2011-12 PROJECT WORK PLAN
For
Non-Dry Dock Stormwater Monitoring
Conducted at
Puget Sound Naval Shipyard
Bremerton, WA
Project ENVVEST Study Area

FINAL

February 2012

Puget Sound Naval Shipyard and Surrounding Area

PNNL Contract No.: N4523A10MP00034 Amendment 1

TAYLOR ASSOCIATES, INC.

TEC inc

Pacific Northwest NATIONAL LABORATORY

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United States Department of Defense
Department of Navy
Puget Sound Naval Shipyard
1400 Farragut Avenue
Bremerton, WA 98314

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3. Jacquelyn Young, NPDES Program Manager – Navy-PSNS&IMF		
Data Analysis and Collection Consultant Project Management Team		
4.Jill Brandenberger, Project Manager / Project Chemist / QC Manager – PNNL-MSL		
5. Dave Metallo, Project and Field Operations Manager / QC Manager – Taylor-TEC		
6. Curtis Nickerson, Senior Technical Advisor – Taylor-TEC		

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I certify that this document and all attachments, related to those sections as assigned to me for primary authorship, were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

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2.0 TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

DISTRIBUTION LIST

The following members of the Navy and Consultant management teams will receive copies of the Project Work Plan (PWP):

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(1) Specify if electronic copy or hardcopy.

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ACRONYMS

%D	percent difference
%D_f	percent drift
%R	percent recovery
%RSD	percent relative standard deviation
ARI	Analytical Resources, Inc.
BMP	Best Management Practice
BNC	Bremerton Naval Complex
CIA	Controlled Industrial Area
CFR	Codes of Federal Registration
CLP	U.S. EPA Contract Laboratory Program
COC	chain-of-custody (form)
CSI	Campbell Scientific, Inc.
CVAAS	cold vapor atomic absorption spectrometry
DI	Deionized Water
DMR	Discharge Monitoring Report
DoD	Department of Defense
DQOs	data quality objectives
Ecology	Washington State Department of Ecology
ES&H	Field Environmental Health and Safety Plan
EPA	U.S. Environmental Protection Agency
GC/MS	gas chromatograph/mass spectrometer
HPLC	high performance liquid chromatographer
ICP/MS	inductively coupled plasma/ mass spectrometer
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
MHxxxx	Man Hole with number (xxxx)
ML	minimum limit
MQI	measurement quality indicator
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
MSL	Marine Science Laboratory

Navy	United States Navy
NELAP	National Environmental Laboratory Accreditation Program
NPDES	National Pollutant Discharge Elimination System
NWTPH-Dx	Northwest Total Petroleum Hydrocarbons – Diesel fraction
OWTS	oil water treatment system
PNNL	Pacific Northwest National Laboratories
PP	Polypropylene
PQL	practical quantification limit
PSNS&IMF	Puget Sound Naval Shipyard & Intermediate Maintenance Facility
PWP	Project Work Plan
QAP	quality assurance plan
QA	quality assurance
QC	quality control
QSM	quality systems manual
RCM	runoff coefficient method
RMTS	recycle material transfer station (area)
RPD	relative percent difference
SDG	sample delivery group
SOP	standard operating procedure
SRM	standard reference material
TAL	Twiss Analytical Laboratories
TPH	total petroleum hydrocarbon
TPH-Dx	total petroleum hydrocarbon diesel fraction
TSS	total suspended solids
USEPA	United States Department of Environmental Protection
YSI	YSI, Inc.

3.0 INTRODUCTION AND BACKGROUND

The Puget Sound Naval Shipyard & Intermediate Maintenance Facility (PSNS&IMF) and Naval Base Kitsap-Bremerton (NBK-Bremerton), collectively known as the Bremerton Naval Complex (BNC), located in Bremerton, WA (Figure 1) are committed to a culture of continuous process improvement for all aspects of Shipyard operations, including reducing the releases of hazardous substances stormwater discharges from the Shipyard. The BNC is referred to as the *Shipyard,* for brevity, throughout this Project Work Plan (PWP).

This document presents the rationale, procedures, and data quality objectives for stormwater monitoring conducted for the Shipyard. Section 3 presents general information about the project, the monitoring program, the Navy's facility and a brief summary of past environmental efforts and NPDES permit considerations. Section 4 includes project description information. The purpose, goals and objectives of the project are discussed in this section, along with general information regarding data collection, target populations, study boundaries, practical restraints and decision making. Section 5 contains details pertaining to organization and schedule, as well as, roles and responsibilities and other special requirements for conducting project work. Section 6 presents the data quality objective for the project. Sections 7 and 8 detail the sampling process design and sampling procedures. These sections contain the necessary event qualification, station setup, field sampling and sample management information to conduct the field sampling activities necessary for this project. Section 9 contains measurement procedure information, including laboratory selection, sample handling and custody, sample custody and chemical analysis procedures. Sections 10 and 11 detail the quality control and data management procedures. Section 12 provides assessment and oversight information. Section 13 covers the various project reporting aspects and requirements. Section 14 contains details regarding data review, verification and validation. Section 15 provides information on corrective actions. Lastly, Section 16 lists the references, with internet links (if available), used in the compilation of this PWP. Appendices A through J provide supporting information; which include among others, the Field Environmental Health & Safety Plan, the Fecal Coliform Monitoring, Assessment and Control Quality Assurance Project Plan and Field Forms.

3.1 INTRODUCTION

The United State Environmental Protection Agency Region X (US EPA), the Washington State Department of Ecology (Ecology), and the Shipyard are working to renew the National Pollution Discharge Elimination System (NPDES) permit for discharges into Sinclair Inlet, Puget Sound, WA (US EPA 2008a,b). The discharge of stormwater from Shipyard operations is permitted by the US EPA Region X under the Clean Water Act (CWA) National Pollution Discharge and Elimination System (NPDES, permit WA-00206-2, 1994). Under the NPDES program, the Shipyard is required to implement Best Management Practices (BMPs) designed to reduce, treat, and control discharges of contaminants from Shipyard operations (Jabloner 2009). This work plan was developed to characterize non-dry dock stormwater discharges at selected stormwater drains located within the facility. The data developed from this study will assist the Navy, EPA, Ecology and other stakeholders in understanding the nature and condition of stormwater discharges from the Shipyard and inform the permitting process (USEPA 2008a, b).

The Shipyard is located about 15 miles west of Seattle, Washington along the northern shore of Sinclair Inlet on Puget Sound and is bounded by the City of Bremerton. The complex covers approximately 350 acres of land and an additional 340 acres of tidelands along 11,000 feet of shoreline and contains over 300 buildings and structures, including a steam plant, six deep water piers, six dry docks, and numerous moorings. The predominant land cover within the Shipyard are roof tops, paved areas (roads, parking areas, sidewalks, and concrete working areas) and piers. Figure 2 shows the demarcation between the PSNS&IMF and NBK-Bremerton portions of the Shipyard.

The main portion of the PSNS&IMF where most of the ship work activities are performed is known as the Controlled Industrial Area (CIA). At 179 acres, the CIA is one of Washington State's largest industrial installations and is responsible for overhaul, maintenance, docking, refueling, and decommissioning of naval vessels, as well as, the dismantling of ships and submarines. NBK provides base operating services, including support for both surface ships and submarines home-ported at NBK-Bremerton. Support areas include housing, parking, shopping, entertainment, and recreation facilities. Non-dry dock stormwater monitoring, as described in this Project Work Plan (PWP), will be conducted for non-dry dock areas within both the CIA and the NBK properties.

The stormwater system at the Shipyard is very complex. It includes 156 storm drains, many of which serve small drainage areas, and there are more than one thousand catch basins or track drains on piers that drain directly into Sinclair Inlet. Additionally, the extensive rail system within the Shipyard provides a pathway for stormwater to seep through the subsurface. Depending on the flow rate and whether the track drains become clogged, this runoff will ultimately discharge directly into the Sinclair Inlet (Jabloner 2009).

This project is a continuation of the Project ENVironmental inVESTment (ENVVEST) endeavors that have been conducted at the Shipyard since 2000 (ENVVST 2006). The intent of this project is to add to the knowledge base and understanding of stormwater particulars across the Shipyard through physical and analytical characterization of non-dry dock discharges in association with specific shipyard and related support tasks.

Data collection and management methodologies to be utilized during this project are developed to be similar to those that would be appropriate and likely used for compliance monitoring under the final version of the Shipyard's forthcoming NPDES permit. Using data collection and monitoring methodologies that are appropriate for both ENVVEST and NPDES requirements allows for the data to satisfy the stormwater characterization goals of ENVVEST and non-dry dock stormwater monitoring requirements that may be included in the NPDES permit (Taylor Associates, Inc. 2009).

3.1.1 Project Work Plan Overview

This Project Work Plan (PWP) details the project background, description, organization, field and data collection methodologies and quality objectives. Quality assurance and quality control (QA/QC) procedures for conducting field activities and laboratory analyses associated with non-dry dock stormwater monitoring, as well as sampling, and other related activities to be conducted at the non-dry dock properties within the Shipyard, in support of potential NPDES requirements, are also presented in this PWP. Actions detailed in this PWP will be conducted by the team of Taylor Associates / TEC Inc. (Taylor/TEC) and Pacific Northwest National Laboratory – Marine Science Laboratory (PNNL-MSL) with support from the PSNS&IMF Environmental Office (Code 106.32). As a companion to the PWP, a Field Environmental Health & Safety Plan (ES&H) (updated for the 2011-12 Field season) is included as Appendix A. Together the PWP and ES&H serve as the Phase II 2011-2012 project guidance documents.

This PWP is a companion to the 2010-11 PWP that details the Phase I sampling locations. The Phase I sampling targeted outfalls in both the CIA and NBK that represented the primary work activities occurring within Shipyard. Phase II targets six storm drains representing highly industrial areas within the Shipyard.

3.2 BACKGROUND

Previously, during a Project ENVVEST effort, Total Maximum Daily Loads (TMDLs) were developed for fecal coliform (FC) and other contaminants for the Sinclair/Dyes Inlet watershed (Figure 3) (ENVVEST 2002a, b, 2006). As part of Project ENVVEST, thirteen storm water drainage basins within the watershed, including three basins within the Shipyard, were monitored for flow and sampled during storm events (Johnston et al. 2005, TEC 2003a, b, c). This work resulted in a calibrated and verified Hydrological Simulation Program Fortan (HSPF) model for drainage basins within the watershed including the shipyard (Skahill and LaHatte 2007) and estimates of stream and storm event runoff quality as a function of upstream land use and cover and storm intensity (Brandenberger et al. 2007a, b, Cullinan et al. 2007). The ENVVEST Studies also provided data that were used to develop a contaminant mass balance for heavy metals, poly aromatic hydrocarbon (PAH)s, polychlorinated biphenyl (PCB)s, and nutrients (Brandenberger et al. 2008).

Recently, an evaluation of existing storm water monitoring data for the Shipyard and a review of technical and regulatory requirements were conducted. In addition, a Quality Assurance Plan for Non-Dry Dock Stormwater Monitoring Conducted Under the National Pollutant Discharge Elimination System by Puget Sound Naval Shipyard & Intermediate Maintenance Facility was prepared that documents the technical strategy and procedures needed for monitoring non-Dry Dock stormwater basins within the Shipyard (Taylor Associates Inc. 2009). This stormwater monitoring plan recommended monitoring seven representative storm drains within the Shipyard. This was completed during project Phase I which was completed in the 2010/2011 wet season. During the second phase of this project (2011-12 wet season) monitoring sites have been changed (from the Phase I sites) to include four newly added storm drainage systems, plus two existing phase I sites that represent highly industrial areas within the Shipyard and the largest NBK drainage basin.

3.3 PSNS&IMF NPDES PERMIT OVERVIEW

Certain stipulations in the draft NPDES permit for PSNS&IMF (USEPA 2008a, b) are relevant to this project, mainly regarding how non-dry dock stormwater runoff is characterized and assessed. Therefore it is necessary to describe and include those elements throughout this PWP as appropriate. A brief overview of these permit stipulations is provided below.

3.3.1 Draft NPDES Stormwater Permit

This section provides an overview of the draft NPDES permit for monitoring non-dry dock stormwater, and discusses issues related to both controlling stormwater discharges and monitoring challenges associated with the Shipyard.

3.3.2 Permit Overview and Monitoring Requirements

The USEPA authorized PSNS&IMF to discharge stormwater to Sinclair Inlet. In accordance with the permit, PSNS&IMF is required to monitor discharge from the following three operations:

- dry dock areas (not covered under this PWP);
- treated wastewater from the steam generation plant (not covered under this PWP); and
- discharges of stormwater and miscellaneous non-stormwater releases from non-dry dock areas (*Note*: *the main purpose of this PWP is to address this stipulation*).

An objective of the stormwater monitoring program is to determine effectiveness of BMPs to ensure protection of water quality and human health. Data from monitoring efforts may also be used to develop future effluent limitations, to monitor effluent impacts on receiving water quality, to identify sources of pollution potentially affecting the quality of storm water discharges associated with industrial activity from the facility, and to ensure implementation of measures to minimize and control pollutants in stormwater discharges.

3.3.3 Stormwater Monitoring from Non-dry Dock Areas

In accordance with the NDPES permit, during Phase I of the project (completed in the 2010/2011 wet season) PSNS&IMF monitored non-dry dock stormwater from stormwater outfalls or conveyances that represented the primary activities

performed within the non-dry dock areas. The primary activities represented the main industrial tasks and processes at the PSNS&IMF, as well as, support functions in the surrounding NBK-Bremerton areas. The activities included:

(1) Materials storage

(2) Vessel, equipment and materials recycling

(3) Vessel maintenance

(4) Non-aircraft carrier vessel support services

(5) Aircraft carrier support services

(6) Parking/steam plant (stormwater discharges only)/truck traffic

(7) Municipal/commercial/residential services

For Phase II of the project in 2011/2012 wet season, the PSNS&IMF selected six stormwater outfalls to monitor – two that had previously been monitored in 2010/2011 and four that were new for 2011/2012. These six selected outfalls represent the more industrial areas of the shipyard. The data from these outfalls will provide the PSNS&IMF with a better understanding of the condition and pollutant potential discharging from these industrial areas.

This updated PWP details the monitoring of the six selected outfalls as part of 2011-12 Phase II of the project. Consistent with the requirements specified in the NPDES permit, grab samples and automated, tidally-compensated, time-paced composite samples will be collected at each of the selected outfalls. The type, number, and methodology used to select storm events to be monitored and the types of parameters to be analyzed are consistent with the permit, and are discussed in detail in the Sections 9 through 11 of this PWP.

In addition to the stormwater samples, during the 2011/2012 wet season, samples of accumulated sediment will be collected at each outfall. The methodology used to collect these sediment samples and the analytical parameters are discussed in Sections 9 through 11.

3.3.4 Controlling Stormwater Discharges

Variable Nature of Stormwater Presents Monitoring Challenges

Industrial facility and municipal stormwater runoff has a number of unique attributes that make the identification of stormwater contaminant problems and their associated solutions difficult to determine.

- Stormwater contains a broad variety of pollutants whose concentrations can vary widely depending on storm events, land use, and a number of other local and regional factors.
- The quality of stormwater runoff can often be difficult to manage due to the seasonal, sporadic nature of surface water discharges and the character and unpredictability of storm events.
- Most industrial facilities and municipal areas have a large number of stormwater outfalls, with a wide diversity of locations and outfall types.

Additional Monitoring Challenges Associated with the Shipyard

Monitoring stormwater discharges within the Shipyard presents even additional challenges unique to a facility located within an urban setting and along a busy maritime waterfront:

- Stormwater runoff from all of the BNC non-dry dock properties is collected into drainage systems that directly discharge into adjacent marine receiving water.
- Most of the drainage basins exhibit backwatering effects due to tidal influences.
- The non-dry dock stormwater drainage systems are relatively short in length (from head to bay outfall), and many systems have limited access, eliminating the opportunity to conduct monitoring in non-tidally influenced areas.

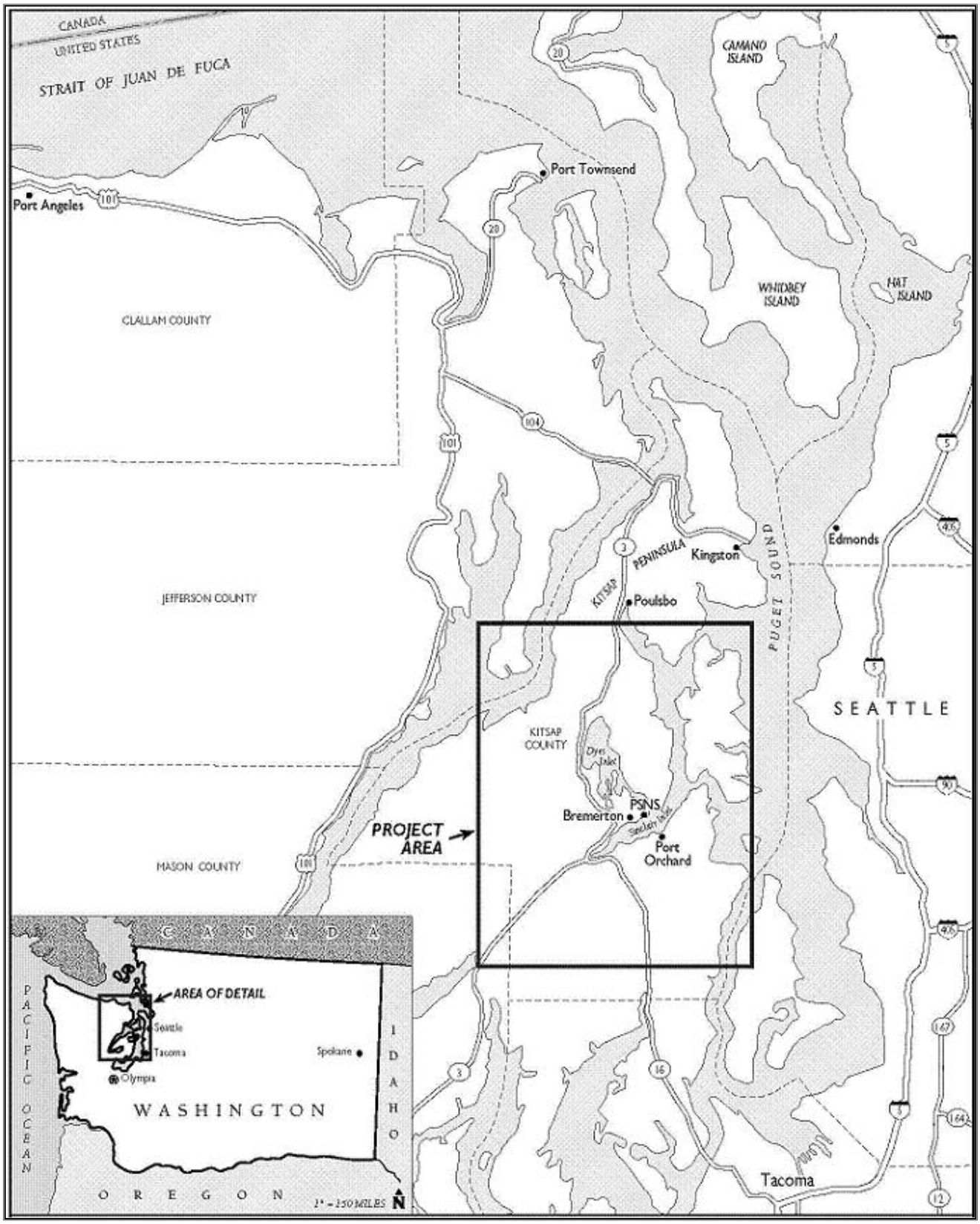

Figure 1. Bremerton Naval Base Regional and Vicinity Map

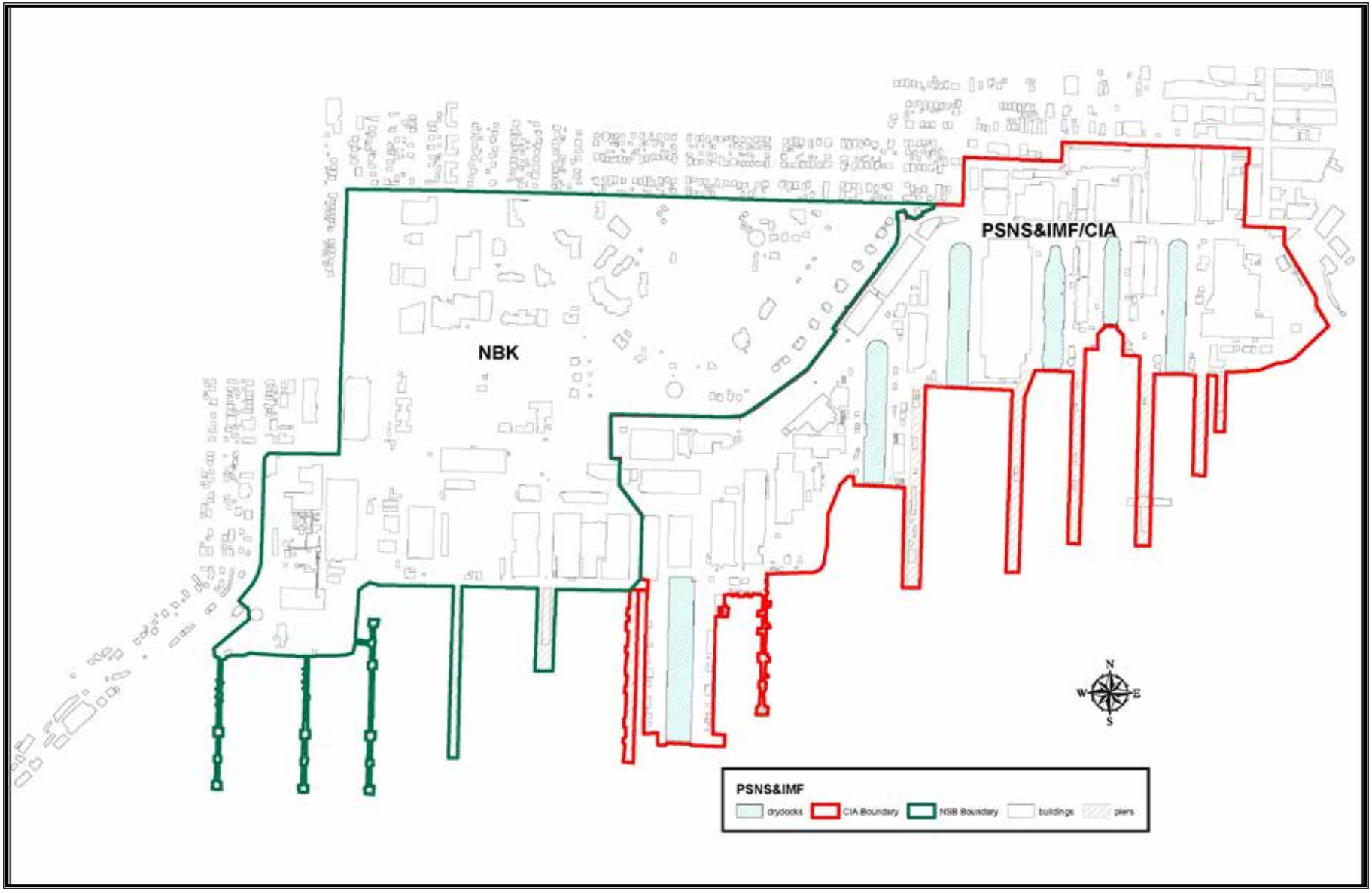

Figure 2. Bremerton Naval Complex, Showing the NBK and PSNS&IMF/CIA Boundaries

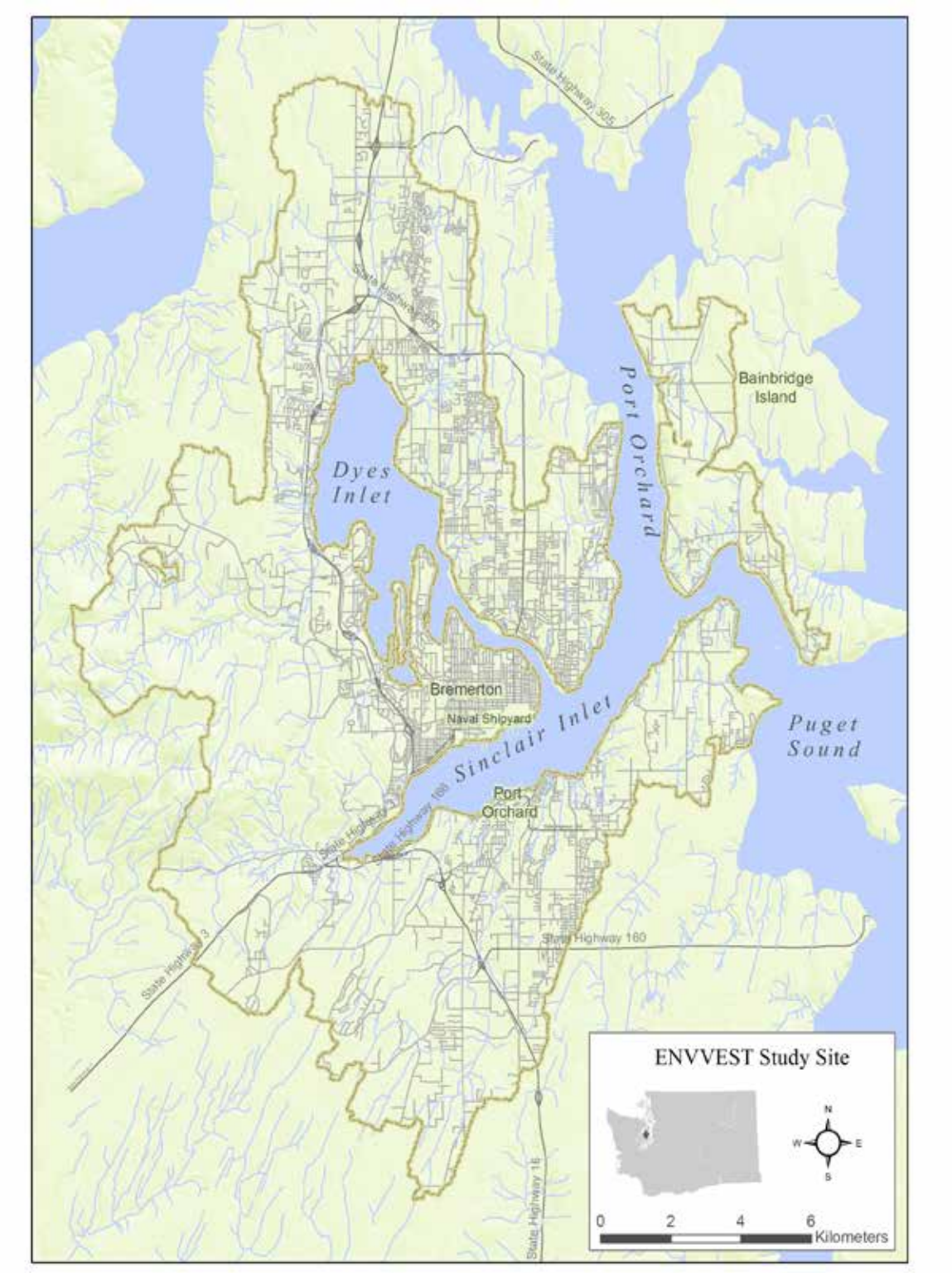

Figure 3. Location of PSNS&IMF within the Sinclair/Dyes Inlet Watershed

Figure 4. Sampling Locations of Six Phase II Stormwater Outfalls Selected for Monitoring in 2011/2012

4.0 PROJECT DESCRIPTION

This section presents the purpose, goals and objectives of the project, describes the boundaries, target populations, and practical constraints of the study, and specifies the information and data required to meet study objectives.

4.1 PROJECT AND PWP PURPOSE

The purpose of this project is to collect and characterize non-dry dock stormwater and associated data from selected locations. For Phase I of the project, completed the in 2010/2011 wet season, these locations represented the seven main industrial activities and processes at the PSNS&IMF as well as support functions in the surrounding NBK-Bremerton areas, as listed in Section 3.3.3. For Phase II of this project, to be completed in the 2011/2012 wet season, these locations represent the more highly industrial areas within the PSNS&IMF (Figure 4). Sampling at these locations meets the requirements anticipated in the PSNS&IMF (Working Draft) NPDES Permit (EPA 200a).

For the purpose of consistency with past efforts and potential future requirements, in regard to project data generation; monitoring tasks, as detailed in this PWP, will be performed following many of the procedures initially developed in the SWMP-QAP (Taylor Associates Inc. 2009). Monitoring will include:

(1) the collection of automated, tidally-compensated, time-paced composite and grab stormwater samples for chemical analysis

(2) the manual collection of accumulated sediment samples for chemical analysis.

For Phase I, stormwater monitoring tasks were performed during three qualifying storm events at each monitoring station between November 2010 through April 2011. Phase II, stormwater monitoring tasks will be performed during four qualifying storm events at each monitoring station between November 2011 and May 2012. Sediment samples will be collected at each of the six monitoring stations during equipment deployment and recovery or maintenance events.

The purpose of this PWP is to document the technical strategy and procedures needed for monitoring stormwater basins within the CIA (the area of PSNS&IMF inside the security perimeter where ship maintenance, refueling and dismantling tasks are conducted; See Figure 2) and NBK. It also describes the sampling

process and procedures (including the collection of stormwater outfall samples and sample compositing), measurement procedures, QA/QC, data management, assessment/oversight, storm event and project reporting, data review/ verification/validation and corrective action tasks. The design and content of this PWP are based heavily on recommendations detailed in the 2009 QAPP (Taylor Associates Inc. 2009) and the 2010-2011 Phase I PWP. As a companion to this PWP, a Field Environmental Health and Safety Plan (EH&S) (PNNL 2010, revised 2011) has been attached as Appendix A. The EH&S presents pertinent site health and safety information and protocols (e.g. confined space entry procedures, emergency planning information, etc.). Copies of both the PWP and EH&S will be present in the field, with the lead crew member, during all sampling and support activities.

4.2 PROJECT GOALS

The goal of this project is to collect and characterize non-dry dock stormwater, sediment, and associated data from the selected locations within the Shipyard to fulfill the requirements of the (Working Draft) NPDES Permit Number WA-00206-2 (US EPA 2008a,b).

4.3 PROJECT OBJECTIVES

The objectives for the Phase II of the project include:

(1) Prepare a Project Work Plan following the procedures identified in the SWMP-QAP (Taylor Associates Inc. 2009), by adding logistics and site information for all six stations selected for monitoring in 2011-2012. This PWP will be updated to document any revisions, additions, and deletions (including changes in monitoring site selection) to the storm water sampling procedures and QA/QC criteria and will be the project guidance document for field and associated procedures;

(2) Following the procedures identified in the PWP, collect grab and automated, tidally-compensated, time-paced composite water samples for four qualifying storm events at each of the six stormwater sampling locations;

(3) Deliver composited samples to PNNL or designated subcontractor for analytical analysis and conduct chemical analyses per the PWP on stormwater composite and grab samples. The sample count includes four

storm events x six sites + three field duplicates + six equipment blanks for a total of 33 samples plus appropriate quality control samples;

(4) Collect representative samples from accumulated sediment within the stormwater vault at each of the six monitored outfalls. Sediment samples will be collected during the equipment deployment and recovery, maintenance events or other events of opportunity.

(5) Prepare field-sampling reports documenting the results of the sampling for each location and storm event.

(6) Prepare an annual report summarizing the results of chemical analysis and documenting progress and provide the status of non-dry dock stormwater monitoring at the Shipyard relative to the working draft NPDES permit (USEPA 2008a). The report may include technical contribution, recommendations for improvements, and incorporate the new stormwater information into the modeling component conducted by ENVVEST (Brandenberger et al. 2007a, b, Cullinan et al. 2007).

(7) Conduct all field and analytical activities required to achieve the project goals. This includes setting up monitoring stations, maintaining sampling and data collection equipment, acquiring all access approvals (to the extent possible regarding security concerns and PSNS&IMF approvals), scheduling of project staff, arranging field teaming, and telemetry equipment use permission. Ensure the chemical analyses are conducted in accordance with the PWP, which serves as the Quality Assurance Project Plan (QAPP).

4.4 INFORMATION REQUIREMENTS

Information required to meet the study objectives include:

- land use and operations within the non-dry dock properties of the Bremerton Naval Complex
- concentrations of constituents of concern in stormwater and sediment samples collected from the identified outfalls
- continuous record of rainfall data – specifically rainfall data prior to and during sampled storm events, including antecedent precipitation period, and total rainfall during each sampled event
- continuous record of water level data from the outfalls
- record of tide elevations during sampled storm events

4.5 DATA COLLECTION

Per this PWP, as part of Phase II of the project automated, tidally-compensated, time-proportionate and grab sampling techniques (as defined in Section 7.7.2) will be used to collect non-dry dock stormwater samples from qualifying storm events (as defined in Section 7.3). Sampling will be conducted at each of the six outfalls during four distinct storm events over the course of the sampling period of performance (November 2011 through May 2012). In addition, samples of accumulated sediment will be collected from within the stormwater vault during the equipment deployment and recovery or maintenance events at each of the six locations. The selected outfalls include PSNS015, PSNS84.1, PSNS115.1, PSNS124, PSNS124.1, and PSNS126. These locations are shown on Figure 4 and discussed in more detail in Section 7.1.

Rainfall, conductivity/salinity, temperature, and in-pipe water level data will be collected at each of the selected basin's monitoring station during all storm events. In-pipe water level data will be collected to assess runoff response and to compare the measured effect of tidal fluctuations on water level at a station against predicted tidal elevations. Rainfall data will be used to estimate the total volume of discharge sampled as described in Section 7.4. Water conductivity/salinity and temperature data will also be collected at monitoring stations during all storm events to discern when the increase in water level in the pipe is from storm flow and when it is from tidal backwater conditions.

4.6 TARGET POPULATION

For monitoring programs such as this, observations are made or samples are collected to describe "target populations". In this case, the target populations are:

- Characteristics of stormwater coming from the non-dry dock properties within the Shipyard complex. Specific characteristics (or target populations) include concentrations of specific constituents in stormwater based on the storm intensity (total precipitation per unit time). Six representative drainage basins will be sampled to characterize these populations.
- Concentrations of pollutants of interest in sediment accumulated in the Type II drainage system vaults (locations where stormwater monitoring equipment is setup) just upstream of each of the six monitored outfalls.

4.7 STUDY BOUNDARY

The study area boundaries encompass non-dry dock properties within the BNC complex covered under the jurisdiction of the NPDES Permit number WA-00206-2. The watershed boundaries of the Project ENVVEST study area are shown in Figure 3. The outfall specific study boundaries for each of the selected monitoring basins are shown on Figure 5.

4.8 PRACTICAL CONSTRAINTS

Practical constraints facing this monitoring project include limitations due to site selection, physical characteristics of the monitoring sites, operational activities at the monitoring sites, equipment limitations, and other logistical challenges to stormwater sampling.

- Secured areas and/or sensitive Navy activities limit site selection and the range of potential sampling points.
- Most of the drainage basins are affected by backwater to some degree due to tidal influences. Water fluctuations in these drainage pipes that are caused by changing tides will often mask fluctuations due to stormwater runoff. This complicates flow monitoring and storm water sampling. Additionally, seawater entering the drainage pipes at higher tides will mix with stormwater at the monitoring stations. The sampling approach targets the collection methods that reduce the potential to sample only the seawater and optimizes the sampling of the representative stormwater runoff.
- The number of potential monitoring points within each of the selected basins is limited because each of these storm drain systems are relatively short.
- Characteristics of the selected site's storm drain system and hydraulics can constrain how monitoring can be conducted. Pipe diameters, slopes, expected water depths, and backwater conditions all constrain what monitoring methods can be used. If the most suitable location for monitoring is a manhole structure rather than an exposed outfall pipe, then confined space entry will be required to install, operate, and maintain monitoring equipment[1].
- Operations at the site constrain monitoring activities by field crews. Monitoring locations may be in traffic areas that will need to be cordoned off when a field

[1] As per NAVSEA Instructions, all confined spaces will be certified gas-free before entry.

crew is operating at the site. This may disrupt the operation of the site and the operations of the field crews. For example, if the monitoring location is in an active parking area, steps would need to be taken to maintain access to the monitoring site.

- Monitoring equipment limitations include the ability of automatic samplers to collect representative samples of stormwater. Auto-samplers have a limited sample storage capacity, which limits the frequency and duration of sample collection during a storm event.
- Stormwater monitoring poses inherent logistical challenges because the activity relies on an event (precipitation) that can only be forecasted in the near-term with limited reliability. Thus, mobilization of field staff for a potential sampling event cannot happen more than a couple of days ahead of a forecasted storm.
- Some parameters cannot be collected using automatic samplers. These samples will need to be collected manually. During an event, staff must be mobilized to collect the manual grab sample on short notice. Therefore, staff may need to visit the site at any time during the storm event to do so. Given that qualifying storm events may begin at night or during the weekends or holidays, it may be difficult to schedule staff resources.

4.9 DECISION MAKING

The results of these monitoring efforts are not intended for use in making specific decisions. In a broader context, results will inform the permitting process and contribute to PSNS&IMF's environmental performance, and thus be more protective of water quality.

5.0 ORGANIZATION AND SCHEDULE

The following section identifies the project team, provides an overview of the project schedule, identifies special training required for project implementation, and describes the process for future revision of this document.

5.1 ROLES AND RESPONSIBILITIES

The table below contains a list of the participants in the major aspects of the project and their associated responsibilities. The full project personnel contact list, which identifies other technical leads, field staff and alternate storm control personnel, is included as Appendix B.

Table 1: Project Participant Roles and Responsibilities

[1]Position	[1]Roles and Responsibilities
Project Manager/PSNS&IMF **Lesley Doyle** Water & Special Projects Supervisor ph: 360-476-9678 pager: 360-781-2045 lesley.doyle@navy.mil	Ms. Doyle's role will be to support the project in an administrative and managerial capacity. She will provide necessary support to the Navy Team, be available for project issue resolution and will help to determine the "go-no-go" decision regarding storm targeting.
NPDES Program Manager/PSNS&IMF **Jacquelyn Young** ph: 360-476-4738 cell: 360-731-2807 jacquelyn.young@navy.mil	Ms. Young's role will be to provide overall management of the NPDES Permit compliance activities. Monitors and assesses the quality of work. Responsible for verifying that the PWP (including the /ES&H) is being followed and that the project is producing data of known and acceptable quality. Ensures adequate training and supervision of all monitoring and data collection activities. Complies with corrective action requirements. Participate in the "go-no-go" decision regarding storm targeting.
Technical Coordinator **Dr. Robert Johnston** MESO-NW/PSNS&IMF ph: 360-782-0113 cell: 360-961-9072 johnston@spawar.navy.mil	Dr. Johnston will be responsible for technical coordination with Navy and other team members, conduct document and report review and will provide project QC. Dr. Johnston will also participate in the process to determine the "go-no-go" decision regarding storm targeting.
Data Collection Consultant Project Manager – Lead Storm Controller/Taylor-TEC **Dave Metallo** ph: 206-267-1400 cell: 206-794—0095 David.Metallo@cardnotec.com	Mr. Metallo will ensure appropriate consultant project management and coordination with project team members and consultant staff. Develops project design, facilitates field operations and data collection, and conducts monitoring system audits and project QC. Mr. Metallo is also the lead storm event controller and lead field activities manager. He will also be involved in the determination of the "go-no-go" decision.

[1]Position	[1]Roles and Responsibilities
Data Collection Consultant Senior Technical Advisor/Taylor-TEC **Curtis Nickerson** ph: 206-267-1400 cell: 206-755-9956 Curtis.Nickerson@cardnotec.com	Mr. Nickerson oversees monitoring activities and data management conducted pursuant to the PWP by the Consultant team. Mr. Nickerson also provides review of project documents, field / monitoring design and provides technical input for issues as they arise. He will also be involved in the determination of the "go-no-go" decision.
Data Collection Sample Event Lead/Taylor-TEC **Brian Rupert** 206-267-1400 cell: 360-620-7254 BWRupert@tecinc.com	Mr. Rupert will manage and oversee monitoring activities, sampling decisions for a specific targeted sample event and routine maintenance of the monitoring systems. Mr. Rupert may also serve as an alternate storm controller for certain sampling events.
Data Collection Consultant Telemetry Systems Manager/Taylor-TEC **Bryan Berkompas** ph: 206-267-1400 cell: 206-718-7446 BEBerkompas@tecinc.com	Mr. Berkompas designs, tests and manages the operation of the telemetry and data collection system/s deployed in the field. He will assist, as requested by the Project Manager, with field installation of the telemetry system/s. He periodically reviews the data collected on the system loggers, provides technical assistance and conducts troubleshooting services. Mr. Berkompas may also serve as an alternate storm controller for certain sampling events.
Data Analysis Consultant Project Manager – Chemist /PNNL **Jill Brandenberger** ph: 360-681-4564 cell: 360-670-3241 Jill.Brandenberger@pnnl.gov	Ms. Brandenberger supervises laboratory personnel involved in generating analytical data for this project. Oversees all operations, ensuring that all quality assurance/quality control (QA/QC) requirements are met, and documentation related to the analysis is complete and accurately reported. Enforces corrective action, as required. Ms. Brandenberger will also conduct field audit tasks to assure proper collection techniques are being employed. She may also participate in sample collection during certain events.
Data Analysis Consultant Laboratory Quality Assurance Manager/PNNL **Jill Brandenberger** ph: 360-681-4564 cell: 360-670-3241 Jill.Brandenberger@pnnl.gov	Monitors the implementation of the Quality Assurance Plan (QAP) sections of the PWP within the analytical laboratory to ensure complete compliance with QA objectives as defined by the contract and in the QAP. Performs validation and verification of data before the report is transmitted to the BNC.
Data Analysis Consultant Quality Control Officer Manager/PNNL **Julie Snelling-Young** ph: 360-681-3631 Julie.Snelling-Young@pnnl.gov	Provides independent review of analytical results and laboratory analysis tasks. Identifies items related to testing results and/or laboratory methodologies that are out of compliance with the associated project (field and lab) QAPs.

[1]See Appendix B for full Project Personnel List

5.2 SCHEDULE

The following table illustrates the approximate implementation schedule for project-related activities.

Table 2: Anticipated Project Schedule

Project Year: 2010-2011(Phase I) , 2011-2012 (Phase II)				
Activity	**Anticipated Date of Initiation**	**Anticipated Date of Completion**	**Deliverable**	**Deliverable Due Date**
Project startup activities	Jul 23, 2010[1] Sep 30, 2011[2]	Nov 1, 2010[1] Nov 15, 2011[2]	Monitoring equipment installation and testing; staff training	Field reports and meeting minutes, per event
Stormwater monitoring	Nov 1, 2010[1] Nov 15, 2011[2]	Apr 30, 2011[1] Apr 30, 2012[2]	Stormwater quality data, water level data, conductivity data, precipitation data	Storm event report following each data collection event.
Data validation	Dec 1, 2010[1] Dec 1, 2011[2]	May 31, 2011[1] May 31, 2011[2]	Data validation /usability report	Prior to annual report
[3]Reporting	Nov 15, 2010[1] Nov 15, 2011[2]	Aug 31, 2011[1] Sep 30, 2012[2]	Progress Status Reports	Quarterly, starting Sep, 2010
			Storm Event Reports	Within 30 days after a storm event
			Electronic Data Reports	Within 30 days after a storm event
			Annual Report Sections	Within 60 days of completion of last sampling event

[1] Work completed in project Phase I
[2] Work to be completed in project Phase II
[3] Taylor/ TEC is not responsible for schedule overages as a result of Navy and/or stakeholder document reviews that exceed the anticipated period.

5.3 SPECIAL TRAINING NEEDS/CERTIFICATION

Project staff will receive the following training/certification as appropriate for their role in the project:

- Any field staff involved with monitoring equipment installation or equipment maintenance requiring confined space entry will have completed confined space entry training, compliant with WAC 296-809 and OSHA 29CFR1910.146 (or equivalent) .
- Any field staff needing to access the monitoring sites will have undergone necessary PSNS&IMF/CIA security clearance, badging, and safety training.
- Field staff will receive training in sampling and telemetry equipment operation, maintenance, and calibration procedures.
- Field staff will receive training in all necessary sample collection, sample handling, and chain of custody for stormwater grab and composite sampling.
- Analytical chemistry results will be reported from a Washington state and National Environmental Laboratory Accredited (NELAC) laboratory. Each laboratory will maintain an internal quality control program with documentation available upon request.

5.4 REVISIONS

Revisions to this PWP or other establish project protocol deemed necessary that would update, modified, remove or otherwise change the procedures, methods and/or qualifications described in this PWP will be immediately brought to the attention of the Navy and consultant project managers. The Navy must approve any such revisions and will receive written notice from the requesting party within five business days of the effective date of the revision. Any modifications in sample collection, sample analysis, or other procedures addressed by the PWP will be documented in an addendum to the PWP. The PWP and any addenda will be kept on site and made available to the Navy or other approved stakeholders upon request.

6.0 DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) refer to both qualitative and quantitative statements that define the type, quality, and quantity of data necessary to support project decisions.

6.1 DATA QUALITY OBJECTIVES

Ultimately, the objective for the usability, quality, type, and output of data collected, as stipulated by the design of this PWP, in conjunction with this project is to achieve the requirements specified in the NPDES Permit No. WA-00206-2, for the satisfaction of those non-dry dock stormwater, related miscellaneous sections as listed in the permit above and in the Performance Work Statement (PNNL 2010).

The DQOs are developed based on the project goals, project objectives, information required to fulfill the monitoring requirements, and project site boundary. These factors are presented and discussed in Section 3.0 and Section 4.0. As driven by the DQOs, the sampling and analysis design and the data quality limits are therefore determined and presented respectively in Section 7.0 though Section 10.0 below.

The specific DQOs for this project are detailed in Table 3 and include:

(1) Ensuring that the data usability meets the project objectives,

(2) Ensuring that outputs from the systematic planning process were used to design the study,

(3) Ensuring collected data are sufficient to characterize the pollutant levels of stormwater, sediment and other discharges from non-dry dock areas,

(4) Ensuring collected data are of known and specified quality, which are presented and evaluated in terms of measurement quality indicators (MQIs).

