deep. The survey methods described by Lummi Natural Resources (LNR 2010) will be adapted for use for these two species. This survey method is also useful for eastern softshell clams (*Mya arenaria*). The second type of clams consists primarily of native littleneck clams (*Protothaca staminea*), Manila clams (*Tapes philippinarum*), and Pacific oysters (*Crassostrea gigas*). These three species will be surveyed using the excavation methods adapted from Campbell (1996). These same survey methods can be used for butter clams (*Saxidomus giganteus*), cockles (*Clinocardium nuttallii*), and eastern softshell clams as well, but the sampling error would be greater when conducting a quantitative survey for these three species since the procedures were developed to target native littleneck and Manila clams, and Pacific oysters. The survey methods described by Campbell (1996) are also expected to be applicable for the various species of macomas (e.g., *Macoma inconspicua, M. secta*, *M. nasuta*, and *M. irus*).

The clam survey will comply with the project HASP for intrusive activities in Site sediments. This is particularly important when excavating for the more deeply buried clam species. The global positioning system (GPS) methods described in the SAP for recording sediment sample locations will also be used for recording clam sample locations. The survey field team will consist of a survey leader and at least one field technician. The survey leader will be well versed in intertidal clam biology and habitat characteristics.

The clam survey will be conducted on the intertidal zone of the Site beach on days with a low tide equal to or lower than -1.0 feet MLLW (Campbell 1996). In July 2011, suitable survey dates include the 28th through 31st. The survey will begin two hours before low tide and end two hours after low tide.

Mobilization activities will include the following:

- Obtain survey equipment (e.g., shovels, calipers or ruler, camera, surveyor's flags, hand-held GPS unit, 100-foot measuring tape, and plastic bags);
- Create field survey data forms, as required; and
- Prepare site map showing coordinates delimiting the pocket beach Site boundaries.

Prior to beginning the survey, the intertidal zone sampling boundaries will be delimited using a hand-held GPS unit and colored flags. The length of beach to be surveyed is approximately 400 feet and extends from the Boulevard Park dock east to the northeastern Site boundary (Figure 1).

The survey will begin with a visual inspection of the beach for horse and/or geoduck clam siphons (i.e., shows) (LNR 2010). If shows are seen, the clam bed(s) will be delimited using surveyor's flags and the perimeter recorded using a hand-held GPS unit. Next, the abundance of shows in the bed will be estimated using a 9 ft^2 plastic sample ring. The ring will be tossed into the clam bed and the location of center of the ring noted using the held-held GPS unit. The number of shows occurring within the ring will be counted and recorded. The number of ring tosses needed to adequately estimate show density is dependent upon the area of the bed. A minimum of five ring tosses will be used with the upper limit of tosses being determined in the field using best professional judgment. Ring toss sample locations will be identified sequentially (A, B, C, etc.) and the coordinates of the center point of each location determined using a hand-held GPS unit. Shows greater than 1.5 inches in diameter are assumed to be horse clams (LNR 2010). This assumption will be tested by assessing the response of the show to tactile stimuli. A clam show will retract rapidly after probing with a finger, while retraction of shows of other organisms, such as anemones, is much less vigorous. Horse clam siphons differ from geoduck siphons in usually having hard, horny plates attached to the tip and having an internal ring of tentacles. Shows less than 1.5 inches in diameter are assumed to be softshell clams, but could also be polychaete worms.

A systemic sample design will be used to characterize the presence of other clam species. Campbell (1996) recommended a minimum sampling density of 11 samples per acre. Assuming the area of the intertidal zone at the Site pocket beach to be approximately 0.25 acre, this sampling design would yield a total sample number of three. Since three samples is considered too small for characterizing clams populations at the Site pocket beach, a modified survey design was used as described below.

Beginning approximately 25 feet east of the Boulevard Park dock, transect lines oriented perpendicular to the water line will be identified with a surveyor's flags every 50 feet. This design will produce approximately 8 to 10 transects across on the Site pocket beach. Transects

will be identified by letter beginning with "A." The first sample along each transect will be located as near the water line as possible. A second transect sample will be located 25 feet shoreward of the first sample location. Additional samples may be located at 25-ft intervals up the transect to the upper limit of the intertidal zone (approximately +10 ft MLLW, if clams are found at either the first or second sample locations of that transect. Sample locations on each transect will be numbered using the transect letter followed by the sample number starting at "1" at the water line and running consecutively to the end of the transect (e.g., A-1, A-2, A-3, etc.). It is anticipated that this sampling design should yield 15 to 20 sample locations. If this sample design produces too many samples (e.g., the width of the intertidal zone is large), the design may be modified in the field at the discretion of the survey leader. A surveyor's flag will be placed at the sample location and recorded using a hand-held GPS unit. At each sample location, a one-square foot plastic sample ring will be centered over the survey flag. A shovel will be used to excavate the area inside the ring to a depth of 12 inches. Excavated sediment will be placed on a sorting board or large black plastic bag and all clams present will be counted and identified by species. The maximum length of a representative number of clams of each species will be measured using calipers or a ruler to the nearest millimeter and recorded on field forms.