Table 3. Data Quality Objectives for Non-Dry Dock Stormwater Sampling at PSNS&IMF&IMF.

Storm Event Sampling Data Quality Objectives
STEP 1: State the Problem Sinclair and Dyes Inlets in Puget Sound, WA may be impacted by pollution from a variety of sources including shipyard operations, marina and vessel traffic, storm event runoff, discharges from waste water treatment plants, industrial outfalls, and surface streams and legacy sources. Additional data to better understand the relative importance of the storm event runoff to the overall load of contaminants to the Inlet is required to provide a baseline to measure processes improvement within the Shipyard and assess trends through time and the effectiveness of BMPs and other pollution control measures to determine if discharges from stormwater outfalls are protective of beneficial uses including aquatic life.
STEP 2: Identify the Decision 1. Are discharges from shipyard industrial outfalls and storm drains protective of beneficial uses of Sinclair Inlet? 2. How does the water quality of storm water runoff compare between various drainage basins in the Shipyard that support different types of activities (e.g. CIA versus NBK)? 3. What is the status and trend of stormwater quality relative to previous Shipyard stormwater sampling in 2003-2005 and/or other Puget Sound industrial areas?
STEP 3: Identify Inputs to the Decision 1. Select outfalls to monitor that represent the primary range of activities within the Shipyard including both the CIA and NBK areas (Project Phase I) and which emphasize the industrial core of the Shipyard (Project Phase II). 2. Conduct storm event monitoring that is comparable to previous ENVVEST sampling and will satisfy anticipated NPDES requirements to establish trends associated with environmental quality within the Inlets. 3. Evaluate stormwater and sediment quality data compared to various water quality benchmarks to identify drainage basins that may require further

Storm Event Sampling Data Quality Objectives
source identification, process improvement, or more effective BMPs.
STEP 4: Define the Study Boundaries Spatial boundary is the PSNS&IMF property boundaries and stormwater drainage basin boundaries.
STEP 5: Develop a Decision Rule The data collected will be used to determine compliance with the draft NPDES stormwater outfall permit, identify stormwater drainage basins that require additional source identification studies, and determine the effectiveness of cleanup and pollution control measures conducted since the previous ENVVEST sampling.
STEP 6: Evaluate Decision Errors Data will be evaluated to assure accuracy, precision, completeness, comparability, and representativeness.
STEP 7: Optimize the Design for Obtaining Data Stormwater outfall and sediment samples will be collected following protocol developed by ENVVEST and modified to meet anticipated NPDES requirements to provide directly comparable results to previous monitoring data and inform the permitting process. Storm event samples will be collected as time-paced, tidally corrected composites to represent the event mean concentration. The sampling locations were selected to represent the various activities occurring within the Shipyard and provide a basis for ongoing stormwater monitoring efforts. The data will be integrated into the network of ambient monitoring stations and regional biota monitoring stations to assess the impact of contaminants discharged into Sinclair and Dyes Inlets, characterize the status and trend of ecological resources and determine if discharges from all sources are protective of beneficial uses including aquatic life. The data will provide a basis for determining the need for improvement, assess the effectiveness of corrective actions, and inform adaptive management actions needed to improve environmental quality and protect aquatic resources.

6.2 MEASUREMENT QUALITY INDICATORS

The quality and usability of data collected in this investigation will be determined based on the outcomes of data verification and validation, and expressed as measurement quality indicators (MQIs) – precision, accuracy (bias), representativeness, comparability, completeness, and sensitivity.

Table 4 presents a summary of QC samples and parameters corresponding to each of the MQIs. The definitions of the MQIs are presented in the sections below.

Table 4: Measurement Quality Objectives For Chemical Analysis Of Stormwater and Sediment Samples

Measurement Quality Indicator	QC Parameters
Precision	RPD values of at least one of the following: (1) LCS/LCSD (2) MS/MSD (or Laboratory Duplicate) (3) Field Duplicates
Accuracy	%RPD, %R, %D, or $\%D_f$ values of: (1) Initial Calibration and Calibration Verification (2) Surrogate Spikes (3) Internal Standards (4) Labeled Compounds (5) LCS (6) MS Results of: (1) Instrument and Calibration Blank (2) Method (Preparation) Blank (3) Trip Blank (4) Field Blank (5) Equipment Rinsate Blank
Representativeness	(1) Results of All Blanks (2) Sample Integrity (3) Holding Times

Measurement Quality Indicator	QC Parameters
Comparability	(1) Sample-specific MRLs (2) Sample Collection Methods (3) Laboratory Analytical Methods
Completeness	(1) Data Qualifiers (2) Laboratory Deliverables (3) Requested/Reported Valid Results
Sensitivity	MDLs and MRLs

Notes:
%RSD – Percent relative standard deviation
%R – Percent recovery
%D – Percent difference
$\%D_f$ – Percent drift
LCS – Laboratory control sample
LCSD – Laboratory control sample duplicate
MDL – Method detection limit
MRL – Method reporting limit
MS – Matrix spike
MSD – Matrix spike duplicate
RPD – Relative percent difference

6.2.1 Precision

Precision refers to the degree of agreement between or among independent, similar, or repeated measures. Precision is expressed in terms of analytical variability. For this investigation, analytical variability will be measured as the RPD or coefficient of variation between replicate analyses and between the MS and MSD analyses. Monitoring variability will be measured by analysis of field duplicate samples. Precision will be calculated as the RPD as follows:

$$RPD = \left[\frac{|X_1 - X_2|}{\frac{(X_1 + X_2)}{2}} \right] \times 100$$

Where:

RPD = relative percent difference

X_1 = native sample

X_2 = duplicate sample

The resultant RPD will be compared with criteria established by this PWP; deviations from these criteria will be reported. If the PWP criteria are not met for the laboratory precision (e.g. excludes field duplicates), the laboratory will supply a justification of why the limits were exceeded, and will implement the appropriate corrective actions. The RPD will be evaluated during data review and

validation. The data reviewer will note deviations from the specified limits and will comment on the effect of the deviations on reported data.

6.2.2 Accuracy

Accuracy refers to the amount of agreement between a measured value and the true value. It will be measured as the percent recoveries of MS and MSD, organic surrogate compounds, standard reference materials (SRM; if available), and the LCS. Additional potential bias will be assessed using calibration standards and blank samples (e.g., method blanks).

In cases where accuracy is determined from spiked samples, accuracy will be expressed as the percent recovery (the closer these values are to 100, the more accurate the data). Matrix spike recovery will be calculated as follows:

$$P = \left[\frac{(SSR - SR)}{SA} \right] \times 100$$

Where:

P = percent recovery

SSR = spiked sample result

SR = sample result (native)

SA = the spiked concentration added to the spiked sample

The resultant percent recoveries will be compared with criteria established by this PWP; deviations from these criteria will be reported. If the objective criteria are not met, the laboratory will supply a justification as to why the limits were exceeded, and will implement the appropriate corrective actions. Percent recoveries will be evaluated during data review and validation, and the data reviewer will comment on the effect of the deviations on the reported data.

For the SRMs, the accuracy will be expressed as the percent difference (%D). The %D will be calculated as the percent difference between the measured and the certified value.

6.2.3 Sensitivity

Sensitivity refers to the measure of the concentration at which an analytical method can positively identify and report analytical results. The sensitivity of a given method is commonly referred to as the method detection limit (MDL).

Although there is no single definition for the detection limit, the following terms and definitions of detection will be used, as appropriate.

- **Minimum Level** (ML) as per the Navy's NPDES Permit (§I.C.5.b) "*For all effluent monitoring, the permittee must use methods that can achieve a minimum level (ML) less than the effluent limitation.*"
- **Method Detection Limit** (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte. MDLs are determined through a MDL study following the requirements in 40 CFR 136, Appendix II.
- **Practical Quantification Limit** (PQL) or **Method Reporting Limit** (MRL) is the concentration of the target analyte that the laboratory has demonstrated the ability to measure within specified limits of precision and accuracy during routine laboratory operating conditions. A PQL/MRL should be equal to or greater than the lowest concentration of the initial calibration standards where the initial calibration does not include the blank standard. As required by U.S. Department of Defense (DOD) Quality Systems Manual for Environmental Laboratories (QSM) (2009), a reported PQL/MRL shall be greater than two times its MDL for any target analyte. To remain consistent with the ENVVEST program, the reporting limit (RL) will be defined as 3.18 x the MDL, which is the Student's T value for n=7 used to generate the MDL. MRL values for these data are also determined using the low-level standard and if they exceed the RL will be used for data qualification.

6.2.4 Representativeness

Representativeness is a qualitative measure of the degree to which collected data accurately and precisely represent a characteristic environmental condition, or more specifically, site conditions. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling. Representativeness can be assessed through the analysis of field duplicate samples and other types of repetitive measures. Field variability can be minimized by collecting composite samples (as opposed to an individual grab sample).

Samples will be collected so they are adequately representative of the volume and nature of the monitored constituents of interest. To meet this goal, samples

will be collected according to appropriate procedures and will consider the following types of representativeness criteria:

- the rainfall event must be "valid" (meeting the qualification criteria per Section 7 of this PWP for a targeted event);
- grab and/or composite stormwater samples must meet certain criteria governing the method and timing of the sampling process relative to the storm discharge hydrograph;
- sediment samples will be collected following methods outlined in Sampling and Analysis Plan: Sediment Quality Verification Study and Baseline for Process Improvement for Puget Sound Naval Shipyard & Intermediate Maintenance Facility (Johnston et al, 2011); and
- all analyses must be conducted within method-required holding times.

Samples may be deemed "non-representative" and data rejected if any of these criteria are not met.

6.2.5 Completeness

Completeness refers to the percentage of measurements judged to be valid compared to the total number of measurements made or planned for a specific sample matrix and analysis. It includes both targeted sample collection by the field team and analytical work done by the laboratory. Essentially, completeness is used to assess how field situations and laboratory problems affected the overall success of the data collection effort. Completeness is calculated by the following:

$$Completeness = \frac{Valid\ \ Measurements}{Total\ \ Measurements} \times 100$$

All valid data will be used for this project. Data that has been qualified as estimated due to a QC outlier will be considered valid for the purpose of assessing completeness, whereas data that have been qualified as rejected will not be considered.

6.2.6 Comparability

Comparability is a qualitative measure expressing the confidence with which one data set may be compared to another. Sample collection and handling techniques, sample matrix type, and analytical method all affect comparability. Comparability is limited by other MQIs because data sets can be compared with

confidence only when precision and accuracy are known. Data from one phase of an investigation or from a separate investigation can be compared to others when similar methods are used and similar data packages are obtained. This study was designed to provide data comparable to the ENVVEST storm water program.

7.0 SAMPLING PROCESS DESIGN

This section describes the monitoring sites, and describes the approach for targeting storm events, collecting grab and composite stormwater samples, and collecting sediment samples.

7.1 MONITORING BASIN DESCRIPTIONS

Phase I monitoring of non-dry dock stormwater occurred at seven representative stormwater drainage basins within the Shipyard. The seven drainage basins are located in both the industrial (CIA) and non-industrial (NBK) areas of the facility and represent the main industrial operations and processes at the PSNS&IMF as well as support functions in the surrounding NBK-Bremerton areas.

Phase II monitoring will occur at six drainage basins within the Shipyard - two that had been monitored in Phase I (PSNS015 and PSNS126) and four (PSNS084.1, PSNS115.1, PSNS124 and PSNS124.1) that are new for the 2011-12 wet season. These six outfalls were selected to represent the more industrial areas of the shipyard as well as the largest portion of the NBK included in a single basin (PSNS015). The locations of the Phase I and Phase II monitoring stations are shown in Figure 5.

The Phase II drainage systems were selected because they are relatively large basins that have heavy industrial use, are in close proximity to legacy sites, and contain unique and/or representative land uses. Figure 6 shows the general proximity of the monitoring locations and other pertinent features of the BNC. Table 5 lists the drainage basins selected for monitoring by their associated stormwater outfall number and primary activity.

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Figure 5. Selected Drainage Basin and Outfall Monitoring Location for Non-Dry Dock Stormwater Monitoring at the Bremerton Naval Complex

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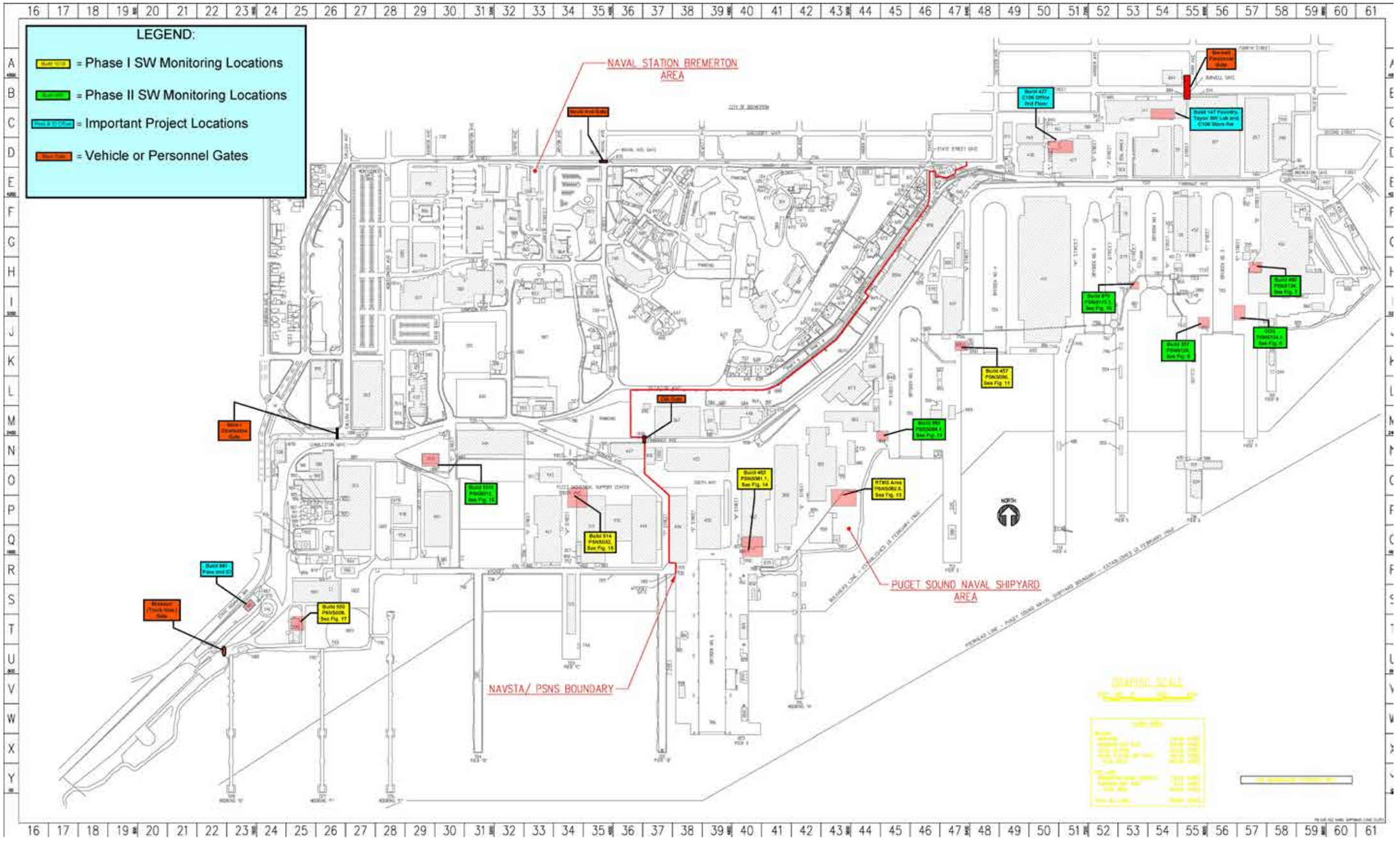

Figure 6. BNC Station Map with Monitoring Locations and Pertinent Features

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Table 5: Drainage Basins Selected For Monitoring And Associated Primary Activity.

PSNS& IMF Outfall #	Monitoring Phase	Geographical Area	Primary Work Activity
126	Phase I & II	East CIA, Southwest B460 along "C" Street, east of DD3	Materials storage (outdoors)
124.1	Phase II	Southwest of Bldg 460, west of Bldg 495, east of DD3	Dry-dock support activities, crane, vehicle and equipment traffic, laydown and staging areas
124	Phase II	Northwest corner of Bldg. 357, west of DD3	Material storage, Pipe/Boiler/Forge/ Nuclear Repair Shops, Chem Lab, DD3 cutting facility
115.1	Phase II	South-southeast of Bldg 879, east of DD4	Materials storage (outdoors), various shops and training center, water front support activities
096	Phase I	Mid CIA, west of DD4, southeast of Bldg 457 along "N" St	Vessel maintenance
084.1	Phase II	Southeast section of Bldg 983, west of DD5	Vehicle and equip. traffic, rad. work builds, outside equip. storage, paint shop, recycling, indust. waste pretreatment
082.5	Phase I	West CIA, southeast of B851, RMTS Area	Vessel, equipment and materials recycling
081.1	Phase I	West CIA, NE of DD6 and NW of Pier 9, south side of Bldg 462	Non-aircraft carrier vessel support services
032	Phase I	East NBK, NW corner of B514	Aircraft carrier vessel support services
015	Phase I & II	Mid NBK, south side of McDonalds rest., east side of drive-through lane	Municipal/commercial/residential services
008	Phase I	West NBK, east side of Inactive Fleet B550	Parking/steam plant/truck traffic

As described in the AKART study (Jabloner 2009) the BNC stormwater system is composed primarily of clay pipe with a mixture of concrete, PVC, steel, and cement-asbestos pipe generally making up rest of piping. Within the CIA, stormwater is collected from buildings and roofs by rain gutters and roof drains, which then discharge into storm drainage pipes or into catch basins located around the buildings. On the piers and other surfaces located directly over the water there are drain holes in the deck that deposit the rainwater directly into Sinclair Inlet. The ground surfaces around the buildings are generally impervious, made up of either asphalt, concrete, or concrete base with asphalt over it. There are various cracks, breaks and holes in some of the surface cover, as well as crane track pathways and a sloped vegetated hillside (the northern boundary to the much of the CIA) that serve to infiltrate a small portion of precipitation and surface runoff within the CIA. However, because the vast majority of the CIA contains no unpaved or pervious areas, stormwater infiltration is minimal.

The depth of the stormwater system ranges from one to twenty feet below ground surface. Most of the stormwater outfalls discharge to Sinclair Inlet below mean lower low tide. The Shipyard is only a few feet above high tide, therefore most of the stormwater piping is tidally influenced. This greatly affected the selection of sampling locations within each drainage basin.

The sections below describe the general characteristics and total drainage basin size (in acres) of each stormwater drainage basin that has been selected for monitoring. Additional information about the drainage basins selected for monitoring, along with the other drainage basins within the BNC property, are included in the Basin Description Table in Appendix C.

Specific attributes of the drainage basins selected for monitoring are presented in Table 6.

Table 6. Selected Drainage Basin Attributes

PSNS Outfall No.	Outfall Location	[1]Monitoring Location	Total Basin Area (acres)[a]	Basin Impervious Surface Area (acres)[a]	Basin Pervious Surface Area (acres)[a]	Monitoring Location Manhole ID	[2]Manhole Rim Elevation (FT)	[2]Approx. Elev. of Sampling Intake (FT)	[3]Effective Tide Height (FT)
126	47°33'37"N, 122°37'36"W	47°33'42"N, 122°37'42"W	15.22	15.00	0.22	5110	18.22	8.38	+8
124.1	47°33'36"N, 122°37'44"W	47°33'39"N, 122°37'45"W	2.66	2.52	0.14	5880	17.15	8.19	+8
124	47°33'36"N, 122°37'47"W	47°33'39.2"N, 122°37'48"W	10.42	9.85	0.57	5881	17.75	5.27	+5
115.1	47°33'39"N, 122°37'54"W	47°33'40.4"N, 122°37'55"W	9.50	9.22	0.28	4860	17.72	1.27	+1
096	47°33'35"N, 122°38'11"W	47°33'37"N, 122°38'11"W	16.48	15.99	0.49	3878	17.46	2.94	+2.5
84.1	47°33'30"N, 122°38'20"W	47°33'31.3"N, 122°38'20"W	0.55	0.55	0.0	551	17.69	5.61	+5.5
082.5	47°33'28"N, 122°38'20"W	47°33'26"N, 122°38'23"W	[5]2.00	[5]2.00	0.00	CBS-6	17.91	9.87	+12[4]
081.1	47°33'21"N, 122°38'31"W	47°33'23"N, 122°38'32"W	22.16	21.51	0.65	SD-1	17.71	3.85	+4

Table 6. Selected Drainage Basin Attributes

PSNS Outfall No.	Outfall Location	[1]Monitoring Location	Total Basin Area (acres)[a]	Basin Impervious Surface Area (acres)[a]	Basin Pervious Surface Area (acres)[a]	Monitoring Location Manhole ID	[2]Manhole Rim Elevation (FT)	[2]Approx. Elev. of Sampling Intake (FT)	[3]Effective Tide Height (FT)
032	47°33'21"N, 122°38'50"W	47°33'27"N, 122°38'49"W	4.79	4.65	0.14	5961	18.46	9.46	+9
015	47°33'21"N, 122°39'02"W	47°33'29"N, 122°39'03"W	92.26	46.13	46.13	A42	17.21	1.96	+1.5
008	47°33'15"N, 122°39'17"W	47°33'19"N, 122°39'16"W	12.71	11.95	0.76	2179	17.95	5.33	+5

[1]Monitoring location information was obtained using a hand held GPS device. This data is not contained in the Basin Description Table.

[2]As referenced to Mean Lower Low Water. All survey data obtained from previous measurements reported in historical PSNS&IMF documents (1994-2008).

[3]Effective Tide Height, based on NOAA tide predications, that would cause tidewater, under non-storm conditions, to be detected at the monitoring intake elevation for a certain monitoring location.

[4]The effective tide height at 082.5 is significantly higher than the approximate elevation of the sampling intake due to the design of the piping system at this location. A TideFlex valve is located in the manhole downstream from CBS-6, which only allows tide water to back up into CBS-6 only higher tidally ranges.

[5]This is an estimate of the area draining through CBS-6. CBS-6 drains only a portion of the total PSNS&IMF 082.5 basin area (14.56).

[a]Basin areas supplied by PSNS C106, these data were revised December 2011 from their previous listing in the Basin Description Table.

Monitoring stations in **bold** utilized during Phase II and stations in **bolded underline** utilized during Phase I and II.

7.1.1 Outfall PSNS126 (Phase I & II)

The PSNS126 drainage basin is on the eastern side of the CIA and drains about 15.22 acres between the eastern side of dry dock #3, the central portion of Building 460, north to Buildings 107 and 290, and to the bulkhead near Build 495 in the south. The stormwater monitoring location, manhole (MH) 5110, is located along the southwest side of Building 460 along C-Street. The predominant work activities in this drainage basin include: ship fitting, welding, pipe and boiler shop activities; sheet metal fabrication, engineering and gyro shop activities; and material laydown and working areas for lead ingots. A diagram of the PSNS126 drainage basin is included in Figure 7.

7.1.2 Outfall PSNS124.1 (Phase II)

Drainage basin PSNS124.1 is approximately 2.66 acres and drains the east side of dry dock #3. This basin extends from the northern head of the dry dock, down along its eastern side, including the areas between the dock and the basin boundary for PSNS126, extending to the southern portion of the dock. The basin serves as the main access to the waterfront from the main East-West road through the shipyard. The predominant work activities in this basin include vehicle and equipment travel, laydown areas, and staging of equipment and materials for projects. The stormwater monitoring location, manhole (MH) 5118, is located along the southeast side of DD#3, west of B495, just south of the crane track terminus (east rail). A diagram of the drainage basin is included in Figure 8.

7.1.3 Outfall PSNS124 (Phase II)

The drainage basin for Outfall PSNS124 includes the north, east, and southeast side of building 147, the area between buildings 107 and 59, the east and north side of building 856, the east and south sides of building 452, and the west side of dry dock 3. The basin is just over 10.42 acres and the buildings within the basin include pipe and boiler shops, a chemical laboratory building, a nuclear repair shop and a forge shop. The stormwater monitoring location, manhole (MH) SS003, is located adjacent to the northwest corner of the OWTS at B357, south of B1003, and on the southwest side of DD#3. A diagram of the drainage basin is included in Figure 9.

7.1.4 Outfall PSNS115.1 (Phase II)

The PSNS115.1 outfall drains just over 9.50 acres, comprising the southwest side of building 147, the west side of building 856, and the south side of building 965. This primary use of these areas includes vehicle and equipment travel, material laydown area, and storage of equipment for ships support. The stormwater monitoring location, manhole (MH) 4862, is located south-southeast of B879, near the southern terminus of I-street, southwest of the temporary stacked refueling office trailers, just east of DD#2. A diagram of the PSNS115.1 drainage basin is included in Figure 10.

7.1.5 Outfall PSNS096 (Phase I)

The drainage basin for PSNS096 consists of about 16.48 acres located in the central portion of the CIA between dry dock #4 and #5 and extending north to Building 940 and south to the bulkhead near Building 694. The stormwater monitoring location, MH3878, is southeast of Building 457 and adjacent (west side) of Lift Station #5 along N-Street. The predominant work activities in this drainage basin include: rigging and paint shops; waterfront support tasks; material laydown areas; and the main industrial vessel maintenance areas for dry dock's 4 and 5 (including equipment and vehicle movement, equipment staging, and portable buildings for temporary work areas). A diagram of the PSNS096 drainage basin is included in Figure 11.

7.1.6 Outfall PSNS084.1 (Phase II)

The drainage basin that comprises PSNS84.1 has its northern head near Build 850 and Farragut Avenue, extending to the south along P-Street to the bay. The basin’s western boundary is along the row of Buildings 873, 880 and 983, with its eastern edge bounded by dry dock #5. Basin 84.1 drains approximately 0.55 acres. Basin activities include; high traffic areas south of B850A along Farragut Avenue (due to this being the main shipyard road),radiological work buildings, outside storage of temporary radiological enclosures, rail transport, paint shop, hopper for recycle grit on the NE side of B873,industrial waste pretreatment facility and a chromic acid scrubber at B1109. The stormwater monitoring location, manhole (MH) 551, is located near the southeast corner of B983, along the west side of the crane track, approximately 50-feet south of a large rollup door. A diagram of the PSNS084.1 drainage basin is included in Figure 12.

7.1.7 Outfall PSNS082.5 (Phase I)

The drainage basin for PSNS082.5 consists of about 2.0 acres located in the western portion of the CIA. The portion of drainage from PSNS082.5 being monitored for this project is approximately 2 acres south-southeast of Building 851 known as the Recycling Materials Transfer Station (RMTS), which drains the area south of Wyckoff Avenue along the north of the RMTS and south to the bulkhead east of Building 959. The RMTS area is drained by a series of small Type-I (smaller, typically shallow, single entry and/or single exit vault) catch basins and curtain drains that are routed through a swirl concentrator and several Contech® media filter cartridges contained in a single vaulted bank. The stormwater monitoring point for the RMTS area is at MHCBS-6. This Type-II (typically large enough to occupy for work or monitoring tasks, deeper, multiple line hubs) vault (referred to as CBS-6) is located a short distance north from the outlet of the filter bank. Flow from MHCBS-6 is delivered north to MH523 where it commingles with the flows from the remaining 12.56 acres of the basin. The CBS-6 line is fitted with a TideFlex® valve at MH523 to prevent as much tidal inundation as possible. The predominant work activities in the portion of the basin being monitored include recycling of vessel components, equipment and materials; exposed scrap metal storage; and recycling material management tasks. A diagram of the PSNS&IMF 096 drainage basin is included in Figure 13.

7.1.8 Outfall PSNS081.1(Phase I)

The drainage basin for PSNS081.1 consists of about 22.16 acres located near the western edge of the CIA northeast of dry dock #6 and northwest of Pier 9. The drainage basin is bounded by Buildings 450 and 462 to the west and east, respectively, and by the bulkhead at near Building 875 to the south. The stormwater monitoring location is along the south side of Building 462 at MHSD-1, which is southwest of Lift Station #3, just to the north of Wyckoff Avenue. The predominant work activities in this drainage basin include: a wide variety of non-aircraft carrier vessel support services; metal preparation, equipment storage, and maintenance shop activities; and general warehousing. Shops and areas contained within this basin include the controlled industrial repair area, woodshop, boat shop, hazardous abatement facility, temporary services warehouse, controlled industrial warehouse, vehicle maintenance shops and various offices. A diagram of the PSNS081.1 drainage basin is included in Figure 14.

7.1.9 Outfall PSNS032 (Phase I)

The PSNS032 drainage basin consists of about 4.79 acres located in the Fleet Industrial Support Center area on the eastern side of the NBK. The drainage basin is bounded to the north by Rogers Ave, Building 494, and the bulkhead near the head of Pier C to the south. Buildings 943 and 514 (western half) bound the site on the west and east sides, respectively. The stormwater monitoring location, MH5961, is located at the northwest corner of Building 514 along South Avenue. The predominant work activities in this drainage basin include: aircraft carrier vessel support services and general warehousing, fire station operations, dental clinic services, and loading, unloading and distribution of supplies and materials. A diagram of the PSNS032 drainage basin is included in Figure 15.

7.1.10 Outfall PSNS015 (Phase I & II)

The largest stormwater basin in the Shipyard, PSNS015 consists of about 92.26 acres and is located in the mid-southern portion of the NBK. The drainage basin is bounded to the north by the BNC boundary with First Street, to the south by the bulkhead south of Building 997, to the east by the parking area east of Build 1004, and to the west by Montgomery Avenue. PSNS015 drains the majority of the fleet personnel support areas of NBK. The stormwater monitoring location, MHA42, is located at the western end of the drive-through lane of the McDonalds® restaurant, (southeast corner of Building 1019). The predominant work activities in this drainage basin include: municipal/commercial/residential services; housing, recreation, roadways, parking, garden center, food market, gym; naval exchange and smaller support businesses consisting of the commissary, credit union, and housing units. A diagram of the PSNS015 drainage basin is included in Figure 16.

7.1.11 Outfall PSNS008 (Phase I)

The PSNS008 drainage basin consists of about 12.71 acres located in the southwestern portion of the NBK. The drainage basin is bounded in the north by Charleston Avenue and to the south by the bulkhead near south of Building 550. Buildings 530 and 550 mark the basins northwest and southwest boundary, respectively. The west side of Building 513 marks the basin's eastern edge. The stormwater monitoring location, MH2179, is in the parking lot of Building 550, along the building's eastern side. The basin drains the area of the steam generating plant and support buildings. The predominant work activities in this drainage basin include: parking, steam plant operations and truck/bus traffic;

large vehicle and equipment parking lots; a power plant complex; sand piles; an oil handling facility; and a waste disposal staging area. A diagram of the PSNS&IMF 008 drainage basin is included in Figure 17.

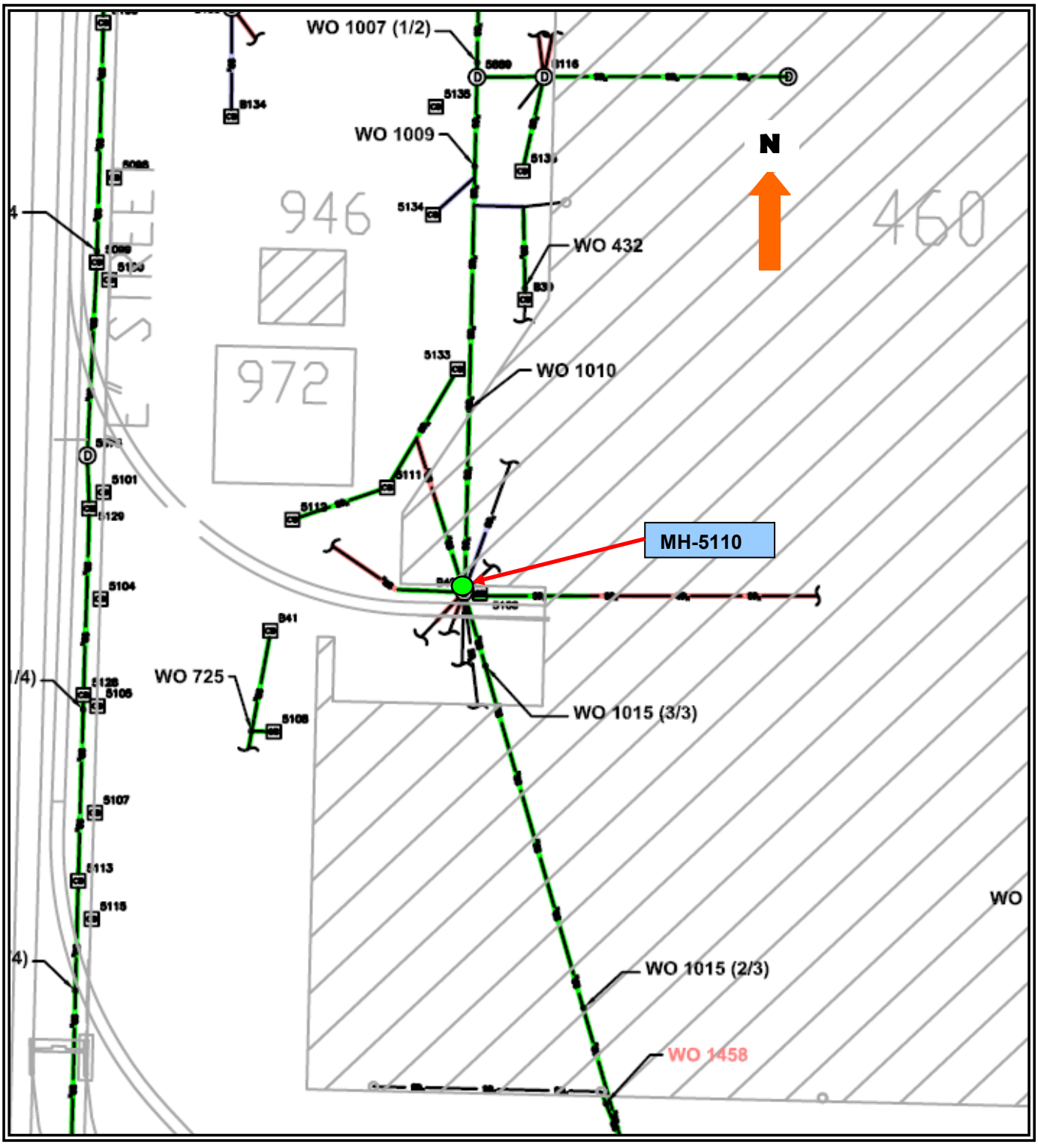

Figure 7. PSNS126 Monitoring Location at MH-5110

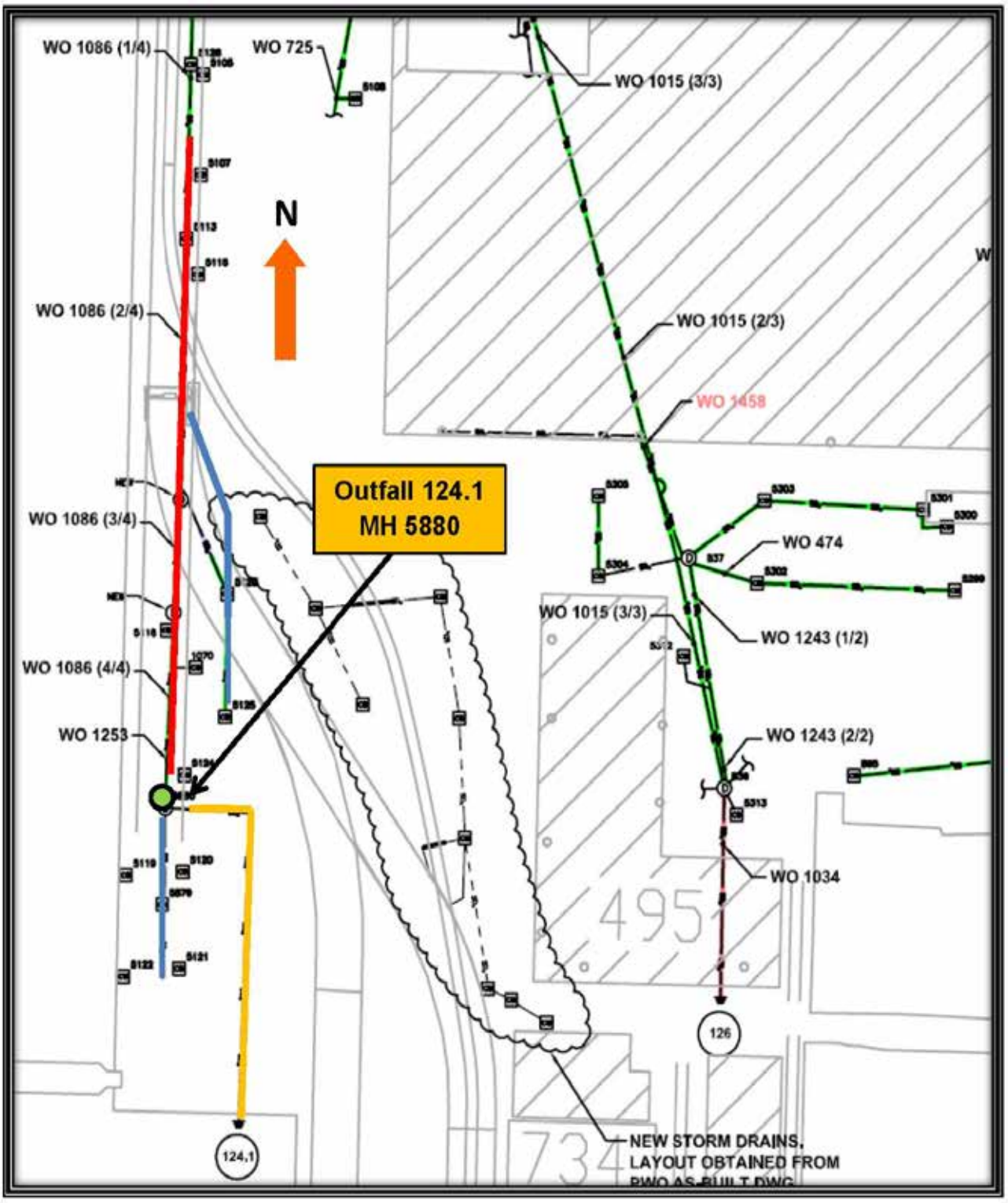

Figure 8. PSNS 124.1 Monitoring Location at MH-5880

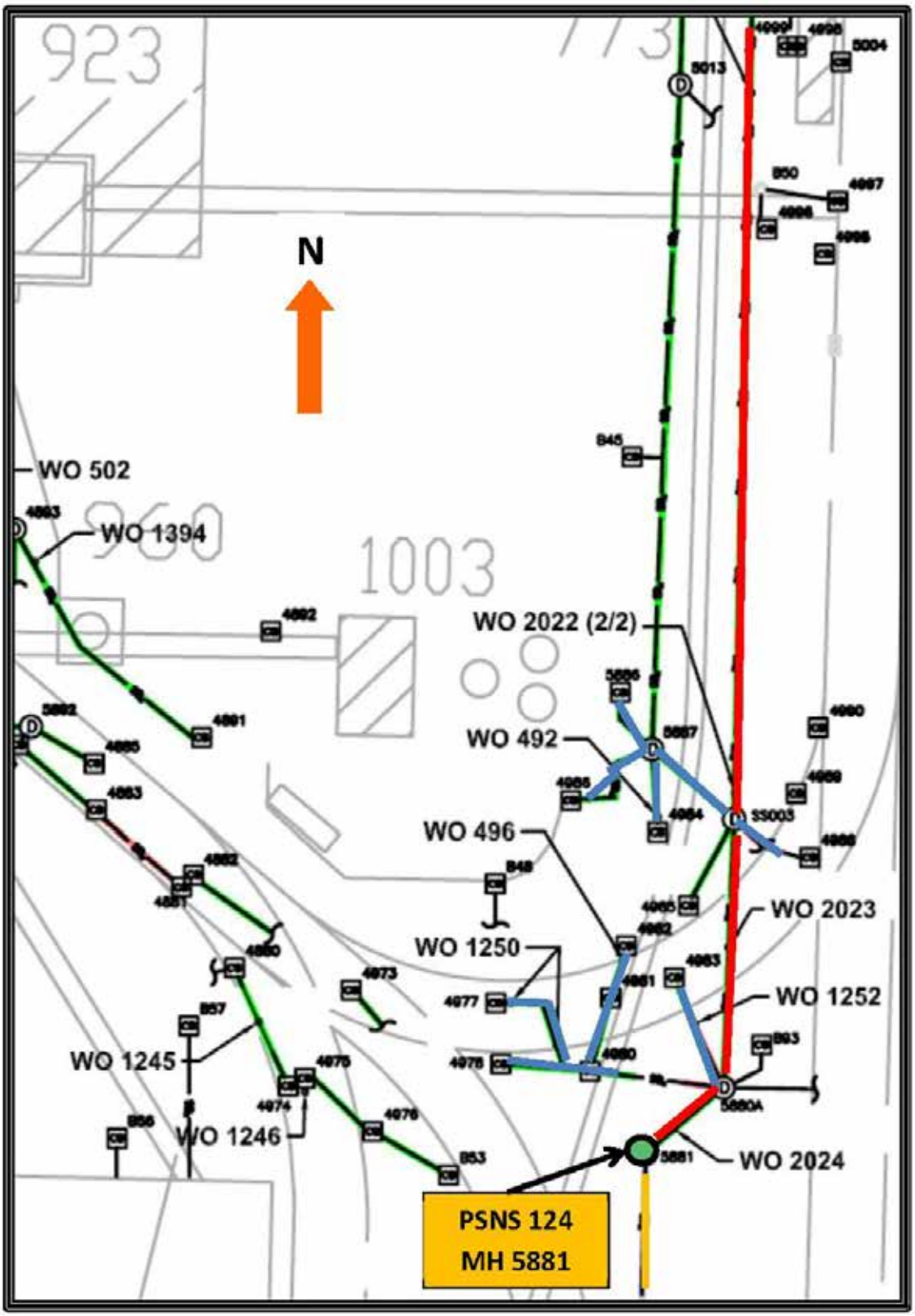

Figure 9. PSNS124 Monitoring Location at MH-5881

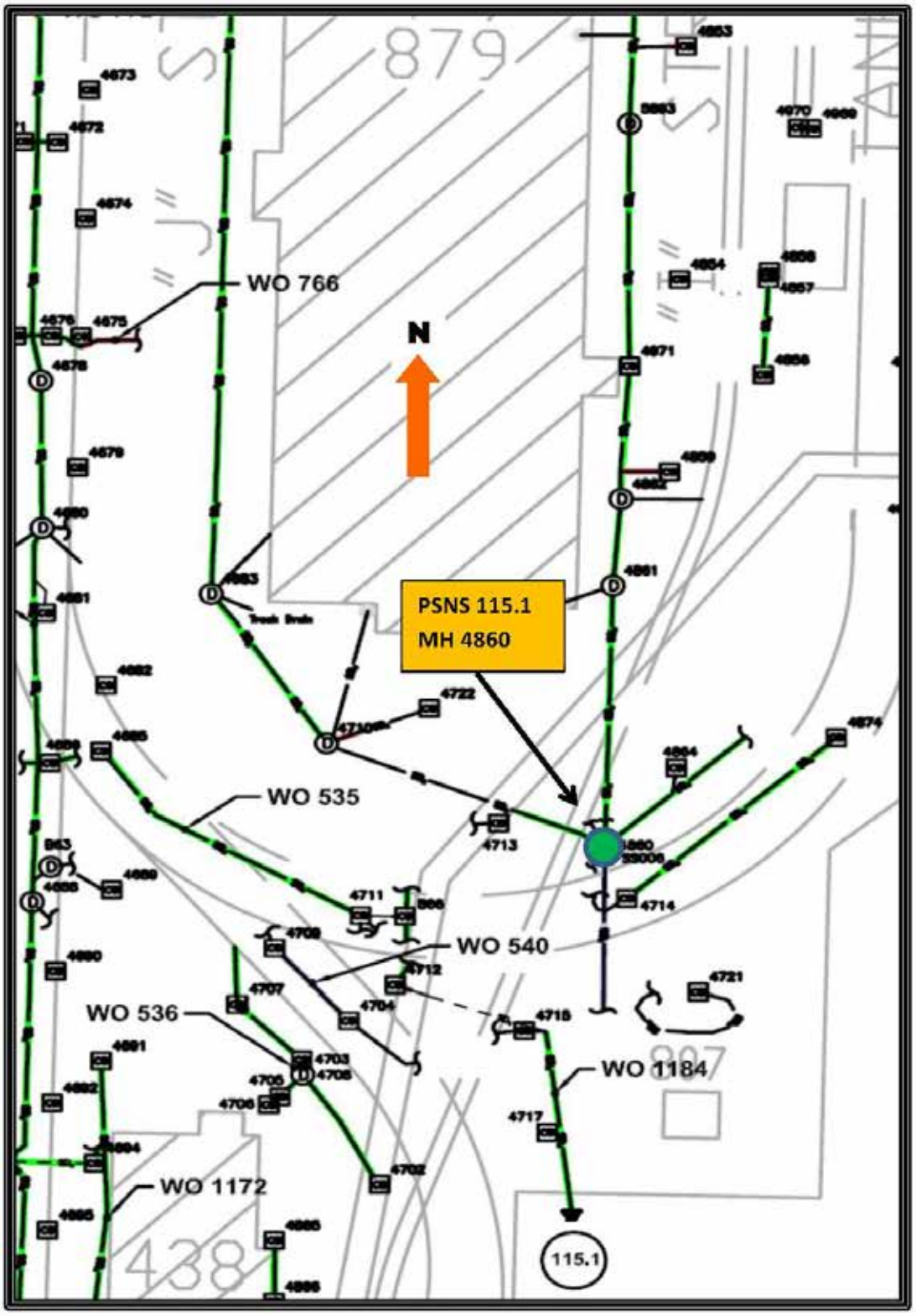

Figure 10. PSNS115.1 Monitoring Location at MH-4860

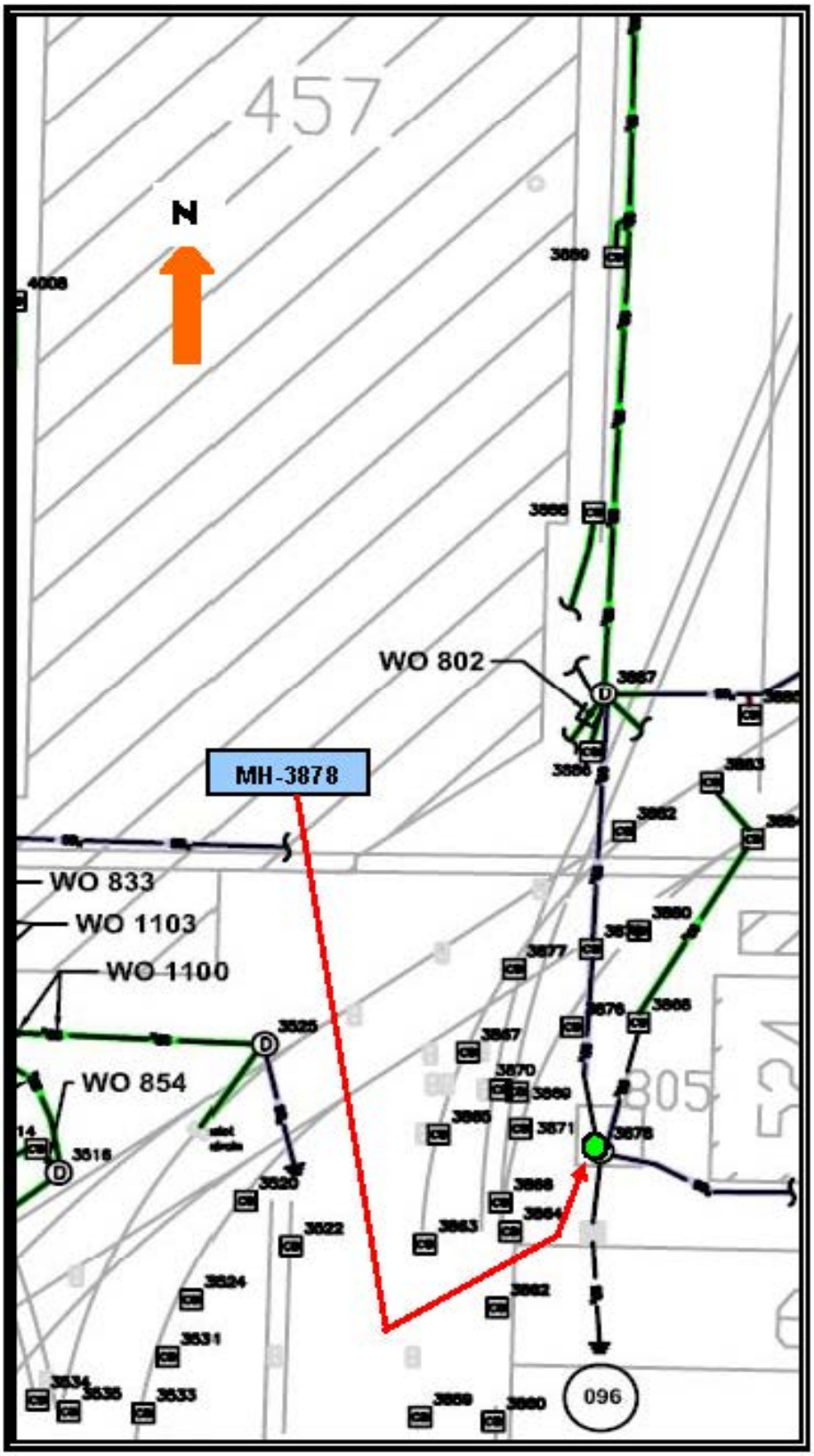

Figure 11. PSNS096 Monitoring Location at MH-3878

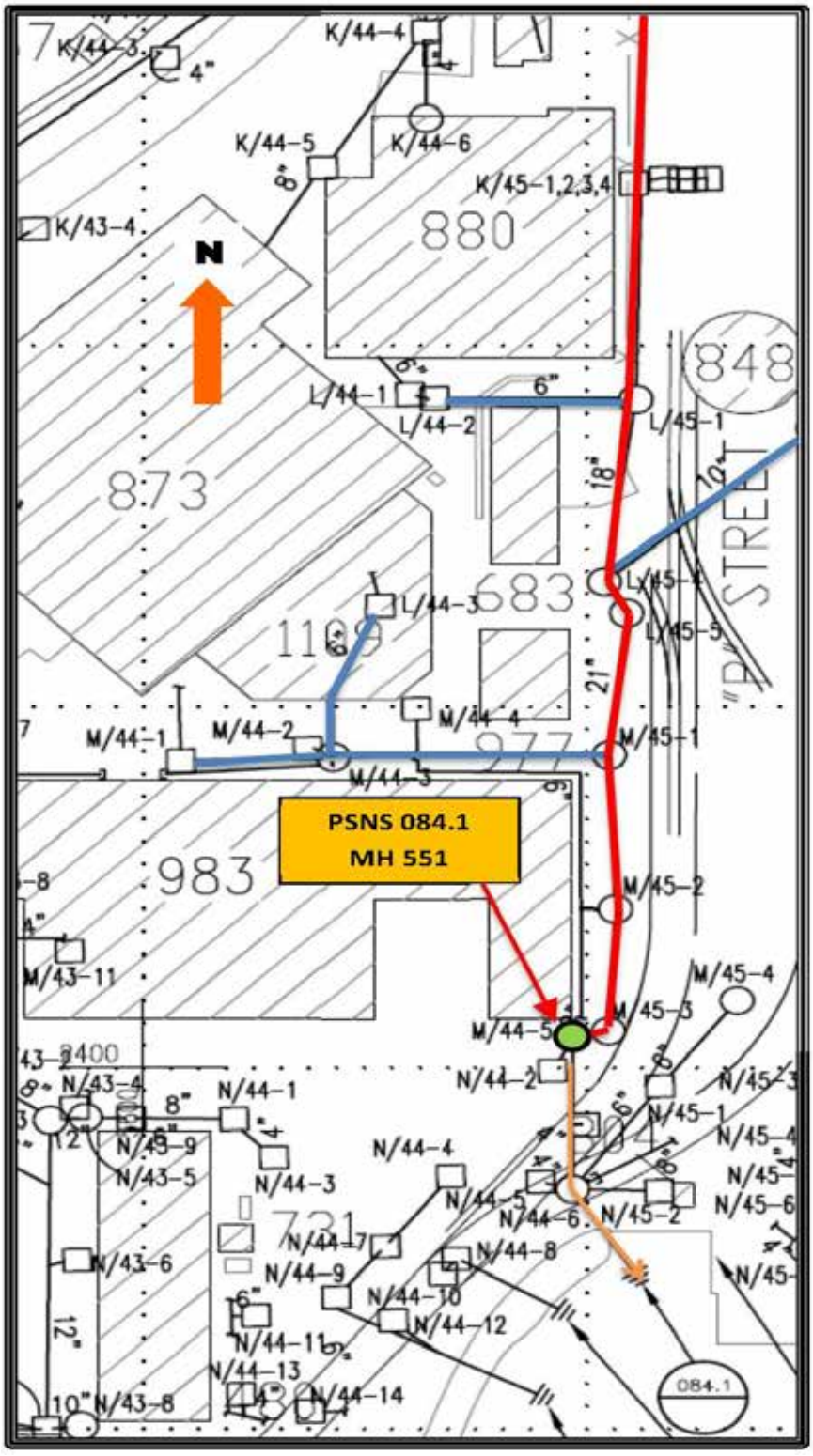

Figure 12. PSNS084.1 Monitoring Location at MH-551

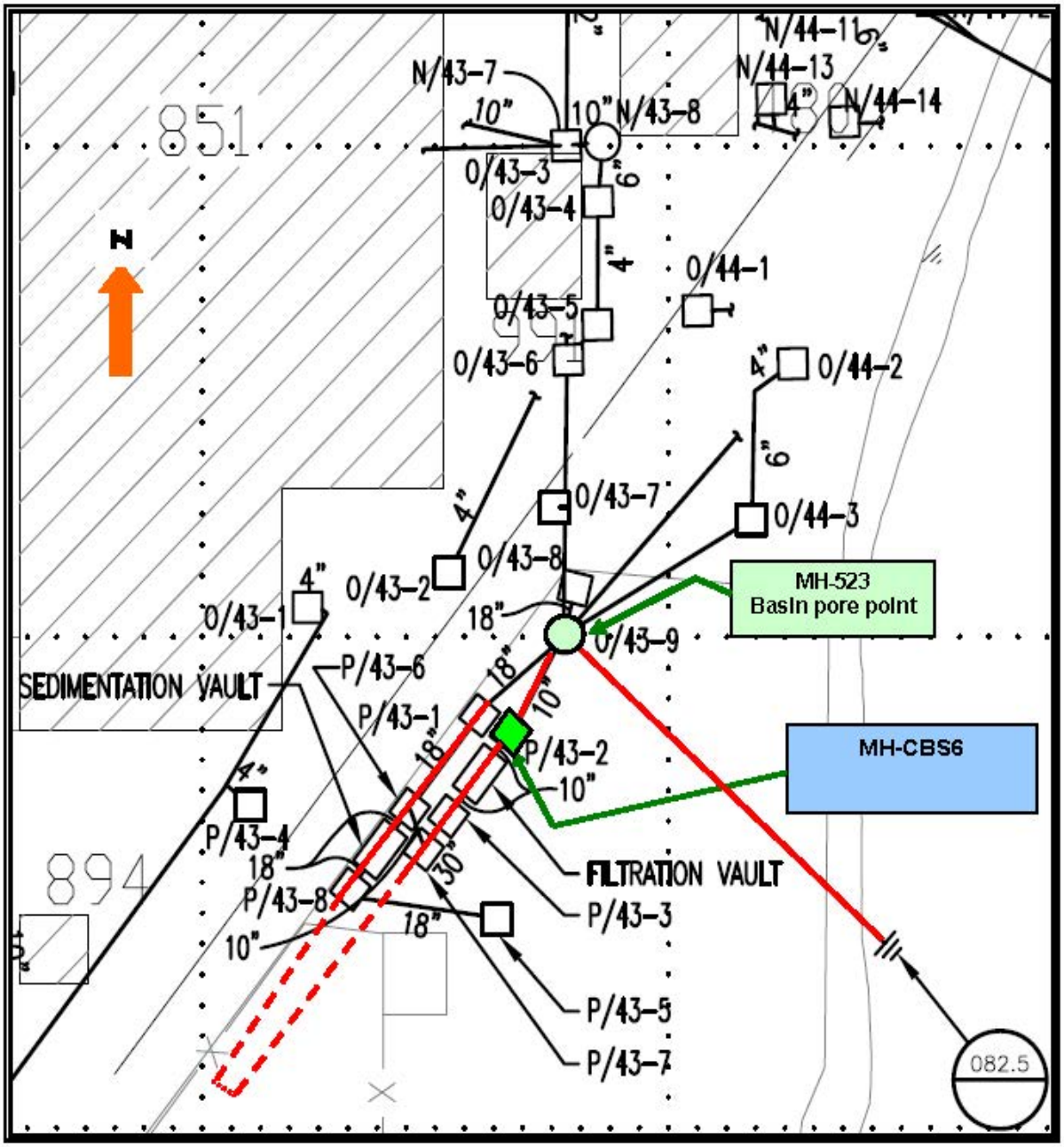

Figure 13. PSNS082.5 Monitoring Location at MH-CBS-6

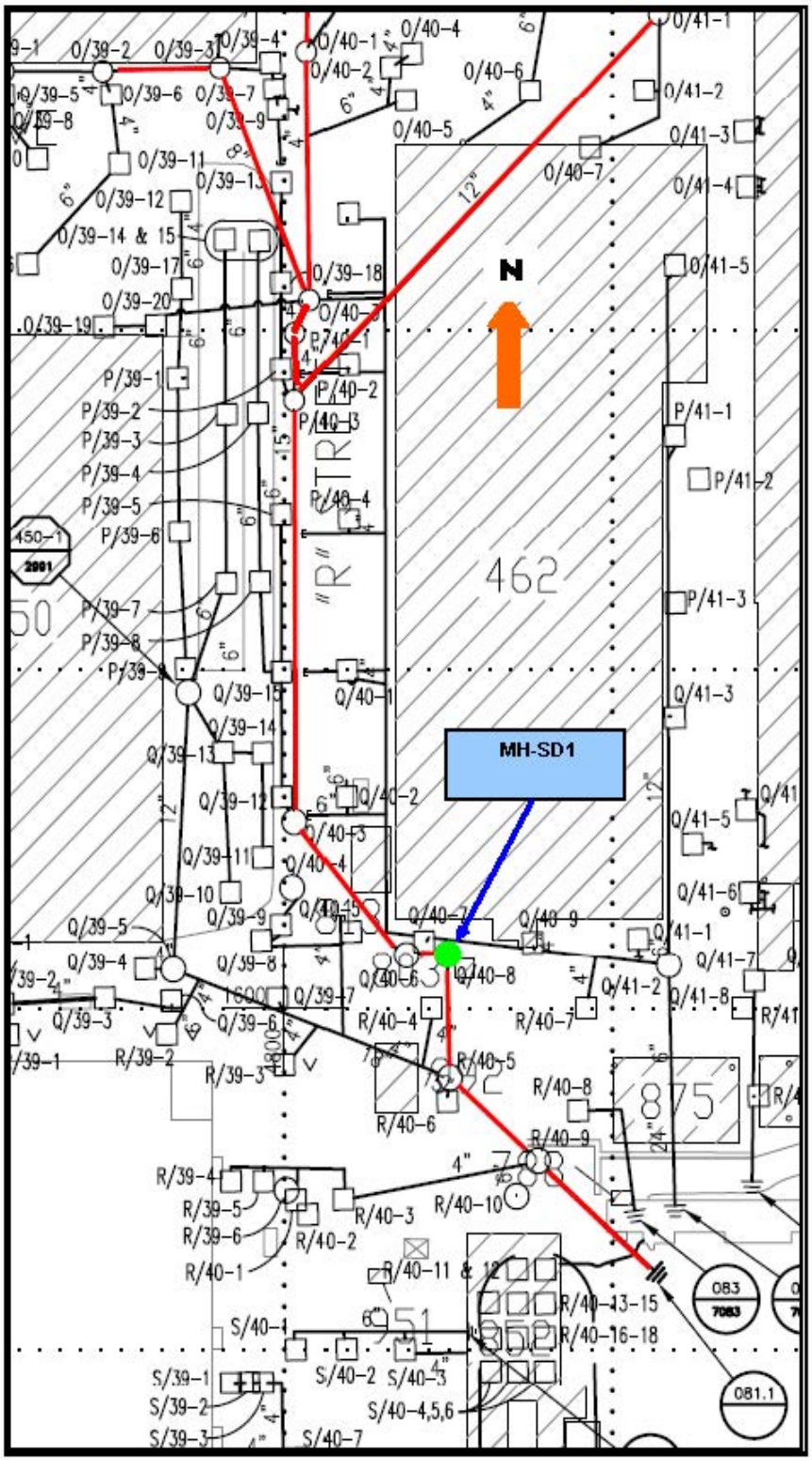

Figure 14. PSNS081.1 Monitoring Location at MH-SD-1

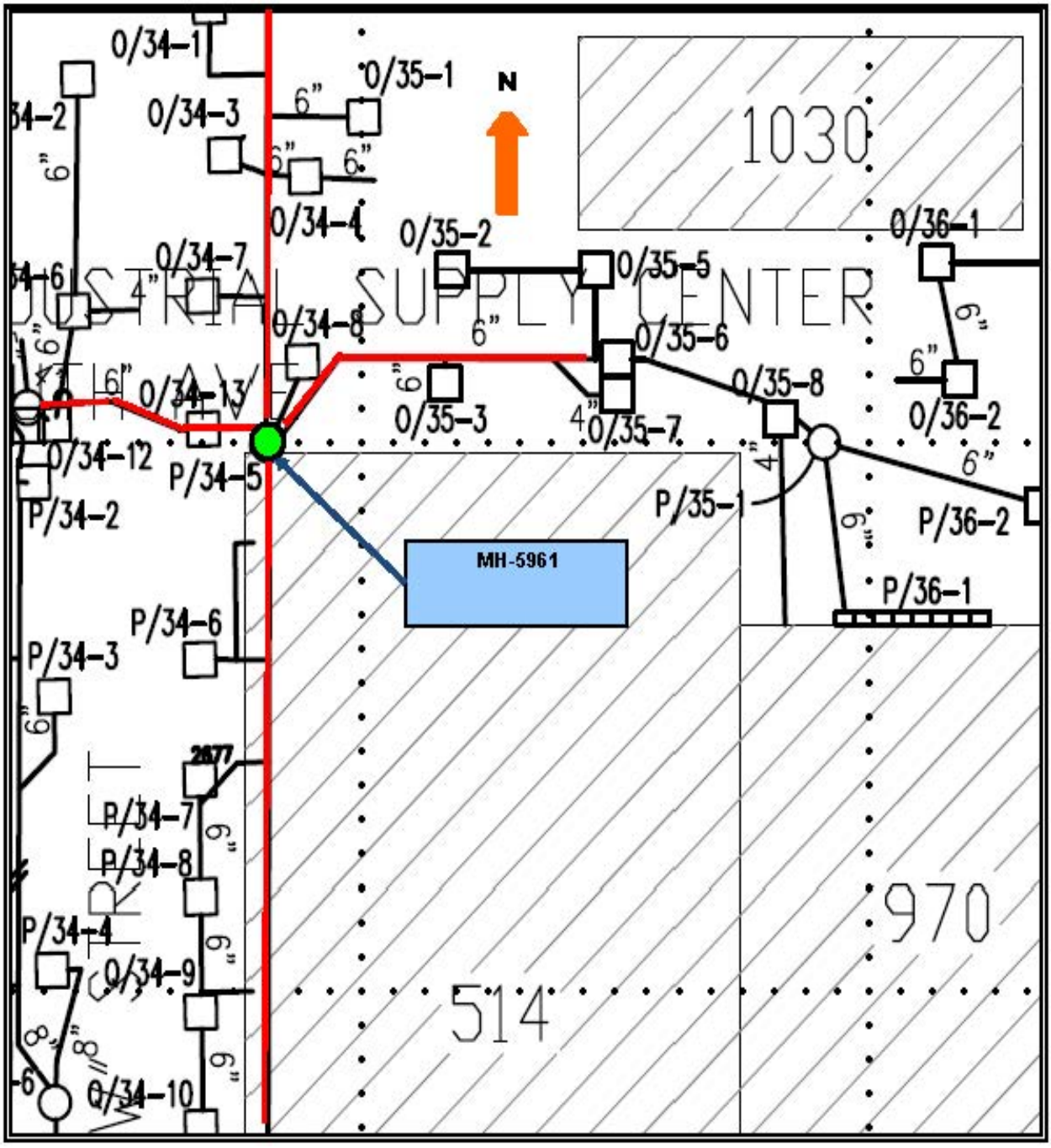

Figure 15. PSNS032 Monitoring Location at MH-5961

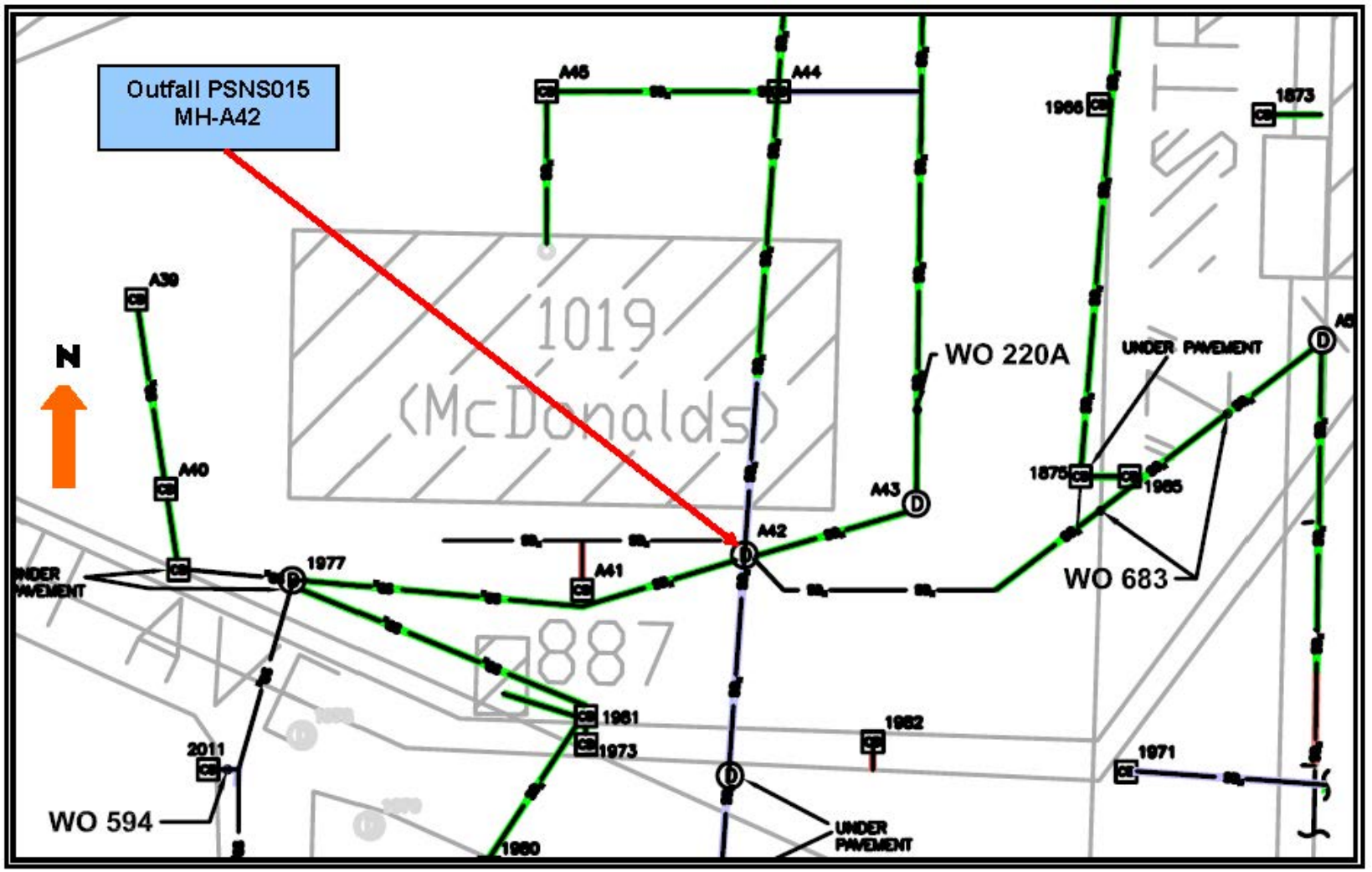

Figure 16. PSNS015 Monitoring Location at MH-A42

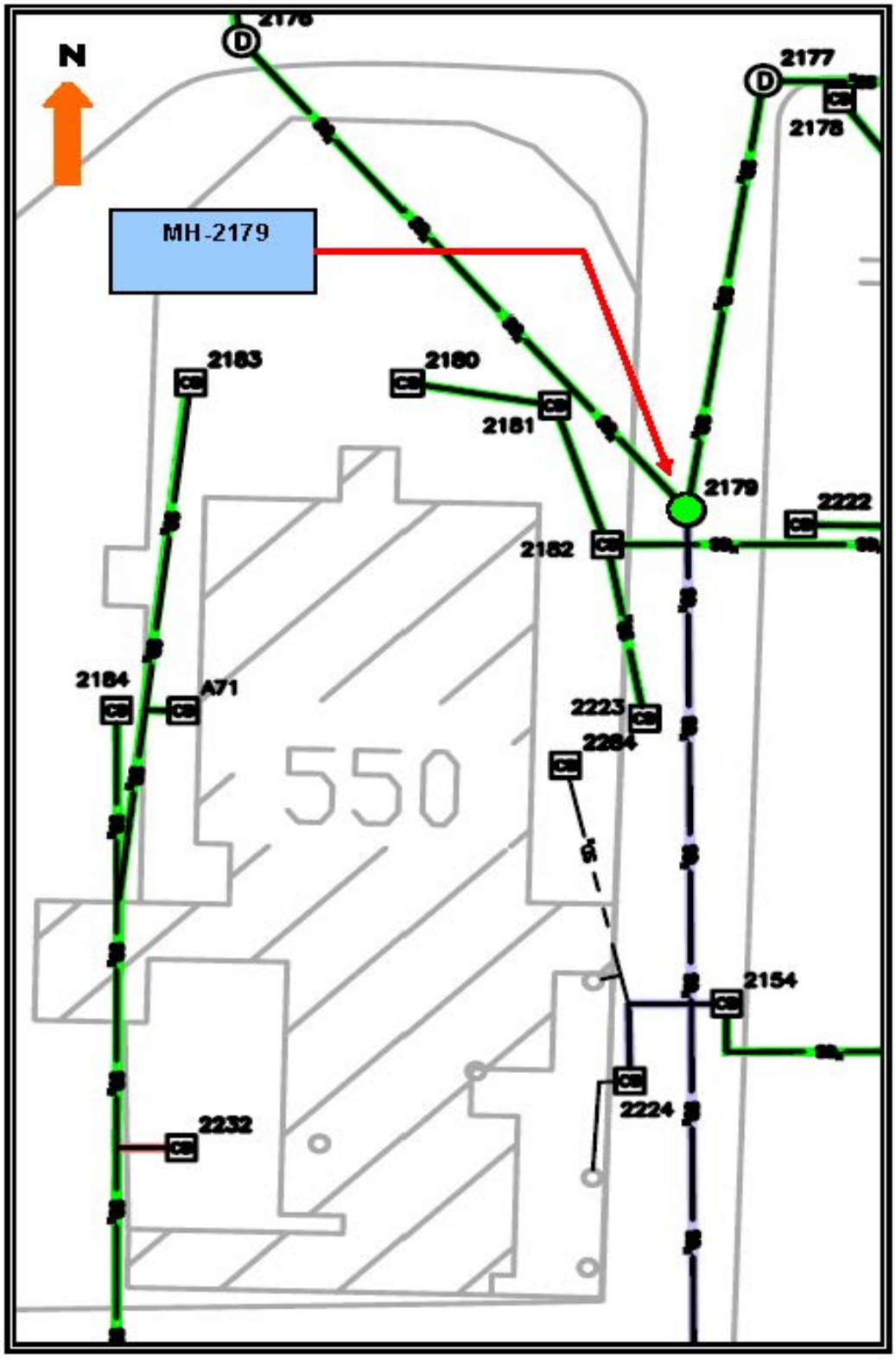

Figure 17. PSNS008 Monitoring Location at MH-2179

7.2 MONITORING SITE SELECTION

The design features and condition of the storm drainage infrastructure within the drainage basins were assessed for stormwater monitoring. Sites were selected that maximize the upstream drainage area and minimize tidal effects and operational constraints.

Prior to targeted storm events, monitoring equipment will be deployed at the sites to be sampled and data will be collected as described below.

7.3 QUALIFYING STORM EVENT

Phase II site stormwater samples will be collected and reported for four qualifying events at each station, ideally 24 total events (6 stations x 4 events). These stormwater events may be targeted from November, 2011 through May, 2012. Table 7 includes storm event criteria that will be used to determine qualifying storm events for the collection of grab and composite samples for chemical analysis for both the "wet season" and "dry season" portions of the water year. Table 8 provides information regarding qualifying antecedent dry periods for storm validation purposes.

Table 7: Qualifying Storm Event Criteria.

Criteria	Wet Season	Dry Season
Seasonal Period	October 1 – April 30	May 1 – September 30
Targeted Storm Size and Probability	≥0.20" in 24-hours ≥70% forecasted probability of occurrence 24-hours prior	≥0.10" in 24-hours ≥50% forecasted probability of occurrence 24-hours prior
Qualifying Storm Size	≥0.10", or a sufficient amount for sampling to have occurred for at least 2 hours during stormwater runoff	≥0.10", or a sufficient amount for sampling to have occurred for at least 2 hours during stormwater runoff

Table 8: Qualifying Antecedent Precipitation Conditions

Criteria	Wet Season	Dry Season
Standard	Less than or equal to 0.1" rain in previous 24-hours No rain in previous 6 hours	Less than or equal to 0.02" rain previous 72-hours No rain in previous 6 hours
Conditional	"Conditional Antecedent Qualification" The 24-hr antecedent overage should not be greater than 10% of the overall storm event rainfall total	
Inter-event Dry Period(1)	6 hours minimum, 12 hours maximum	6 hours minimum, 12 hours maximum

(1) A storm event can be considered completed once there has been a 6-hour period with no precipitation. However water sampling could continue, as long as runoff is occurring or the station hydrograph is elevated above pre-storm conditions, for up to a 12-hour period with no precipitation, at which time the storm would be considered complete.

7.4 PRECIPITATION MONITORING

During targeted storm events, precipitation will be continuously monitored at each established project site using a tipping bucket rain gauge. A continuous rainfall record will allow the establishment of a rainfall/runoff relationship at each site and will be used to estimate the total volume of discharge sampled using the Runoff Coefficient Method (RCM). The RCM was previously used for volume estimation purposes during implementation of the 1994 PSNS NPDES compliance monitoring (Navy, 1994). The RCM method is an accepted industry standard and is an effective calculation method for providing an estimate of storm flow volumes in the absence of dedicated flow monitoring equipment. This method uses the total storm rainfall, pervious and impervious drainage area size, and a runoff coefficient to calculate the total runoff volume in cubic feet. Runoff coefficients for the selected monitoring sites where chosen from published values for the following surface types: heavy (0.6-0.9) and light (0.5-0.8) industrial areas, railroad lines (0.2-0.4), continuous concrete or asphalt cover (0.7-0.95), heavy soil (0.18-0.22) and residential/suburban (0.25-0.4). The coefficient range gives latitude for consideration of particular basin characteristics. Typically the upper end of the coefficient range values are applied to the more impervious portions and the lower end of the coefficient range values are applied to the more pervious portions of a certain surface type when calculating runoff volumes.

The formula below was slightly modified from the standard RCM so that it accounts for the effective runoff from both pervious and impervious areas from each monitored outfall drainage basin (Navy, 1996).

$$TotalRunoffVolume(V) = R \times \left[\left(A_i \times Ci \right) + \left(Ap \times Cp \right) \right]$$

Where: V = Total runoff volume (in cubic feet)

R = Total rainfall (in feet)

A_i = Total impervious drainage area (in square feet)

A_p = Total pervious drainage area (in square feet)

C_i = Runoff Coefficient for impervious area of drainage basin

C_p = Runoff Coefficient for pervious area of drainage basin

Table 9 presents the total area of the monitored drainage basins, their percent pervious and impervious areas, runoff coefficient value ranges for the basin surface types and the total discharge volume estimation equations.

Table 9: Stormwater Outfall Total Discharge Volume Estimation Equations

PSNS Drainage Basin	Total Basin Area (ft^2)	Type of Surface	Percentage of Drainage Basin Surface Type	Area of Basin Surface Type (ft^2)	[1]Runoff Coefficient Range	Area of Basin Surface Type with Maximum Coefficient Value Applied (ft^2)	[2]Total Discharge Volume (ft^3)
126	662,986	Impervious	98.55	653,373	0.6 – 0.9	588,036	R(591,881)
		Pervious	1.45	9,613	0.2 – 0.4	3,845	
124.1	116,000	Impervious	94.56	109,690	0.6 – 0.9	98,721	R(101,245)
		Pervious	5.44	6310	0.2 – 0.4	2,524	
124	454,000	Impervious	94.56	429,302	0.6 – 0.9	386,372	R(396,251)
		Pervious	5.44	24,698	0.2 – 0.4	9,879	
115.1	463,042	Impervious	97	449,104	0.6 – 0.9	361,422	R(366,390)
		Pervious	3	13,938	0.2 – 0.4	4,968	
096	717,872	Impervious	97	696,336	0.6 – 0.9	626,702	R(635,317)
		Pervious	3	21,536	0.2 – 0.4	8,615	
084.1	23,958	Impervious	100	23,958	0.6 – 0.9	21,562	R(21,562)
082.5	87,120	Impervious	100	87120	0.7 - 0.95	82,764	R(82,764)

PSNS Drainage Basin	Total Basin Area (ft^2)	Type of Surface	Percentage of Drainage Basin Surface Type	Area of Basin Surface Type (ft^2)	[1]Runoff Coefficient Range	Area of Basin Surface Type with Maximum Coefficient Value Applied (ft^2)	[2]Total Discharge Volume (ft^3)
081.1	965,294	Impervious	97	936,335	0.6 – 0.9	842703	R(849,074)
		Pervious	3	28,959	0.18 – 0.22	6,371	
032	208,653	Impervious	97	202,393	0.6 – 0.9	182,154	R(184,658)
		Pervious	3	6,260	0.2 – 0.4	2,504	
015	4,018,862	Impervious	50	2,009,431	0.5 – 0.8	1,607,549	R(2,411,321)
		Pervious	50	2,009,431	0.25 – 0.4	803,772	
008	553,650	Impervious	94	520,431	0.5 – 0.8	416349	R(429,637)
		Pervious	6	33,219	0.2 – 0.4	13,288	

Notes: R = Amount of rainfall in feet; [1]These values are derived from various published sources regarding the RCM.

In addition to calculating a total storm discharge, the rain gauge will help with the determination and tracking of qualifying storm events and will allow the validation of the storm event samples based on the criteria present in Section 7.3. Field staff will have near real-time rain data to alert them to when antecedent precipitation conditions have been met, when the rainfall event has started (to schedule grab sampling), and to determine when the rainfall event has ended (to retrieve composite samples). To reduce staff effort required to repeatedly go to the rain gauge site and download data, the rain gauge will be equipped with telemetry (e.g., cellular) to allow for remote data acquisition via dialing into a modem through specialty software. Rain data will be downloaded via telemetry at least once each day as well as during and following targeted storm events. Sites located within both the CIA and NBK that utilize telemetry systems require special permission from PSNS&IMF Security. Telemetry Use Permission forms (and information packet) for these sites are included in Appendix D.

The rain gauges will be maintained per manufacturer's recommendations (see Section 8.1 for methods). The rain gauges will be capable of measuring only liquid precipitation (i.e., rainfall or melted snow); they will not be capable of melting snow. If any of the rain gauges malfunction, the official PSNS&IMF rain gauge (mounted on the roof of the Code 106 offices, Building 427) will be used for storm qualification and validation purposes (see Section 8.3). The official PSNS&IMF rain gauge is maintained, serviced and downloaded by Code 106 staff.

7.5 WATER LEVEL MONITORING

During each targeted storm event water level within the drainage pipe or vault will be continuously monitored (except during maintenance or replacement periods) and recorded using a pressure transducer at each sampling site. Duration of water level monitoring at a particular monitoring location will be dependent on how long that station is operational (e.g. equipped with the necessary gear). The water level reading will be transmitted to a data logger. Water level data will be downloaded via telemetry at least once each day as well as during and following targeted storm events.

7.6 CONDUCTIVITY MONITORING

During each targeted storm event, conductivity within the pipe will be continuously monitored (except during maintenance or replacement periods) and

recorded using a multi-parameter transducer or sonde at each sampling site. The conductivity sensor will be installed either in the vault sump or pipe invert and will transmit information to a data logger common to water level and precipitation inputs. Conductivity data will be downloaded via telemetry at least daily, as well as, during and following targeted storm events. Conductivity may be measured at a particular station during non-storm periods to determine a relationship between conductivity and the tidal backwater conditions at that station.

7.7 STORMWATER SAMPLE COLLECTION

Two types of stormwater samples will be collected at each monitoring site: (1) manual grab samples and (2) time-proportionate composite samples. This project requires that representative samples be collected from four qualifying storm events at each Phase II monitoring station presented and described in Sections 4.5 and 7.1.

7.7.1 Grab Sampling

Manual grab sampling is required for samples undergoing analysis for fecal coliform and total petroleum hydrocarbon (TPH)s. Personnel from the Navy Project Team (PSNS&IMF c/106.32) will be responsible for the collection of all grab samples. The Navy Project Team will be solely responsible for the management, transportation and laboratory coordination of the fecal coliform manual grab samples collected during storm event sampling. The Navy will pass possession of the TPH samples to the Data Collection Consultant post-collection, during the storm event in which they are collected, so that they may be processed along with any corresponding composite samples.

Grab samples will be collected at each basin as soon as possible after runoff has commenced as long as conductivity levels are below 2,000 micromhos (µmho)/cm of conductivity[2]. Stormwater runoff will be verified prior to sample collection at each station visually and/or through the confirmation of a hydrologic response to stormwater runoff at the station. A hydrologic response is defined as water levels that are elevated at least 10% above recent pre-storm background water levels within the monitoring station's piping system. Grab sampling may be

[2] Based on a recent study conducted by the City of Tacoma in the Thea Foss Waterway (Tacoma, 2006), a conductivity reading of less than 2,000 µmhos/cm indicates sample water is made up of greater than 95 percent stormwater and less than 5 percent salt water.

conducted if runoff is either occurring at the time of collection (as confirmed visually) or at any point in the storm where the hydrograph is elevated at least 10% above recent pre-storm water levels.

Grab samples for TPH will be collected by dipping a clean, sterile, stainless steel sample vessel into the flow stream and pouring the sample into two separate amber glass containers (500mL or 1L). The redundant sampling provides additional volume for quality control and a backup in case of breakage. Samples will be skimmed from the surface for TPH if the flow stream is not well mixed/turbulent. Other than sample volume requirements listed in Table 10, no additional information regarding fecal coliform sample collection is provided in this PWP. Fecal coliform samples will be collected and managed as described in the *Fecal Coliform (FC) Monitoring Assessment and Control - Water Year 2011 Quality Assurance Project Plan* (Johnston, et al, 2010). The FC Monitoring QAPP is included as Appendix E.

Attempts will be made to collect both grab and composite samples as an associated pair from the same storm event at each site. However, storm events may start in the middle of the night, on weekends, or during holidays when it may be difficult to have field staff available. If, for whatever reason, all other storm requirements have been satisfied and only the grab or composite sample are collected from a site, this sample would still be submitted for analysis and would be considered event-qualified data. If a grab or composite sample is not collected during a particular storm event then the sample type that was missed will be specifically collected during a future event, if possible.

Table 10 lists the estimated sample volume required for each parameter to be analyzed for in grab samples.

Table 10: Stormwater Grab Sample Analytes and Required Volumes

Parameter / Specific Analyte	Required Sample Volume (ml)[1]	Additional Volume "When Required" for Quality Control Samples (ml)[2]
Bacteria		
Fecal Coliform	125	125-250
TPH		
[3]NWTPH-Dx	2000	2000 – 4000

(1) Required sample volumes correspond to method-specific bottle requirements for parameters obtained by grab samples.

(2) Addition volumes (when required) correspond to sample volumes needed for analysis of field and/or laboratory QC samples. The LPM will notify the field crew, prior to sampling, when the collection of these additional volumes will be required.

(3) NWTPH-Dx = Northwest Total Petroleum Hydrocarbon – Diesel extended

Attempts will be made to collect grab samples from a storm event that meets the qualifying storm event criteria, as discussed in Section 7.3; however, grab samples may be collected prior to the confirmation that the storm has met the qualifying rainfall depth. If a grab sample is collected during storm runoff that meets all qualifying storm event criteria (Section 7.3) except for the minimum amount of rainfall, the grab sample may be analyzed and would be considered a valid sample[3]. Attempts will be made to have fecal coliform and TPH collected at the same time during the event. However, if the 24-hour maximum holding time for fecal coliform cannot be met (e.g., due to the laboratory being closed on a weekend or holiday), a grab sample could be taken for fecal coliform either later in the storm event or during a future storm event. See Appendix E and Section 8.2.3 for the procedures to collect fecal coliform and TPH grab samples, respectively.

[3] Water quality represented by the grab sample will not be affected by environmental conditions occurring after the time the grab sample is taken. For example, a grab sample taken during initial runoff from 0.05 inches of precipitation will be the same whether 0.00 inches of rain falls afterwards (a non-qualifying event), or if 0.10 inches of rain falls afterwards (a qualifying event).

7.7.2 Automatic Time-Proportionate Composite Sampling

Time-proportionate composite samples will be collected at the monitoring sites during qualifying storm events as defined in Section 7.3. Autosamplers will be configured to begin sampling when a given combination of rain, and/or water level and/or conductivity conditions have been met as outlined in this section, to the extent possible.

For storms lasting more than two hours, composite samples will be collected for at least the first two hours of non-tidally effected runoff and up to 24-hours. For storms lasting less than two hours, composite samples will be collected over at least 75 percent of the storm hydrograph period. Each composite sample will consist of at least eight discrete sample aliquots of at least 240 mL each.

7.7.2.1. Composite Sample Analytical Parameters and Volume Needs

Time-proportionate composite samples will be analyzed for the following project parameters:

- Total Suspended Solids (TSS)
- Turbidity[5]
- Total recoverable and dissolved aluminum (Al), arsenic (As), copper (Cu), lead (Pb), mercury (Hg), silver (Ag), cadmium (Cd), chromium (Cr), and zinc (Zn)
- Hardness
- Total organic carbon (TOC)
- Dissolved organic carbon (DOC)
- Oil Sheen[4]
- Conductivity[5]
- Temperature

Section 9.2.2 presents the specific laboratory analyses and analytical limits for each of these parameters. Table 11 illustrates the estimated sample volume

[4] Oil sheen analysis will consist of a visual observation of the sample by field staff and will be noted as a presence or absence on the field datasheet.

[5] Conductivity, temperature and turbidity will be recorded in the field at the time of sample collection and recorded on the field datasheet.

required for each composite sample parameter/analyte. A total composite minimum sample of 1,500 mL is needed and an optimal volume of 3,250 mL or greater (not to exceed a container maximum of 9,750 mL) is recommended to run the targeted analyses. When field and lab QC samples are targeted (See Section 10.0), an additional minimum composite sample volume of at least 3,250 mL is needed. An optimal QC volume of 6,500 mL or greater (not to exceed a container maximum of 9,750 mL) is recommended. The LPM will instruct the field crew prior to conducting sampling activities if additional QC sample volume will be required for a particular storm event.

Table 11: Analytical Parameters and Required Sample Volumes for Routine Stormwater Composite Samples

Parameter/Specific Analyte	Routine Composite Sample Volume (mL)[1]		Additional Volume "When Required" for Quality Control Samples (mL)[2]
	Min.	Optimal	Min / Rec.
Conventional			
TSS	200	1000	1000-2000
Turbidity	100	500	500-1000
Metals			
Total recoverable and dissolved (Al, As, Cu, Hg, Pb, Cd, Cr, and Zn)	200	500	500-1000
Hardness	250	250	250-500
Total Organic Carbon	250	250	250-500
Dissolved Organic Carbon	250	250	250-500
Total Volumes	1500	3250	3250-6500
Total Volume for Routine and Field & Lab QC combined:	4750	6500	9750

(1) Routine composite sample volumes correspond to method-specific procedural requirements. These are given in a range from "minimum" (below which there is not enough volume to properly analyzed the parameter by the requested test method) to "optimal" (the volume where the lab has enough sample for a range of contingencies).

(2) Addition volumes (when required) correspond to sample volumes needed for analysis of field and/or laboratory QC samples. The LPM will notify the field crew, prior to sampling, when the collection of these additional volumes will be required.
(3) This represents the optimal composite volume combined with the minimum QC volume.
(4) This represents the optimal composite volume combined with the recommended QC volume.

7.7.2.2. Composite Sample Collection Method

Composite samples will be collected with the use of autosamplers. The autosamplers will be programmed to collect sequential samples over the course of a sample event. Programming in this manner, while using a 24-bottle configuration, allows for the greatest amount of sampling resolution. The sequential program allows the possibility of selecting a subset of filled bottles (depending on total sample volume needed for the targeted event), which represent the volume and nature of the storm flow and exclusion of sample bottles that are largely filled with tidal flow or base flow at the end of an event. Upon completion of a sample event, the contents of each bottle representing the storm flow will be combined to produce a single composite sample.

A sampler will be set to initiate its sampling program when a series of enabling conditions are met that indicate storm runoff is occurring and that there is no tidal influence. These enabling conditions include rainfall, water level, and conductivity. For the rainfall conditions to be met, the rain gauge must detect a rain intensity of at least 0.03 inches of precipitation in a one-hour time period. The autosampler will remain inhibited until the rainfall produces adequate stormwater runoff based on an increase in the water level as measured by the pressure transducer installed at the monitoring site. The enabling water level will be determined from background water level measurements taken when the site was not affected by storm runoff or tides plus an upward water level change beyond the sensitivity (i.e., noise) of the instrument. This water level change value is typically 0.03 to 0.1 ft. For the conductivity condition to be met, the conductivity meter must measure a reading of less than 2,000 µmho/cm. A variation of the conductivity enable condition is the “repeatable enable”. This is where the sampler program will be toggled on and off based on the 2,000 µmho/cm threshold – such that only qualified water would be collected. Various combinations of these enabling conditions and variations will be used throughout the individual storm sampling events.

7.8 STORMWATER SAMPLE COLLECTION MATERIALS

All composite water samples will be collected into polypropylene (PP) containers using peristaltic pumps equipped with siliconized Tygon™ pump head tubing, Teflon™-lined suction line, and Teflon™ strainers. Routine grab samples will be collected into amber glass bottles for TPH-Dx analysis.

7.9 STORMWATER SAMPLE CONTAINER AND EQUIPMENT PREPARATION

All sample containers and (non-metal) equipment will be either new and certified cleaned with accompanying certificate of analysis or re-used and cleaned following methods outlined in the project Standard Operating Procedures for Decontamination Of Sampling Materials (listed in Appendix F). Grab sample bottles for TPH will be new and certified clean. Metals analysis requires containers to be rinsed with an acid solution. Therefore, for all composite containers and non-metal sampling equipment, the analytical laboratory will wash the containers using a laboratory grade non-phosphate detergent (Micro-90®), rinse with deionized (DI) water, rinse with 20% hydrochloric acid, rinse once again with DI water, wash with a 10 % methanol/90 percent isopropyl alcohol solution, and rinsed a final time with DI water. Any laboratory quality control samples would then be collected (e.g. equipment blanks). Finally, the containers and/or non-metal sampling equipment will be packaged in appropriate protective material for transport/storage. Ends of tubing coils should be closed together using silicon tubing (do not use aluminum foil). All equipment should be placed in a clean plastic zip top bag or clear trash bag for transport. For metallic or partially metallic sampling equipment the decontamination process is nearly identical to the procedure listed above, but using a different detergent (Extrans300®) and without the acid rinse.