All clams excavated during the survey will be returned to the excavation and the excavation backfilled with excavated sediment.

If no or limited clam populations are observed in the intertidal zone of the Site pocket beach, a habitat survey will be conducted to evaluate the suitability of the beach to support clams. For native littleneck clams, a habitat suitability index is available that identifies the habitat features that are most important for maintaining populations of this species (Rodnick and Li 1983). The most important habitat characteristics for native littleneck clams are substrate composition, substrate depth, and current velocity. Observations will be made on substrate composition and depth at each clam sample excavation location. Current velocity will be estimated using published information for locations in Bellingham Bay. Procedures described in Rodnick and Li (1983) will be used to interpret the habitat data.

4 REFERENCES

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Legend

Proposed Additional Sample Locations

- GeoProbe

RI Dataset Locations

Location Type

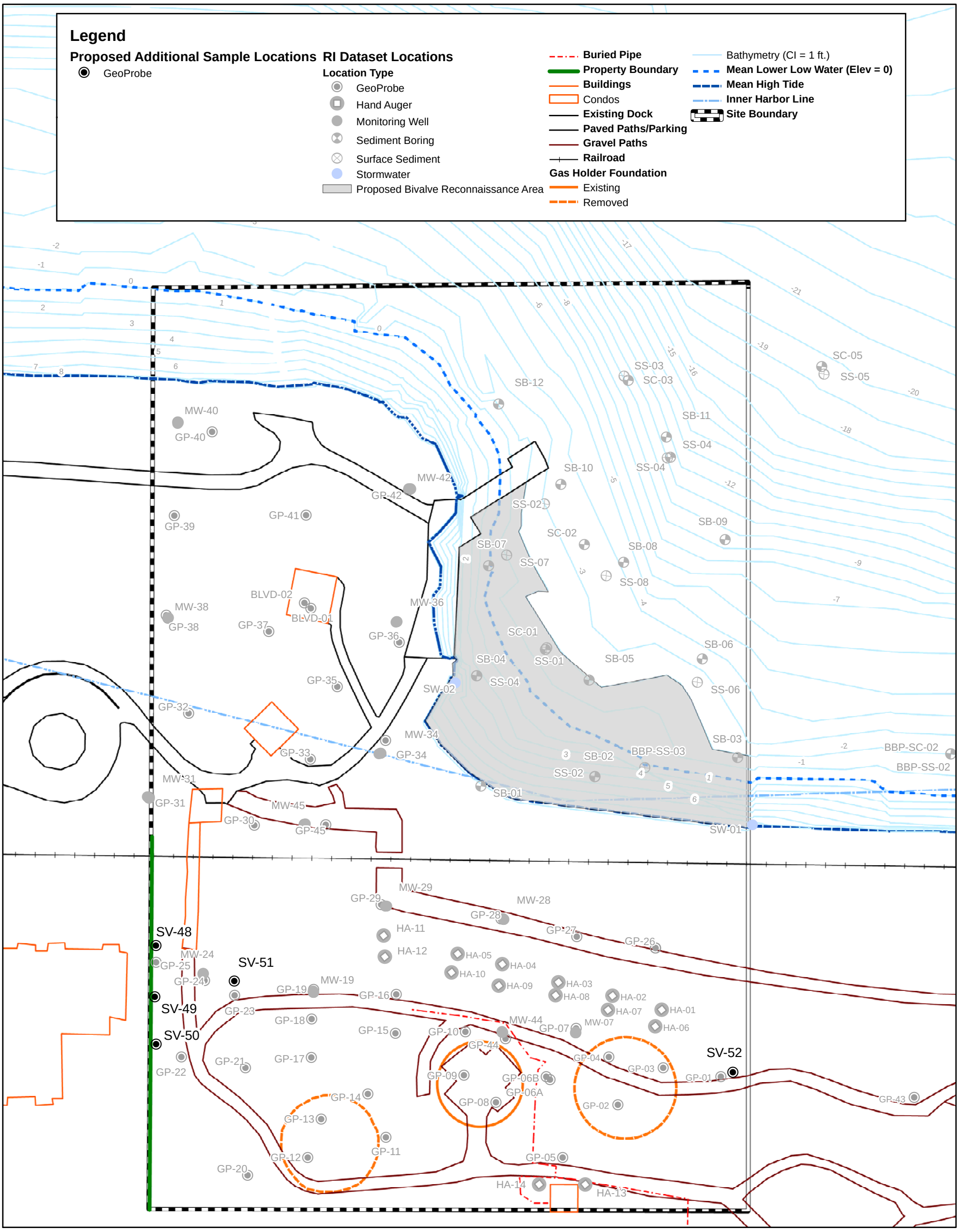
- GeoProbe
- Hand Auger
- Monitoring Well
- Sediment Boring
- Surface Sediment
- Stormwater
- Proposed Bivalve Reconnaissance Area