7.10 SEDIMENT SAMPLE COLLECTION

As part of Phase II, sediment samples will be collected from within the stormwater vault at each of the six monitoring location. Samples will be collected during the equipment deployment and recovery or maintenance events. Each sediment sample will be analyzed for the following parameters:

- Total Organic Carbon
- Grain size

- Metals (Al, Ag, As, Cd, Cr, Cu, Ni, Pb, Zn)
- Mercury
- PAH
- PCB

Table 12 indicates the parameter, number of sediment samples, and analytical methods. Section 9.3.2 for more information on analytical methods and holding times.

Table 12. Analytical Parameters, Number and Analytical Methods for Sediment Sampling

Parameter/Specific Analyte	Sample Numbers	Analytical Method[1]
Total Organic Carbon	12	ASTM D4129-82 M
Grain Size	12	ASTM D422 MIPSEP
Metals	12	EPA 1638/1640m[2]
Hg	12	DMA[2]
PAH	12	GC-MS[2]
PCB	12	GC-ECD[2]

[1]Sediment Methods, detection limits, and reporting limits are provided in Johnston et al. (2011) *Sediment Verification Study Sampling and Analysis Plan.*

[2]Sediment analyzed for metals, Hg, PAH, and PCB will follow methods detailed in Johnston et al. (2011) and will remain consistent with the ENVVEST protocol to ensure comparability across projects.

7.11 STORMWATER MONITORING EQUIPMENT INSTALLATION AND SETUP

This section describes the type of monitoring equipment that will be deployed and the general configuration of equipment installation, including the rain gauges, pressure transducers, conductivity meters, and autosamplers.

7.11.1 Stormwater Monitoring System

At each site, an above-ground equipment enclosure will house a Campbell Scientific, Inc. (CSI) CR1000 datalogger, cellular modem, sensor cables,

batteries and an autosampler. The datalogger will record and store water level, precipitation, conductivity, and sampler data at each site. The datalogger will also control communication between the monitoring equipment and the autosampler.

A 10-foot tall mast, which will support a solar panel, omni-directional antenna and rain gauge, will be attached to each housing. Two 12-volt deep cycle marine batteries will provide power; one for the autosampler and the other for the datalogger/modem and sensor systems. The datalogger/modem and sensor system battery will be charged by a CSI SP20-20 watt solar panel.

A number of monitoring system components will be installed underground at all sites. The transmission cables for the pressure transducers and conductivity meters as well as the sampler suction lines will run from the equipment enclosures into the associated vault through a heavy-duty plastic conduit. Inside each vault, the sampler suction lines will run along the wall and will terminate at the sampler strainers, which will generally be installed in the outlet pipe. In situations where water may not be deep enough at times to submerse the sampler intake, an engineered solution may be needed to ensure adequate water depth over the strainer (e.g. create a small sump in the piping or vault invert, install a coffer dam, etc.).

While onsite, field personnel will interface with the CSI datalogger and autosampler using a laptop computer equipped with necessary software. A telemetry communication system will also be installed at each monitoring location that will provide for remote communication access with all of the CSI dataloggers. Remote access to the data logger will be provided via a Sierra Wireless Raven CDMA cellular modem. The telemetry system will allow for downloading data to offsite computers and will permit remote programming and control of the monitoring and sampling instruments.

7.11.2 Precipitation Monitoring

For this project, an Isco 674 or similar tipping bucket rain gauge will be installed at each station to be sampled. This instrument measures rainfall at 0.01-inch increments. The rain gauge will be connected to a data logger which will record rainfall data at 5-minute intervals.

7.11.3 Level and Conductivity Monitoring

Water level and conductivity sensors will be installed at each monitoring site to be sampled. Diagrams of a typical equipment layout at a monitoring site and a

general schematic of the monitoring system components are provided in Figures 18 and 19, respectively. At each monitoring site a pressure transducer (CSI CS450 or INW CT2X) will measure water level and temperature. A separate (YSI 6820) or combined (INW CT2X) sonde will measure specific conductivity and temperature (YSI only). Salinity is automatically calculated based on current site conductivity and temperature readings.

7.11.4 Water Sampling Equipment

Stormwater samples will be collected using commercially available automatic water samplers installed at each site. Water sampling equipment will include a Teledyne-Isco 6700 series sampler, Teflon®-lined polyethylene sampler suction line, and a Teflon™ sample line strainer. Autosamplers will be deployed in an off-the-shelf configuration equipped with 24 one-liter PP wedge bottles. Each sampler will be programmed in a similar fashion. Appendix G provides examples of autosampler programs for standard and duplicate configurations. The samplers will be connected to their associated data loggers, which in turn control sampler activation and sample collection pacing. Sampler reports can also be remotely downloaded. Appendix H contains the general wiring diagrams for two main system types used for this project.

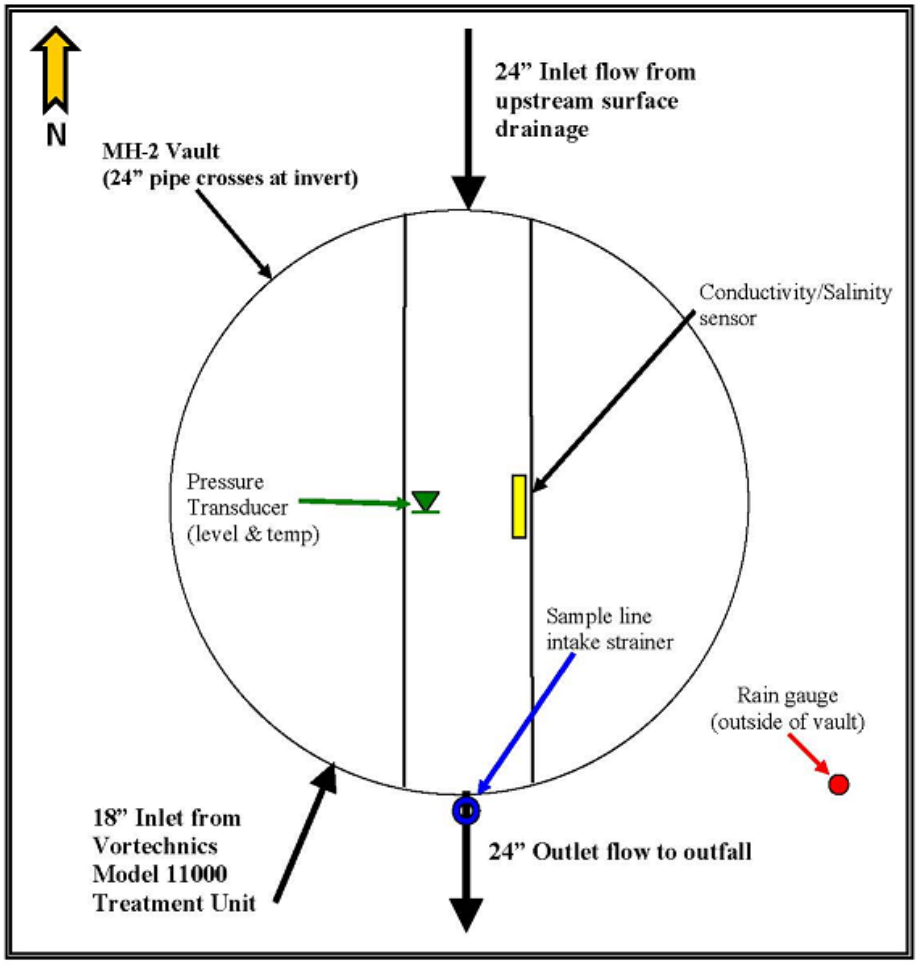

Figure 18. Generalized Diagram of Monitoring Site Equipment Layout

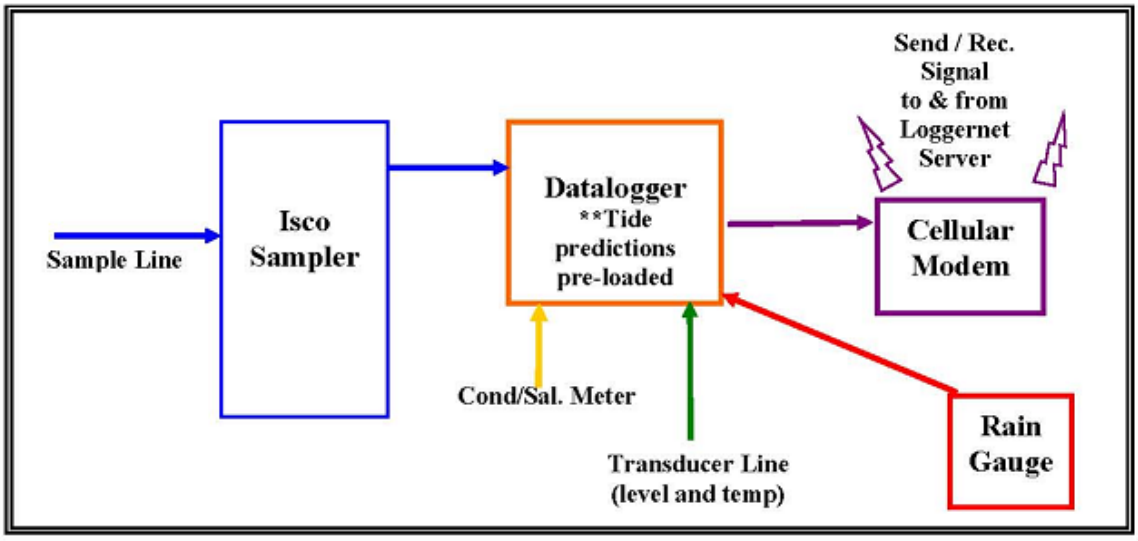

Figure 19. Generalized Schematic of Monitoring Station Components

7.11.5 Monitoring Equipment Preparation and Testing

Prior to initial deployment, each autosampler head and body will be washed with SOP-specified detergent (as referenced in Section 7.9) and rinsed with lab-provided DI-water. The sampler pump tubing, suction line, and strainer will be washed with SOP-specified detergent, rinsed with reagent grade water, rinsed with 20% hydrochloric acid, and then rinsed again with reagent grade water. The ends of the pump tubing and suction line will be capped using Parafilm® until deployed.

During equipment installation, each sampler and piece of monitoring equipment will be programmed and tested. If flow is not available for a test run, a test run may be scheduled later to ensure the equipment is working properly. During sampler programming, field staff (Navy and/or Consultant) will be trained (if needed) to program, calibrate, and operate the equipment.

8.0 SAMPLING PROCEDURES

The following sections document activities associated with field instrument operation and maintenance and sample collection. Further details on the field procedures to ensure quality control for sample collection and handling are provided in Section 10.1.1.

8.1 PRECIPITATION, WATER LEVEL AND CONDUCTIVITY MONITORING

The rain gauges will be automatically downloaded via telemetry at least once each day and immediately prior to, during, and following targeted sample events. Field staff will inspect the rain gauges monthly and provide service as needed. Rain gauge calibration will occur using the method and at the frequency recommended by the manufacturer.

The pressure transducers and conductivity meters will be inspected and serviced as recommended by the manufacturer at least once each month and prior to targeted storm events. Water level data will be downloaded via telemetry at least once each day as well as during and following targeted storm events. Conductivity will be downloaded immediately following targeted storm events.

8.2 STORMWATER SAMPLE COLLECTION

This section documents the procedures to prepare for and conduct water sample collection. Sample events could occur at one or more of the sampling locations on the same date, but the same procedures will apply regardless of the number of sampling locations targeted.

8.2.1 Procedures for Storm Targeting

At least once each week during periods when storms are to be targeted for sampling, the Data Collection Consultant (Taylor/TEC) Project Manager and Technical Lead or designee will check precipitation forecasts for the Bremerton, WA area (for example, NWS - http://www.wrh.noaa.gov/sew/ or 180-hour GFS meteogram – http://www.wsmaps.org/) to determine if a storm meeting the minimum rainfall depth criteria (Section 7.3) might occur during the next 7-day period. If forecasts suggest that a storm meeting the criteria might occur, the Data Collection Consultant Project Manager or designee and the Data Analysis Consultant (PNNL) Project Manager will confer to decide if the storm should be

considered for targeting. The Data Collection Consultant Project Manager will notify the Navy Non-dry Dock Stormwater Project Team (Project Manager, NPDES Manager and the Technical Coordinator) to discuss the situation. If the decision is made to continue tracking the storm, the Data Collection Consultant Project Manager or designee will continue reviewing forecasts once each day and will update the other team members as to the status of the forecast.

Seventy-two hours prior to the onset of the candidate storm, the Data Collection Consultant Project Manager or designee will review precipitation forecasts and, in consultation with the Navy Project Team and the Data Analysis Consultant Project Manager, make a final "go-no go" decision to target the storm for sampling. If the decision is made to target the storm, the Data Collection Consultant Project Manager will designate a Sample Event Lead for the targeted storm event and the Navy Project Team will be notified. The initial act of the Sample Event Lead will be to schedule a field team to conduct pre-storm site setup activities. From that point until all samples related to the storm are delivered to the laboratories, the Sample Event Lead will be responsible for managing all field activities and sampling decisions related to the targeted storm event.

Prior to and during storm targeting periods, Internet-based forecasts will be archived to document targeting decisions.

8.2.2 Pre-storm Site Setup

Within 24 hours prior to the start of the targeted storm event, a field team will visit each sampling location to prepare the monitoring equipment for data and stormwater collection. Prior to deployment, autosampler bottles will have been cleaned by the analytical laboratory, as described in Section 7.9. Bottles will be stored in plastic bags prior to placement into the sampler. The field team will not be deployed unless the antecedent precipitation criteria have been met or, in the professional judgment of the Sample Event Lead, are likely to be met (see Table 6).

During the pre-storm site visit, the field team will check/modify the autosampler programs (see Appendix G for examples), conduct necessary maintenance and calibration activities, and place sample bottles into the autosampler. All setup, maintenance, and calibration activities will be recorded on field data sheets, along with notes of other relevant site conditions. Appendix I includes the field forms that will be utilized during this project.

During pre-storm set up, the following specific tasks will be performed:

(1) Check and, if necessary, calibrate the pressure transducers and conductivity meters.

(2) Install new sampler pump tubing, if needed, and calibrate the autosampler sample volume.

(3) Back flush the sampler pump tubing and suction line with one gallon of reagent-grade water.

(4) Assess charge level voltage of the telemetry system and sampler batteries. Change Sampler battery if less than 12.5 vdc and the modem battery if below 12 vdc.

(5) Inspect sampler strainer for debris and clean if necessary.

(6) Prepare sampler, including removing bottle lids.

(7) Confirm sampler programs and configuration settings.

(8) Run sampler diagnostics to confirm operation of sampler distributor arm.

(9) Set the proper sampler enabling conditions (listed in Section 7.7.2.2) to be met to initiate stormwater collection and reset telemetry system slate ("trigger").

(10) Start sampler program and confirm program is active and is inhibited / disabled (program active but in suspense until enabling conditions have been met).

(11) Test the telemetry system's remote connectivity ability by having project personnel outside of the PSNS&IMF attempt to connect to the site via connection software. Troubleshoot if necessary.

8.2.3 Storm Event Grab Sample Collection

As the targeted storm event approaches, the Sample Event Lead will monitor the rain gauges at each site to confirm that antecedent precipitation conditions are met and to determine the start of the storm. During this period, the Sample Event Lead will be in contact with field team members to keep them apprised of the status of the impending storm. Once the targeted storm begins (i.e. antecedent precipitation conditions are met followed by 0.03-inch of rain recorded at the project rain gauge in a one-hour period), the field team will be notified as to when the earliest opportunity is to be mobilized to conduct grab sampling. The field

team will strive to collect the grab samples within one hour of the onset of storm runoff at all monitoring sites; however, sites may be tidally influenced at the start of storm runoff. If conductivity measurements indicate there is seawater present, the grab sample will be delayed until later in the storm when conductivity measurements indicate the tide has receded. In addition, as noted in Section 7.7.1, grab sampling may be conducted if runoff is either occurring at the time of collection (as confirmed visually) or at any point in the storm where the hydrograph is elevated at least 10% above recent pre-storm water levels. At the time the grab sample is collected the Navy field team will conduct the following tasks at the site:

(1) Check autosampler status. If problems are discovered, troubleshoot the issue and if possible, recover the sampling effort.

(2) Check autosampler battery voltage and replace battery if necessary.

(3) Check the conductivity of the stormwater at the monitoring site, using a separate hand-held meter (of equal or greater precision as the in-vault meter) to determine if seawater is present (indicated by conductivity readings above 2,000 µmho/cm).

(4) Test the conductivity of the actual sample material being brought to the surface using the hand-held meter by dipping water into a test container (separate from the sample collection vessel) to ensure levels are below 2,000 µmhos/cm, thus demonstrating that the samples collected during the grab event were storm runoff and not tidal backwater.

(5) Collect grab samples by dipping a stainless steel sample vessel into flow stream of the stormwater conveyance and pouring the sample into the appropriate containers. Samples will be skimmed from the surface for TPH if the flow stream is not well mixed/turbulent. The fecal coliform sample will be collected below the surface of the water following the procedures as detailed in Appendix E. The order of collection for the grab samples will be to collect the TPH sample first and then the fecal coliform sample.

(6) Collect duplicate grab samples, if scheduled, as per task 4 above.

(7) Collect grab sample blank, if scheduled, as per Section 10.1.2.

(8) Label and store samples on ice for transport to processing area or laboratory. All activities and pertinent observations will be recorded on the same field data sheet used to document pre-storm setup activities.

8.2.4 Composite Sample Retrieval

Over the course of the targeted storm event, the Sample Event Lead will monitor the sampler program, rain gauge, water level and conductivity data at the sites using telemetry along with near term forecasts and weather conditions via the internet to determine when precipitation has ended. Once the storm event has ended, a field team will be mobilized to retrieve the composite samples. Field teams will conduct the following tasks to retrieve the composite sample and demobilize a site after the sampling event is over:

(1) Review sampler reports and record/retrieve collection data. Cap and label sample containers (if not previously done). Leave the sample containers in their associated sampler bases. Make sure that the sampler base is labeled with its associated site ID information. If necessary (when ambient air temperature is above 50° F) place ice inside of the interior of the sampler base to keep the samples cool for transport to the sample processing area.

(2) Record pertinent data on field forms (e.g. channel condition observations, etc.); note any maintenance items required before next storm sampling event can be conducted.

(3) Power-down the autosampler and remove its battery from the equipment enclosure to be charged prior to the next sampling event.

(4) Secure/cap any cable and/or tubing that was disconnected from the sampler and secure the equipment enclosure.

(5) Proceed to next sample collection location or return to the sample processing area, which is located in the Navy's Stormwater Lab at Building 147.

All activities and pertinent observations will be recorded on the same field sheet used to document pre-storm setup and grab sampling activities. The field crew will prepare the final overall composite sample at the designated PSNS&IMF Storm Lab area. This composite sample will be hand delivered to MSL. Fractionation of the composite sample into its requisite analytical sample aliquots and containers will be completed by MSL staff at their laboratory facility in Sequim, WA.

8.2.5 Composite Sample Formulation Procedure

The following procedure will be conducted to formulate a composite sample (and its duplicate, if applicable) from each sampling station where enough qualified storm event water is collected:

(1) Set up processing area in Stormwater Lab. Prepare two tables by wiping down their surfaces with Clorox wipes, spray off with DI water and then dry with paper towels. Set up supplies (label tape, pens, markers, baggies, nitrile gloves, trash bags) and a computer (with sampler reports already downloaded) on one of the tables. Use the other table for the composite processing platform.

(2) Calibrate the YSI-30 hand held conductivity meter (Navy's unit) or similar device. Place the conductivity meter, a 100-ml graduated cylinder, a 500-ml beaker and a one-gallon bottle of store bought distilled water onto the other table (processing table)

(3) Bring one of the sampler bases close to the processing table, remove the first six individual sample containers (numbers 1-6) (make sure these and subsequent containers are labeled), place these six onto the table in a sequential manner. Since there are 24 individual 1-liter bottles in a single sample base this should be repeated for the next three groups of six bottles. , Each sample container represents one hour of time per each bottle. The maximum available overall volume in which the composite sample from a station is 24-liters. If a duplicate program was used then segregate out the duplicate sample bottles from the normal sample bottles then go to Step #4. If no duplicate was collected then proceed to Step #5. .

(4) **Note: if a duplicate is collected, the sampler will be programmed to collect water into paired bottles. Therefore each bottle pair (e.g. 1 and 2, 3 and 4, 5 and 6, and so on) represents a normal and its corresponding duplicate sample. Prior to processing the Sample Event Lead will decide which, odd numbered or even numbered, bottles will represent the normal and duplicate sample. Either is fine – this is a preferential field "call". Just make sure to segregate the odd from the even bottles and maintain that segregation throughout the sample processing steps. Since there are only 24 bottles in a sampler base, running a duplicate program will limit collection to a total of 12 bottles (representing two hours of time per each bottle) for the normal and 12 bottles for the corresponding duplicate samples. Therefore the available

overall volume in which the composite or composite duplicate samples from this station will be 12-liters, instead of 24-liters.

(5) Fill the 500-ml beaker with distilled water and place the conductivity probe into the beaker. This beaker will serve as the conductivity probe wash bottle. Allow a few minutes for the probe to "warm-up" and equilibrate in the beaker and note the conductivity of the wash bottle water. Periodically note the conductivity value of the wash water. Change it as frequently as needed – especially when processing samples with seawater range conductivity values.

(6) Pour approximately 40-ml from a single 1-liter sample bottle into the 100-ml graduated cylinder. Put the probe of the conductivity meter into the cylinder and record the conductivity value onto the field sheet for this station.

(7) If the conductivity value is less than 2,000 µmho/cm, then set this bottle aside to be used as part of the composite sample. If the bottle tests greater then 2,000 µmho/cm, re-test. If its still over 2,000 µmho/cm then set aside to be poured out – not used for the composite sample. Repeat this step for all normal and duplicate individual sample bottles from a particular site.

(8) Once all of the bottles from a station have been tested figure out how much potential volume is available for the composite sample based on how many conductivity-qualified individual sample bottles remain. Refer to Table 9 to determine how much volume needs to be sent to the laboratory. If unsure call the Data Analysis Consultant Project Manager. Figure out how many milliliters will be needed from each bottle.

(9) Pour off the required amount from each of the remaining qualifying individual sample bottle (divide the total required volume by the number of remaining qualified sample bottles) into the 10-liter pre-cleaned glass composite jar. The required volumes from the remaining individual sample containers are mixed together in the 10-liter jar thus comprising the composite sample.

(10) Once the composite sample has been completed, VERY carefully shake the bottle to thoroughly mix the sample. Again, VERY carefully pour off 40 to 100-ml into the graduated cylinder and take a conductivity measurement. This is the overall composite sample conductivity value. Record on this value on the field form.

(11) Seal the composite jar as soon as possible with its corresponding (cleaned) lid. Identify the container with sample ID and station ID using an adhesive label. .

(12) Reference the sampler report to figure out the time of the last individual sample bottle that was used in the composite sample. Use this time as the time of the composite sample. Record this time on both the field sampling form and the chain of custody (COC) form.

(13) Record all aspects of the composite process in the appropriate sections of the project designed field sheets.

(14) Place the composite sample into a cooler of good condition and of appropriate dimension to be able to completely close the lid. Place two bags of ice and any required padding into the cooler. Close the lid and set the cooler aside, or directly into the transport vehicle if ready for shipment.

8.2.6 Field Sample Validation

Concurrent with composite sample processing and prior to transferring custody to the analytical laboratory, the Sample Event Lead will validate the samples against criteria presented in Section 7.3. Validation activities for the grab and composite samples are presented below.

Grab Samples

- Review field forms and the precipitation, water level, and conductivity data to ensure the grab samples were collected when storm runoff was occurring.
- Review field notes to determine whether anomalous conditions were encountered that would disqualify the grab samples.
- Inspect the grab sample containers to ensure they are properly filled and labeled.

Composite Samples

- Determine if storm runoff occurred during the sample event.
- Review the storm event hyetograph, hydrograph and timing of the sample aliquot collection to ensure that the composite samples were collected within the first two hours of non-tidally influenced runoff for storms lasting more than two hours, or for at least 75-percent of the storm hydrograph period if the storm lasts less than two hours.

- Review field notes to determine whether anomalous conditions were encountered that would disqualify the composite sample (e.g., missed aliquots or sample bottles overfilled).
- Confirm that the conductivity of each 1-liter sample bottle was tested using a hand-held conductivity meter to ensure levels are below 2,000 µmhos/cm, demonstrating samples were collected during storm runoff and not tidal backwater.
- Confirm that the overall composite sample consists of at least eight (8) aliquots.
- Check that sufficient sample volume has been collected to complete laboratory analyses.
- Inspect the composite sample containers to ensure they are properly filled and labeled.

8.2.7 Preventative Maintenance

Periodic preventive maintenance of equipment will occur between targeted storm events to ensure equipment is operating properly. Signs of vandalism, rusting equipment, equipment failure, or other maintenance issues will be documented in field notebooks or on field data forms. Each time a station is moved to a different location a new sampler suction line will be installed and the samplers will be brought into the laboratory for a thorough cleaning.

8.3 SEDIMENT SAMPLE COLLECTION

Sediment samples will be collected at each stormwater monitoring location, as described in Section 7.10.Sediment will be collected using pre-cleaned plastic spatulas to scoop available sediment from 3-5 locations from within the vault. Due to the potential for high concentrations of contaminants, the sample collection team will wear disposable boot covers and use a new set of equipment at each outfall location. This will ensure no cross contamination between outfalls and no tracking of sediment outside of the vault area. See Section 9.2 for further information on sediment sample processing; sample amounts, containers, preservation, and analytical holding times; and sample labeling and chain-of-custody procedures.

8.4 DATA ACQUISITION REQUIREMENTS (NON-DIRECT MEASUREMENTS)

In the event that any of the project rain gauges malfunction, precipitation data from the official PSNS&IMF Code 106.32 rain gauge will be obtained to fill in data gaps in the precipitation record. Raw (non-Quality Controlled) precipitation data from this rain gauge can be downloaded manually by the Navy. Arrangements will be made to acquire this data should it become necessary.

9.0 MEASUREMENT PROCEDURES

This section summarizes the analytical methods and sample processing procedures that will be used for routine grab and composite stormwater samples and sediment samples. Fecal coliform samples will be collected as grab samples following the procedures detailed in the *Fecal Coliform (FC) Monitoring, Assessment, and Control Water Year 2011 Quality Assurance Project Plan,* [Johnston et al. (2010)] presented in Appendix E.

9.1 LABORATORY SELECTION

The laboratories selected for this program will have the demonstrated ability to achieve acceptable detection/reporting limits at levels less than the effluent limitation for the constituents of interest using analytical methods approved under 40 CFR 136 (USEPA, 2007)) or other approved and acceptable methods (e.g. WADOE NWTPH methods for hydrocarbon analysis). The laboratories will also have demonstrated the ability to meet project-specific criteria and be accredited by the Washington State Department of Ecology and the National Environmental Laboratory Accreditation Program (NELAC). The samples will be analyzed by two laboratories: 1) PNNL will analyze the trace metals and 2) Columbia Analytical Laboratory (CAS) will analyze TPH, hardness, total suspended solids (TSS), total organic carbon (TOC), and dissolved organic carbon (DOC). Each laboratory maintains an independent quality assurance program. The addresses for the laboratories are:

Pacific Northwest National Laboratory
Marine Science Laboratory
1529 West Sequim Bay Road
Sequim, WA 98382
PM: Jill Brandenberger 360-681-4564

Columbia Analytical Services
1317 South 13th Avenue
Kelso, WA 98626
Howard Holmes, Project Chemist 360-501-3364

9.2 POST STORM EVENT SAMPLE PROCESSING

This section presents the post event sample processing procedures for stormwater and sediment samples, required sample amounts, containers, preservation, and holding times for chemical testing procedures, and sample label and COC procedures for all samples.

9.2.1 Stormwater Sample Handling and Custody Requirements

Immediately following the storm completion, the 24 wedge bottles will be retrieved from their locked and secured equipment enclosures and capped, labeled (if not previously done), and transported to the Navy Stormwater Lab, contained in their associated sampler bases, for compositing. The field team collecting the samples will ensure that the sampler bases are labeled with their associated station ID.

Post-stormwater event sample processing for composite samples will consist of preparing a final composite sample from the available sample container volumes. See section 8.2.4 for detailed compositing procedures. The field team crew will follow established industry methodologies for sample handling and processing. All sample processing equipment will be laboratory decontaminated prior to use following established procedures.

Composite sample containers and grab sample bottles will properly labeled, sealed and stored either on ice in coolers or placed into the sample-only refrigerator at the Navy Stormwater Lab. Samples in coolers will be either in direct possession or in line of sight of the field crew during the entire collection, compositing and transport event. Samples will not otherwise be left unattended. Samples may be held and temporarily stored in the storage room portion of the Navy's Stormwater Lab (also contains the sample-only refrigerator) which has double locked access and is restricted to authorized personnel only.

Chain-of Custody forms, specifically crafted for this project (see Appendix I) will be used to log all collected samples and will serve as the official project record of possession. The forms will accompany all samples and/or sample groups during transfer to the project laboratory and when possession is formally transferred to the laboratory. Samples will be handled, stored, transported to the analytical laboratory and otherwise managed following established sample handling and COC procedures as outlined in Standard Methods for the Examination of Water

and Wastewater, 21st edition (Eaton et al, 2005). Section 9.2.3 provides more detail regarding COCs.

9.2.2 Stormwater Sample Containers, Preservation, and Holding Times

Composite and grab stormwater samples will be collected in either polyethylene, polypropylene, Teflon™, or glass bottles as suggested in Chapter 1060 of Standard Methods (Eaton et al, 2005). All reusable sample bottles and their associated caps used for the collection of project chemicals of concern will be washed following procedures outlined in the project decontamination SOP (see section 7.9) and/or the PNNL standard operating procedure (SOP) for Teflon™. The final composite sample will be prepared in a 10L pre-cleaned glass jar. Required stormwater sample containers, preservatives, and analytical holding times for the targeted project chemical analyses of grab samples and composite samples are included in Table 13.

9.2.3 Sediment Sample Handling and Custody Requirements

The sediment samples will be collected in an 8 ounce pre-cleaned glass jar, labeled and placed in a cooler for transport to the analytical laboratory. Upon arrival at the analytical laboratory, the sediment samples will be formally transferred following established chain-of-custody procedures from the field crew to the analytical laboratory for further processing and analysis. The laboratory will homogenize the samples prior to splitting them off for the requested parameters. Sediment sample holding conditions and recommended holding times limits (HTLs) are defined in Table 14. HTLs will be calculated from the time of sample collection unless samples are archived at -18˚C. If samples are archived at -18˚C then the HTL will be calculated from first thaw. The HTLs specified in this table are routine, generally accepted HTLs and laboratories will endeavor to meet these HTLs.

Table 13.Typical Sample Container Types, Preservatives, Recommended Handling, and Holding Times for Routine Non-Dry Dock Stormwater Samples.

Parameter	Container Type	Handling / Preservation	Holding Time
Chemicals of Concern			
NWTPH-Dx (grab)	(2) 1L Amber Glass + pres.	Cool to 4°C ± 2°C, H_2SO_4	7 days for extraction, 40 days for analysis
Total Recoverable Metals (Al, As, Cu, Cr, Cd, Pb, Zn, Hg)	1L Teflon	Cool to 4°C ± 2°C; pH < 2.0 using double distilled nitric acid	90 days Hg and 6 months for all others
Dissolved Metals (Cu, Cr, Cd, Pb, Zn, Hg)	From Total 1L Teflon; Filtrate 500mL Teflon	Cool to 4°C ± 2°C; pH < 2.0 using double distilled nitric acid after filtration	Filter (0.45µm precleaned) within 48 hours of composite; see above
Conventional Parameters			
Turbidity	From glass composite	Cool to 4°C ± 2°C	48 hours
Total Suspended Solids (TSS)	1L LDPE	Cool to 4°C ± 2°C	7 days
Hardness, Total (as $CaCO_3$)	250mL LDPE	Cool to 4°C ± 2°C	14 days
Total Organic Carbon (TOC)	250 or 500mL LDPE w/Pres.	Cool to 4°C ± 2°C, H_2SO_4	28 days
Dissolved Organic Carbon (DOC)	250 or 500mL LDPE w/Pres.	Cool to 4°C ± 2°C, H_2SO_4	After filtration using 0.45µm filter, 28 days

Table 14. Typical Sample Container Types, Sample Size, Preservative Requirements and Holding Times for Sediment Samples.

Parameter	Container Type[1]	Minimum Sample Size	Notes	Sample Preservative	Holding Time[2]
PAH, PCB	G	4-oz	¾ full	Freeze, -18˚C	1 year
TOC	G	1-oz	¾ full	Freeze, -18˚C	1 year
Grain Size	P	2-oz	¾ full	4˚±2˚C	1 year
Metals + Hg	P	1-oz	¾ full	Freeze, -18˚C	1 year

[1] Container Type: G=pre-cleaned glass with Teflon-lined lid; P=acid-cleaned, polypropylene

[2] The holding time may be extended if the samples are frozen and the oxidized layer is removed prior to analyses.

9.2.4 Sample Labels and Chain of Custody

Samples will be uniquely labeled with information corresponding to the COC. The laboratory will provide waterproof labels for all sample containers and the field team will use waterproof ink to write the information on the sample label. The COC will include the following information:

- Project name and number
- Sample ID with the following convention (for grab and composite stormwater samples):
    - Storm event number (e.g. for first event is SW01- and subsequent events SW02-, etc.), followed by,
    - Sample label unique to each parameter (for grab components) or container (for composite samples) (e.g. -0001, 0002, and so on)
    - Complete ID would be SW01-0001, etc.

      (for Stormwater equipment blanks and other QC samples)

  - Sample label unique to each blank or QC sample (e.g. SW0001, SW0002, and so on)

    (Sediment samples)

  - SQV07-0001, -0002, -0003, and so on. **Use the next <u>two</u> available codes for each sediment sample.** One of the code #s will be assigned to the metals fraction and the other to the organics fraction.

- Station code (PSNS126, PSNS124.1, PSNS124, PSNS115.1, PSNS096, PSNS084.1, PSNS082.5, PSNS081.1, PSNS032, PSNS015 or PSNS008)
- Date and time of sample collection (24-hour clock using Pacific Time)
- Matrix (freshwater, saltwater, or sediment)
- Sample type (grab or composite)
- Quality control type (equipment blank, etc.)
- Check parameters
- Overall individual composite sample conductivity readings
- Storm identification number (e.g. SW01, SW02, …)

The COC procedures will be strictly followed to provide an accurate written record of the possession of each sample from the time it is collected in the field through laboratory analysis. The laboratory will provide sufficient copies of blank COC forms. Example COC forms are included in Appendix I. All sample information (i.e., sample date/time, sample matrix, number of containers, etc.), including all required analyses, will be logged onto a COC form after sample processing in the field laboratory and prior to formal transfer of sample containers to the analytical laboratory. Any time possession of the samples is transferred, the individual(s) relinquishing and receiving the samples will respectively sign, date, and note the time of transfer on the COC form. This record documents the transfer of custody of samples from the samplers to the laboratory. The person responsible for transfer/transport of the samples to the analytical laboratory will sign the COC form and retain the record in a Ziploc bag in one of the sampler coolers. The completed COC forms will remain on file with PNNL for the project record.

Coolers will contain ice to maintain a proper temperature (4±2^{o}C) during transfer. Coolers will be packaged accordingly to guard against damage or breakage. If it is necessary to ship any of the coolers via courier or through express delivery services, each will be sealed with custody tape prior to transfer/transport and the custody seal will be signed and dated by the person transferring/transporting the samples, secured across the lid and body of the cooler, and covered with clear shipping tape.

Upon receipt of the samples, the laboratory will assume responsibility for maintaining sample chain of custody. The composite samples will be split into parameter specific containers at MSL and will follow all applicable internal procedures for sample log-in, storage and holding times, tracking, and control.

Immediately upon receipt by a laboratory, the condition of samples must be assessed and documented. The contents of the shipping container must be checked against the information on the COC form for anomalies. If any discrepancies are noted, or if laboratory acceptance criteria or project-specific criteria are not met, the laboratory must contact the Data Collection Consultant Project Manager and the Sample Event Lead for resolution of the problem. The discrepancy, its resolution, and the identity of the person/s contacted must be documented in the project file. The following conditions may cause sample data to be unusable and must be communicated to the laboratory team leader:

- The integrity of the samples is compromised (e.g., leaks, cracks, grossly contaminated container exteriors or shipping cooler interiors, obvious odors, etc.);
- The identity of the container cannot be verified;
- The proper preservation of the container cannot be established;
- Incomplete sample custody forms (e.g., the sample collector is not documented or the custody forms are not signed and dated by the person who relinquished the samples);
- The sample collector did not relinquish the samples; and,
- Required sample temperatures were not maintained during transport (4°C ± 2).

The custodian must verify that sample conditions, amounts, and containers meet the requirements for the sample and matrix. A unique sample identifier must be

assigned to each sample container received at the laboratory, including multiple containers of the same sample. Each laboratory maintains a quality control program that will be followed during the project.

9.3 CHEMICAL ANALYSIS PROCEDURES

This section presents the methodologies that will be used by the laboratory testing facilities for the chemical analysis of stormwater and sediment samples collected during this project.

9.3.1 Analytical Instruments

Analytical instruments used by the laboratory will be maintained and calibrated according to the internal laboratory quality assurance management plan (QAMP), all applicable SOPs, the instrument manufacturer's specifications, and any specific method requirements. These documents are available upon request to the laboratory, but are not otherwise included in this PWP.

9.3.2 Analytical Methods and Reporting Limits for Stormwater Samples

All analytical methods applied to the analyses of the project stormwater samples will conform with those specified in 40 CFR 136, the project PWP, alternate methods for TPH analysis (non-40 CFR 136 method, e.g. WADOE NW-TPH methods), the contract laboratory's QAMP, and any specific analytical SOPs. Analytical methodologies applied to the analyses of all project samples are in accordance with the following documents or modification have been accepted by the NELAC accreditation program:

- 40 CFR Parts 122, 136, et al. *Guidelines Establishing Procedures for the analysis of Pollutants Under the Clean Water Act; National Primary Drinking Water Regulations; and National Secondary Drinking Water Regulations; Analysis and Sampling Procedures; Final Rule*, Federal Register / Vol. 72, No. 47 / Monday, March 12, 2007 / Rules and Regulations
- *Analytical Methods for Petroleum Hydrocarbons*, Washington State Department of Ecology, Publication No. ECY 97-602. June 1997

The target constituents for this project and corresponding analytical methods and reporting limits are presented in Table 15.

Table 15. Target Constituents, Analytical Methods and Method Reporting Limits (RL) For Routine Stormwater Samples

Parameter	Preparation Method	Analytical Method[1]	Laboratory RL
Conventional Parameters			
TSS (mg/L)	USEPA 160.2	EPA 160.2	0.5 mg/L
Turbidity (NTU)	180.1	180.1	0.1 NTU
Hardness, Total (as $CaCO_3$)	STM2340C	STM2340C	2 mg/L
TOC	SM5310C	SM5310C	1 mg/L
DOC	SM5310C	SM5310C	1 mg/L
Total Recoverable and Dissolved Metals			
Aluminum	EPA 1640m	EPA 1638m	1 µg/L
Arsenic	EPA 1640m	EPA 1638m	0.1 µg/L
Copper	EPA 1640m	EPA 1638m	0.02 µg/L
Chromium	EPA 1640m	EPA 1638m	0.3 µg/L
Cadmium	EPA 1640m	EPA 1638m	0.01 µg/L
Lead	EPA 1640m	EPA 1638m	0.007 µg/L
Zinc	EPA 1640m	EPA 1638m	0.2 µg/L
Mercury	EPA1631 revE	EPA1631 revE	0.3 ng/L
Total Petroleum Hydrocarbons			
Diesel Range (TPH)	Method	NWTPH-Dx	0.25 mg/L

Notes:

1 – 40 CFR Parts 122, 136, et al. Guidelines Establishing Procedures for the analysis of Pollutants Under the Clean Water Act; National Primary Drinking Water Regulations; and National Secondary Drinking Water Regulations; Analysis and Sampling Procedures, unless otherwise needed.

2 – For all effluent monitoring, analytical methods will be used that can achieve a minimum level less than the permitted effluent limitation. The laboratory RL is defined as 3.18 x MDL for this project and will not exceed the MRL.

9.3.3 Analytical Methods and Reporting Limits for Sediment Samples

The list of parameters and appropriate analytical methods for sediment sampling are listed in Table 12. A detailed description of the sediment preparation, analytical methods, reporting requirements, and quality control requirements is provided in the Sampling and Analysis Plan for the Sediment Quality Verification Study and Baseline for Process Improvement, Sinclair and Dyes Inlets, Puget Sound, Washington by Johnston et al. (2011). The standard operating procedures for sample collection, handling, storage, analysis and quality control are provided in detail and will remain consistent with the ENVVEST protocol to ensure comparability across projects.

10.0 QUALITY CONTROL

This section presents the QC requirements for field and laboratory activities associated with this project. Project QC procedures will include the collection and analysis of field QC samples and the use of standard laboratory QC analyses. The overall quality of data generated during this project will be evaluated in terms of the MQIs specified in Section 6.2 to ensure that project data quality objectives are met.

10.1 FIELD QUALITY CONTROL

Field quality control requirements for this project will include procedures for sampling and field measurement equipment, field documentation, sample collection, field QC samples, and possible corrective actions for field activities.

10.1.1 Field Quality Control Procedures

Preventive maintenance of the pressure transducers, conductivity meters, automatic samplers, on-site rain gauges, and field instrumentation will be performed as specified by the manufacturer. The samplers, pressure transducers, and conductivity meters will be calibrated to the manufacturer's recommendations.

Original field records will be maintained in designated binders and databases for all monitoring and field related activities using project-specific forms and established procedures. Project records will be kept for a period of at least one year from the date of the sample, measurement, or report. Field documentation may include, but not limited to, stormwater sample event field sheets, sediment sampling field sheets, maintenance activity logs, instrument calibration logs, work permits for confined space, COC forms, raw data from continuous monitoring instrumentation, and other required documentation (see Appendix I). All entries in field form and/or notebooks will be written in waterproof ink. When errors are made on accountable documents, the person who made the error will make the correction by crossing a line through the error, entering the correct information, and initialing and dating the correction.

The sampling efforts for this program will employ the following field QC procedures to ensure consistency, reduce contamination, and ensure representative samples:

- Collect composite water samples using automatic samplers.
- Collect stormwater samples in certified contaminant-free or properly decontaminated containers.
- Collect sediment samples using clean plastic utensils and glass containers.
- Store sampling containers in clean, sealed boxes or bags prior to use.
- Use “clean hands/dirty hands” sampling techniques (e.g., one team member performs “dirty tasks” such as lifting manhole covers and handling samplers with batteries, while the other member performs “clean tasks” such as handling sample intake lines and sample collection bottles).
- Use USEPA’s “clean techniques” guidance document for trace metals (US USEPA, 1996a), adapted to meet equipment and sampling constraints and reflect a non-ambient water sampling condition.
- Periodically clean and replace Teflon-lined sampler tubing and Teflon™ strainers.
- Backflush sampler tubing with deionized water immediately prior to a sampling event.
- Cool automatic samplers with ice when ambient temperatures require.
- Hold samples on ice in coolers during retrieval and delivery to laboratory.
- Deliver samples to laboratory with proper COC forms and within recommended holding times.

Field QC samples will be targeted for collection during stormwater sample events. The decision as to when, where and what QC samples will be collected will be determined by agreement between the Data Consultant Project Manager and/or the Sample Event Lead and the Data Analysis Consultant Project Manager. This decision will be presented to the Navy Project Team for final approval prior to collection.

Field QC samples will require special labeling and tracking procedures. All field duplicate samples will be collected in an identical manner to the primary “parent” field samples and will receive an independent sample identification code. All field blank samples will be appropriately labeled. The various types of field control samples planned for this project, procedures for their collection, and possible corrective measures are discussed below.

Field corrective actions will be taken during this project to address field activities that could be detrimental to data quality. The corrective action process will consist of identifying a problem, acting to eliminate the problem, monitoring the effectiveness of the corrective action, verifying that the problem has been eliminated, and documenting the corrective actions in the sample collection, packing, transporting, field record keeping, and/or training procedures. Additional activities may include re-sampling or evaluating and amending sampling procedures. Further information on field corrective actions can be found in Section 15.1.

10.1.2 Field Control Samples

Field QC samples are used to assess sample collection procedures, environmental conditions during sample collection, storage, and transport to the laboratory, and the adequacy of equipment and sampling container decontamination. Typically, one QC sample is collected for every ten environmental samples, or in other words, the number of QC samples collected during a study is equal to 10-percent of the environmental samples collected for chemicals of concern (e.g. metals and TPH). The types of field QC samples that will be collected for this project to meet PWP objectives include field duplicate samples, field blanks, and equipment blanks.

10.1.2.1. Field Duplicates

The purpose of collecting and analyzing field duplicates is to demonstrate the precision of field sampling and sample processing. In general, a replicate or duplicate sample refers to two (or more) samples collected at the same time and place. A replicate sample represents a means to estimate the total random variability (precision) of individual results. In this case, the field duplicate sample can be used to measure whether environmental conditions are changing faster (are more variable) than can be accommodated by the sampling design.

Field duplicates for stormwater will be collected at the rate of at least ten percent of the total number of stormwater samples submitted for analysis, and will be analyzed along with the associated environmental sample. Field duplicates will consist of an “internal” duplicate, which will include a replicate (composite stormwater) sample collected at the same time using a single autosampler configuration. The autosampler will be programmed to collect sequential aliquots of stormwater and deliver them to two separate sets of bottles (see Section 8.2.4). Additionally, field duplicates will be collected for those parameters that

require grab samples (i.e. TPH, fecal coliform) by filling an additional set of grab sample bottles in rapid succession. Field duplicate samples will be assigned a unique sample identifier added to the station identification.

Field duplicate results are typically used as a qualitative evaluation of sample precision and are not used as a basis for qualifying or accepting/rejecting data. However, if the relative percent difference of field duplicate results is greater than twenty-five percent, the sampling crew should be notified so that the source of sampling variability can be identified (if possible) and corrective measures can be taken prior to the next sampling event.

10.1.2.2. Field Blanks

Field blanks will be collected in order to check for possible contamination of laboratory-cleaned grab sample and autosampler containers. The field blank may also detect contamination from the surroundings and/or containers or from cross-contamination during transportation and/or storage. For the TPH grab sample, deionized water from MSL will be poured into a randomly selected stainless steel sampling cup and then into an amber glass sample container while at a randomly selected outfall location.

In order to check for potential contamination, at least one composite autosampler blank will initially be collected at each project monitoring station prior to the onset of storm event sampling during the equipment set up phase. The autosampler, associated equipment and laboratory cleaned sample intake line and strainer will be connected and readied for use. Before the strainer end of the sample intake line is affixed to its desired position in the associated vault the interior of the entire autosampler tubing system (including distributor arm and pump head tubing) will be thoroughly rinsed with reagent grade deionized water supplied by MSL. The deionized water will be pumped through the tubing system using the integrated autosampler pump. Blanks will be obtained by allowing the autosampler to fill deionized water into a single laboratory cleaned glass composite sample container with the strainer intake inserted into the water source container and discharging through the end of the distributor arm tubing.

The blank samples will be assigned a unique sample identification code, labeled, and analyzed by the contract analytical laboratory for the analytes of interest. Blanks samples will be managed as detailed in Section 9.

10.1.2.3. Equipment Blanks

Equipment blanks (rinsate blanks) are collected to check for potential contamination of sampling and processing equipment and are used to assess the effectiveness of cleaning or decontamination procedures. Equipment blanks will be collected from any equipment used to composite samples in the field, aliquot samples at the laboratory, or filter samples during post-storm event processing at MSL. These include blanks from the Teflon tubing used for composite sampling, wedge bottles, glass composite jars, sample containers, and filters. The equipment blanks will be collected at the laboratory by pouring deionized water into the processing equipment and analyzing them as samples. The field equipment blanks also provide possible contamination information for these pieces of equipment, therefore, both the field blanks and equipment blanks will be collected at a collective frequency of 10% of the field samples unless significant contamination is identified and warrants a higher frequency.

10.1.2.4. Field Control Sample Corrective Action

If any analytes of interest are detected at levels greater than the RL the data will be evaluated for further action. If the sample concentrations are less than five times the detected value in field and/or equipment blank/s, the field sampling and/or sample processing crew will be notified so that the source of contamination can be identified (if possible) and corrective measures taken prior to the next sampling event. If the concentration in the associated samples is less than five times the value in the equipment blanks the results for the environmental samples may be unacceptably affected by contamination and should be qualified as appropriate (see discussion below). If contamination is detected, and analyte method blank results rule out the laboratory as a source of contamination, then equipment or processing blanks must be collected more frequently until the source of contamination is eliminated (if possible).

Table 16 describes the guidelines for project field QC samples, including the type, frequency, acceptance limits, and corrective actions.

Table 16.Summary of project field quality control requirements

Field QC Sample	Frequency	Control Limit	Corrective Action(s)
Field duplicate	10% frequency	Not applicable; qualitative evaluation Only	Review, modify sample collection procedures
Field blank (sample containers, autosampler)	Three times, or at a collective 10% frequency for all blanks	Analyte concentration less than reporting limit	Compare analyte method blank results to rule out lab contamination; review modify sample collection procedures; evaluate any analyte results that are <5 times blank concentration
Equip. blank (tubing, etc.)	Once over the course of SW sampling period/station, or at a 10% frequency	Analyte concentration less than reporting limit	Compare analyte method blank results to rule out lab contamination; review modify equipment decontamination procedures; evaluate any analyte results that are <5 times blank concentration

10.2 LABORATORY QUALITY CONTROL

Specific QA/QC policies and procedures followed by PNNL and CAS are detailed in each of the laboratories Quality Assurance Program (QAP) and/or method-specific SOPs. As the prime contractor, PNNL maintains the requirements of the Department of Energy (DOE) Order 414.1C, Quality Assurance (QA Order). The QA Order requires all DOE contractors to develop and maintain a QAP which implements 10 criteria specified in the Order. The QA Order requires that contractors develop and maintain programs to control safety software and to prevent introduction of suspect/counterfeit items into work for DOE or other contractors.

In addition, the laboratories should maintain compliance with requirements and accreditation with the following protocols during the analyses of samples for this project:

- National Environmental Laboratory Accreditation Program (NELAP), which is based on the National Environmental Laboratory Accreditation Conference (NELAC) Constitution, Bylaws, and Standard, approved June 5, 2003 (EPA/600/R-04/003).
- State of Washington Department of Ecology Accreditation.

10.2.1 Laboratory Control Samples

Analytical procedures conducted by the laboratories should meet all requirements as specified in Section 10.2. Quality control checks and measurements, such as instrument tuning, initial and continuing calibrations, analyses of blanks, spikes, internal standards, replicates, and standard reference material (SRM), will be performed at the required frequency and meet the control criteria specified in the analytical methods or SOPs.

The required quality control samples will include matrix spike (MS), MS duplicate (MSD), method blank, laboratory duplicate (for select parameters), and SRM (if available). The matrix spike analyses will be conducted on selected project samples in order to evaluate the sample-specific effects on the analytical methodologies. Additional volumes will be collected for selected samples for MS/MSD analyses. For conventional parameters (e.g., anions, TSS), laboratory duplicate analyses can be performed in lieu of a MS and MSD.

10.2.2 Data Quality Control Criteria

Specific data quality control criteria are established in this PWP to ensure that the project DQOs are met during the course of the data collection, and to set forth criteria to assess the data quality and usability. The data QC criteria are derived based on the following:

- Analytical methods will be used that can achieve a minimum level less than the permitted effluent limitations
- The control limits for accuracy and precision are based on the DoD QSM, and the laboratory in-house performance-based statistics, as applicable.

Project PQLs and control limits for accuracy and precision measurement are summarized in Table 17.

Table 17. Precision, Accuracy, Sensitivity, And Completeness Control Criteria For Routine Non-Dry Dock Stormwater Samples

Parameter	Surrogate Spike (% R)[1]	LCS (%R)[1]	Matrix Spike (% R)[1]	Precision (RPD)[1]	Completeness (%)
Conventional Parameters					
TSS (mg/L)	-	-	-	30	95
Turbidity (NTU)	-	-	-	30	95
Hardness	-	-	-	30	95
TOC	-	-	-	30	95
DOC	-	-	-	30	95
Total Recoverable and Dissolved Metals					
Al, As, Cd, Cr, Cu, Pb, Hg, Zn	-	70-130%	70-130%	30	95
Total Petroleum Hydrocarbons (µg/L)					
Diesel Range (TPH)	-	43-100	43-100[2]	50[2]	95
o-Terphenyl (Surr.)	41-121	51-120	41-121	-	95

Notes:
1 – Quality Assurance Project Plan for ENVVEST (Johnston et al. 2009)
2 – Advisory only
LCS – Laboratory control samples
%R – Percent recovery.
RPD – Relative percent difference
Surr – Surrogate Spike

10.3 INSTRUMENT TESTING, INSPECTION, AND MAINTENANCE

Equipment will be tested by the Data Collection Consultant Sample Event Lead or designee to assure proper functioning before being installed in the field. After initial installation, equipment operations will be field-verified by field staff.

Inspections and preventive maintenance activities on the automated samplers, the flow meters, and pressure transducer will occur prior to each targeted sample event as part of the pre-event visit. Sample lines will be backflushed with one gallon of deionized water (per station line) provided by the lab prior to initiating the sampling program. Additional maintenance activities will be performed on an as-needed basis. A record of maintenance activities will be kept in the field notebook. Records will be kept for a period of at least one year from the date of the maintenance. The following critical spare parts will be available for maintenance:

- ISCO® pump and distributor arm tubing
- Teflon®-lined polyethylene intake tubing
- ISCO® 1-liter poly bottles
- 12-vdc marine batteries

Spare parts will be stored at PSNS&IMF Code 106 Environmental Store Room or an area designated by the Data Collection Consultant for readily accessibility.

10.4 INSTRUMENT CALIBRATION AND FREQUENCY

Field teams will calibrate monitoring equipment according to the manufacturer's recommendations upon installation, at time intervals specified by the manufacturer, and as determined by field inspections and data review. Calibration records will be kept for a period of at least one year from the date of the calibration.

10.5 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Upon receipt, field equipment and monitoring supplies will be inspected by the Data Collection Consultant Storm Event Lead or designee to determine whether any of the goods are damaged. If goods are damaged, the equipment will be returned to the source for replacement.

11.0 DATA MANAGEMENT PROCEDURES

There are three types of data that will be generated during this stormwater monitoring project: (1) field activity data, including non-sampling task field operations, sample collection and monitoring equipment maintenance activities;

(2) field monitoring data, including water level, precipitation, temperature, conductivity, sampler and meta data; and (3) laboratory data. All data records will be stored for a period of at least one year from the date of the sample or measurement. Chemistry data will be stored for up to ten years per PNNL QAP project management protocols.

11.1 FIELD ACTIVITY DATA

Field activity data will be recorded in the field notebook. The field notebook will include field operations notes (including site setup information, troubleshooting and documentation of other non-sampling project related activities), completed stormwater and sediment sample event field sheets and COC forms. Blank copies of these field data sheets can be found in Appendix I. The Data Collection Consultant Project Manager and Storm Event Lead Technical Lead are responsible for updating and storing the field notebook. The field notebook will be stored at the Taylor/TEC office.

11.2 FIELD MONITORING DATA

Field data to be collected include water level, precipitation, temperature, conductivity and sampler data. Meta data records, documenting and detailing various particulars about the collected field data will also be compiled and managed with this general group of data. All field data will be automatically stored on the CSI CR1000 datalogger at five-minute intervals. Data on the datalogger will be programmed to download, via telemetry system, to a base station computer at the Taylor/TEC office on a schedule of at least once per day. Incoming field data will be split into a raw and comma-delimited formats. The raw data will be stored “as-is”, remaining static and unedited, serving as an archive and backup to the overall field monitoring data generated over the course of the project. The comma-delimited data will be maintained as .DAT files that are dynamic; older data deleted once uploaded to the database, to make room for more recent data. Once incoming field data has been split into its formats, the comma-delimited files will be uploaded to a proprietary water quality data management and display database (e.g. Isco® Flowlink). Once data has been uploaded into the water quality database a wide variety of reports, descriptive statistics and graphs could be available for a range of reporting and assessment needs.

Field monitoring data may also be downloaded at the site by field staff onto a project designated laptop computer and/or a Rapid Transfer Device (for Isco® samplers). Data downloaded in the field will be transferred to the project data archive storage at the Taylor/TEC office and to the main project water quality database if it is not otherwise automatically downloaded via telemetry. The Data Collection Consultant Project Manager and/or the Telemetry Systems Manager will be responsible for maintaining and backing-up the project database. The project databases will be backed up weekly, with back-up files stored at Taylor/TEC. On a monthly basis the water quality database and the raw and comma-delimited data will be copied onto CD-ROMs. Copies of these CD-ROMs will be submitted to the Navy.

11.3 LABORATORY DATA

All laboratory reports will be stored electronically and in hard copy formats by the Data Analysis Consultant. Data reported electronically by the analytical laboratory will be transferred to Excel spreadsheets comprising the project water quality analytical database. Access to this project water quality analytical database will be made available to the Data Collection Consultant for the purposes of reporting and site assessments. Data generated in support of the Sinclair and Dyes Inlet Study will be tracked and reviewed by the Data Analysis Consultant. Project Manager - Chemist. Data management (e.g., paper flow; data tracking, data entry, etc.) and data assessment (e.g., verification, validation, and Data Quality Assessment (DQA)) activities require adequate QC procedures to ensure that the SOPs and this PWP will be followed and result in records and reports that are accurate and appropriate. All chemistry data will be reviewed by the laboratory QA program and all reports will go through a peer review process. The data validation procedures include peer review by the project chemist or project manager, validation by a quality control officer or designee, and final review by the project manager.

12.0 ASSESSMENT/OVERSIGHT

Assessment and oversight activities in the form of audits and reviews will be performed to determine whether the QC measures identified in the PWP are being implemented and documented as required. For example, during a review, the auditor may check that a sampling location has been correctly sampled or that the field QC samples were collected at the appropriate frequency. During an audit or review, the auditor may check for:

- Adherence to the site-specific plans
- Documentation of the process or system
- Proper identification, resolution, and documentation of nonconformance with the process or system
- Correction of identified deficiencies
- Assessments and Response Actions

12.1 ASSESSMENTS AND RESPONSE ACTIONS

The need for an audit can be determined independently by the Data Collection or Data Analysis Consultant Project Managers, Technical Leads or at the recommendation of the Navy Team. Assessment activities may include surveillance, inspection, peer review, management system review, readiness review, technical systems audit, performance evaluation, and data quality assessment. The Data Collection or Data Analysis Project Managers (depending on whether the issue is mainly field or laboratory in nature) will be responsible for initiating audits, selecting the audit team, and overseeing audit implementation. Non-project audits of the analytical laboratory occur annually by PNNL in accordance with the evaluated supplier program.

12.1.1 Laboratory Performance and Systems Audits

Laboratory systems may be audited in accordance with project requirements. Contracted laboratories must submit a Laboratory Quality Assurance Plan (LQAP). The LQAP must include relevant standard operating procedures, a description of the laboratory's internal procurement policies, and its corrective action program. The laboratory audits will address at least the following questions:

- Is the laboratory operation being performed as required by the subcontract?
- Are internal laboratory operations being conducted in accordance with the LQAP?
- Are the laboratory analyses being performed in accordance with the method requirements?

Any nonconformance noted during an audit will result in a corrective action.

12.1.2 Field Team Performance and System Audits

The Data Collection Consultant Project Manager, Technical Lead and/or Telemetry Systems Manager or a designated representative may conduct audits of the field activities in accordance with the project requirements. The audit will address at least the following questions:

- Are sampling operations being performed as directed in the PWP and SOPs?
- Are the sample labels being filled out completely and accurately?
- Are the COC records complete and accurate?
- Are the field notebooks being filled out completely and accurately?
- Are the sampling activities being conducted in accordance with the PWP and SOPs?
- Are the documents generated in association with the field effort being stored as described in the PWP and SOPs?

The generation and documentation of field data may also be audited. The audits will verify that proper procedures are followed so that subsequent sample data will be valid. Any nonconformance noted during an audit will result in corrective action. The results of the assessment and oversight activities will be reported to the Data Collection and Data Analysis Consultant Project Managers and to the Navy Team. The Data Collection Consultant Project Manager will ultimately have the responsibility for ensuring that the corrective action response is completed, verified, and documented.

13.0 REPORTING

Three types of reports will be generated in relation to the non-dry dock stormwater monitoring activities covered in this PWP. These report types are:

(1) Sample Event Reports

(2) Project Status Reports, and

(3) Annual Report of Progress

13.1 SAMPLE EVENT REPORT

Two types of sample event reports will be generated. The first is the storm report which will be brief summaries specific to each qualified (successfully collected and storm-validated event, where properly prepared, representative samples are submitted to the laboratory) or non-qualified (false start events, where field efforts do not culminate in qualifying samples being submitted to the laboratory) storm sampling effort. Sample event reports will provide specific details of each stormwater sampling event, expect for analytical testing results. Upon approval from the Navy Project Team, details from multiple storm events may be combined into a single sample event report if the sampling frequency or other considerations warrant this compilation. The assemblage of sample event reports will be used to efficiently and accurately develop certain components of the Annual Report, as described in Section 13.3.

A typical sample event file may include, but not limited to, the following information and components:

- Sample event hydrographs, showing rainfall and when samples were collected
- An estimate of the total storm runoff volume as described in Section 7.4
- Copies of pertinent sampling field sheets (includes bench top conductivity testing results)
- Validation sheet indicating how the sample event and samples collected have met the criteria listed in Section 7.0
- Copies of sample chain-of-custody forms
- Documentation of weather tracking and forecasts

- Any other supporting documents or calculations (e.g. sampler reports, runoff calculation worksheets, enabling information table, etc.)
- Rainfall total information for monitoring stations and the PSNS&IMF gauge
- Narrative discussion of storm event details, encountered anomalies or issues that will be needed for later data analysis and reporting
- Monitoring station map
- Telemetry data download (submitted on CD-ROM) with accompanying descriptive summary of storm period data and brief write-up regarding QC checks of the data.

Sample event reports will be prepared shortly after each qualified or false-start sampling event. Reports for false-start events will contain only those reporting elements, as listed above, pertinent to those events. Sample event reports will completed in a technical memorandum style document in a single, electronic iteration. Hard copies of these reports will be included in the Annual Report.

The second type of sample event report will be the storm chemistry data report. The chemistry data report for each storm event will be submitted as a PDF document that includes the following:

- Summary table of the field results,
- Summary table of the associated QC data,
- Data qualifiers,
- QC narrative that summarizes preparation and analytical methods, QC samples analyzed with each parameter, and any QC issues encountered during the analyses,
- Laboratory login and sample receipt information document the condition of the samples upon arrival,
- Chain of Custody

13.2 PROJECT STATUS REPORTS

Project status reports, of various types, are intended to track the progress of the planning and preparation, station set-up, stormwater monitoring, data and event reporting and project administration tasks associated with this project. The

various types of project status report elements and associated tasks include (but may not be limited to) the following:

- Project schedule
- Project quarterly progress reports (see below for detail)
- Project team coordination (client and internal project team) directives (typically via email)
- Pertinent project team decisions documentation
- Scope or budget modifications documentation
- Scope and budget progress monitoring reports (typically combined with the project progress reports)
- Contracting issue resolution documentation
- Monthly project invoicing
- Participating in project stakeholder meetings

A typical quarterly status report may include the following information and components:

- A summary of the number of successful valid samples to date and where the project is at in relation to the overall proposed schedule
- Current status of work on a task-by-task basis
- Budget particulars
- Discussion of any stormwater monitoring program issues that may need to be addressed
- Project activities anticipated for the next quarter

Project status report elements will be prepared by the Data Collection Consultant Project Manager or their designee and will be submitted to the Data Analysis Consultant Project Manager and/or to the Navy Team as appropriate.

13.3 ANNUAL REPORT OF PROGRESS

An annual report summarizing the results of chemical analyses and documenting progress and status of stormwater and sediment monitoring for the project will be prepared by the Data Analysis Consultant (PNNL) with contributions from the Data Collection Consultant (Taylor/TEC). The Annual Report of Progress US

EPA 2008a) is a required component of the PSNS&IMF NPDES Working Draft Permit (USEPA 2008a).

PNNL will be responsible for outlining the report, summarizing the chemical data, formatting, and production of the report. Taylor /TEC will be responsible for compiling all telemetered data and addressing the progress made towards reaching the compliance date for the storm water effluent limitations listed in the Permit. The report will include the following information:

- An assessment of the project generated data will be led by PNNL with significant contribution of data, previous experience, and storm water expertise from Taylor/TEC.
- A report section on progress made and identification of further actions and milestones targeted for the upcoming year will be prepared by Taylor/TEC.
- Documentation by Taylor/TEC of the results of data qualification and validation for stormwater sampling events and associated telemetry data (see section 14).
- Documentation by PNNL of data qualification and validation activities for the analytical chemistry analysis.

Taylor/TEC will prepare field, telemetry and other electronic project data for inclusion into the annual report, including graphs and tables. PNNL will direct Taylor/TEC as to those sections of the annual report they will draft. PNNL will be responsible for the preparation of analytical data and for the use or summary of non-project data. Further, PNNL will be responsible for the production of the draft or final iterations of the overall report document.

14.0 DATA REVIEW VERIFICATION AND VALIDATION

Two types of data will be generated during this monitoring program – field data (rainfall, temperature, water level, conductivity and sampler report data) and water and sediment quality analytical data. The field data (excluding sampler report data) will require review and verification. Analytical data for the water and sediment quality parameters will require data validation. Data review requires examination of the data for errors or omissions. Data verification refers to the systematic process of examining the QC results for compliance with acceptance criteria. Data validation involves the examination of complete data packages submitted by the contracted laboratories to verify compliance with the PWP and to determine the quality and usability of data.

14.1 FIELD DATA REVIEW AND VERIFICATION

Field data will be reviewed and verified following the guidance provided by the USEPA (2002) in Guidance on Environmental Data Verification and Data Validation, USEPA QA/G-8. These procedures include, for example, how computer entries are compared to field data sheets, how data gaps are identified, how calculations are checked, and how raw data are examined for outliers or nonsensical readings.

The Data Collection Consultant Project Manager and Telemetry Systems Manager are responsible for ensuring that field data are properly reviewed and verified for integrity. On a monthly basis and after each successfully sampled storm event, the Data Collection Consultant will review rainfall, water level, temperature and conductivity data for gross errors such as spikes or data gaps to determine completeness of the data set. Rainfall, water level, temperature and conductivity measurements will be checked as follows:

- Identify data gaps and determine if the gaps can be filled with estimated or alternate data. Document the process for filling in data gaps.
- Identify data anomalies or spikes. Are certain data outside the limits of reality? Document the process for dealing with data anomalies.
- Cross check data sets against field sheets and calibration records. Determine if data set needs to be adjusted based on instrument calibration or field staff observations.

- Expected patterns/yield for that basin/area – based on previous project or historic data. Comparison of hyetograph to the hydrograph – is there a water level response to rainfall?

14.2 LABORATORY INTERNAL REVIEW

Each analytical laboratory will review the data internally prior to submitting the data to ensure the following:

- Sample preparation information is correct and complete.
- Analytical information is complete and was generated within acceptable criteria.
- The appropriate SOPs have been followed.
- QC samples were within established control limits.
- Analytical requirements have been met (e.g., the correct analytical procedures were used).
- Documentation is complete.

An authorized quality assurance program member must sign the data package to indicate that the data have been reviewed.

Data management at the laboratory begins with the receipt of samples. Samples are logged in and assigned unique identification numbers that are used to identify samples throughout storage, processing, analysis, and reporting. A combination of hand-recorded and electronically captured data is generated. Hand-recorded data include sample processing and spiking procedures. Hand-recorded data are transcribed to spreadsheets using established formats. The raw data are maintained in the project files and the transcribed data are 100% verified. Data will be entered into an EDD using a format supplied by the PSNS&IMF ENVVEST Technical Coordinator.

Data review includes data verification, validation, and oversight, as well as reconciliation of the data quality with user requirements. The data verification process includes the initial review of the data packages to ensure that the analyses requested have been provided. Data validation is the process of reviewing data and accepting, qualifying, or rejecting data on the basis of sound criteria. Data will be reviewed by the Data Analysis Consultant Project Manager

and/or Quality Control Officer to assure that it is complete. Data qualifier codes are provided in Appendix J.

14.3 LABORATORY DATA DELIVERIES

The analytical laboratory reports, at a minimum, should contain summary forms for various types of analyses. Information reported in each of the summary forms should be equivalent to those referenced in the applicable USEPA Contract Laboratory Program (CLP) Statement of Work. In cases where a CLP format summary form is not available (for conventional chemistry parameters in particular), raw data such as instrument printout or analyst bench sheet relaying the same information are sufficient.

Data reports, consisting of a QC narrative and summary data tables. Data reports must include the following:

- Complete field sample identification;
- Sample identification numbers assigned by the laboratory;
- Date of sample collection;
- Date sample is received by the laboratory;
- Date of sample analysis;
- Sample matrix;
- Analytical SOP number
- Brief description of SOP and base method (if applicable);
- Results for each analyte requested;
- Data qualifying flags;
- Dilution factor(s);
- Limits of detection;
- Date of report.

ELECTRONIC DATA DELIVERABLES (EDDs)

As part of the laboratory deliverables, EDDs are to be prepared and submitted by the laboratory in two formats along with the hardcopy report:

- ENVVEST database format (see Johnston et al. 2009)

- Standard Excel format with sample information (name, type, collection dates, etc.), analytical results, RL, and QC results

14.4 LABORATORY DATA REVIEW AND VALIDATION

The purpose of the data review is to eliminate unacceptable analytical data and to designate a data qualifier for any discovered data quality limitation. A independent data validation will be performed on 100 percent of the laboratory data following the guidelines listed in the PNNL QAP, which adhere to:

- National Environmental Laboratory Accreditation Program (NELAP), which is based on the National Environmental Laboratory Accreditation Conference (NELAC) Constitution, Bylaws, and Standard, approved June 5, 2003 (EPA/600/R-04/003).
- State of Washington Department of Ecology Accreditation

The review will include checking laboratory performance criteria and sample-specific criteria. The reviewer will determine whether the measurement performance criteria have been met, and will calculate the data completeness for the project.

The data quality review will include verification of the following:

- Compliance with this PWP
- Proper sample collection and handling procedures
- Holding times
- Field QC results
- Instrument tuning and performance check
- Instrument initial calibration and calibration verification
- Laboratory and field blank analysis
- Detection and reporting limits
- Laboratory analytical precision
- Matrix spike and matrix spike duplicate percent recoveries and precision, as required by the method
- Laboratory control sample recovery

- Internal standards and surrogate spikes
- Data completeness and format
- Data qualifiers assigned by the laboratory

A Data Review Report will be prepared for individual or multiple sample delivery groups (SDGs) to present and discuss the findings of the data review.

14.5 DATA QUALITY AND USABILITY ASSESSMENT

A data usability assessment considers whether data meet project DQOs, and evaluates whether data are suitable for making relevant project decisions. The assessment will be conducted by the Data Collection Consultant Project Manager for field data considerations and by the Data Analysis Consultant Project Manager for water and sediment analytical data considerations. These considerations may be based on the field notes taken during sample collection, the outcome of the field data quality review, and the outcome of the laboratory data review.

A data usability assessment write-up will be prepared and incorporated into the QA/QC section of the Annual Report of Progress. The assessment write-up will present and discuss the following:

- A brief description of sampling and analytical procedures applied in collecting and analyzing each type of samples
- Deviations from any planned sampling procedures or activities
- Identification of unrepresentative sample(s) through field/laboratory notes or data review
- Overall precision and accuracy/bias associated with the data
- Overall measurement performance via evaluation of sensitivity and quantitation limits for each type of analysis
- Data comparability to results collected from other sampling events at the site
- Completeness of the sampling and analysis for the entire project
- Conclusion and recommendation of the extent for data usability.

15.0 CORRECTIVE ACTIONS

Any non-conformance with the established QC procedures will be expeditiously identified, corrected, and controlled. Where procedures are not in compliance with the established protocols, corrective actions will be taken as soon as possible. Subsequent work that depends on the nonconforming activity will not be performed until the identified nonconformance is corrected.

In summary, corrective action involves the following steps:

1. Discovery of a nonconformance
2. Identification of the responsible party
3. Determination of root causes of the nonconformance
4. Planning and scheduling of corrective/preventive action
5. Review of the corrective action taken
6. Confirmation that the desired results were produced

15.1 FIELD CORRECTION ACTION

The Data Collection Consultant Project Manager and/or Data Analysis Consultant Project Manager will review the procedures implemented in the field for consistency with the established protocols. Members of the Navy Project Team management or technical advisor designees from either the Data Collection or Data Analysis Consultant teams may also perform field procedural reviews. Sample collection, preservation, labeling, and other procedures will be checked for completeness. Where procedures are not in compliance with the established protocols, the deviations will be field documented and reported to the Data Collection Consultant Project Manager.

Examples of field non-conformances include, but are not limited to, the following:

- Items provided by a subcontractor supplier that do not meet the contractual requirements
- Errors made in following work instruction or improper work instruction
- Unforeseen or unplanned circumstances that result in services that do not meet quality/contractual/technical requirements
- Unapproved or unwarranted deviations from established procedures

- Missing or deficient sample chain-of-custody documentation
- Data falling outside established objective criteria

Corrective action/s will be defined by the Data Collection Consultant Technical Lead and Data Collection Consultant Project Manager with concurrence from the Data Analysis Consultant Project Manager and the Navy Project Team managers. Problems that require corrective action will be documented by the use of a corrective action report. Upon implementation of the corrective action, the Data Collection Consultant Project Manager will provide the Data Analysis Consultant Project Manager with a written memo documenting the corrective action and modifications to the field procedures. The changes in field procedures will necessitate a revision to the PWP; the memo will therefore be documented as an addendum to the PWP and will be kept on site and made available upon request.

15.2 LABORATORY CORRECTIVE ACTION

The PNNL Laboratory Quality Assurance Officer or designee will review the data generated to ensure that all samples have been analyzed as specified by this PWP. The Data Collection Consultant Project Manager will be notified immediately if discrepancies occur between the contracted analyses and the analyses listed on the COCs. The Data Analysis Consultant Project Manager will contact the Data Collection Consultant Project Manager and/or the Data Collection Consultant Technical Lead to discuss noncompliant data sets after first discovering that any analysis failed to meet the required data quality criteria. If the analyses cannot produce data sets that are within control limits, the Navy Project Team will be notified. At a minimum, corrective actions are necessary if any of the following occur:

- Initial calibration verification and continuing calibration verification do not meet investigation-specific QC criteria.
- Any changes in the MRL.
- Method blanks contain contaminants at concentrations greater than the MRL for any target analyte.
- The QC data are outside the acceptance windows for precision and accuracy.
- Undesirable trends are detected in MS or LCS recoveries.

- Undesirable trends are detected in RPD for MS/MSD or laboratory duplicates.
- The Laboratory Quality Assurance Officer detects deficiencies during internal or external audits.

If laboratory personnel identify a non-conformance in analytical methodologies or QC sample results, corrective actions will be immediately implemented. Corrective action procedures will be handled initially at the bench level by the analyst, and followed with protocols specified in the laboratory QA manual or process specific SOP.

Corrective action may include, but will not be limited to, the following:

- Recalibrating analytical instruments
- Reanalyzing suspect samples if holding time criteria permit. The need for reanalysis is dependent on the number of analytes that are out of compliance, the importance of the outlier to the decision making process, and the magnitude of the outlying data.
- Re-sampling and analyzing newly collected samples
- Evaluating and amending sampling and/or analytical procedures
- Accepting data with an acknowledged level of uncertainty
- Evaluating and attempting to identify limitations to the data

Following the implementation of the required corrective action measures, if data are still deemed unacceptable, possible follow-up corrective actions will be explored.

15.3 CORRECTIVE ACTIONS FOLLOWING DATA REVIEW

The Data Analysis Consultant Project Manager and/or Quality Control Officer will review the laboratory data generated for this investigation to ensure that all project DQOs are met. If any non-conformances in the data have resulted from the field procedures, sample collection procedures, field documentation procedures, or laboratory analytical and documentation procedures, the impact of those non-conformances on the overall project data quality and usability will be assessed. Appropriate actions, including re-sampling and/or re-analysis of samples, may be recommended to the Navy Project Team so that the project objectives may be achieved.

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APPENDIX A:

FIELD ENVIRONMENTAL HEALTH & SAFETY PLAN

FINAL

Field Environmental Health and Safety Plan

For

NON-DRY DOCK STORMWATER MONITORING FOR PUGET SOUND NAVAL SHIPYARD, BREMERTON, WA

PSNS Project ENVVEST Study Area

September 2010
Annual Review October 2011

Prepared By:
Pacific Northwest National Laboratory
Marine Science Laboratory, Sequim, WA
And
Taylor Associates, Inc.

Contract No.: N4523A10MP00034 Amendment 1

Annual Review

This document was reviewed by the field team in October 2011. Revisions to the original field safety plan include the following:

1. Update to the Objectives noted addition of new sampling stations.
2. New contact list for Roles and Responsibilities
3. New map of field locations
4. Hazardous analysis section now includes "Working at Heights". Taylor Associates, Inc. has procedures in place to address this hazard in accordance with the WAC 296-155 Part C-1 for our fall protection.

Approvals – October 2011 Annual review

Approval			
Role	Print Name	Signature	Date
PNNL Project Manager	Jill M Brandenberger		
PNNL S&H Rep	Mike Fullmer		
Line Director	Charles Brandt		
MSL Operations Manager	Sue Southard		
Technical Group Manager	Gary Gill		
TAI Project Manager	Dave Metallo		
NPDES Program Manager	Jacquelyn Young		

Annual Review

This document was reviewed by the field team in October 2011. Revisions to the original field safety plan include the following:

1. Update to the Objectives noted addition of new sampling stations.
2. New contact list for Roles and Responsibilities
3. New map of field locations
4. Hazardous analysis section now includes "Working at Heights". Taylor Associates. Inc. has procedures in place to address this hazard in accordance with the WAC 296-155 Part C-1 for our fall protection.

Approvals – October 2011 Annual review

Approval Role	Print Name	Signature	Date
PNNL Project Manager	Jill M Brandenberger		11/1/11
PNNL S&H Rep	Mike Fullmer		10/31/11
Line Director	Charles Brandt		11.1.11
MSL Operations Manager	Sue Southard		11-2-11
Technical Group Manager	Gary Gill		11/1/11
TAI Project Manager	Dave Metallo	Dave Metallo, LHG	11/4/2011
NPDES Program Manager	Jacquelyn Young		

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Table of Contents

Introduction

The Pacific Northwest National Laboratory (PNNL) is committed to a safe and healthful workplace for all employees. The PNNL integrates Environment, Safety, and Health (ES&H) requirements into the processes for planning and conducting work at PNNL in accordance with PNNL's Operating Contract (DE-AC05-76RL01830) Clause I-87 that implements DOE Acquisition Regulation (DEAR) Clause 970.5223-1, Integration of Environment, Safety, and Health Into Work Planning and Execution (DEC 2000). The PNNL standard operating procedures (SOPs) include descriptions of processes for accomplishing work safely and the road map of the systems and processes that make up the PNNL Integrated Environment, Safety, and Health (IESH) Program. (Note: The IESH Program is PNNL's implementation of the U.S. Department of Energy [DOE] Integrated Safety Management System [ISMS]. The terms IESH and ISMS are interchangeable within the context of the PNNL IESH Program.).

The IESH Program is accomplished by employing an integrated set of management systems that deploy the requirements defined in the DOE ISMS Manual. Within the context of DOE's ISMS language, the ISMS Core Functions include defining work scope, identifying and analyzing hazards and risks associated with the work, developing and implementing controls to mitigate hazards and risks, performing work within the controls, and providing feedback for continuous improvement. These processes are implemented down at the project level and include the development of a Field Environmental Health and Safety Plan (EHS).

The EHS will be kept on-hand during all project field activities and will be reviewed as necessary. This plan will be amended or revised as project activities or conditions change. This EHS will serve as the overall project safety guidance document for field tasks described in the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAP). This EHS will be attached to the combined project guidance documents (the FSP and the QAP). The field coordinator (FC) is to be familiar with all of the documents listed above and the contents of this plan and ensure all field team members and subcontractors read and acknowledge their understanding of and commitment to abide by the provisions herein by signing the Employee Signoff form in this plan.

Objectives

The goal of the project and the associated field tasks is to collect and characterize non-dry dock stormwater and associated data from seven selected outfall locations within the Puget Sound Naval Shipyard & Intermediate Maintenance Facility (herein after referred to as the Shipyard) located in Bremerton, WA (Figure 1). This work fulfills the requirements of the (Working Draft) National Pollution Discharge Elimination System (NPDES) Permit Number WA-00206-2 (US EPA 2008a, b). In addition, this data will support the continual development of the ENVVEST land-use and land cover (LULC) stormwater loading model as part of the contaminant mass balance for Sinclair and Dyes Inlet (Brandenberger et al. 2008).

Specific field tasks to be performed include site evaluations, establishment of seven monitoring locations in 2010 and six in 2011 (Figure 1), placement and relocation of sampling equipment at each location, collection of composite samples during three storm events at each location, and removal of sampling equipment as necessary following completion of the project. Detailed descriptions of the field task activities are provided in the statement of work (SOW), QAP for Non-Dry Dock

Stormwater Monitoring Conducted under the NPDES by the Shipyard (Taylor Associates Inc. 2009), and the FSP. The FSP amends the QAP with changes to logistics and site information for all seven stations selected for monitoring in the QAP and document revisions, additions, and deletions to the stormwater sampling procedures and quality assurance/quality control (QA/QC) criteria. These documents collectively serve as guidance for field and associated laboratory procedures conducted during the project. Procedures supporting the overall project objectives described in these guidance documents include:

2010 Objectives

1. Conducting up to three days worth of sites visits to gain setup and associated information regarding the seven monitoring stations listed in the QAP and FSP.
2. Preparing seven sampling locations identified in the QAP and FSP for the collection of time composited samples during a storm event.
3. Preparing an FSP to serve as an addendum to the QAP (Taylor Associates Inc. 2009) to document site locations and access logistics.
4. Collecting grab and composite water samples for three qualifying storm events at each of the seven stormwater sampling locations according to the procedures identified in the QAP and the FSP.
5. Conducting chemical analyses per the QAP and as amended in the FSP on stormwater composite samples. The sample count includes three storm events x seven sites + three field duplicates + seven equipment blanks for a total of 31 samples plus appropriate quality control samples.
6. Preparing field-sampling reports documenting the results of the sampling for each sampling location and storm event and prepare an annual report summarizing the results of chemical analysis and documenting progress and provide the status of non-dry dock stormwater monitoring at the Shipyard relative to the working draft NPDES permit (USEPA 2008a).
7. Attending at least two meetings with stakeholders and/or resource agencies and provide integration with the ENVVEST stakeholder working group. The integration will include compiling the new stormwater data with the database of stormwater concentrations from previous ENVVEST studies.

2011 Objectives

1. Update 2010 sampling plan and quality assurance project plan with new site specific information pertaining to the six Phase II sampling locations, as well as sediment sampling methodology and analysis information.
2. Following the procedures identified in the Non Dry Dock Stormwater Project Work Plan (Taylor/TEC and PNNL 2011) and addenda, collect composite stormwater samples for at least four qualifying storm flow events at each of the six Phase II stormwater sampling locations.
3. Analyze the sediment and water samples for the parameters listed in Table 3 of the 2011 statement of work.
4. Provide technical data evaluation and recommendations for improvements; a summary of the chemical analyses, descriptive statistics, and document progress relative to other regional stormwater sampling in an annual report.

Project Information and Description

PROJECT NO: PNNL 54220 Modification 3 MIPR # N4523A10MP00034

CLIENT: U.S. Navy, Puget Sound Naval Shipyard

PROJECT/SITE NAME: Non-Dry Dock Stormwater Monitoring for PSNS&IMF, Bremerton, WA

SITE LOCATION: Puget Sound Naval Shipyard, Bremerton, WA

Roles and Responsibilities

NAVY PROJECT MANAGER: Bruce Beckwith, PSNS Code 106, 360 476-9678 (new manager will be named in November 2011)

NAVY TECHNICAL COORDINATOR: Robert Johnston, SPAWAR, 360-782-0113

PNNL PROJECT MANAGER: Jill Brandenberger, 1529 West Sequim Bay Road, Sequim, WA, Office: 360-681-4564, Cell: 360-670-3241

SUBCONTRACT MANAGER AND FIELD COORDINATOR: Dave Metallo, Taylor Associates, Inc., Division of TEC Inc., 2825 Eastlake Avenue East, Suite 300, Seattle, WA 98102 Office: 206-267-1400, Cell: 206-794-0095

DATE HEALTH AND SAFETY PLAN PREPARED: 19 August 2010; revised October 2011

DATE(S) OF SITE WORK: September 2010 – June 2011; Revised to October 1, 2011 through September 30, 2012.

SITE ACCESS: The project site will be controlled by others. All sampling sites are located on the military installation of PSNS&IMF Shipyard. The Pacific Northwest National Laboratory (PNNL) and Taylor Associates, Inc. (TAI) staff will be subject to their controls and procedures. Therefore, site access will require coordination with the base Pass and ID Office to ensure all policies and procedures for access are maintained through the study period. In addition, several sites are located within the Controlled Industrial Area (CIA) of the base and will require additional access and badge protocol. All field team members will obtain unescorted access to the Shipyard and comply with all rules stated by the Shipyard.

PREVAILING WEATHER: Mild, wet in winter and dry in summer.

SITE DESCRIPTION AND HISTORY: The study area for this task is located entirely within jurisdiction of the U.S. Department of the Navy at the Shipyard. It is a portion of the Project ENVVEST Watershed-Scale Study Area and is located on Sinclair and Dyes Inlets. These Inlets are inter-connected sub-basins of the Puget Sound and have been the focus of the stormwater loading task of ENVVEST since 2005. The collection of stormwater from outfalls within the Shipyard will support the continual development of an empirical stormwater loading model and refine the calculations on the estimated mass of contaminants entering these Inlets during storm events. In addition, the study will support the draft NPDES permit for the Shipyard.

Description of Tasks

This project documents the technical strategy, procedures, and performs the first year of data collection needed for monitoring stormwater basins within the Shipyard to support development of a NPDES permit for non-dry dock stormwater sampling. To address anticipated future permit monitoring requirements, non-dry dock stormwater monitoring will be conducted at seven select outfalls located within the Shipyard. Specific field tasks to be performed by the PNNL and the sub-contractor of TAI include the following:

Task 1: Conduct site surveys to determine the locations and logistics required for citing of the seven monitoring stations. Proposed locations were documented in the QAP (Taylor Associates Inc. 2009). Surveys will be conducted by PNNL, TAI, and Shipyard Code 106 stormwater management personnel to ensure locations and logistical requirements will not interfere with current Shipyard practices. The anticipated seven sampling locations have been approved by the Shipyard. The approved final sampling locations will be detailed in the FSP.
2011 Update to six new sampling locations (Figure 1 green).

Task 2: Equipment necessary for the collection of time-paced sample collection will be deployed at each site in cooperation with the Naval Facility Engineering Command (NAVFAC) Public Works Department located at the Shipyard. The field equipment tasks will include mobilization-demobilization of all field equipment unless the Shipyard requests permanent monitoring installations. These tasks will also include routine and non-routine maintenance of the equipment while installed at each sampling location.

Task 3: Three qualifying storm events will be sampled at each of the seven storm water monitoring locations (see Table 1 and 2 of the SOW). For logistical purposes, the stations will be divided into two groups and equipment will be moved from Group 1 locations to Group 2 locations after three qualifying storms are sampled or at the discretion of the Shipyard.
2011 Update to collect four storms at each of the six locations.

A health and safety hazards analysis has been performed for each task and is incorporated in this plan through task-specific hazard controls and requirements for monitoring and protection. This project does not involve tasks regulated by the Occupational Safety and Health Administration (OSHA) under 29 Code of Federal Regulations (CFR) 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER).

Field Locations

Figure 1. a) The location of Puget Sound Naval Shipyard & Intermediate Maintenance Facility (Shipyard) within Sinclair and Dyes Inlets in the central Puget Sound. b) 2010 seven sampling locations in red and 2011 sampling locations in green.

Personnel and Contact Information

The field team will have a single point of contact serving as the FC (Dave Metallo or delegate) and will report to the PNNL Project Manager (PM Jill Brandenberger or delegate) prior to commencement of field work and after the completion of each day's field sampling.

Field Team Members from Navy, PNNL, and TEC *(October 2011 Updated List)*

Navy	
Bruce Beckwith, Navy Project Manager Puget Sound Naval Shipyard & IMF c/106.32 Water, Special Projects Supv. (acting) Office: 360 476-9678 Email: bruce.beckwith@navy.mil	Dr. Robert K. Johnston, Technical Coordinator Marine Environmental Support Office – NW Space and Naval Warfare Systems Center, c/o Code 106.32, Puget Sound Naval Shipyard Office: 360-782-0113, Cell: 360-961-9072 Email: johnston@spawar.navy.mil
Jacquelyn Young, Navy NPDES Program Manager Office: (360) 476-4738 Email: jacquelyn.young@navy.mil	Christina Gebhart, Navy Stormwater Program Support C/106.32 Office: 360-476-9676 christine.gebhart@navy.mil
Chelsea Grace, Navy Pollution Prevention Office: (360) 476-2630, Pager: 360-476-5295 Email: chelsea.grace@navy.mil	Eric Mollerstuen, Navy NEPA Office: 360-476-4594, Cell: 360-440-3524 Pager: 360-476-8550 Email: eric.mollerstuen@navy.mil
Duy Pham, Navy Water, Sanitary Sewer Office: 360-476-0122, Cell: 360-781-1284 Pager: 360-476-8550 Email: duy.t.pham@navy.mil	C106.32 Branch – Stormwater Cell Phone 360-340-5279; **PSNS Emergency 911 (ONLY on Shipyard phone) (360) 476-3333**
PNNL	
Jill M Brandenberger, PNNL Project Manager Office: 360-681-4564, Cell: 360-670-3241 Email: Jill.Brandenberger@pnnl.gov	Li-Jung Kuo, PNNL Office: 360-681-4589, Cell: 979-739-3025 Email: Li-Jung.Kuo@pnnl.gov
Taylor/TEC	
Dave Metallo, TEC/TAI Project, Field Manager and Lead Storm Controller Office: (206) 267-1400 x8210, Cell: (206) 794-0095 DCMetallo@tecinc.com	Brian Rupert, TEC/Taylor Field / Task Manager Office (206) 267-1400 x8213 Cell (360) 620-7254 BWRupert@tecinc.com
Curtis Nickerson, TEC/Taylor Senior Technical Advisor Office (206) 267-1400 x8235 Cell (206) 755-9956 CMNickerson@tecinc.com	Carla Milesi TEC/Taylor Alt. Storm Controller Office (206) 267-1400 x8219 Cell (206) 579-7163 CBMilesi@tecinc.com
Bryan Berkompas, TEC/Taylor Telemetry Systems, Alt. Storm Controller Office (206) 267-1400 x8217 Cell (206) 718-7446 BEBerkompas@tecinc.com	

Safety Plan and Hazard Mitigation

The field team will be working together collecting non-dry dock stormwater from seven outfalls located within the Puget Sound Naval Shipyard, Bremerton, WA (Shipyard). All field crew members have a basic understanding of first aid and are cognizant of the hazards involved with field work. This section identifies hazards associated with the project and provides safe work practices and control measures used to reduce or eliminate these known and potential hazards. These practices and controls are to be implemented by the PNNL field team members and their subcontractor, Taylor Associate, Inc. They must maintain awareness of the hazards affecting them regardless of who is responsible for controlling the hazards (e.g. Shipyard activities).