- **Buried Pipe**
- **Property Boundary**
- **Buildings**
- Condos
- **Existing Dock**
- **Paved Paths/Parking**
- **Gravel Paths**
- **Railroad**

Gas Holder Foundation

- Existing
- Removed

- Bathymetry (CI = 1 ft.)
- **Mean Lower Low Water (Elev = 0)**
- **Mean High Tide**
- **Inner Harbor Line**
- **Site Boundary**



Herrenkohl Consulting LLC

0 30 60 120 180 Feet

1 inch = 60 feet

True North

LANDAU ASSOCIATES

Data Sources:
Survey - Larry Steele and Assoc, 2010
Contours - COB
Bathymetry - Larry Steele and Assoc, 2010
Horizontal Datum: Washington State Plane Coordinate System of 1983 (1991 update)
Elevation Datum: COB contours - sea level using the COB datum
Bathymetric contours - mean lower low water
Elevation Units: Feet

South State Street Manufactured Gas Plant RI/FS Bellingham, WA	**Proposed Sampling Locations**	Figure **1**

Table 1. Sediment Target Analytes, Sample Preparation and Analytical Methods.

Analytes	Laboratory	Sample Preparation		Quantitative Analysis	
		Protocol	Procedure	Protocol	Procedure
Sediment samples					
PCB Aroclors	ARI	EPA 3550C	Sonication	EPA 8082A	Dual column GC/ECD
		EPA 3665A	Sulfuric acid cleanup		
		EPA 3630C	Silica Gel Cleanup		
		EPA 3660B	Sulfur cleanup		
Chlorinated dioxins and furans	ARI	EPA 1613B	Soxhlet/Dean Stark extraction	EPA 1613B	HRGC/HRMS
		EPA 3665A	Sulfuric acid cleanup		
		EPA 3630C	Silica/carbon column cleanup		

Table 2. Screening Benchmarks and MRLs for Additional Sediment Analytes

Analyte	Units	Screening Benchmark Source	Selected Screening Benchmark	Method Reporting Limit
Dioxins				
1,2,3,4,6,7,8-HpCDD	ng/kg	--	NV	5
1,2,3,4,6,7,8-HpCDF	ng/kg	--	NV	5
1,2,3,4,7,8,9-HpCDF	ng/kg	--	NV	5
1,2,3,4,7,8-HxCDD	ng/kg	--	NV	5
1,2,3,4,7,8-HxCDF	ng/kg	--	NV	5
1,2,3,6,7,8-HxCDD	ng/kg	--	NV	5
1,2,3,6,7,8-HxCDF	ng/kg	--	NV	5
1,2,3,7,8,9-HxCDD	ng/kg	--	NV	5
1,2,3,7,8,9-HxCDF	ng/kg	--	NV	5
1,2,3,7,8-PeCDD	ng/kg	--	NV	5
1,2,3,7,8-PeCDF	ng/kg	--	NV	5
2,3,4,6,7,8-HxCDF	ng/kg	--	NV	5
2,3,4,7,8-PeCDF	ng/kg	--	NV	5
2,3,7,8-TCDD	ng/kg	--	NV	1
2,3,7,8-TCDF	ng/kg	--	NV	1
OCDD	ng/kg	--	NV	10
OCDF	ng/kg	--	NV	10
Total HpCDD	ng/kg	--	NV	--
Total HpCDF	ng/kg	--	NV	--
Total HxCDD	ng/kg	--	NV	--
Total HxCDF	ng/kg	--	NV	--
Total PeCDD	ng/kg	--	NV	--
Total PeCDF	ng/kg	--	NV	--
Total TCDD	ng/kg	--	NV	--
Total TCDF	ng/kg	--	NV	--
TEQ (ND=0.5 DL)	ng/kg	DMMP Interim Guideline[1]	4	--
PCBs				
Aroclor 1016	ug/kg	--	NV	20
Aroclor 1221	ug/kg	--	NV	20
Aroclor 1232	ug/kg	--	NV	20
Aroclor 1242	ug/kg	--	NV	20
Aroclor 1248	ug/kg	--	NV	20
Aroclor 1254	ug/kg	--	NV	20
Aroclor 1260	ug/kg	--	NV	20
Total PCBs	mg/kg OC or ug/kg	Sediment Management Standards or LAET	12 mg/kg OC or 130 ug/kg	--

Notes:

1 Updated Dioxin Guidance for Dispersive Disposal Sites in Puget Sound.
4 pptr is the nonparametric estimation of the 90% upper confidence limit for the 90th percentile of the distribution of the background Puget Sound Main Basin data set, rounded up to the nearest whole digit.

NV = no value

-- = not applicable