Date: August 19, 2010	**Author: Jill Brandenberger (360-681-4564)**
Project #: 54220	**Project Title**: Non-Dry Dock Stormwater Monitoring for PSNS&IMF, Bremerton, WA

Detailed description of activities provided above.

1. Shipyard Operations: Working within the Puget Sound Naval Shipyard (PSNS) is cognizant of all activities and regulations required by those with access to the PSNS.
2. Traffic (Driving): Staff will drive between their respective locations (e.g., Seattle for TAI and Sequim for PNNL) to Bremerton, WA and driving within the PSNS boundaries. In addition, sites may be located in high traffic areas.
3. Heavy and awkward equipment: Staff may have to carry heavy equipment to and from the site.
4. Fatigue/Physical Stress: The field work will involve long hours collecting stormwater, which can be physically challenging.
5. Environmental Extremes (Exposure to the Elements): Exposure to the elements (heat, cold, rain) is a concern. Freezing conditions may occur during periods of field work.
6. Confined Space: Select field team members may need to access manholes, which are confined space hazards.

Work Location: Puget Sound Naval Shipyard, Bremerton, WA

ES&H Hazards:			
☐ Chemical	■ Electrical hazards	■ Traffic	■ Fatigue/physical stress
■ Biological	■ Powered equipment	☐ Off-road vehicles	☐ Hazardous flora/fauna
☐ Radiological	■ Manual lifting	☐ Boats/water hazards	■ Hazardous activities nearby (vehicles)
☐ NIR: Lasers/RF/ magnetic field	☐ Working alone	☐ U/W diving	■ Other dangerous environment
☐ Waste generation/ treatment/disposal	■ Work at heights	☐ Aviation	
	☐ Foreign travel	■ Environmental/ temp. extremes	
	■ Industrial site		

■ Other ES&H risks: Confined Space Entry

Risk Analysis: The level of risk is higher than normal, but can be mitigated to acceptable levels. All Supervisory or Lead field team members have extensive experience with this type of field work and will read this field plan and attend a documented kick-off field briefing at which safety precautions will be described and questions will be answered. Primary personal protective equipment (other than the confined space specific equipment, see below for details) for this field work consists of rain gear, work gloves, and warm clothes. Staff will always work at minimum in teams of two and be aware of weather. Staff will maintain awareness of themselves and others to avoid contact while hand tools or powered equipment are in use. Staff will monitor themselves and each other for signs of and take appropriate steps to ensure thermal regulation of the body through the use of layers of clothing and raingear. Sub-contractors will follow WAC 296-155 Part C-1 for fall protection http://www.lni.wa.gov/wisha/rules/construction/HTML/296-155c1.htm

Hazard Mitigation - Each activity lists specific hazards and mitigation methods

Activity	Hazard(s)	Hazard Control/Mitigation
Work within CIA at Shipyard	Noise	Given that some of the sites are located within the CIA, where heavy machinery is often in operation; ear plugs will be available for use. In the event that any of the site tasks occur within the vicinity of any noise producing operations, ear plugs will be used. There are three general classes of noise that are typically associated with construction activities: continuous noise, intermittent noise, and impact-type noise. Continuous noise is heard when a truck or saw is running; intermittent noise occurs when compressors or other equipment are in use; and an impact-type noise is produced by equipment such as percussion hammers and driving tools. Noise varies in intensity and is measured in decibels (dB). Prolonged exposure to noise above 85 dB from heavy equipment can cause hearing loss characterized by the inability to hear certain sounds. Ear plugs will be issued and must be worn when personnel are required to work NEAR saws, impact tools, and/or heavy machinery. As a general rule, ear plugs will be worn when it is difficult to hold a conversation at standard volume at a distance of 3 feet. Ear protection shall comply with OSHA 29 CFR 1910.95.
Work within CIA at Shipyard	Flying Debris/Objects	All personnel shall don American National Standards Institute (ANSI) compliant hardhats and safety glasses to protect the head and eyes from potential airborne debris/objects during work within the CIA, as required by the U.S. Navy.
Site setup and sampling	Electrical Hazards	During the site setup phase, a 110-volt generator will be used to power certain power tools. Additionally, during the storm sampling activities the auto-samplers will be powered by a 12-volt battery. The following precautions shall be observed when operating the generator and the samplers: • Only properly trained and qualified personnel will be permitted to work on unprotected energized electrical systems. • Workers shall not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lock-out/tag-out testing procedures are implemented. • Workers shall inspect electrical equipment, power tools, and extension cords for damage prior to use. Defective electrical equipment will not be used and will immediately be removed from service. • All temporary wiring, including extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed. • Extension cords must be: ➢ equipped with third-wire grounding; ➢ covered, elevated, or protected from damage when passing through work areas; ➢ protected from pinching if routed through doorways; ➢ not fastened with staples, hung from nails, or suspended with wire. • Electrical power tools and equipment must be effectively grounded or double-insulated and Underwriters Laboratory (UL) approved. • Workers shall operate and maintain electric power tools and equipment according to manufacturers' instructions. • Maintain safe clearance distances between overhead power lines and any

Hazard Mitigation - Each activity lists specific hazards and mitigation methods		
Activity	**Hazard(s)**	**Hazard Control/Mitigation**
		electrical conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus 1-inch for every 1 kV over 50 kV. • Temporary lights shall not be suspended by their electric cord unless designed for suspension. Lights shall be protected from accidental contact or breakage. • Protect all electrical equipment, tools, switches, and outlets from environmental elements.
Site setup and sampling	Slip, Trip, and Fall Hazards	Falls as a result of slipping or tripping are generally the most common form of injury on project sites. These injuries typically are a result of poor housekeeping, lack of attention to detail, or simple carelessness. Personnel shall take precautions when working in areas where slip, trip, and fall hazards exist by watching their footing and being aware of their surroundings at all times. Work areas shall be kept clear of trash, debris, and hand tools that are not in use in the immediate work area. Such hazards shall be marked as necessary with a traffic cone, CAUTION tape, or similar warning to avoid slips, trips, and falls.
Heavy Lifting	Back Injury	The field team will plan the storage and staging of equipment and materials to minimize lifting and carrying distances. They should use their best personal judgment in determining loads that they can safely lift. In general, individuals should not attempt to lift loads of 50 pounds or more without the assistance or appropriate lifting equipment. When possible, loads should be lifted with two hands, without rotation of the trunk, using the leg muscles (not back muscles) for elevation. Loads should also be lifted so that the center of mass is stable during the initiation and throughout the duration of the lift. Floor or ground surfaces should be in good condition (i.e., clear of obstacles, level, dry). During times of heavy or prolonged lifting, personnel and supervisors should increase rest duration and frequency as necessary to reduce injury potential. Ambient temperature should also be considered if lifting requires repetitive motion. The Applications Manual For The Revised Lifting Equation (National Institute for Occupational Safety and Health [NIOSH]), contains more detailed information regarding repetitive lifting and required recovery periods. If frequent repetitive lifting is anticipated, it is recommended that the referenced NIOSH manual be consulted to estimate the hazard to workers in order to reduce potential injuries. The following recommendations should be considered when lifting or preparing to lift a heavy load: • Split heavy loads into smaller loads, and reduce the size of individual loads. • Bring the load close to the body. • Remove any horizontal barriers. • Avoid lifts near the floor or ground surface. • If loads near the floor or ground surface cannot be avoided, the load should fit easily between the legs. • Raise/lower the origin/destination of the lift. • Reduce trunk rotation by rotating the feet. • Reduce the lifting frequency and duration.

Hazard Mitigation - Each activity lists specific hazards and mitigation methods		
Activity	**Hazard(s)**	**Hazard Control/Mitigation**
		• Provide longer recovery periods. • Provide new containers with adequate handles. • Eliminate the need for lifting by redesigning or modifying the container characteristics. • Use mechanical lifting aids whenever possible. • Have someone assist with the lift, especially for heavy or awkward loads. • Make sure the path of travel is clear prior to the lift.
Sample Collection	Visible Lighting	Storm event sampling may occur before dawn or after dusk, particularly in the winter when hours of daylight are reduced. Sufficient lighting (i.e., enough to read field documents, labels, placards, and warning signs) will be provided for periods of low light by vehicle headlights and/or personal head lamps.
Outfall sample collection	Elevated Work Areas / Falls	Storm event samples will be collected from storm water outfalls located down manholes, which constitute a fall hazard while open. All manholes will be constantly attended by a field team member or protected by standard railings while the cover is off of the opening.
Driving	Mechanical or Electrical Breakdown	Be sure field manager and project manager are informed of all trips and field activities before driving to the site. Perform operator check before driving (to include; brakes, tires, horn, lights, wipers, defrost, turn signals, mirrors, etc.). Correct any items that are not operating properly.
Driving	Auto Accident	• Drivers must have valid drivers' license • Inspect vehicle prior to departures • Drive defensively • Obey all posted speed limit and directional signs • Obey Oregon/Washington Vehicle Operating Rules and Regulations • Smoking is not allowed in Government vehicles • Walk around vehicle or use ground guide when backing in unfamiliar surroundings • Do not drive if tired • No cell phone use while driving • Reduce speed to accommodate road and traffic conditions. • All vehicles entering the Shipyard must have proper identification issued by the U.S. Navy.
Site setup and sample collection	Vehicle Traffic	Several sampling sites are located in the vicinity of active roads and Shipyard activities that are considered to be areas where vehicular traffic could pose a potential hazard. Some of the sampling sites are located in roadways. The field team manager will work with the Shipyard Public Works to ensure the areas are properly marked. Orange Department of Transportation (DOT) approved traffic cones, barriers, and signage will be placed around the perimeter of the working area in order to direct traffic around the work area as required. All personnel shall don orange safety vests to increase visibility to passing traffic when working in these areas. Personnel shall also use caution and be aware of their surroundings at all times.
Site setup and use of	Physical Injury	In order to prepare at some of the storm flow sampling sites, enclosures must be built and/or customized to house the samplers. This construction will

Hazard Mitigation - Each activity lists specific hazards and mitigation methods		
Activity	**Hazard(s)**	**Hazard Control/Mitigation**
power tools		involve the use of various powered hand tools. During the use of hand tools personnel will wear appropriate work wear, ANSI compliant hard hat and safety goggles. Safe work practices will be used when hand tools are in operation.
Site setup and sample collection	Spider Bite	Spiders are common inhabitants of storm water manholes. The only spiders common in Washington that pose any threat to humans are the black widow spiders and the funnel web spiders. Black widow spiders are not common in Bremerton, WA. The adult female, which is the most dangerous, is usually identified by the famous reddish hourglass-shaped marking on the underside. Generally speaking, these are shy, retiring spiders which bite only reluctantly. Females may be more aggressive when protecting an egg sac. They may be found in areas such as woodpiles, dry crawl spaces, abandoned buildings, rock piles, or bales of hay. When working in such areas or other similar habitats, it is wise to look where you place your hands and to wear gloves and a long-sleeved shirt. Bites should be treated by a physician. The other dangerous spider is the aggressive house spider, one of the funnel web spiders, which have become established across most of the Pacific Northwest. These spiders make a sheet web with a funnel-tube at one end, usually in damp protected spaces such as corners of basements. They wait inside the tube and dash out to bite any prey that becomes entangled in the web. These are large spiders, ranging up to 1-3/4 inches in diameter. They prowl basement or ground floor living spaces at night and may bite intruders with little provocation. If bitten by a spider, wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction or infection; seek medical attention if a reaction or infection develops.
Site setup and sample collection	Heat or Cold Stress	• Be aware of your own and our co-workers' physical/emotional state, especially in hot or cold conditions. • Know symptoms of thermal stress. If hypothermia is suspected, warm subject up. Recommendations for preventing hypothermia: Wear several layers of loose clothing. Layering provides better insulation and tight clothing reduces blood circulation. Warm blood needs to be circulated to the extremities. When choosing clothing, be aware that some clothing may restrict movement resulting in a hazardous situation. Make sure to protect the ears, face, hands and feet in extremely cold weather. Wear a hat: it will keep your whole body warmer because hats reduce the amount of body heat that escapes from your head). Move into warm locations during work breaks; limit the amount of time spent outside on extremely cold days. Carry cold weather gear, such as extra socks, gloves, hats, jackets, blankets, and a change of clothes in a dry bag. Also bring along a thermos of hot liquid. Include a thermometer in the first aid kit. Avoid touching cold metal surfaces with bare skin. Monitor your own and your co-workers' physical condition. • During warm months if heat stroke becomes an issue remove subject from sun and provide plenty of water for hydration. • Discuss questionable situations with supervisor and/or co-workers.

Hazard Mitigation - Each activity lists specific hazards and mitigation methods		
Activity	**Hazard(s)**	**Hazard Control/Mitigation**
Site Setup	Confined Space Entry	• Remove yourself or others from hazardous areas as appropriate. See following section for entry requirements.

Confined Space Entry

Confined space is defined as a space that is large enough and configured such that an employee can enter and perform assigned work, and:

- has limited or restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, pipes, and pits are spaces that may have limited means of entry); and
- is not designed for continuous occupancy.

A confined space is considered dangerous for the following reasons:

- Existing ventilation may be insufficient to prevent the accumulation of toxic or volatile gases and vapors that may create an oxygen deficiency or a poisonous or explosive atmosphere. High temperatures and humidity may aggravate conditions.
- Access or egress in case of emergency (e.g., injured or suddenly disabled employee) may be difficult due to the location and/or size of the opening(s).

Field team members consisting of employees from TAI will be operating under their Confined Space Entry Program revision date 04/08/2008 (Appendix A). This confined space entry (CSE) program:

- Identifies all permit-required confined spaces in TAI workplaces and
- Describes TAI procedures for worker safety and health in permit-required confined spaces.

The TAI Confined Space Entry (CSE) program requires the following:

1. Complete 4 hours of OSHA compliant Confined Space Entry Training upon employment and prior to CSE (renewed every 3 years as a matter of company policy and continued safety training).
2. Participate in monthly Safety Refresher coursework or project updates as either is applicable.
3. Review Taylor Associates Confined Space Safety Program Plan upon employment and at a minimum biannually thereafter.
4. Commit to minimizing safety and health hazards by adhering to this CSE program plan.

In addition, Taylor Associates, Inc. will treat all confined spaces as permit-required spaces until they have been evaluated and are documented to be non-permit.

Pre-emergency Planning

This section details the roles and responsibilities for following pre-emergency planning activities.

- The FC performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with the PNNL PM, Navy PM, facility, and Shipyard emergency-service providers as appropriate.
- Review the facility emergency and contingency plans where applicable. The Shipyard maintains a fire department and emergency response unit, but they are not responsible for responding to contractor emergencies. In the event of an emergency, dial 911 and notify the Shipyard that the responding unit will need access to the Shipyard and be able to direct the responders to the accident site.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel. All emergency information for this project, including directions to the nearest hospitals in the project area is included below.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, first aid supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Brief new workers on the emergency response plan.
- The FC will evaluate emergency response actions and initiate appropriate follow-up actions.
- Conduct daily H&S Tailgate Briefing with all field personnel. Discuss updates to EHS, review emergency procedures and contact information, and other pertinent issues.
- All field team members will have quick, reliable access to cell phones.

Emergency Medical Treatment

The procedures listed below may also be applied to non-emergency incidents. Injuries and illnesses must be reported to PNNL PM Jill Brandenberger at 360-670-3241 (mobile). The PM or delegate will then contact the PNNL Single Point of Contact at 509-375-2400. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the PNNL PM. Follow these general procedures as appropriate:

1. Minor and non-life threatening emergencies will be treated at Harrison Memorial Hospital in Bremerton, WA (Figure 2).
2. Dial 911 for ALL life threatening (or if you are unsure) emergencies. Do not transport the victim!
3. Notify the Shipyard Emergency Point of Contact at **360-476-3333.** They will need to coordinate access and an escort for the responder.
4. The SSC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.

5. The SSC will contact PNNL PM 360-670-3241 and PNNL PM will report the accident to the PNNL Single Point of Contact at 509-375-2400.
6. The SSC will prevent further injury, initiate first aid, and/or CPR where feasible.
7. Get medical attention immediately.
8. Make certain that the injured person is accompanied to the hospital emergency room.
9. When contacting the medical consultant, state that the situation is a PNNL matter and you are located within the Puget Sound Naval Shipyard. The Shipyard will provide an escort and coordinate access for the responding unit. Give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.

Contact Information

Name	**Phone Number**
For all EMERGENCIES provide your location as Puget Sound Naval Shipyard, Bremerton, WA	**911 (from Shipyard phone)** **Otherwise: 360-476-3333**
PSNS Emergency Line (call after 911)	**360-476-3333**
TAI SSC	206-794-0095
PNNL PM	360-670-3241
PNNL Single Point of Contact	509-375-2400
PSNS Single Point of Contact	360-476-3333
PSNS Watch Office (advise for sampling)	360-476-7617 (day) 360-476-7601 (off hours) 360-476-3393 (base police)
Bremerton Police (non-emergency)	360-473-5220
PSNS Base Emergency Information	1-866-291-1160 for the latest status.

Maps

The Shipyard maintains a site specific fire department and emergency medical response team and may provide assistance to the contractor during an emergency. However, the Shipyard response units are specifically for their work activities and city/country response units should be contacted in case of emergency. The closest hospital is the Harrison Medical Center, Bremerton, WA. Figure 2 provides a map with point A representing the exit from the Shipyard and Point 2 the Harrison Medical Center. The driving directions from the Shipyard to the hospital are as follows (approximately 10 minutes):

Puget Sound Naval Shipyard 1400 Farragut Avenue Bremerton, WA 98314-6001

1. Head southwest on Farragut Ave 472 ft
2. Take the 1st left to stay on Farragut Ave 0.1 mi
3. Turn left at Barclay St/West St Continue to follow Barclay St 0.4 mi
4. Take the 3rd left to stay on Barclay St 217 ft
5. Turn right at Mahan Ave 0.2 mi
6. Take the 1st left onto Naval Ave 0.1 mi

7. Turn right at Burwell St 0.6 mi
8. Turn left at Warren Ave 1.1 mi
9. Continue onto Warren Ave Bridge 0.5 mi
10. Turn right at Sheridan Rd 0.2 mi
11. Take the 2nd right onto Cherry Ave Destination will be on the left 0.4 mi

Harrison Medical Center 2520 Cherry Avenue Bremerton, WA 98310

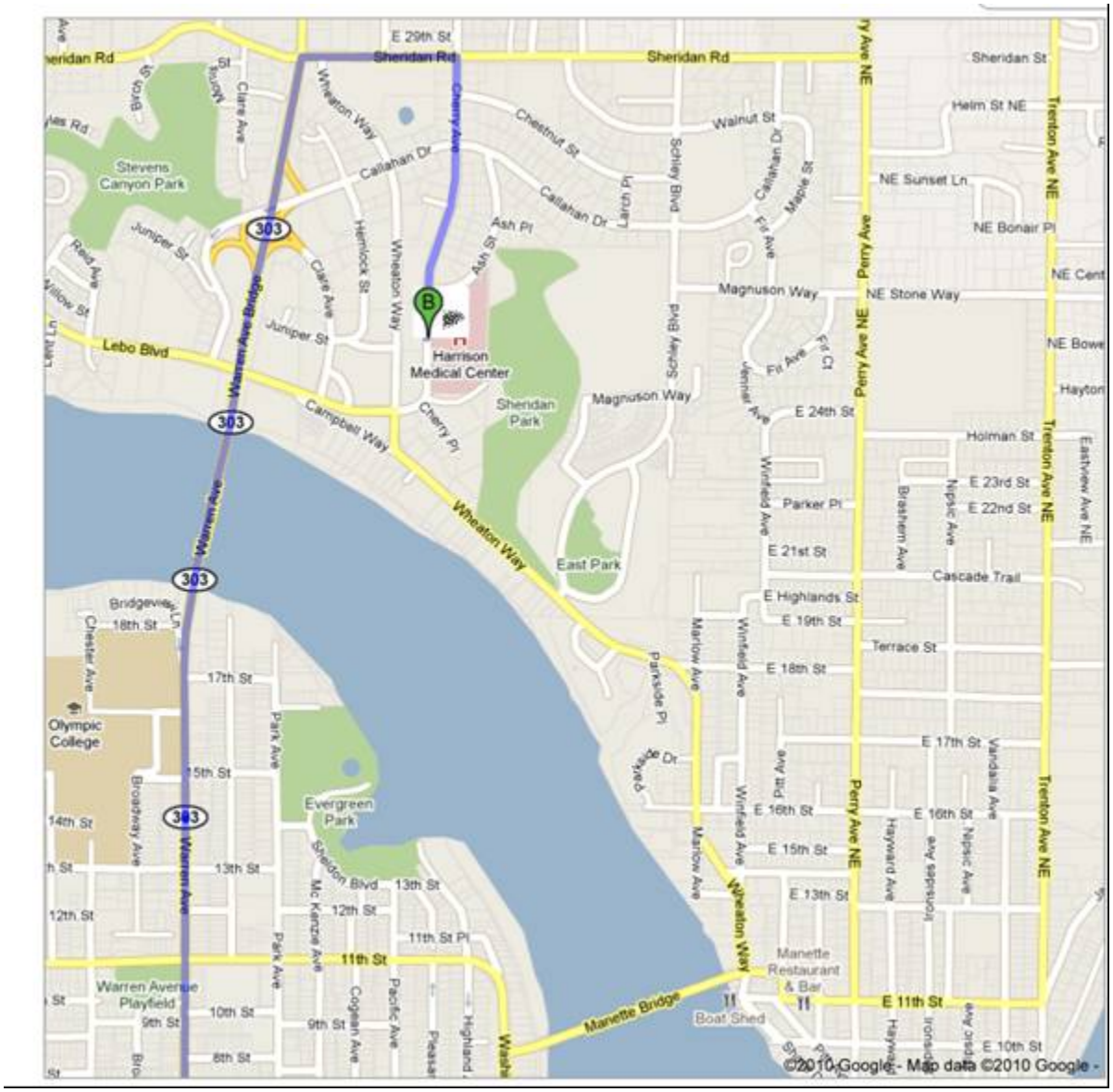

Figure 2. A map of East Bremerton showing the route from Naval Station Bremerton to Harrison Medical Center.

References

Brandenberger J. M., E.A. Crecelius, and R. K. Johnston 2008. Contaminant Mass Balance for Sinclair and Dyes Inlets, Puget Sound, Washington. Prepared for the Puget Sound Naval Shipyard and Intermediate Maintenance Facility Project ENVVEST Bremerton, Washington under Contract DE-AC06-76RLO 1830, Pacific Northwest National Laboratory, Richland, Washington.

Taylor Associates Inc. 2009. Quality Assurance Plan for Non-Dry Dock Stormwater Monitoring Conducted Under the National Pollutant Discharge Elimination System by Puget Sound Naval Shipyard & Intermediate Maintenance Facility. Contract W912DW-06-D-1007, USACE Delivery Order 023, December 2009. Report and Supporting Information http://www.mesodat.org/ENVVEST/Reports/TaylorAssoc_2009_Report/TaylorAssoc_2009_Report.html

US EPA 2008a. Draft Working NPDES Permit for the Puget Sound Naval Shipyard, US EPA Region X, 6 May 2008.

US EPA 2008b. Draft Working NPDES Fact Sheet for Puget Sound Naval Shipyard, US EPA Region X, 6 May 2008.

Signature Sheet

I have read the Hazard Analysis and Safety Plan presented herein and fully understand the material covered. I understand that I am responsible for compliance with the requirements of this HASP and I agree to abide by the same. I also had the opportunity to discuss the information presented in the HASP, and to ask any questions about the information that I want clarified. I understand that this record will become a permanent part of my employee health and safety training file.

Date	Print Name	Signature

Signature Sheet (continued)

I have read the Hazard Analysis and Safety Plan presented herein and fully understand the material covered. I understand that I am responsible for compliance with the requirements of this HASP and I agree to abide by the same. I also had the opportunity to discuss the information presented in the HASP, and to ask any questions about the information that I want clarified. I understand that this record will become a permanent part of my employee health and safety training file.

Date	Print Name	Signature

Appendix A: Taylor Associates, Inc. Confined Space Entry Program

TAYLOR ASSOCIATES, INC.

revised 04/08/2008

CONFINED SPACE ENTRY PROGRAM

Overview

This confined space entry (CSE) program:

- Identifies all permit-required confined spaces in our workplace **and**
- Describes our procedures for worker safety and health in permit-required confined spaces

Employees will participate in developing and implementing the program in the following ways:

- Complete 4 hours of OSHA compliant Confined Space Entry Training upon employment and prior to CSE (renewed every 3 years as a matter of company policy and continued safety training).
- Participate in monthly Safety Refresher coursework or project updates as either is applicable.
- Review Taylor Associates Confined Space Safety Program Plan upon employment and at a minimum biannually thereafter.
- Commit to minimizing safety and health hazards by adhering to this CSE program plan.

Taylor Associates, Inc. will treat all confined spaces as permit-required spaces until they have been evaluated **and** are documented to be nonpermit.

ROLES & RESPONSIBILITIES

The following shows which employees are responsible for the tasks outlined:

Each Confined Space Entry is treated as a separate event. All employees that will be involved either as a Supervisor, Attendant or Entrant for a CSE must have OHSA approved CSE training. CSE teams will work together to identify hazardous conditions and maintain the health and safety of all parties present for CSE.

Responsibility:	**Person assigned this responsibility:**
Evaluate our work locations and determine: • Confined space(s) exist at the worksite. • Permit-required confined space(s) exist at the worksite.	Supervisor, Attendant, and Entrant
Evaluate the confined space(s) to determine whether hazards are present.	Supervisor, Attendant, and Entrant
Evaluate hazards and determine the appropriate entry procedure for the space. **Note:** • Until evaluated and documented otherwise, all confined spaces will be considered permit-required spaces. • Alternate entry procedure may apply when the only hazard remaining in the space is a potential hazardous atmosphere controlled by the use of forced air ventilation.	Supervisor, Attendant, and Entrant
Re-evaluate the space when the use, configuration, or hazards of a confined space change.	Supervisor, Attendant, and Entrant will continually reevaluate space, and note observations on permit documentation for changes in condition.
Monitoring and testing as follows: • Conduct initial monitoring to identify and evaluate any potentially hazardous atmospheres • Complete atmospheric testing in the following order: – Oxygen – Combustible gases – Toxic gases and vapors • Record the data **Confined Space Safety Folder** • Keep up-to-date maintenance log for gas meter calibration: store records at Greenwood Office in **Confined Space Safety Folder**	Supervisor, Attendant, and Entrant
Inform exposed or potentially-exposed employees	Supervisor

of the existence and hazards of confined spaces using the methods described below under "Control Confined Space Entry."	
Provide employees entering confined spaces, or their designated representative, an opportunity to observe pre-entry testing and any subsequent testing. - All test results will be provided to the entrants or their representatives upon request. - The space will be re-evaluated if entrants or their representatives believe that the permit space was inadequately tested.	Supervisor
Make sure that all equipment needed for safe entry into any confined space is available and in proper working order.	Supervisor, Attendant, and Entrant (all field staff should be aware of equipment condition prior to entry.)
Conduct a review using the canceled entry permits to identify and correct any deficiencies in our program.	Suzanne Osborne (company safety officer - SO) or specific project manager with routine reports to the company SO.

IDENTIFY CONFINED SPACES AND HAZARDS

Taylor Associates, Inc accesses confined spaces primarily for installation, maintenance, and demobilization of flow monitoring and autosampling equipment. Clients and their monitoring projects/programs that dictate frequent CSE are identified below.

Port of Seattle

- Comprehensive Stormwater Monitoring Program,
- National Pollution Discharge Elimination System
- SE Pond Treatment Facility
- Shilshole Bay Catch Basin Monitoring
- Seaport Phase I

Seattle Public Utilities

- Madison Valley- CSO Monitoring

- Venema Creek

Port of Tacoma

- Phase I Monitoring

City of Bellevue

- Bellevue Source Control

City of Bainbridge Island

- CoBI Water Quality and Flow Monitoring Program

City of Black Diamond

- Black Diamond I/I Monitoring

Puget Sound Naval Shipyard

- Non-dry dock stormwater monitoring

Confined Spaces and Hazards

CONTROL OF CONFINED SPACE ENTRY

The majority of confined spaces accessed for flow monitoring projects/programs are located on public property and secured from unauthorized access by manhole covers often secured with ½-inch allen bolts.

We use the following method(s) to inform employees and outside parties about the existence and hazards of confined spaces, and prevent unauthorized entry:

- Posting barriers and cones to prevent accidental entry.
- Maintain Supervisor position and awareness to prevent unauthorized entry.

PERMIT ENTRY PROCEDURES

Our entry procedures for permit spaces include the following:

Procedure 001: Job Hazard Analysis
Procedure 002: Traffic Control
Procedure 003: Atmospheric Monitoring
Procedure 004: Lockout/Tagout
Procedure 005: Field Day p.m. Checkout

We will do all of the following when entering CSE:

- Eliminate unsafe conditions before removing entrance covers.

- After removing entrance covers, promptly guard the opening with a railing, temporary cover, or other temporary barrier to prevent accidental falls through the opening and protect entrants from objects falling into the space.

- Certify that pre-entry measures have been taken (such as safe removal of the cover and having protection needed to gather pre-entry data), with the date, location of the space, and signature of the person certifying.

- Make the pre-entry certification available to each entrant before entry.

- Before an employee enters the confined space, test the internal atmosphere with a calibrated, direct-reading instrument for all of the following, in this order:
  1. Oxygen content
  2. Flammable gases and vapors
  3. Potential toxic air contaminants.
- Provide entrants, or their authorized representatives, with an opportunity to observe the pre-entry and periodic testing.

  - Make sure the atmosphere within the space is not hazardous when entrants are present.
- Use continuous forced air ventilation, as follows:

  - Wait until the forced air ventilation has removed any hazardous atmosphere before allowing entrants into the space.

  - Direct forced air ventilation toward the immediate areas where employees are, or will be, and continue ventilation until all employees have left the space.

  - Provide the air supply from a clean source and make sure it does not increase hazards in the space.
- Test the atmosphere within the space as needed to make sure hazards do not accumulate.
- If a hazardous atmosphere is detected during entry, we will do all of the following:
  - Evacuate employees from the space immediately.
  - Evaluate the space to determine how the hazardous atmosphere developed.
  - Implement measures to protect employees from the hazardous atmosphere before continuing the entry operation.
  - Verify the space is safe for entry before continuing the entry operation.

- The written documentation is available to each employee entering the space or to that employee's representative at the confined space bulletin board.

CLASSIFY A CONFINED SPACE AS A NONPERMIT SPACE

- A space will be classified nonpermit only for as long as all the hazards remain eliminated.

- If someone must enter the space to eliminate of any of the hazards, we will follow all the requirements listed under the permit entry procedures.

- Documentation that no permit-required confined space hazards exist will include the following:

  - The date, location, and signature of the person making the determination.
  - How we determined that no permit-required confined space hazards exist.
  - Documentation will be available to entrants or their authorized representatives through oral communication.

AT THIS POINT IN TIME, ALL CONFINED SPACES ACCESSED BY TAYLOR ASSOCIATES, INC. ARE DEFINED AS PERMIT REQUIRED (If in the future non-permit spaces are identified the following table and form will be utilized.)

The following spaces can be classified as non-permit spaces by following the listed methods of hazard elimination:

Date	***Location of Confined Space***	***Hazards***	**Method of Hazard Elimination**
(Input your specific information)			

NON-PERMIT SPACE DOCUMENTATION FORM

Non-permit confined space name or number	*(Insert your specific information here)*
Location	
Documentation	
Date	
Signature	

TRAINING

- We will provide permit space training to employees at the following times:

    - When hired, so new employees are aware of our confined spaces
    - Before they are assigned permit space entry duties
    - When their assigned duties change
      and
    - When there is a change in a space that creates hazards for which they have not been trained.

Rescue and Emergency Services

We have developed the following rescue and emergency action plan:

ENTRY RESCUE PLANS

The Entry Rescue Plan for Taylor Associates, Inc is listed below:

The following information should be included in the field notebook for all projects that include CSE in their Job Hazard Analysis:

Name of rescue service: _____

Telephone number: _____

Location: _____

Approximate response time: _____

Name of emergency medical service: _____

Telephone number: _____

Location: _____

Approximate response time: _____

EMERGENCY ENTRY RESCU FOR CONFINED SPACES:

1) CONTACT all emergency numbers required.
2) CONTACT senior project manager.
3) CONTACT Bill Taylor.
4) COMPLETE AN INCIDENT REPORT AND SUBMIT TO YOUR SAFETY OFFICER!

PERMIT-REQUIRED CONFINED SPACE PROGRAM REVIEW

At least every 12 months we will conduct a review using canceled entry permits to identify any deficiencies in our program. We will conduct a review immediately if there is reason to believe that the program does not adequately protect our employees, such as the following situations:

- Unauthorized entry of a permit space
- Discovery of a hazard not covered by the permit
- Detection of a condition prohibited by the permit
- An injury or near-miss during entry
- Change in the use or configuration of the space

or

- Employee complaints of permit space program ineffectiveness.

Corrective measures will be documented by revising the program. Employees will participate in revising the program, and will be trained on any changes.

If no permit space entry operations are conducted during the year, no review is needed.

Confined Space/Hazardous Area Entry Permit		
Job Location/Site Description:	Date:	
	Permit Expires At	
	Date:	Time:
Reason for Entry:		
Type of Entry:		
Entry Supervisor:		
Standby Person		

SPECIFIC HAZARDS THAT MAY BE ENCOUNTERED:

ATMOSPHERIC ☐ PHYSICAL ☐ OTHER (explain) ☐ _____

AUTHORIZED ENTRANTS	TIME IN	TIME OUT
1.		
2.		
3.		
Attendant:	N/A	N/A

HAZARD CONTROL:

Physical Hazard Requirements	Yes	No	Notes
Fall Protection Equipment			
Lighting (Intrinsically Safe)			
Hearing Protection			
Secure Area and Monitor			
Personal Protective Equipment			
Hard Hats			
Onsite Rescue Equipment Required	**Yes**	**No**	**Notes**
Fire Extinguisher			
Respirator / SCBA			
Communications Devices			
Retrieval Equipment			
Atmospheric Equipment Required	**Yes**	**No**	**Notes**
Gas/O_2/LEL Detector			
Blower/Ventilator			

EMERGENCY RESCUE INFORMATION: In the event of a life threatening emergency, dial 911. If the emergency occurs onsite where outside help is not readily available refer to HSP.

I certify that I have evaluated the situation and the assigned personnel and the procedures to be followed are in compliance with Taylor Associates, Inc. Confined Space Program.

Signed_____. Print Name_____.

PLEASE KEEP COMPLETED PERMIT ON FILE.

Confined Space/Hazardous Area Entry Permit, Continued

Atmospheric Requirements Continued					
Acceptable Limits for Entry					
Oxygen (O_2): 19.5 – 23.5 %					
Combustible Gas – Lower Explosion Limit (LEL): 10% Max					
Hydrogen Sulfide (H_2S) : 10 PPM Max					
Carbon Monoxide (CO): 35 PPM Max					
Other (explain):					
Time (24-hr)	**O_2**	**LEL**	**H_2S**	**CO**	**Other_____**
Pre-Entry					
Entry					

Gas Detector Information		
Unit #:	Operational	
Last Calibrated:	Batt. Check	

NOTES:

Tailgate Safety Meeting Form

Daily Health and Safety Tailgate Meeting Form	
Site Health and Safety Officer Conducting Meeting :	
Date :	**Weather:**
Personnel In Attendance :	
Meeting Minutes (Brief description of topics, special concerns and sites discussed):	
Signature of Attendees' :	
"THE BEST JOB IS ONE DONE SAFELY ! "	

Confined Space Safety Certificates

Certificate of Completion

This is to certify that

Brad D. Kwasnowski

has satisfactorily completed
4 hours of training in

Confined Space Safety

to comply with the training requirements of
WAC 296-809 and OSHA 29 CFR 1910.146.

Certificate Number 10303401

Instructor

ARGUS PACIFIC TRAINING•CONSULTING

Dec 16, 2008
Date(s) of Training

Argus Pacific, Inc. • 1900 W Nickerson • Suite 315 • Seattle, Washington • 98119 • (206) 285.3373 • fax (206) 285.3927

Certificate of Completion

This is to certify that

Dave Metallo

has satisfactorily completed
4 hours of training in

Confined Space Safety

to comply with the training requirements of
WAC 296-809 and OSHA 29 CFR 1910.146.

Certificate Number 1029779

Instructor

ARGUS PACIFIC TRAINING•CONSULTING

Jun 16, 2008
Date(s) of Training

Argus Pacific, Inc. • 1900 W Nickerson • Suite 315 • Seattle, Washington • 98119 • (206) 285.3373 • fax (206) 285.3927

Certificate of Completion

This is to certify that

Bryan Berkompas

has satisfactorily completed
4 hours of training in

Confined Space Safety

to comply with the training requirements of
WAC 296-809 and OSHA 29 CFR 1910.146.

Certificate Number 1029775

Instructor

ARGUS PACIFIC TRAINING•CONSULTING

Jun 16, 2008
Date(s) of Training

Argus Pacific, Inc. • 1900 W Nickerson • Suite 315 • Seattle, Washington • 98119 • (206) 285.3373 • fax (206) 285.3927

Certificate of Completion

This is to certify that

Carla B. Milesi

has satisfactorily completed
4 hours of training in

Confined Space Safety

to comply with the training requirements of
WAC 296-809 and OSHA 29 CFR 1910.146.

Certificate Number 1029780

Instructor

ARGUS PACIFIC TRAINING•CONSULTING

Jun 16, 2008
Date(s) of Training

Argus Pacific, Inc. • 1900 W Nickerson • Suite 315 • Seattle, Washington • 98119 • (206) 285.3373 • fax (206) 285.3927

Certificate of Completion

This is to certify that

Jon W. Berg

has satisfactorily completed
4 hours of training in

Confined Space Safety

to comply with the training requirements of
WAC 296-809 and OSHA 29 CFR 1910.146.

Certificate Number 1023231

Instructor

ARGUS PACIFIC
SAFETY • TRAINING • INDUSTRIAL HYGIENE

Aug 15, 2006
Date(s) of Training

Argus Pacific, Inc. • 1900 W Nickerson • Suite 315 • Seattle, Washington • 98119 • (206) 285.3373 • fax (206) 285.3927

1900 W. Nickerson, Suite 315
Seattle, WA 98119
(206) 285-3373

ARGUS PACIFIC
TRAINING • CONSULTING

This certifies that
Daniel D. O'Brien
has satisfactorily completed
Confined Space Entry

in compliance with the training requirements of
WAC 296-809 and OSHA 29 CFR 1910.146

Instructor

Cert. Num: 10303647
Class Date: Jan 26, 2009

APPENDIX B:
PROJECT PERSONNEL CONTACT LIST

NON-DRY DOCK STORMWATER MONITORING PROJECT
2011 / 2012
PROJECT PERSONNEL CONTACT IST

NAVY :

Lesley Doyle
Project Manager:
Puget Sound Naval Shipyard & IMF c/106.32
Water, Special Projects Supv.
Phone: 360 476-9678
Pager: 360-781-2045
Email: lesley.doyle@navy.mil

Jacquelyn Young
NPDES Program Manager
C/106.32 Environmental Engineer
Office: 360- 476-4738
Cell: 360-731-2807 (Not in CIA)
Email: jacquelyn.young@navy.mil

Dr. Robert K. Johnston
Technical Coordinator:
Marine Environmental Support Office – NW
Space and Naval Warfare Systems Center, c/o
Code 106.32
Puget Sound Naval Shipyard
Office: 360-782-0113
Cell: 360-961-9072
Email: johnston@spawar.navy.mil &
robert.k.johnston@navy.mil

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C/106.32
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christine.gebhart@navy.mil

Eric Mollerstuen
Stormwater Program Support
C/106.32
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cell: 360-440-3524
eric.mollerstuen@navy.mil

Duy Pham
Water, Sanitary Sewer
C/106.32
Office: 360-476-0122
cell: 360-781-1284
CIA cell: 206-383-9623
duy.t.pham@navy.mil

C106.32 Branch – Stormwater Cell Phone
360-340-5279

PSNS Emergency
911 (ONLY on Shipyard phone)
(360) 476-3333

Mail to all (copy and paste into message)
bruce.beckwith@navy.mil; jacquelyn.young@navy.mil; johnston@spawar.navy.mil; robert.k.johnston@navy.mil; christine.gebhart@navy.mil; eric.mollerstuen@navy.mil; duy.t.pham@navy.mil

NON-DRY DOCK STORMWATER MONITORING PROJECT
2011 / 2012
PROJECT PERSONNEL CONTACT IST
Continued

Pacific Northwest National Laboratories (PNNL):

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Cell (360) 670-3241
Jill.Brandenberger@pnnl.gov

TEC / Taylor:

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Jon Berg – Cell (206) 718-7849
Jonathan.Berg@cardnotec.com

Dan O'Brien – Cell (206) 913-8129
Daniel.O'Brien@cardnotec.com

TEC /Taylor Office Lines & Address

Main (206) 267-1400
Fax (206) 267-1401
2825 Eastlake Ave East, #300
Seattle, WA 98102

Group	Name	Affiliation	File as	Email	Phone
swTeam	Bob Johnston	MESO-NW/PSNS&IMF 106.32	Johnston, Robert K.	johnston@spawar.navy.mil; robert.k.johnston@navy.mil	360-782-0113, cell 360-961-9072
swTeam	Lesley B Doyle	PSNS & IMF 106.32	Doyle, Lesley B CIV C/1	lesley.doyle@navy.mil	(360) 476-9678
swTeam	Christine Gebhart	PSNS&IMF 106.32	Gebhart, Christine	christine.gebhart@navy.mil	360-476-9679
swTeam	Duy Pham	PSNS&IMF 106.32	Pham, Duy	duy.t.pham@navy.mil	360-476-0122, cell: 206-383-9623
swTeam	Eric Mollerstuen	PSNS&IMF 106.32	Mollerstuen, Eric	eric.mollerstuen@navy.mil	360-476-4594, cell: 360-440-3524
swTeam	Jacquelyn Young	PSNS&IMF 106.32	Young, Jacquelyn	jacquelyn.young@navy.mil	360- 476-4738, cell: 360-731-2807
swTeam	Eric Beckley	NBK	Beckley, Eric	eric.beckley@navy.mil	360-476-6067
swTeam	Mike Hardiman	NBK	Hardiman, Mike	michael.hardiman@navy.mil	425-453-6082
swTeam	Jill Brandenburger	Batelle - PNNL	Brandenberger, Jill	Jill.Brandenberger@pnnl.gov	(360) 681-4564, Cell (360) 670-3241
swTeam	Brian Rupert	TEC	Rupert, Brian	BWRupert@tecinc.com	cell (360) 620-7254
swTeam	Dave Metallo	TEC	Metallo, Dave	DCMetallo@tecinc.com	cell 206-794-0095
swInfo	David Ulrich	NAVFAC NW	Ulrich, David	david.ulrich@navy.mil	360-476-8737
swInfo	Mark Wicklein	NAVFAC NW	Wicklein, Mark A	mark.wicklein@navy.mil	360-396-0226
swInfo	Matt Jabloner	NAVFAC NW EV1	Jabloner, Matt	matt.jabloner@navy.mil	360-396-0050
swInfo	Suzanna Jefferis	NAVFAC NW EV1	Jefferis, Suzanna	suzanna.jefferis@navy.mil	360-396-0053
swInfo	Mark Kougl	NAVFAC NW OP3E3	Kougl, Mark	mark.kougl@navy.mil	360-396-0058
swInfo	Steve Rupp	PSNS & IMF 106.3	Rupp, Steve	steven.rupp@navy.mil	(360) 476-6009
swInfo	Victoria S Whitney	PSNS & IMF 106.32	Whitney, Victoria S.	victoria.whitney@navy.mil	(360) 476-4594

	johnston@spawar.navy.mil; robert.k.johnston@navy.mil; lesley.doyle@navy.mil; christine.gebhart@navy.mil; duy.t.pham@navy.mil; eric.mollerstuen@navy.mil; jacquelyn.young@navy.mil; eric.beckley@navy.mil; michael.hardiman@navy.mil; Jill.Brandenberger@pnnl.gov;
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APPENDIX C:

BASIN DESCRIPTION TABLE

PHYSICAL CHARACTERISTICS

Outfall and Basin Information				Drainage Basin Area Statistics and Outfall Positioning Information																Outfall Engineering Characteristics																	
				Basin Area Statistics									Positioning							Stormwater System Information			Piping Information (piping measured at sampling vault location)													
Outfall ID		Basin ID	Location of Drainage Basin Area w/in the BNC	Total Basin Area			Total Basin Area Impervious Surface			Basin Drainage Capacity				Outfall Coordinates						Junction Type	Junction Access ID	EMCON Junction Code	Elevation	Pipe No. 1			Pipe No. 2			Pipe No. 3			Pipe No. 4		
EPA	PSNS	ENVVEST DSN #	NBK / CIA	Sq. Ft.	Acres	Size Ranking	Sq. Ft	Acres	Percentage of Basin	Sq. Ft.	Acres	Percentage of Total Basin	Size Ranking	Latitude			Longitude						Rim Ht. (FT)	Flow Direction	Diameter (IN)	Invert elev. (FT)	Flow Direction	Diameter (IN)	Invert elev. (FT)	Flow Direction	Diameter (IN)	Invert elev. (FT)	Flow Direction	Diameter (IN)	Invert elev. (FT)
1	126.4	178	CIA	420,576	9.65	42(2)	397,696	9.13	94.56%	15,005.86	0.34	3.57%	61	47	33	40	122	37	31	MH	MH-1		18.73	inlet	24	13.43	inlet	12	16.06	outlet	24	13.43			
1B	126.4B	178	CIA	420,576	9.65		397,696	9.13	94.56%	353,036.79	8.10	83.94%	18	47	33	41	122	37	32	MH	MH-2		18.00	inlet	24	12.66	outlet	24	12.66	inlet	18	10.42			
2	126.1	178	CIA	420,576	9.65	42(2)	397,696	9.13	94.56%	141,571.55	3.25	33.66%	40	47	33	36	122	37	37	MH	B24		17.90	inlet	24	12.48	outlet	24	12.48	inlet	6	14.4	inlet	6	12.98
2B	126.1B	178	CIA	420,576	9.65		397,696	9.13	94.56%	217,669.33	5.00	51.76%	32	47	33	43	122	37	39	MH	5873		18.20	inlet	24	6.3	inlet	6	14.23	outlet	24	6.24	inlet	6	14.17
3	124	176	CIA	788,344	18.09	17(7)	745,458	17.11	94.56%	123,425.26	2.83	15.66%	45	47	33	36	122	37	47	MH	5887 - SS003	7124	17.86	inlet	24	8.03	outlet	24	8.03	inlet	6	7.19			
3B	124B	176	CIA	788,344	18.09		745,458	17.11	94.56%	341,609.87	7.84	43.33%	19	47	33	37	122	37	45	MH	5880A		17.50	inlet	24	6.92	outlet	24	6.92	inlet	6	13.25			
4	122	177	CIA	663,265	15.22	26(4)	653,316	15.00	98.50%	2,390.28	0.05	0.36%	89	47	33	39	122	37	49																
5	117	176	CIA	788,344	18.09	17(7)	748,927	17.19	95.00%	4,250.34	0.10	0.54%	73	47	33	41	122	37	52																
6	115.1	175	CIA	463,189	10.63	40(2)	449,293	10.31	97.00%	443,957.14	10.19	88.76%	9	47	33	39	122	37	54	MH	4862		18.53	inlet	8	7.78	outlet	8	7.78						
6B	115.1B	175	CIA	463,189	10.63		449,293	10.31	97.00%	411,108.79	9.43	95.85%	12	47	33	42	122	37	54	MH	4860		17.72	inlet	18	1.62	outlet	18	1.62	inlet	6	12.89	inlet	6	13.05
7	106	174	CIA	536,165	12.30	32(6)	520,080	11.94	97.00%	48,762.69	1.12	9.09%	51	47	33	36	122	38	2			7106													
8	096	172	CIA	718,196	16.48	24(2)	696,650	15.99	97.00%	54,340.94	1.25	7.57%	50	47	33	35	122	38	11			7096													
9	099	172	CIA	718,196	16.48	24(2)	696,650	15.99	97.00%	136,935.26	3.14	19.07%	42	47	33	22	122	38	22																
10	081.1	169	CIA	965,759	22.16	15(2)	936,786	21.51	97.00%	420,007.89	9.64	43.49%	11	47	33	21	122	38	31	MH	5926		17.99	inlet	4	4.16	outlet	18	3.32	inlet	18	3.32			
10B	081.1B	169	NBK	965,759	22.16		936,786	21.51	97.00%	386,233.67	8.86	39.99%	16	47	33	23	122	38	35	MH	SD-1		17.71	inlet	4	6.04	outlet	4	3.88						
11	056	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	2,256.33	0.05	0.00%	91	47	33	21	122	38	39			7056													
12	053	168	NBK	965,759	22.16	15(2)	936,786	21.51	97.00%	405,618.75	9.31	42.00%	14	47	33	21	122	38	41	MH	2723	7053	17.81	inlet	10	6.81	outlet	10	6.81	inlet	6	15.36	inlet	6	15.36
12B	053B	169	NBK	965,759	22.16		936,786	21.51	97.00%	280,070.09	6.43	29.00%	25	47	33	24	122	38	41	MH	2730 - A85		18.11	inlet	10	7.11	outlet	10	7.11	inlet	6	15.28	inlet	6	14.44
13	020.1	168	NBK	1,424,430	32.69	3(9)	1,381,698	31.72	97.00%	512,794.97	11.77	36.00%	5	47	33	21	122	38	58	MH	2591		18.11	inlet	16	15.28	outlet	16	15.28	inlet	16	14.61			
14	015	167	NBK	4,407,826	101.16	1	4,035,805	92.65	91.56%	837,486.85	19.22	19.00%	1	47	33	23	122	39	2	MH	A42	7015	17.21	inlet	48	6.54	outlet	48	6.54	inlet	8	10.38	inlet	18	7.38
14B	015B	167	NBK	4,407,826	101.16		4,035,805	92.65	91.56%	661,173.83	15.17	15.00%	3	47	33	23	122	39	3	MH	SW corner fitness center parking area		18.15	inlet	36	8.99	outlet	36	8.99	inlet	24	11.32	inlet	12	10.15
15	011	166	NBK	1,304,943	29.95	11(4)	1,220,905	28.03	93.56%	156,593.16	3.59	12.00%	39	47	33	15	122	39	11	MH	2281	7011	19.03	inlet	36	4.78	outlet	36	4.78	inlet	16	6.44	inlet	6	14.53
17	123	176	CIA	788,344	18.09	17(7)	745,458	17.11	94.56%	283,803.87	6.51	36.00%	24	47	33	26	122	37	48																
22	008	166	NBK	1,304,943	29.95	11(4)	1,220,905	28.03	93.56%	508,927.79	11.68	39.00%	6	47	33	15	122	39	17	MH	2179	7008	17.95	outlet	32	12.62	inlet	24	13.62	inlet	24	13.62			
23	126	177	CIA	663,265	15.22	26(4)	653,316	15.00	98.50%	247,314.15	5.68	37.29%	29	47	33	37	122	37	36	MH	5110 - 125	7126	18.22	outlet	24	8.5	inlet	24	8.51	inlet	8	10.08	inlet	10	9.36
24	126.2	177	CIA	663,265	15.22	26(4)	653,316	15.00	98.50%	203,000.92	4.66	30.61%	33	47	33	37	122	37	37																
25	124.1	176	CIA	788,344	18.09	17(7)	745,458	17.11	94.56%	341,609.87	7.84	43.33%	20	47	33	36	122	37	44	MH	5118A		17.31	inlet	10	7.31	outlet	10	7.31						
25B	124.1B	176	CIA	788,344	18.09		745,458	17.11	94.56%	406,031.59	9.32	51.50%	13	47	33	42	122	37	44	MH	5878		17.50	inlet	10	7.67	outlet	10	7.67						
26	113	PIER	CIA	20,000	0.46	60	20,000	0.46	100.00%	552.67	0.01	2.76%	100	47	33	40	122	37	54																
27	108	174	CIA	536,165	12.30	32(6)	520,080	11.94	97.00%	180,516.90	4.14	33.67%	36	47	33	37	122	37	57																
28	107	174	CIA	536,165	12.30	32(6)	520,080	11.94	97.00%	129,164.15	2.96	24.09%	44	47	33	37	122	38	0	MH	026	7107	17.39	inlet	6	7.89	outlet	6	7.89						
28B	107B	174	CIA	536,165	12.30		520,080	11.94	97.00%	84,854.06	1.95	15.83%	47	47	33	41	122	37	59	MH	4727		17.32	inlet	12	4.07	outlet	12	4.07	inlet	3	13.74			
29	085	171	CIA	1,857,726	42.63	2	1,801,995	41.37	97.00%	668,781.49	15.35	36.00%	2	47	33	30	122	38	19																
30	082.5	170	CIA	634,570	14.56	30(2)	615,533	14.13	97.00%	228,445.19	5.24	36.00%	30	47	33	28	122	38	20	MH	523		18.03	inlet	6	11.7	outlet	18	8.45	inlet	18	11.2	inlet	10	10.36
30B	082.5B	170	CIA	634,570	14.56		615,533	14.13	97.00%	184,025.29	4.22	29.00%	35	47	33	27	122	38	23	MH	3237		18.03	inlet	4	9.03	outlet	18	9						
31	082.4	170	CIA	184,000	4.22	45	184,000	4.22	100.00%	66,240.00	1.52	36.00%	49	47	33	22	122	38	24																
32	082.3	170	CIA	224,000	5.14	44	224,000	5.14	100.00%	80,640.00	1.85	36.00%	48	47	33	22	122	38	26																
33	082	170	CIA	634,570	14.56	30(2)	615,533	14.13	97.00%	228,445.19	5.24	36.00%	31	47	33	21	122	38	30			7082													
34	032	168	NBK	1,424,430	32.69	3(9)	1,381,698	31.72	97.00%	441,573.44	10.13	31.00%	10	47	33	21	122	38	50			7032													
35	031	168	NBK	1,424,430	32.69	3(9)	1,381,698	31.72	97.00%	299,130.40	6.87	21.00%	23	47	33	21	122	38	52																
36	028	168	NBK	1,424,430	32.69	3(9)	1,381,698	31.72	97.00%	356,107.61	8.17	25.00%	17	47	33	21	122	38	54																
37	024	168	NBK	1,424,430	32.69	3(9)	1,381,698	31.72	97.00%	470,062.05	10.79	33.00%	7	47	33	21	122	38	56			7024	17.18												
38	017.1	168	NBK	1,424,430	32.69	3(9)	1,381,698	31.72	97.00%	270,641.79	6.21	19.00%	26	47	33	21	122	38	59																
39	017	168	NBK	1,424,430	32.69	3(9)	1,381,698	31.72	97.00%	170,931.66	3.92	12.00%	37	47	33	21	122	39	1																
40	014	166	NBK	1,304,943	29.95	11(4)	1,220,905	28.03	93.56%	391,482.91	8.98	30.00%	15	47	33	21	122	39	5	MH	A15	7014	17.21	inlet	8	11.62	outlet	8	11.62	inlet	6	13.88			
40B	014B	166	NBK	1,304,943	29.95		1,220,905	28.03	93.56%	260,989	5.99	20.00%	27	47	33	23	122	39	4	MH	A17		17.98	inlet	12	12.48	outlet	12	12.48	inlet	6	13.81	inlet	6	12.81
41	012	166	NBK	1,304,943	29.95	11(4)	1,220,905	28.03	93.56%	326,236	7.49	25.00%	21	47	33	21	122	39	8																
42	122	176	CIA	788,344	18.09	17(7)	745,458	17.11	94.56%	252,270	5.79	32.00%	28	47	33	39	122	37	50																
43	118.2	176	CIA	788,344	18.09	17(7)	745,458	17.11	94.56%	315,338	7.24	40.00%	22	47	33	39	122	37	52																
44	116	175	CIA	463,189	10.63	40(2)	449,293	10.31	97.00%	166,748	3.83	36.00%	38	47	33	39	122	37	54																
45	111	PIER 5	CIA	6,500	0.15	83(5)	6,500	0.15	100.00%	2,340	0.05	36.00%	90	47	33	38	122	37	54																
46	110	PIER 5	CIA	6,500	0.15	83(5)	6,500	0.15	100.00%	1,170	0.03	18.00%	94	47	33	36	122	37	54																
47	108.1	174	CIA	536,165	12.30	32(6)	520,080	11.94	97.00%	193,019	4.43	36.00%	34	47	33	37	122	37	56																
48	104	174	CIA	536,165	12.30	32(6)	520,080	11.94	97.00%	916	0.02	0.17%	96	47	33	36	122	38	2																
49	103	174	CIA	536,165	12.30	32(6)	520,080	11.94	97.00%	1,657	0.04	0.31%	93	47	33	36	122	38	3																
50	UNK	168	NBK	1,424,430	32.69	3(9)	1,381,698	31.72	97.00%	541,284	12.42	38.00%	4	47	33	36	122	38	4																
51	102	173	CIA	484,387	11.12	38(2)	469,855	10.79	97.00%	21,910	0.50	4.52%	59	47	33	36	122	38	3																
52	101	173	CIA	484,387	11.12	38(2)	469,855	10.79	97.00%	140,881	3.23	29.08%	41	47	33	36	122	38	5	MH	B76	7101	18.30	inlet	12	8.72	outlet	12	8.72	inlet	3	16.38	inlet	3	16.38
52B	101B	168	CIA	496,586	11.40		536,169	12.31	107.97%	130,372	2.99	26.25%	43	47	33	44	122	38	3	MH	A31		18.36	inlet	12	9.69	outlet	12	9.69	inlet	8	14.36	inlet	12	9.36
53	099	168	CIA	104,000	2.39	46	104,000	2.39	100.00%	40,560	0.93	39.00%	52	47	33	36	122	38	6																
54	090	168	CIA	94,000	2.16	47	94,000	2.16	100.00%	25,380	0.58	27.00%	57	47	33	30	122	38	12																
55	084.1	168	CIA	24,000	0.55	58(2)	24,000	0.55	100.00%	9,360	0.21	39.00%	63	47	33	30	122	38	20																
56	082.6	170	CIA	15,250	0.35	72	15,250	0.35	100.00%	5,948	0.14	39.00%	66	47	33	29	122	38	20																
57	082.2	170	CIA	14,000	0.32	73(5)	14,000	0.32	100.00%	5,460	0.13	39.00%	69	47	33	22	122	38	27																
58	075	PIER D	NBK	14,000	0.32	73(5)	14,000	0.32	100.00%	4,060	0.09	29.00%	75	47	33	14	122	38	32																
59	074	PIER D	NBK	11,500	0.26	78(2)	11,500	0.26	100.00%	3,335	0.08	29.00%	82	47	33	13	122	38	32																
60	072	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	3,610	0.08	19.00%	79	47	33	12	122	38	32																
61	068	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	4,560	0.10	24.00%	72	47	33	11	122	38	39																
62	067	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	5,510	0.13	29.00%	68	47	33	12	122	38	39																
63	066	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	4,180	0.10	22.00%	74	47	33	13	122	38	39																
64	065	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	2,850	0.07	15.00%	84	47	33	14	122	38	39																
65	064	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	5,130	0.12	27.00%	71	47	33	15	122	38	39																
66	063	PIER D	NBK	29,000	0.67	55(3)	29,000	0.67	100.00%	7,250	0.17	25.00%	64	47	33	16	122	38	39																

PHYSICAL CHARACTERISTICS

Outfall and Basin Information				Drainage Basin Area Statistics and Outfall Positioning Information																Outfall Engineering Characteristics																	
				Basin Area Statistics									Positioning							Stormwater System Information			Piping Information (piping measured at sampling vault location)													
Outfall ID		Basin ID	Location of Drainage Basin Area w/in the BNC	Total Basin Area			Total Basin Area Impervious Surface			Basin Drainage Capacity				Outfall Coordinates						Junction Type	Junction Access ID	EMCON Junction Code	Elevation	Pipe No. 1				Pipe No. 2				Pipe No. 3				Pipe No. 4			
EPA	PSNS	ENVVEST DSN #	NBK / CIA	Sq. Ft.	Acres	Size Ranking	Sq. Ft	Acres	Percentage of Basin	Sq. Ft.	Acres	Percentage of Total Basin	Size Ranking	Latitude			Longitude						Rim Ht. (FT)	Flow Direction	Diameter (IN)	Invert elev. (FT)	Flow Direction	Diameter (IN)	Invert elev. (FT)	Flow Direction	Diameter (IN)	Invert elev. (FT)	Flow Direction	Diameter (IN)	Invert elev. (FT)
67	061	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	5,890	0.14	31.00%	67	47	33	17	122	38	39																
68	060	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	3,990	0.09	21.00%	76	47	33	17	122	38	39																
69	059	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	3,610	0.08	19.00%	80	47	33	18	122	38	39																
70	058	PIER D	NBK	19,000	0.44	61(11)	19,000	0.44	100.00%	6,270	0.14	33.00%	65	47	33	19	122	38	39																
71	057	PIER D	NBK	11,500	0.26	78(2)	11,500	0.26	100.00%	3,335	0.08	29.00%	83	47	33	20	122	38	39																
72	051	168	NBK	59,000	1.35	50	59,000	1.35	100.00%	22,420	0.51	38.00%	58	47	33	21	122	38	40																
73	050	168	NBK	6,500	0.15	83(5)	6,500	0.15	100.00%	2,470	0.06	38.00%	88	47	33	21	122	38	42																
74	049	168	NBK	6,500	0.15	83(5)	6,500	0.15	100.00%	2,535	0.06	39.00%	86	47	33	21	122	38	42																
75	048	168	NBK	6,500	0.15	83(5)	6,500	0.15	100.00%	1,820	0.04	28.00%	92	47	33	21	122	38	43																
76	043	168	NBK	9,000	0.21	80(3)	9,000	0.21	100.00%	3,420	0.08	38.00%	81	47	33	21	122	38	45																
77	042	168	NBK	9,000	0.21	80(3)	9,000	0.21	100.00%	2,520	0.06	28.00%	87	47	33	21	122	38	46																
78	037	168	NBK	14,000	0.32	73(5)	14,000	0.32	100.00%	5,320	0.12	38.00%	70	47	33	21	122	38	47																
79	UNK			6,500	0.15	NA	6,500	0.15	100.00%	2,730	0.06	42.00%	85	47	33	21	122	38	47																
80	033	168	NBK	24,000	0.55	58(2)	24,000	0.55	100.00%	857	0.02	3.57%	97	47	33	21	122	38	48																
82			Gone	24,000	0.55	NA	24,000	0.55	100.00%		0.00	0.00%		47	33	21	122	39	9																
83	011.3	166	NBK	14,000	0.32	73(5)	14,000	0.32	100.00%	566	0.01	4.04%	99	47	33	20	122	39	10																
84	011.2	166	NBK	29,000	0.67	55(3)	29,000	0.67	100.00%	663	0.02	2.29%	98	47	33	19	122	39	10																
85	011.1	166	NBK	29,000	0.67	55(3)	29,000	0.67	100.00%	1,104	0.03	3.81%	95	47	33	17	122	39	10																
87	009	166	NBK	34,000	0.78	53(2)	34,000	0.78	100.00%	14,280	0.33	42.00%	62	47	33	15	122	39	15																
88	008.1	166	NBK	64,000	1.47	49	64,000	1.47	100.00%	26,880	0.62	42.00%	56	47	33	15	122	39	16																
89	006	166	NBK	34,000	0.78	53(2)	34,000	0.78	100.00%	29,086	0.67	85.55%	54	47	33	15	122	39	18	MH	A4		16.66	inlet	8	10.91	outlet	8	10.91						
90	005	166	NBK	14,000	0.32	73(5)	14,000	0.32	100.00%	3,617	0.08	25.84%	78	47	33	15	122	39	19																
91	003.1	166	NBK	44,000	1.01	52	44,000	1.01	100.00%	38,557	0.88	87.63%	53	47	33	15	122	39	20																
92	UNK	PIER 3	CIA	9,000	0.21	80(3)	9,000	0.21	100.00%	3,780	0.09	42.00%	77	47	33	15	122	39	22																
93	UNK	PIER 3	CIA	74,000	1.70	48	18,500	0.42	25.00%	28,860	0.66	39.00%	55	47	33	13	122	39	27																
94	UNK	PIER 3	CIA	54,000	1.24	51	13,500	0.31	25.00%	19,440	0.45	36.00%	60	47	33	8	122	39	38																
95	125	177	CIA	663,265	15.22	26(4)	662,878	15.22	99.94%	111,834	2.57	16.86%	46	47	33	36	122	37	40	MH	125A		17.44	inlet	8	7.44	outlet	8	7.44						
97	121	176	CIA	788,344	18.09	17(7)	631,105	14.49	80.05%	449,356	10.31	57.00%	8	47	33	39	122	37	50																
TOTALS				**55,366,463**	**1,271.03**	**NA**	**52,730,170**	**1,210.51**	**95.24%**	**15,473,858**	**355.18**	**27.95%**	**NA**																							

APPENDIX D:

TELEMETRY PERMISSION FORMS

ROUTE SHEET *DO NOT DETACH FROM CORRESPONDENCE*

ACTION CODE	COPIES FURNISHED	LOCAL FILE NO.
Code 106.32 Water Programs	One hardcopy	

ROUTING CODE/SHOP	INITIALED BY	INITIALED DATE	REMARKS
C/106.13	[signature]	10/24/11	Taylor Associates, Inc. has been contracted by PSNS&IMF to perform environmental monitoring of selected outfalls with the Shipyard property. They will provide a variety of field, data management, and data analysis services to PSNS&IMF through the implementation, installation, and deployment of environmental monitoring equipment to achieve the necessary data to meet the federal requirements of the draft NPDES permit using Telemetry Data Collection systems.
C/1121			
C/1234	[signature]	01/11/12	

NPDES Monitoring OF Select Outfalls Within PSNS&IMF CIA and Naval Station Bremerton using Telemetry Data Collection

CONTENTS

POC: Victoria Whitney
C/106.32
476-0526

RETURN TO CODE/SHOP	CROSS FILE

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

Ref: NAVSHIPYDPUGETINST P5239.2

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE (i.e., Windows 2000, Linux, MAC, etc.)**
Campbell Scientific	S/N 27470	Pakbus

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

I certify that this system is owned by a company under contract with the U.S. Government or is owned by the U.S. Government. I understand that **personally owned** computers and peripherals **are not authorized** at PSNS & IMF and are not covered by this Authority to Operate.

I understand that while at PSNS & IMF site I will not connect to the PSNS & IMF Local Area Network. I will ensure that daily virus scan of memory and all storage media is performed before conducting any use of this system and that all removable media will be identified with appropriate sensitivity labels. A copy of this Authority to Operate shall accompany the system at all times while at PSNS & IMF.

DATE: 10 - 10 - 2011 SIGNATURE: David C. Metallo

PHONE NUMBER: (206) 267-1400 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

INDICATE THE SENSITIVITY LEVEL OF THE INFORMATION STORED ON THE SYSTEM BY PERCENTAGE (MUST TOTAL 100%):

LEVEL	PERCENT
COMPANY (NON-NAVY DATA)	____%
UNCLASSIFIED	____%
SENSITIVE UNCLASSIFIED	100 %
☐ FOUO	____%
☐ PRIVACY ACT	____%
☐ NNPI/NOFORN	____%
CONFIDENTIAL	____%
SECRET	____%

YES	NO	(IF YES, EXPLAIN IN COMMENTS BLOCK, BELOW.)
☑	☐	WILL THE MODEM BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE A WIRELESS CARD?
☐	☑	WILL THE WIRELESS CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE AN ETHERNET CARD?
☐	☑	WILL THE ETHERNET CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE BLUETOOTH CAPABILITY?
☐	☑	IS THIS AN NMCI-NNPI ASSET (UNDER THE NNPI COI)?

COMMENTS: This is an extension to the current telemetry request of August 28, 2010. Modems will interface via Verizon cellular network to transfer data to Taylor Associates for QC, analyses, and deliverables.

ALL USERS HAVE SECURITY CLEARANCE EQUAL TO OR HIGHER THAN THE HIGHEST LEVEL OF INFORMATION ON THE SYSTEM AND A NEED-TO-KNOW FOR ALL OF THE INFORMATION.

REQUESTOR'S FAX NUMBER: (206) 267 -- 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria J. Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

WHEN APPROVED, A COPY OF THIS FORM SHALL ACCOMPANY THE EQUIPMENT AT ALL TIMES WHILE AT PSNS & IMF.

OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT		OWNING ORGANIZATION TELEPHONE NUMBER	
Taylor Associates, Inc.	David Metallo		206-794-0095	
PSNS & IMF CODE/SHOP SUPPORTED	**PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM (BUILDING OR AREA)**		**PSNS & IMF LOCAL POINT OF CONTACT**	
C/106.32	PROJECT: NPDES Permit	LOCATION: CIA	NAME: (REQUIRED) Victoria Whitney	PHONE: (REQUIRED) 360-476-0526

PSNS & IMF APPROVAL TO OPERATE	DATE
I hereby grant authority to operate this system on PSNS & IMF during the period specified and under the conditions specified above. Code 1234, (360) 627-2405, Fax (360) 476-2049 Manuel J. Bautista	1/11/12

PSNS&IMF 5239/49 (Rev. 8-07)

3566

Ref: NAVSHIPYDPUGETINST P5239.2

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE** (i.e., Windows 2000, Linux, MAC, etc.)
Campbell Scientific	S/N 35264	Pakbus

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

I certify that this system is owned by a company under contract with the U.S. Government or is owned by the U.S. Government. I understand that **personally owned** computers and peripherals **are not authorized** at PSNS & IMF and are not covered by this Authority to Operate.

I understand that while at PSNS & IMF site I will not connect to the PSNS & IMF Local Area Network. I will ensure that daily virus scan of memory and all storage media is performed before conducting any use of this system and that all removable media will be identified with appropriate sensitivity labels. A copy of this Authority to Operate shall accompany the system at all times while at PSNS & IMF.

DATE: 10-10-2011 SIGNATURE: [signature]

PHONE NUMBER: (206) 267-1409 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

INDICATE THE SENSITIVITY LEVEL OF THE INFORMATION STORED ON THE SYSTEM BY PERCENTAGE (MUST TOTAL 100%):

LEVEL	PERCENT
COMPANY (NON-NAVY DATA)	%
UNCLASSIFIED	%
SENSITIVE UNCLASSIFIED	100 %
☐ FOUO	%
☐ PRIVACY ACT	%
☐ NNPI/NOFORN	%
CONFIDENTIAL	%
SECRET	%

YES	NO	(IF YES, EXPLAIN IN COMMENTS BLOCK, BELOW.)
✓		WILL THE MODEM BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
	✓	DOES THE LAPTOP HAVE A WIRELESS CARD?
	✓	WILL THE WIRELESS CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
	✓	DOES THE LAPTOP HAVE AN ETHERNET CARD?
	✓	WILL THE ETHERNET CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
	✓	DOES THE LAPTOP HAVE BLUETOOTH CAPABILITY?
	✓	IS THIS AN NMCI-NNPI ASSET (UNDER THE NNPI COI)?

COMMENTS: This is an extension to the current telemetry request of August 28, 2010. Modems will interface via Verizon cellular network to transfer data to Taylor Associates for QC, analyses, and deliverables.

ALL USERS HAVE SECURITY CLEARANCE EQUAL TO OR HIGHER THAN THE HIGHEST LEVEL OF INFORMATION ON THE SYSTEM AND A NEED-TO-KNOW FOR ALL OF THE INFORMATION.

REQUESTOR'S FAX NUMBER: (206) 267 - 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: [signature]

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

WHEN APPROVED, A COPY OF THIS FORM SHALL ACCOMPANY THE EQUIPMENT AT ALL TIMES WHILE AT PSNS & IMF.

OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT		OWNING ORGANIZATION TELEPHONE NUMBER	
Taylor Associates, Inc.	David Metallo		206-794-0095	
PSNS & IMF CODE/SHOP SUPPORTED	**PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM** (BUILDING OR AREA)		**PSNS & IMF LOCAL POINT OF CONTACT**	
C/106.32	**PROJECT:** NPDES Permit	**LOCATION:** CIA	**NAME: (REQUIRED)** Victoria Whitney	**PHONE: (REQUIRED)** 360-476-0526

PSNS & IMF APPROVAL TO OPERATE	DATE
I hereby grant authority to operate this system on PSNS & IMF during the period specified and under the conditions specified above. Code 1234, (360) 627-2405, Fax (360) 476-2049 [signature]	1/11/12

PSNS&IMF 5239/49 (Rev. 8-07)

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

Ref: NAVSHIPYDPUGETINST P5239.2

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE (i.e., Windows 2000, Linux, MAC, etc.)**
Campbell Scientific	S/N 35265	Pakbus

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

I certify that this system is owned by a company under contract with the U.S. Government or is owned by the U.S. Government. I understand that **personally owned** computers and peripherals **are not authorized** at PSNS & IMF and are not covered by this Authority to Operate.

I understand that while at PSNS & IMF site I will not connect to the PSNS & IMF Local Area Network. I will ensure that daily virus scan of memory and all storage media is performed before conducting any use of this system and that all removable media will be identified with appropriate sensitivity labels. A copy of this Authority to Operate shall accompany the system at all times while at PSNS & IMF.

DATE: 10-10-2011 SIGNATURE: David C. Metallo

PHONE NUMBER: (206) 267-1400 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

INDICATE THE SENSITIVITY LEVEL OF THE INFORMATION STORED ON THE SYSTEM BY PERCENTAGE (MUST TOTAL 100%):

LEVEL	PERCENT
COMPANY (NON-NAVY DATA)	____%
UNCLASSIFIED	____%
SENSITIVE UNCLASSIFIED	100 %
☐ FOUO	____%
☐ PRIVACY ACT	____%
☐ NNPI/NOFORN	____%
CONFIDENTIAL	____%
SECRET	____%

YES	NO	(IF YES, EXPLAIN IN COMMENTS BLOCK, BELOW.)
☑	☐	WILL THE MODEM BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE A WIRELESS CARD?
☐	☑	WILL THE WIRELESS CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE AN ETHERNET CARD?
☐	☑	WILL THE ETHERNET CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE BLUETOOTH CAPABILITY?
☐	☑	IS THIS AN NMCI-NNPI ASSET (UNDER THE NNPI COI)?

COMMENTS: This is an extension to the current telemetry request of August 28, 2010. Modems will interface via Verizon cellular network to transfer data to Taylor Associates for QC, analyses, and deliverables.

ALL USERS HAVE SECURITY CLEARANCE EQUAL TO OR HIGHER THAN THE HIGHEST LEVEL OF INFORMATION ON THE SYSTEM AND A NEED-TO-KNOW FOR ALL OF THE INFORMATION.

REQUESTOR'S FAX NUMBER: (206) 267 - 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria J Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

WHEN APPROVED, A COPY OF THIS FORM SHALL ACCOMPANY THE EQUIPMENT AT ALL TIMES WHILE AT PSNS & IMF.

OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT	OWNING ORGANIZATION TELEPHONE NUMBER
Taylor Associates, Inc.	David Metallo	206-794-0095

PSNS & IMF CODE/SHOP SUPPORTED	PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM (BUILDING OR AREA)		PSNS & IMF LOCAL POINT OF CONTACT	
	PROJECT:	LOCATION:	NAME: (REQUIRED)	PHONE: (REQUIRED)
C/106.32	NPDES Permit	CIA	Victoria Whitney	360-476-0526

PSNS & IMF APPROVAL TO OPERATE	DATE
I hereby grant authority to operate this system on PSNS & IMF during the period specified and under the conditions specified above. Code 1234, (360) 627-2405, Fax (360) 476-2049 Michael J. Barnhart	1/11/12

PSNS&IMF 5239/49 (Rev. 8-07)

3568

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

Ref: NAVSHIPYDPUGETINST P5239.2

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE** (i.e., Windows 2000, Linux, MAC, etc.)
Campbell Scientific	S/N 35266	Pakbus

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

I certify that this system is owned by a company under contract with the U.S. Government or is owned by the U.S. Government. I understand that **personally owned** computers and peripherals **are not authorized** at PSNS & IMF and are not covered by this Authority to Operate.

I understand that while at PSNS & IMF site I will not connect to the PSNS & IMF Local Area Network. I will ensure that daily virus scan of memory and all storage media is performed before conducting any use of this system and that all removable media will be identified with appropriate sensitivity labels. A copy of this Authority to Operate shall accompany the system at all times while at PSNS & IMF.

DATE: 10-10-2011 SIGNATURE: David C. Metallo

PHONE NUMBER: (206) 267-1400 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

INDICATE THE SENSITIVITY LEVEL OF THE INFORMATION STORED ON THE SYSTEM BY PERCENTAGE (MUST TOTAL 100%):

LEVEL	PERCENT
COMPANY (NON-NAVY DATA)	%
UNCLASSIFIED	%
SENSITIVE UNCLASSIFIED	100 %
☐ FOUO	%
☐ PRIVACY ACT	%
☐ NNPI/NOFORN	%
CONFIDENTIAL	%
SECRET	%

YES	NO	(IF YES, EXPLAIN IN COMMENTS BLOCK, BELOW.)
✓		WILL THE MODEM BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
	✓	DOES THE LAPTOP HAVE A WIRELESS CARD?
	✓	WILL THE WIRELESS CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
	✓	DOES THE LAPTOP HAVE AN ETHERNET CARD?
	✓	WILL THE ETHERNET CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
	✓	DOES THE LAPTOP HAVE BLUETOOTH CAPABILITY?
	✓	IS THIS AN NMCI-NNPI ASSET (UNDER THE NNPI COI)?

COMMENTS: This is an extension to the current telemetry request of August 28, 2010. Modems will interface via Verizon cellular network to transfer data to Taylor Associates for QC, analyses, and deliverables.

ALL USERS HAVE SECURITY CLEARANCE EQUAL TO OR HIGHER THAN THE HIGHEST LEVEL OF INFORMATION ON THE SYSTEM AND A NEED-TO-KNOW FOR ALL OF THE INFORMATION.

REQUESTOR'S FAX NUMBER: (206) 267 - 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

WHEN APPROVED, A COPY OF THIS FORM SHALL ACCOMPANY THE EQUIPMENT AT ALL TIMES WHILE AT PSNS & IMF.

OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT		OWNING ORGANIZATION TELEPHONE NUMBER	
Taylor Associates, Inc.	David Metallo		206-794-0095	
PSNS & IMF CODE/SHOP SUPPORTED	**PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM** (BUILDING OR AREA)		**PSNS & IMF LOCAL POINT OF CONTACT**	
C/106.32	**PROJECT:** NPDES Permit	**LOCATION:** CIA	**NAME: (REQUIRED)** Victoria Whitney	**PHONE: (REQUIRED)** 360-476-0526

PSNS & IMF APPROVAL TO OPERATE	DATE
I hereby grant authority to operate this system on PSNS & IMF during the period specified and under the conditions specified above. Code 1234, (360) 627-2405, Fax (360) 476-2049	1/11/12

PSNS&IMF 5239/49 (Rev. 8-07)

3569

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

Ref: NAVSHIPYDPUGETINST P5239.2

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE (i.e., Windows 2000, Linux, MAC, etc.)**
Campbell Scientific	S/N 42496	Pakbus

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

I certify that this system is owned by a company under contract with the U.S. Government or is owned by the U.S. Government. I understand that **personally owned** computers and peripherals **are not authorized** at PSNS & IMF and are not covered by this Authority to Operate.

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DATE: 10-10-2011 SIGNATURE: D. C. Metallo

PHONE NUMBER: (206) 267-1400 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

INDICATE THE SENSITIVITY LEVEL OF THE INFORMATION STORED ON THE SYSTEM BY PERCENTAGE (MUST TOTAL 100%):

LEVEL	PERCENT
COMPANY (NON-NAVY DATA)	____%
UNCLASSIFIED	____%
SENSITIVE UNCLASSIFIED	100 %
☐ FOUO	____%
☐ PRIVACY ACT	____%
☐ NNPI/NOFORN	____%
CONFIDENTIAL	____%
SECRET	____%

YES	NO	(IF YES, EXPLAIN IN COMMENTS BLOCK, BELOW.)
☑	☐	WILL THE MODEM BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE A WIRELESS CARD?
☐	☑	WILL THE WIRELESS CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE AN ETHERNET CARD?
☐	☑	WILL THE ETHERNET CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE BLUETOOTH CAPABILITY?
☐	☑	IS THIS AN NMCI-NNPI ASSET (UNDER THE NNPI COD)?

COMMENTS: This is an extension to the current telemetry request of August 28, 2010. Modems will interface via Verizon cellular network to transfer data to Taylor Associates for QC, analyses, and deliverables.

ALL USERS HAVE SECURITY CLEARANCE EQUAL TO OR HIGHER THAN THE HIGHEST LEVEL OF INFORMATION ON THE SYSTEM AND A NEED-TO-KNOW FOR ALL OF THE INFORMATION.

REQUESTOR'S FAX NUMBER: (206) 267 - 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria D Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

WHEN APPROVED, A COPY OF THIS FORM SHALL ACCOMPANY THE EQUIPMENT AT ALL TIMES WHILE AT PSNS & IMF.

OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT		OWNING ORGANIZATION TELEPHONE NUMBER	
Taylor Associates, Inc.	David Metallo		206-794-0095	
PSNS & IMF CODE/SHOP SUPPORTED	**PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM (BUILDING OR AREA)**		**PSNS & IMF LOCAL POINT OF CONTACT**	
C/106.32	**PROJECT:** NPDES Permit	**LOCATION:** CIA	**NAME: (REQUIRED)** Victoria Whitney	**PHONE: (REQUIRED)** 360-476-0526

PSNS & IMF APPROVAL TO OPERATE | **DATE**

I hereby grant authority to operate this system on PSNS & IMF during the period specified and under the conditions specified above.
Code 1234, (360) 627-2405, Fax (360) 476-2049 — 1/11/12

PSNS&IMF 5239/49 (Rev. 8-07)

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

Ref: NAVSHIPYDPUGETINST P5239.2

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE (i.e., Windows 2000, Linux, MAC, etc.)**
Campbell Scientific	S/N 42497	Pakbus

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

I certify that this system is owned by a company under contract with the U.S. Government or is owned by the U.S. Government. I understand that **personally owned** computers and peripherals **are not authorized** at PSNS & IMF and are not covered by this Authority to Operate.

I understand that while at PSNS & IMF site I will not connect to the PSNS & IMF Local Area Network. I will ensure that daily virus scan of memory and all storage media is performed before conducting any use of this system and that all removable media will be identified with appropriate sensitivity labels. A copy of this Authority to Operate shall accompany the system at all times while at PSNS & IMF.

DATE: 10-10-2011 SIGNATURE: David C. Metallo

PHONE NUMBER: (206) 267-1400 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

INDICATE THE SENSITIVITY LEVEL OF THE INFORMATION STORED ON THE SYSTEM BY PERCENTAGE (MUST TOTAL 100%):

LEVEL	PERCENT
COMPANY (NON-NAVY DATA)	____%
UNCLASSIFIED	____%
SENSITIVE UNCLASSIFIED	100 %
☐ FOUO	____%
☐ PRIVACY ACT	____%
☐ NNPI/NOFORN	____%
CONFIDENTIAL	____%
SECRET	____%

YES	NO	(IF YES, EXPLAIN IN COMMENTS BLOCK, BELOW.)
☑	☐	WILL THE MODEM BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE A WIRELESS CARD?
☐	☑	WILL THE WIRELESS CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE AN ETHERNET CARD?
☐	☑	WILL THE ETHERNET CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS)
☐	☑	DOES THE LAPTOP HAVE BLUETOOTH CAPABILITY?
☐	☑	IS THIS AN NMCI-NNPI ASSET (UNDER THE NNPI COI)?

COMMENTS: This is an extension to the current telemetry request of August 28, 2010. Modems will interface via Verizon cellular network to transfer data to Taylor Associates for QC, analyses, and deliverables.

ALL USERS HAVE SECURITY CLEARANCE EQUAL TO OR HIGHER THAN THE HIGHEST LEVEL OF INFORMATION ON THE SYSTEM AND A NEED-TO-KNOW FOR ALL OF THE INFORMATION.

REQUESTOR'S FAX NUMBER: (206) 267 - 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

WHEN APPROVED, A COPY OF THIS FORM SHALL ACCOMPANY THE EQUIPMENT AT ALL TIMES WHILE AT PSNS & IMF.

OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT	OWNING ORGANIZATION TELEPHONE NUMBER
Taylor Associates, Inc.	David Metallo	206-794-0095

PSNS & IMF CODE/SHOP SUPPORTED	PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM (BUILDING OR AREA)		PSNS & IMF LOCAL POINT OF CONTACT	
	PROJECT:	LOCATION:	NAME: (REQUIRED)	PHONE: (REQUIRED)
C/106.32	NPDES Permit	CIA	Victoria Whitney	360-476-0526

PSNS & IMF APPROVAL TO OPERATE	DATE
I hereby grant authority to operate this system on PSNS & IMF during the period specified and under the conditions specified above. Code 1234, (360) 627-2405, Fax (360) 476-2049 Merrill J. Barnett	1/11/12

PSNS&IMF 5239/49 (Rev. 8-07)

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

Ref: NAVSHIPYDPUGETINST P5239.2

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE (i.e., Windows 2000, Linux, MAC, etc.)**
Campbell Scientific Raven XVT	0929381962	SC932 DCE Intterface

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

I certify that this system is owned by a company under contract with the U.S. Government or is owned by the U.S. Government. I understand that **personally owned** computers and peripherals **are not authorized** at PSNS & IMF and are not covered by this Authority to Operate.

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DATE: 10-10-2011 SIGNATURE: David C. Metallo

PHONE NUMBER: (206) 267-1400 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

INDICATE THE SENSITIVITY LEVEL OF THE INFORMATION STORED ON THE SYSTEM BY PERCENTAGE (MUST TOTAL 100%):

LEVEL	PERCENT
COMPANY (NON-NAVY DATA)	____%
UNCLASSIFIED	____%
SENSITIVE UNCLASSIFIED	100 %
☐ FOUO	____%
☐ PRIVACY ACT	____%
☐ NNPI/NOFORN	____%
CONFIDENTIAL	____%
SECRET	____%

YES	NO	(IF YES, EXPLAIN IN COMMENTS BLOCK, BELOW.)
☑	☐	WILL THE MODEM BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE A WIRELESS CARD?
☐	☑	WILL THE WIRELESS CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE AN ETHERNET CARD?
☐	☑	WILL THE ETHERNET CARD BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
☐	☑	DOES THE LAPTOP HAVE BLUETOOTH CAPABILITY?
☐	☑	IS THIS AN NMCI-NNPI ASSET (UNDER THE NNPI COI)?

COMMENTS: This is an extension to the current telemetry request of August 28, 2010. Modems will interface via Verizon cellular network to transfer data to Taylor Associates for QC, analyses, and deliverables.

ALL USERS HAVE SECURITY CLEARANCE EQUAL TO OR HIGHER THAN THE HIGHEST LEVEL OF INFORMATION ON THE SYSTEM AND A NEED-TO-KNOW FOR ALL OF THE INFORMATION.

REQUESTOR'S FAX NUMBER: (206) 267 - 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria J. Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

WHEN APPROVED, A COPY OF THIS FORM SHALL ACCOMPANY THE EQUIPMENT AT ALL TIMES WHILE AT PSNS & IMF.

OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT		OWNING ORGANIZATION TELEPHONE NUMBER	
Taylor Associates, Inc.	David Metallo		206-794-0095	
PSNS & IMF CODE/SHOP SUPPORTED	**PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM (BUILDING OR AREA)**		**PSNS & IMF LOCAL POINT OF CONTACT**	
	PROJECT:	**LOCATION:**	**NAME: (REQUIRED)**	**PHONE: (REQUIRED)**
C/106.32	NPDES Permit	CIA	Victoria Whitney	360-476-0526

PSNS & IMF APPROVAL TO OPERATE	DATE
I hereby grant authority to operate this system on PSNS & IMF during the period specified and under the conditions specified above. Code 1234, (360) 627-2405, Fax (360) 476-2049 Marvel J. Marriott	1/11/12

PSNS&IMF 5239/49 (Rev. 8-07)

3572

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

Ref: NAVSHIPYDPUGETINST P5239.2

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE (i.e., Windows 2000, Linux, MAC, etc.)**
Campbell Scientific Raven XVT	1033520314	SC932 DCE Intterface

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

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DATE: 10 - 10 - 2011 SIGNATURE: David C. Metallo

PHONE NUMBER: (206) 267-1400 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

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COMPANY (NON-NAVY DATA)	____%
UNCLASSIFIED	____%
SENSITIVE UNCLASSIFIED	100 %
☐ FOUO	____%
☐ PRIVACY ACT	____%
☐ NNPI/NOFORN	____%
CONFIDENTIAL	____%
SECRET	____%

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REQUESTOR'S FAX NUMBER: (206) 267 - 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria A. Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

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OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT		OWNING ORGANIZATION TELEPHONE NUMBER	
Taylor Associates, Inc.	David Metallo		206-794-0095	
PSNS & IMF CODE/SHOP SUPPORTED	**PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM (BUILDING OR AREA)**		**PSNS & IMF LOCAL POINT OF CONTACT**	
C/106.32	**PROJECT:** NPDES Permit	**LOCATION:** CIA	**NAME: (REQUIRED)** Victoria Whitney	**PHONE: (REQUIRED)** 360-476-0526

PSNS & IMF APPROVAL TO OPERATE	DATE
I hereby grant authority to operate this system on PSNS & IMF during the period specified and under the conditions specified above. Code 1234, (360) 627-2405, Fax (360) 476-2049 Mark J. Bennett	1/11/12

PSNS&IMF 5239/49 (Rev. 8-07)

3973

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

Ref: NAVSHIPYDPUGETINST P5239.2

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE (i.e., Windows 2000, Linux, MAC, etc.)**
Campbell Scientific Raven XVT	1033520124	SC932 DCE Intterface

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

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DATE: 10-10-2011 SIGNATURE: David C. Metallo

PHONE NUMBER: (206) 267-1400 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

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COMPANY (NON-NAVY DATA)	____%
UNCLASSIFIED	____%
SENSITIVE UNCLASSIFIED	100 %
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☐ NNPI/NOFORN	____%
CONFIDENTIAL	____%
SECRET	____%

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REQUESTOR'S FAX NUMBER: (206) 267-1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria A Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

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OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT		OWNING ORGANIZATION TELEPHONE NUMBER	
Taylor Associates, Inc.	David Metallo		206-794-0095	
PSNS & IMF CODE/SHOP SUPPORTED	**PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM (BUILDING OR AREA)**		**PSNS & IMF LOCAL POINT OF CONTACT**	
	PROJECT:	**LOCATION:**	**NAME: (REQUIRED)**	**PHONE: (REQUIRED)**
C/106.32	NPDES Permit	CIA	Victoria Whitney	360-476-0526

PSNS & IMF APPROVAL TO OPERATE	DATE
I hereby grant authority to operate this system on PSNS & IMF during the period specified and under the conditions specified above. Code 1234, (360) 627-2405, Fax (360) 476-2049 Thomas J. Danielson	1/11/12

PSNS&IMF 5239/49 (Rev. 8-07)

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

Ref: NAVSHIPYDPUGETINST P5239.2

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE (i.e., Windows 2000, Linux, MAC, etc.)**
Campbell Scientific Raven XVT	1033519944	SC932 DCE Intterface

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

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DATE: 10 - 10 - 2011 SIGNATURE: David C. Metallo

PHONE NUMBER: (206) 267-1400 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

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☐ NNPI/NOFORN	____%
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SECRET	____%

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REQUESTOR'S FAX NUMBER: (206) 267 -- 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

WHEN APPROVED, A COPY OF THIS FORM SHALL ACCOMPANY THE EQUIPMENT AT ALL TIMES WHILE AT PSNS & IMF.

OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT		OWNING ORGANIZATION TELEPHONE NUMBER	
Taylor Associates, Inc.	David Metallo		206-794-0095	
PSNS & IMF CODE/SHOP SUPPORTED	**PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM (BUILDING OR AREA)**		**PSNS & IMF LOCAL POINT OF CONTACT**	
C/106.32	**PROJECT:** NPDES Permit	**LOCATION:** CIA	**NAME: (REQUIRED)** Victoria Whitney	**PHONE: (REQUIRED)** 360-476-0526

PSNS & IMF APPROVAL TO OPERATE | **DATE**

I hereby grant authority to operate this system on PSNS & IMF during the period specified and under the conditions specified above.
Code 1234, (360) 627-2405, Fax (360) 476-2049 Muriel A. Bartlett — 1/11/12

PSNS&IMF 5239/49 (Rev. 8-07)

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

Ref: NAVSHIPYDPUGETINST P5239.2

COMPANY OR ACTIVITY NAME	ARRIVAL DATE	DEPARTURE DATE
Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE (i.e., Windows 2000, Linux, MAC, etc.)**
Campbell Scientific Raven XVT	1121627529	SC932 DCE Intterface

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

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DATE: 10-10-2011 SIGNATURE: David C. Metallo

PHONE NUMBER: (206) 267-1409 PRINTED NAME: David C. Metallo

DATA SENSITIVITY

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LEVEL	PERCENT
COMPANY (NON-NAVY DATA)	____%
UNCLASSIFIED	____%
SENSITIVE UNCLASSIFIED	100 %
☐ FOUO	____%
☐ PRIVACY ACT	____%
☐ NNPI/NOFORN	____%
CONFIDENTIAL	____%
SECRET	____%

YES	NO	(IF YES, EXPLAIN IN COMMENTS BLOCK, BELOW.)
✓		WILL THE MODEM BE USED TO CONNECT TO ANY NETWORK? IF YES, EXPLAIN BELOW (COMMENTS).
	✓	DOES THE LAPTOP HAVE A WIRELESS CARD?
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	✓	DOES THE LAPTOP HAVE AN ETHERNET CARD?
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REQUESTOR'S FAX NUMBER: (206) 267 -- 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria M Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

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OWNING ORGANIZATION ADDRESS	OWNING ORGANIZATION POINT OF CONTACT		OWNING ORGANIZATION TELEPHONE NUMBER	
Taylor Associates, Inc.	David Metallo		206-794-0095	
PSNS & IMF CODE/SHOP SUPPORTED	**PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM (BUILDING OR AREA)**		**PSNS & IMF LOCAL POINT OF CONTACT**	
C/106.32	**PROJECT:** NPDES Permit	**LOCATION:** CIA	**NAME: (REQUIRED)** Victoria Whitney	**PHONE: (REQUIRED)** 360-476-0526

PSNS & IMF APPROVAL TO OPERATE	DATE
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PSNS&IMF 5239/49 (Rev. 8-07)

3576

AIS SECURITY SURVEY FOR VISITOR COMPUTER EQUIPMENT

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Taylor Associates, Inc.	November 1, 2011	December 31, 2012
MFG & MODEL ID	**SERIAL NUMBER**	**OPERATING SYSTEM TYPE (i.e., Windows 2000, Linux, MAC, etc.)**
Campbell Scientific Raven XVT	1121627636	SC932 DCE Intterface

AUTHORITY TO OPERATE ON PUGET SOUND NAVAL SHIPYARD AND INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF) BREMERTON SITE

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REQUESTOR'S FAX NUMBER: (206) 267 -- 1401

SIGNATURE OF PERSON VALIDATING SECURITY CLEARANCE: Victoria Whitney

PHONE NUMBER: 360-476-0526 PRINTED NAME: Victoria Whitney

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Taylor Associates, Inc.	David Metallo		206-794-0095	
PSNS & IMF CODE/SHOP SUPPORTED	**PSNS & IMF PROJECT NAME AND LOCATION OF SYSTEM (BUILDING OR AREA)**		**PSNS & IMF LOCAL POINT OF CONTACT**	
	PROJECT:	**LOCATION:**	**NAME: (REQUIRED)**	**PHONE: (REQUIRED)**
C/106.32	NPDES Permit	CIA	Victoria Whitney	360-476-0526

PSNS & IMF APPROVAL TO OPERATE	DATE
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PSNS&IMF 5239/49 (Rev. 8-07)

2011 PSNS Non-Dry Dock Stormwater Monitoring
Telemetry Systems Information

PSNS Outfall No.	Manhole ID	General Location	Telem Pkg Map Fig No.	Specific Location Info.	Control Box No.	Datalogger S/N	Modem ESN	Modem S/N
015	A42	NBK	1	SE corner McD's at end of drive-thru lane, B1019	1	35266	9611775713	1033519944
124	5881	CIA	4	NW coner of OWTS B357, south of B1003, southwest side of DD#3	2	35264	9611775481	1033520314
124.1	5880	CIA	5	Southeast side of DD#3, west of B495, just south of crane track terminus	3	35265	9611775498	1033520124
84.1	551	CIA	2	Southeast corner of B983, along west side of crane track in front of large rollup door	4	27470	9609075190	929381962
115.1	4860	CIA	3	South-southeast of B879, southern terminus of I-street, southwest of tempoaray stacked refueling office trailers, east of DD#2	5	42497	9611816930	1121627636
126	5110	CIA	6	Western side of B460, in pass-thru alcove	6	42496	9611816936	1121627529

APPENDIX E:
FECAL COLIFORM MONITORING, ASSESSMENT AND CONTROL QAPP

PUGET SOUND NAVAL SHIPYARD &
IMTERMEDIATE MAINTENANCE FACILITY

Fecal Coliform (FC) Monitoring, Assessment, and Control

Water Year 2011 Quality Assurance Project Plan

Robert K. Johnston
Marine Environmental Support Office-NW, Code 71752
Space and Naval Warfare Systems Center Pacific, Bremerton, WA

Jacquelyn Young, Eric Mollerstuen, Joseph Wright, Bruce Beckwith
Puget Sound Naval Shipyard & Intermediate Maintenance Facility c/106.32
Bremerton, WA

Eric Beckley
Naval Base Kitsap
Bremerton, WA

DRAFT 9/29/2010

Waterbody Number: WA-15-0040 Sinclair Inlet

Table of Contents

1. Introduction

This document describes the technical approach, procedures, and quality assurance/ quality control (QA/QC) requirements for monitoring, assessing, and controlling fecal coliform (FC) pollution in the waters of Sinclair Inlet surrounding the Puget Sound Naval Shipyard & Intermediate Maintenance Facility (PSNS&IMF) and Naval Base Kitsap-Bremerton (NBK-Bremerton), (herein after referred to as the Shipyard) located in Bremerton, WA (Figure 1). The Shipyard is committed to a culture of continuous process improvement for all aspects of Shipyard operations (PSNS&IMF 2009), including reducing the releases of bacterial waste in discharges from the Shipyard. Monitoring of microbial pollution must be conducted in ambient marine waters adjacent to the shipyard and during storm events at selected stormwater drains located within the Shipyard to comply with expected requirements of the Shipyard's NPDES permit issued by the US Environmental Protection Agency (USEPA 2008a,b). Additionally, Fecal FC monitoring, assessment, and control in areas adjacent to the Shipyard is required as part of the implementation plan for the water quality improvements required to meet Total Maximum Daily Load (TMDL) targets for Sinclair and Dyes Inlets mandated under the Clean Water Act by the Washington State Department of Ecology (Lawrence, Roberts, and Johnston 2010). This work will be coordinated with other FC monitoring programs being conducted to meet TMDL targets in Sinclair and Dyes Inlets by other participating stakeholders.

2. Objectives

The objectives of this sampling plan are to:

1. Establish baseline for assessing continuous process improvement of Shipyard operations for the release of bacterial contamination into Sinclair Inlet.
2. Obtain data for assessing the status and trends of FC contamination in the waters of Sinclair Inlet adjacent to the Shipyard.
3. Identify areas that may require corrective action to control FC pollution sources.
4. Provide data for adaptive management required to meet the water quality improvement TMDL targets for Sinclair and Dyes Inlets.

The data obtained from this sampling effort will be used to assess the impact of FC pollution on the environmental quality of receiving waters adjacent to the Shipyard, indentify if there are any problems that require corrective actions, and inform the water quality improvement process for Sinclair and Dyes Inlet (Table 1). Data from the network of monitoring stations will be evaluated to assess the impact of FC bacteria released into Sinclair and Dyes Inlets, characterize the status and trend of FC pollution in the vicinity of the Shipyard, and determine if discharges from all sources are protective of beneficial uses. The data will provide a basis for determining the need for improvement, assess the effectiveness of corrective actions, and inform adaptive management actions needed to improve environmental quality and protect aquatic resources and human health.

Figure 1. The location of PSNS&IMF and NBK in Sinclair Inlet, Bremerton, WA.

3. Background

A cooperative watershed-based approach to meet clean water objectives has been implemented through an ENVironmental inVESTment Project Agreement (ENVVEST) among PSNS&IMF, EPA, Ecology, and local stakeholders. This work has specifically addressed the development of a Total Maximum Daily Load (TMDL) for FC pollution in the Sinclair/Dyes Inlet surface water system adjacent to PSNS&IMF (May et al. 2005), calibrated and verified watershed and receiving water models to simulate the total loading of FC pollution in the watershed (Johnston et al. 2009), and established the basis for determining TMDL targets for jurisdictions within the watershed (Lawrence, Roberts, and Johnston 2010). Understanding and addressing all sources of FC pollution coming into the Inlets will help regulatory agencies prioritize pollution control and water cleanup plans and focus resources on obtaining measurable improvements in the quality of the environment.

Table 1. Data quality objectives for monitoring, assessment, and control of fecal coliform (FC) pollution in Sinclair Inlets near the Puget Sound Naval Shipyard.

Fecal Coliform Monitoring, Assessment, and Control Data Quality Objectives
STEP 1: State the Problem Sinclair Inlet in the Puget Sound, WA may be impacted by FC pollution from a variety of sources including shipyard operations, marina and vessel traffic, storm event runoff, discharges from waste water treatment plants, industrial outfalls, and surface streams. An ambient monitoring program is needed to assess the status and trends of FC contamination in the waters of Sinclair Inlet adjacent to the Puget Sound Naval Shipyard. The monitoring data will be used to assess the extent of contamination, determine corrective actions to control FC sources from the Shipyard, assess the effectiveness of pollution control measures, and determine if discharges from all sources are protective of beneficial uses including contact recreation and shellfish harvesting.
STEP 2: Identify the Decision 1. What are the status and trends of FC contamination in waters of Sinclair Inlet adjacent to the Shipyard? 2. Are FC discharges from shipyard impacting beneficial uses of Sinclair Inlet? 3. Are corrective actions needed to control FC discharges from the Shipyard into Sinclair Inlet? 4. If corrective actions are required, are they effective in reducing FC contamination in waters adjacent to the Puget Sound Naval Shipyard?
STEP 3: Identify Inputs to the Decision 1. Establish a network of monitoring stations in the vicinity of the Shipyard that are: (a) located along nearshore areas that receive discharges from stormwater and industrial outfalls, (b) cover the range of waterfront operations within the Shipyard, and (c) represent ambient conditions of the Inlet. 2. Conduct periodic monthly monitoring to establish trends associated with FC pollution levels near the Shipyard 3. Conduct storm event monitoring at representative stormwater outfalls within the Shipyard 4. Coordinate sampling with ongoing local and regional sampling being conducted within Sinclair/Dyes Inlet by Kitsap County SSWM, Kitsap County Health District, the Cities of Bremerton and Port Orchard, and other stakeholders. .
STEP 4: Define the Study Boundaries Spatial boundaries include NBK, PSNS&IMF and the waters of Sinclair Inlet and the surrounding watersheds.
STEP 5: Develop a Decision Rule Each ambient monitoring station will be monitored monthly for one year (a minimum of 12 sampling events). The data collected from each ambient monitoring station will be used to calculate a 12-month moving geometric mean and 90^{th} percentile for comparison to Part I and Part II of the water quality standards, respectively. The results will be used to categorize locations that do not meet standards, identify any follow-on pollution identification and control studies that may be required, determine the effectiveness of pollution control measures, and assess whether discharges from all sources are protective of beneficial uses.
STEP 6: Evaluate Decision Errors Data will be evaluated to assure accuracy, precision, completeness, comparability, and representativeness .

Fecal Coliform Monitoring, Assessment, and Control Data Quality Objectives
STEP 7: Optimize the Design for Obtaining Data Collect monthly water quality monitoring data (temperature, pH, conductivity, salinity, dissolved oxygen, turbidity, and secchi dish depth) and collect samples for FC analysis at sampling locations in nearshore areas of the Shipyard (within 200 ft of the shoreline and outfall discharge locations), at locations about 300 ft from the end of piers (at the security barrier), and at reference locations in Sinclair Inlet. Data from the network of ambient monitoring stations will be evaluated to assess the impact of FC releases from the Shipyard into Sinclair Inlet, characterize the status and trends of FC pollution in the vicinity of the Shipyard, and determine if discharges from all sources are protective of beneficial uses. The data will provide a basis for determining the need for improvement, assess the effectiveness of corrective actions, and inform adaptive management actions needed to improve environmental quality and protect human health and the environment.

4. Sampling Design

The data quality objectives for this study (Table 1) will be met by establishing a network of monitoring stations in nearshore areas of the Shipyard (within 200 ft of the shoreline and outfall discharge locations), at locations about 300 ft from the end of piers (at the security barrier), and reference locations in Sinclair Inlet (Figure 2, Table 2). During stormwater sampling scheduled for Fall/Winter of WY2011 (TAI 2009, 2010), FC samples will also be collected periodically from representative outfalls selected for monitoring during qualifying storm events (Figure 3). Data from the network of ambient monitoring stations will be evaluated to assess the impact of FC releases from the Shipyard into Sinclair Inlet, characterize the status and trends of FC pollution in the vicinity of the Shipyard, and determine if discharges from all sources are protective of beneficial uses. The ambient stations will be sampled monthly to establish trends associated with environmental quality within the Inlets. The stormwater outfalls will be sampled during qualifying events to characterize FC levels in stormwater discharged from the Shipyard. The sampling will be coordinated with ongoing local and regional sampling being conducted within Sinclair and Dyes Inlets by Kitsap County Health District (KCHD 2009), Kitsap County Surface and Stormwater Management (SSWM 2009), Washington Department of Health (WDOH 2010), the local cities and other jurisdictions within the watershed.

Key questions to be addressed by the monitoring program include:

- Are FC discharges from the Shipyard impacting beneficial uses of Sinclair Inlet?
- What are the status and trends of FC pollution in Sinclair Inlet adjacent to the Shipyard?
- Are corrective actions needed to control FC discharges from the Shipyard into Sinclair Inlet?
- If corrective actions are required, are they effective in reducing FC contamination in waters adjacent to the Puget Sound Naval Shipyard?

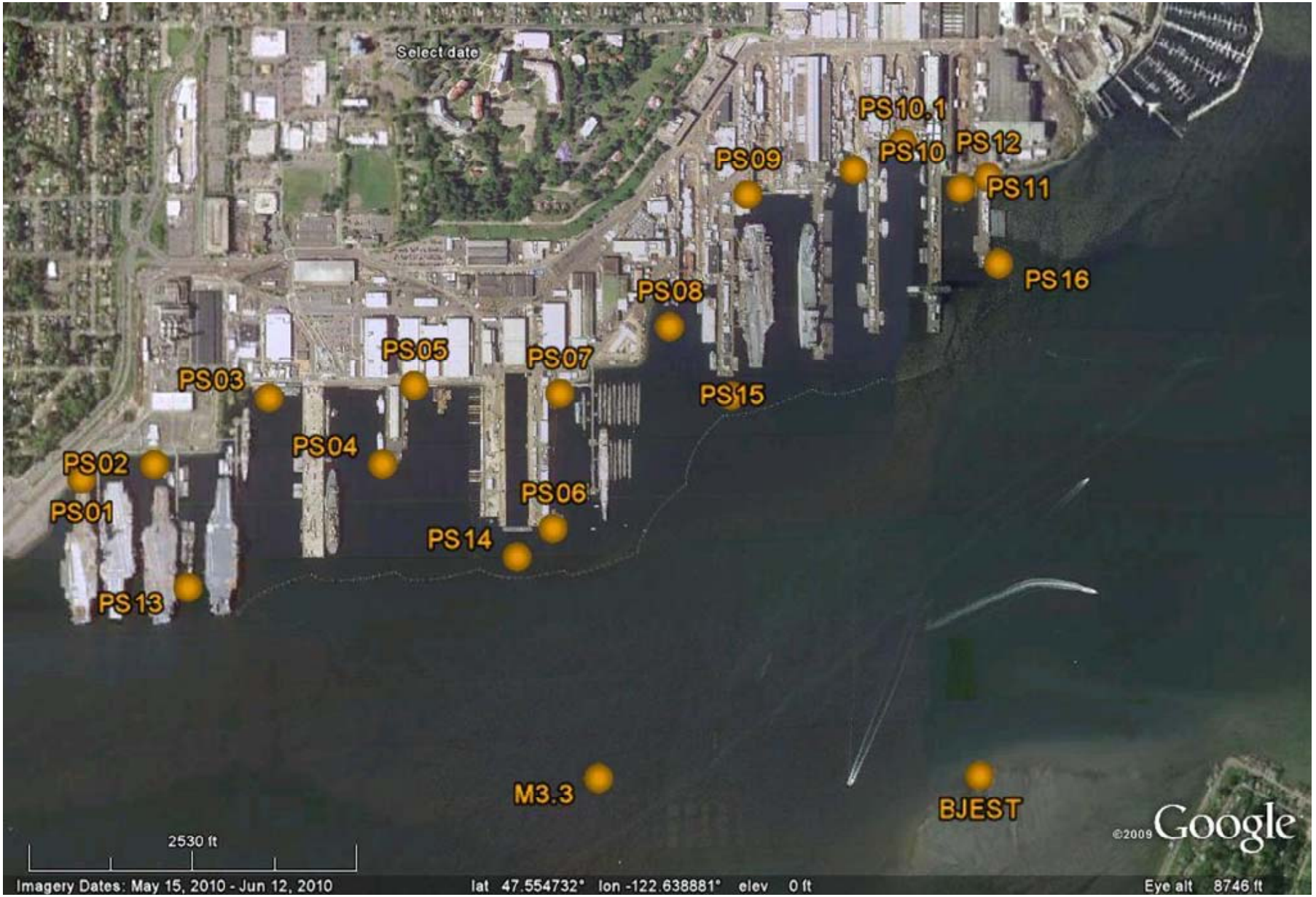

Figure 2. Proposed ambient sampling locations.

Figure 3. Industrial outfall discharge locations (blue circles) and stormwater outfall sampling locations (red circles) to be monitored during WY2011 (TAI 2009, 2010).

Table 2. List of sampling station locations.

	ENVVEST Stations	Outfall Ids	StationID	FC Sample		Comment	Coordinates	
							Latitude	Longitude
Shipyard								
	P1	B-ST28	PS01	1		Near Callow Ave Outfall	47.55209	-122.65903
		PSNS008	PS02	1		Inactive Ships	47.554453	-122.654308
	P2	PSNS015	PS03	1		Outfall drains large commercial/residental basin	47.55559	-122.651
			PS04	1		Pier "C"	47.554424	-122.647053
		PSNS053	PS05	1		Pier "B" newly constructed pier	47.555858	-122.645352
		NPDES19	PS06	1		Near DD6 outfall	47.552959	-122.641925
		PSNS081.1	PS07	1		Finger Pier	47.555904	-122.641411
	P3	PSNS096	PS08	1		Near DD5	47.557738	-122.638664
	P4	NPDES18AB	PS09	1		Near outfall for DD 1-5	47.559964	-122.635965
		PSNS124	PS10	1		Near DD2	47.560299	-122.632676
			PS10.1	1		Near DD1	47.56112	-122.631161
			PS11	1		Near DD3	47.560306	-122.629472
		PSNS126	PS12	1		Edge of CIA, Pier 7 removed	47.5609	-122.625598
		NPDES21	PS13	1		Inactive Ships near steam plant outfall	47.551248	-122.651904
			PS14	1		Security barrier offshore of DD6	47.551914	-122.642927
			PS15	1		Security Barrier offshore of CIA	47.555456	-122.635964
	P5		PS16	1		Security barrier east end of shipyard; Sea Lion haul out	47.558500	-122.628650
Sinclair Inlet								
	BJ-EST		BJ-EST	1		Mouth of Blackjack Creek	47.54401	-122.62628
	M3.3		M3.3	1		Center of Sinclair Inlet btwn Bremerton & PO	47.54782	-122.64394
	M4		M4	1		Center of Sinclair Inlet off Ross Point	47.54215	-122.66491
		Total Samples		20				

4.1 Technical Approach

The sampling will be initiated on or following October 1, 2010 and will continue until the end of Water Year (WY) 2011 (September 30, 2011). The analysis and data report will most likely be completed by December 2011. Any deviations from this plan will be documented in writing and appended to this sampling plan.

Ambient water marine samples will be collected from a small boat provided by the Shipyard using sterile sampling techniques (APHA 1999) for FC analysis. Water quality characteristics will also be measured using an in situ probe and a secchi dish will be used to measure light penetration depth (Table 3). The coordinates of the sampling locations will be recorded with a handheld GPS, and time, tidal state, weather conditions, and other pertinent information will also be recorded. Stormwater samples will be taken periodically during qualifying storm events, where a qualifying event for sampling is defined as a storm event that results in more than 0.25 inches of rain within a 24-hr period, following a discernable period of no rainfall (ENVVEST 2002b, TEC 2004, 2005). The details of the storm event sampling are provided in TAI (2009, 2010).

Table 3. Analysis parameter, type of sample, and method information.

Analysis Parameters	**Type of Sample**				
Microbial Pollution		**Bottle Size**	**Preservation**	**Holding Time**	**Method***
Fecal Coliform Bacteria	Grab	125-375 ml (sterile)	Cool, 4C	24 hr	SM9222D (APHA 1999)
Water Quality		**Precision/ Repeatability**	**Detection Limit**	**Instrument**	
Temperature	in situ	±0.3°C	-10-50°C	Horiba U10	
pH	in situ	±0.05 pH units	0-14 pH	Horiba U10	
Specific Conductance	in situ	±1% of full scale	0-100 mS/cm	Horiba U10	
Salinity	in situ	±0.1%	0-4%	Horiba U10	
Dissolved oxygen	in situ	±0.1 mg/L	0-19.9 mg/L	Horiba U10	
Turbidity	in situ	±3% full scale	0-800 NTU	Horbia U10	
Secchi Depth	in situ	±0.5 ft	NA	Secchi Dish	

* Or equivalent method

4.2 Technical Requirements:

The analytical laboratory selected for this work must be able to demonstrate proficiency and capability to conduct the FC analysis required by holding a Washington State Accreditation for FC analysis. Certified clean and sterile (for microbial samples) sample bottles shall be provided by the Laboratory at least 48 hr in advance of scheduled sampling events or within 96 hr of notification of an upcoming sampling event. Samples will be collected and provided to the Laboratory by PSNS&IMF staff at a pre-arranged pickup location agreed to by both parties. A sample chain of custody (COC) sheet will be provided for each set of samples that will identify the sample ID, date/time of sample, and other sample information (see Attachment 1).

4.3 Sampling Schedule.

The estimated sampling schedule and number of samples to be collected is provided in Table 4. Monthly samples will be collected periodically for one year and storm event samples will be collected during qualifying storm events (TAI 2009, 2010). The laboratory will be notified at least 72 hr prior to an attempt to collect storm event samples.

Table 4. Sampling events, estimated date, and number of samples to be analyzed for FC.

Ambient Marine Sampling (Tentative Date)	stations	samples	field duplicates	total samples
Tuesday, October 26, 2010	20	1	2	22
Tuesday, November 16, 2010	20	1	2	22
Wednesday, December 22, 2010	20	1	2	22
Wednesday, January 19, 2011	20	1	2	22
Wednesday, February 23, 2011	20	1	2	22
Wednesday, March 23, 2011	20	1	2	22
Tuesday, April 26, 2011	20	1	2	22
Tuesday, May 17, 2011	20	1	2	22
Tuesday, June 14, 2011	20	1	2	22
Tuesday, July 20, 2010	20	1	2	22
Tuesday, August 23, 2011	20	1	2	22
Wednesday, September 21, 2011	20	1	2	22
Stormwater Outfall Sampling*				
Storm -1	4	6	2	26
Storm -2	4	6	2	26
Storm -3	4	6	2	26
Storm -4	4	6	2	26
Storm -5	4	6	2	26
Total				394

*Qualifing Storm Event TBD; Outfall stations will be alternated

4.4 Quality Assurance/Quality Control (QA/QC).

Field samples will include a field duplicate (1 for approximately every 10 samples) and the laboratory will conduct laboratory reanalysis of about 5% of the field samples (approximately 1 laboratory reanalysis for every 20 field samples). The laboratory will document all good laboratory practice (GLP) procedures and notify the government of any QA/QC problems to identify appropriate corrective action.

4.5 Safety

All personnel participating in field sampling activities will be briefed on health and safety issues involved in the sampling (Attachment 2. Safety Notes).

5. Coordination with Local and Regional Puget Sound Monitoring Programs

The FC monitoring to be conducted for the Shipyard will be coordinated, to the extent practical, with other ongoing bacterial monitoring programs being conducted for Sinclair and Dyes Inlets. These programs include water and shellfish monitoring programs conducted by Kitsap County Health District and Surface and Storm Water Management Programs (KCHD 2002, 2003a,b, 2009, KC-SSWM 2009) and Washington State Department of Health (Determan 2001, WDOH 2009); NPDES monitoring for WWTPs, Industrial Outfalls, and storm water being conducted by the City of Bremerton, West Sound Utility District, Central Kitsap Wastewater District, U.S Navy (TAI 2009, 2010), and City of Bainbridge Island.

Coordination will be accomplished by sharing data and information developed by the monitoring program, collaborating on sampling and analysis, participating in technical workshops, scientific conferences, and other proceedings, and partnering to achieve mutual objectives.

6. Data Management and Analysis

Data generated in support of this project will be tracked and reviewed by the ENVVEST Technical Coordinator. Data management (*e.g.,* paper flow; data tracking, data entry, etc.) and data assessment (*e.g.,* verification, validation, and Data Quality Assessment (DQA)) activities require adequate QC procedures to ensure that the SOPs will be followed and result in records and reports that are accurate and appropriate. QC procedures include peer review of each step and management review of a certain percentage of the data.

Data management at the laboratory begins with the receipt of samples. Samples are logged in and assigned unique identification numbers that are used to identify samples throughout storage, processing, analysis, and reporting. A combination of hand-recorded and electronically captured data is generated. Hand-recorded data include sample processing and spiking procedures. Hand-recorded data are transcribed to spreadsheets using established formats. (The raw data are maintained in the project files and the transcribed data are 100% verified). Data will be entered into an electronic format compatible with Ecologies Environment Information Management System (EIM).

6.1 DATA VALIDATION AND USABILITY

Data review includes data verification, validation, and oversight, as well as reconciliation of the data quality with user requirements. The data verification process includes the initial review of the data packages to ensure that the analyses requested have been provided. Data validation is the process of reviewing data and accepting, qualifying, or rejecting data on the basis of sound criteria.

6.2 ASSESSMENT

Each ambient monitoring station will be monitored monthly for one year (a minimum of 12 sampling events). The data collected from each ambient monitoring station will be used to calculate a 12-month moving geometric mean and 90^{th} percentile for comparison to Part I and Part II of the water quality standards, respectively. Preliminary data collected during the Spring of 2010 are shown in Attachment 3. Preliminary Results from Spring 2010 Sampling. Data from the stormwater monitoring events will be used to characterize FC discharges from stormwater runoff from the Shipyard. The results will be used to categorize locations that do not meet standards, identify any follow-on pollution identification and control studies that may be required, determine the effectiveness of pollution control measures, and assess whether discharges from all sources are protective of beneficial uses.

Based on the analysis of the results, following on studies and corrective actions may be identified and recommended for implementation. Follow-on studies include site inspections and upstream sampling in problem areas to identify cross connections, broken pipes, or other sources; conducting microbial source tracking analysis to determine whether fecal matter is originating from birds, wildlife, or human sources; and conducting other investigations to identify direct and indirect sources of bacterial pollution. If warranted, based on the outcomes of these investigations, corrective action plans will be developed and submitted to Shipyard management for authorization and scheduling for implementation.

7. Summary

Sinclair Inlet in the Puget Sound, WA may be impacted by FC pollution from a variety of sources including shipyard operations, marina and vessel traffic, storm event runoff, discharges from waste water treatment plants, industrial outfalls, and surface streams. An ambient monitoring program was described to assess the status and trends of FC contamination in the waters of Sinclair Inlet adjacent to the Puget Sound Naval Shipyard.

Each ambient monitoring station will be monitored monthly for one year (a minimum of 12 sampling events). The data collected from each ambient monitoring station will be used to calculate a 12-month moving geometric mean and 90^{th} percentile for comparison to Part I and Part II of the water quality standards, respectively. Data from stormwater monitoring event will be used to characterize FC discharges from stormwater runoff from the Shipyard. The results will be used to categorize locations that do not meet standards, identify any follow-on pollution identification and control studies that may be required, determine the effectiveness of pollution control measures, and assess whether discharges from all sources are protective of beneficial uses.

8. References

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TEC 2005. Field Sampling Reports for 2005 Storm Events. http://www.ecy.wa.gov/programs/wq/tmdl/sinclair%2Ddyes%5Finlets/sinclair%5Fcd/Watershed/StreamStormSampling2002%2D2003/Field%5FSampling%5FReports/FY2005/

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9. Attachments

Attachment 1. Example chain of custody sheet.

Project:						Analysis				
Sampling Team										
Results To										PSNS
FAX										POC: Bob Johnston
Cell										c/106.32
Type: Freshwater Marine Sewage _____										1400 Farragut Ave
										Bremerton, WA 98314
#	Sample ID	Date	Time	Results	Lab ID #	MF Fecal Coliform				Notes & Comments
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
Collected by:										
Reelinquished by:						Date		Time		
Received by:						Date		Time		

Attachment 2. Safety Notes

Work on the water is inherently hazardous and this danger is greatly compounded in bad weather. The safety of the crew and equipment is of paramount importance throughout the project. Each person working on board the vessel should take personal responsibility for his or her own safety.

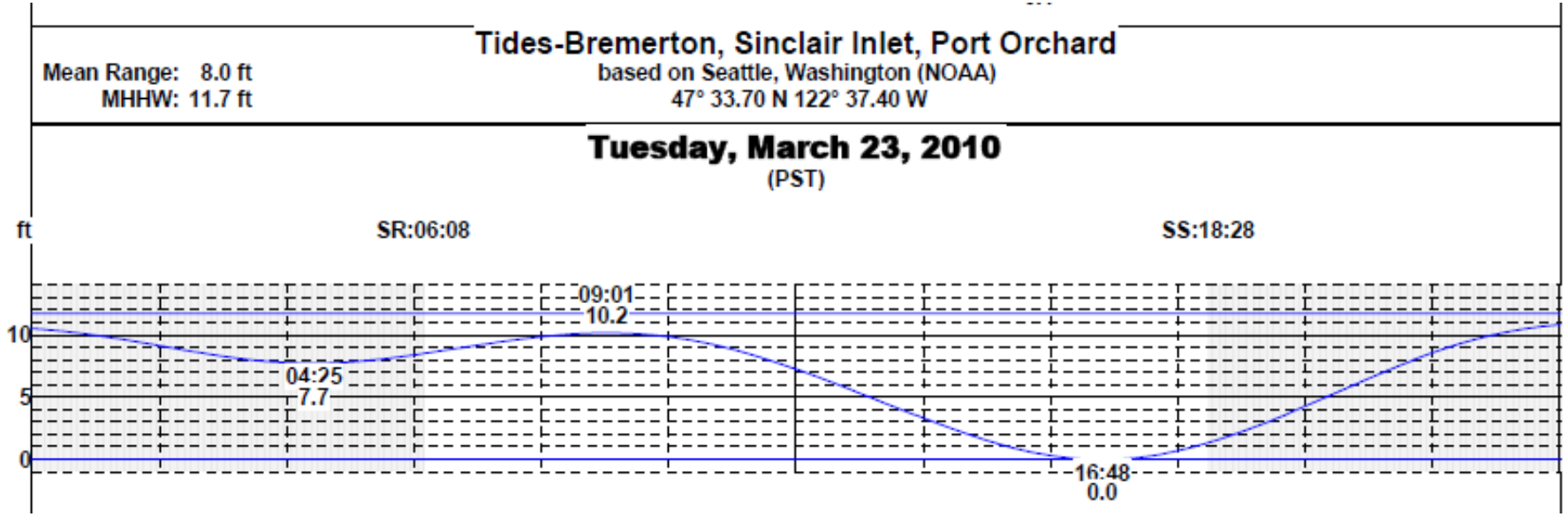
Many accidents at sea are preventable. Safety awareness by the Boat Captain and all crewmembers is the greatest single factor that will reduce accidents at sea. All personnel will defer to the judgment of the Boat Captain regarding safety or operational concerns. Operations should be canceled or postponed during hazardous weather conditions. The final decision is made by the Boat Captain, who is responsible for the safety of everyone on board. As with any field program, the first priority is the safety of the people on board, followed by the safety of the equipment and the recovery of the data.

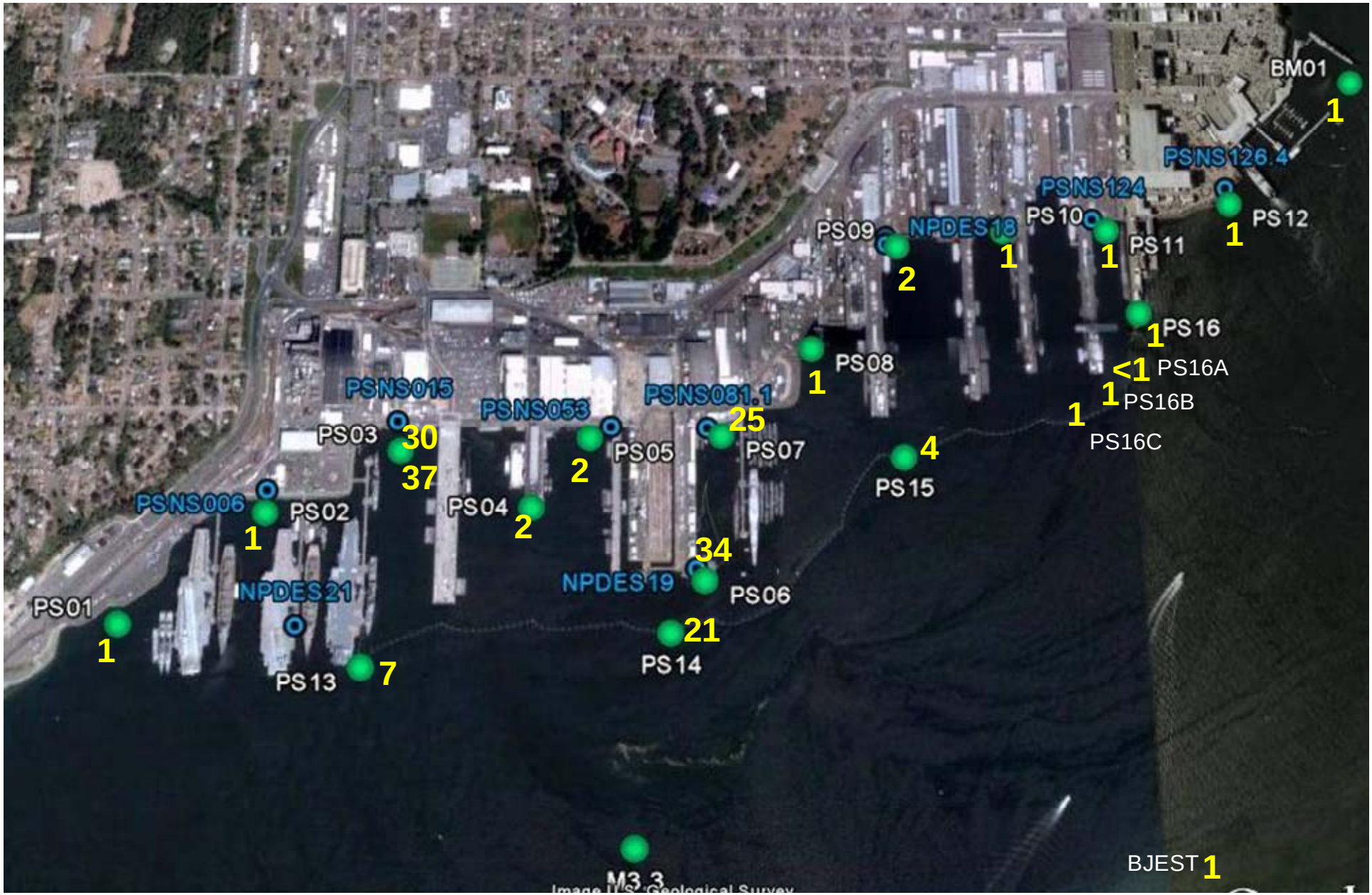
Safety Check List.

- All crewmembers will wear personal floatation devices (PFDs) at all times while onboard the vessel.
- Wear appropriate personal protection devices (PPDs) – steel toed boots, rain gear, warm clothes, etc
- Keep control of personal gear and prevent unsafe cluttering of workspaces.
- Notify boat captain or other crewmembers if you observe unsafe working conditions.
- No alcohol consumption or smoking while onboard the vessel.

Attachment 3. Preliminary Results from Spring 2010 Sampling

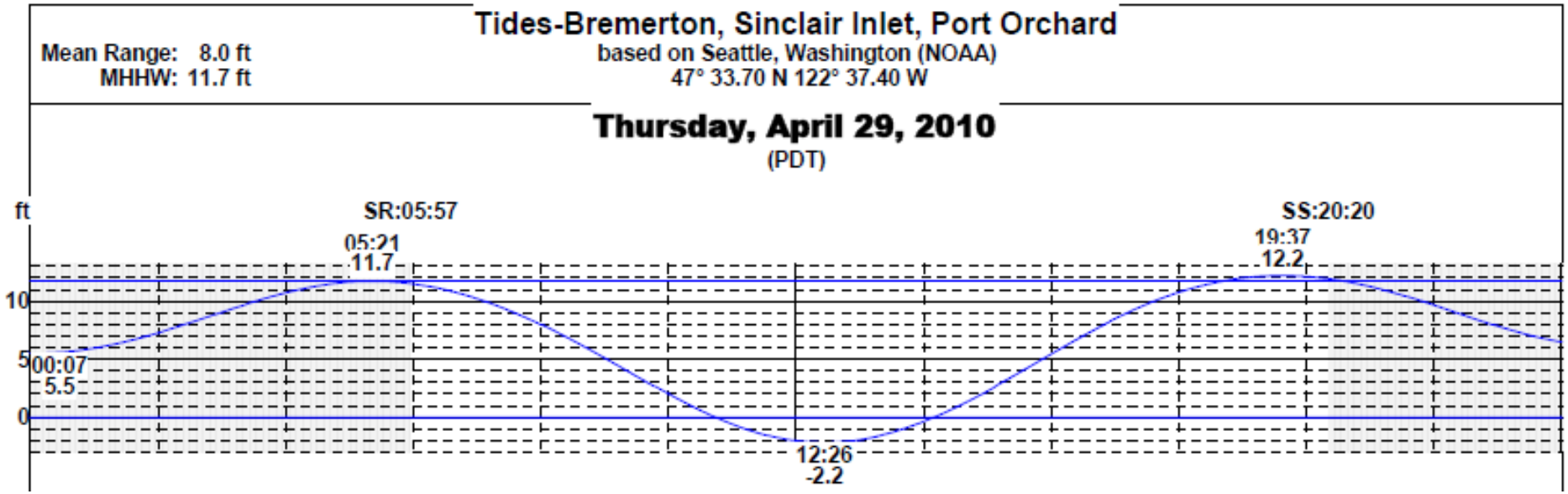
March 23, 2010





Results from FC samples (cfu/100ml) collected March 23, 2010

April 29, 2010



Results from FC samples (cfu/100ml) collected April 29, 2010

APPENDIX F:

STANDARD OPERATING PROCEDURES FOR EQUIPMENT DECONTAMINATION

SOP: STEPWISE DECONTAMINATION PROCEDURE
Method A & B– DECONTAMINATION OF SAMPLING EQUIPMENT

Purpose: Define explicit methods to decontaminate equipment utilized for environmental sampling.

Program: Puget Sound Naval Shipyard (PSNS) – National Pollutant Discharge Elimination System Program; Non-Dry Dock Stormwater Monitoring and Support.

Rev. Date: October 19, 2010

Method A Decontamination Process (Without Metal Parts)

Step Number	***PSNS Equipment approved for decontamination with this SOP:*** Glass Composite Bottles with Teflon Lined Lids (2.5 gal), Plastic 1-L Isco Wedge Bottles, Quick Connect Tubing Fittings, Stir Bars, Teflon Sample Tubing, Silicone Tygon Pump Tubing, Project Dedicated Glassware, Other Re-usable Teflon or Glass Sample Containers
Step 1	Wash with non-phosphate detergent solution (Micro-90).
Step 2	Rinse with DI water.
Step 3	Rinse with 20% reagent grade HCl.
Step 4	Rinse with DI water.
Step 5	Wash with 10% methanol/ 90% isopropyl alcohol solution.
Step 6	Rinse with DI water.
Step 7	Collect quality control blank samples if scheduled.
Step 8	Package equipment in appropriate protective material for transport/storage. (Ends of tubing should be closed together using silicon tubing (do not use aluminum foil). All equipment should be placed in a clean plastic zip top bag or clear trash bag for transport)

Method B Decontamination Process (With Metal Parts)

Step Number	***PSNS Equipment approved for decontamination with this SOP:*** Stainless Steel Beakers, Stainless Steel Connectors
Step 1	Wash with non-phosphate detergent solution (Extran 300).
Step 2	Rinse with DI water.
Step 3	Wash with 10% methanol/ 90% isopropyl alcohol solution.
Step 4	Rinse with DI water.
Step 5	Collect quality control blank samples if scheduled.
Step 6	Package equipment in appropriate protective material for transport/storage. (Ends of tubing and stir bars should be covered in clean aluminum foil; then placed in plastic bag.) All other cleaned equipment should be placed in a clean plastic bag.)

APPENDIX G:

EXAMPLE AUTOSAMPLER PROGRAMS

Standard Sampling Program
(programming for Isco 6700)

****** PROGRAM SETTINGS ******

PROGRAM NAME:
"PSNS081-1 "
SITE DESCRIPTION:
"PSNS081-1 "

UNITS SELECTED:
LENGTH: ft

24, 1000 ml BTLS
39 ft SUCTION LINE
17 ft SUCTION HEAD
0 RINSES, 0 RETRIES

ONE-PART PROGRAM

PACING:
FLOW, EVERY
1 PULSES
SAMPLE AT START

DISTRIBUTION:
4 SAMPLES/BOTTLE

VOLUME:
240 ml SAMPLES

ENABLE:
NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

NO RAIN GAGE

NO YSI SONDE

MASTER/SLAVE OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR
EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

I/O1= NONE
I/O2= NONE
I/O3= NONE
---
0 ANALOG OUTPUTS
NO PERIODIC
SERIAL OUTPUT

NO DIALOUT
CONDITIONS SET

Duplicate Sampling Program
(programming for Isco 6700)

*****PROGRAM SETTINGS******

PROGRAM NAME:
"PSNS126DUP"
SITE DESCRIPTION:
"PSNS126DUP"

UNITS SELECTED:
LENGTH: ft

24, 1000 ml BTLS
21 ft SUCTION LINE
13 ft SUCTION HEAD
0 RINSES, 0 RETRIES

ONE-PART PROGRAM

PACING:
FLOW, EVERY
1 PULSES
SAMPLE AT START

DISTRIBUTION:
2 BOTTLES/SAMPLE
8 SAMPLES/BOTTLE

VOLUME:
120 ml SAMPLES

ENABLE:
NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

NO RAIN GAGE

NO YSI SONDE

MASTER/SLAVE OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR
EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

I/O1= NONE
I/O2= NONE
I/O3= NONE
---
0 ANALOG OUTPUTS

NO PERIODIC
SERIAL OUTPUT

NO DIALOUT
CONDITIONS SET

APPENDIX H:
TELEMETRY SYSTEMS WIRING DIAGRAMS

WIRING INSTRUCTIONS for Stations using the INW CT2X Sonde

INW CT2X-measures pressure, temperature, and conductivity
SDI-12 address is 0

White	12V
Brown	C1
Clear, Blue	G

ISCO 674 Rain Gauge

Pin A (Green)	P1
Pin D (Red)	G

Raven XT Modem

Connect Null Modem Cable (1ft) to RS232

Red	SW-12V
Black	G

ISCO 6700 Sampler to Flowmeter

Pin A (Red)	H on VDIV10.1 (7H)
Pin B (White)	G
Pin C (Green)	C8
Pin E (Yellow)	C7
Pin F (Blue)	C6

ISCO 6700 Sampler Download

Pins B& C (Yellow)	G
Pin D (Red)	C4 (RX)
Pin E (Orange)	C3 (TX)

12V Power

Pin A (White)	G on power plug
Pin B (Red)	12V on power plug

WIRING INSTRUCTIONS for stations using CS450 & YSI sonde

CS450- pressure transducer-installed in vault
SDI-12 address is 0

Red	12V
White	C1
Black, Clear, Blue, Yellow	G

YSI 6820 measuring conductivity, temperature, and salinity
SDI-12 address is **1**

Pin A (Red)	12V
Pin B (Black, Shield)	G
Pin F (Purple)	C1

ISCO 674 Rain Gauge connected to same connector as 6820

Pin B (Red)	G
Pin D (Green)	P1

Raven XT Modem
Connect Null Modem Cable (1ft) to RS232

Red	SW-12V
Black	G

ISCO 6700 Sampler to Flowmeter

Pin A (Red)	H	on VDIV10.1 (7H)
Pin B (White)	G	
Pin C (Green)	C8	
Pin E (Yellow)	C7	
Pin F (Blue)	C6	

ISCO 6700 Sampler Download

Pins B & C (Yellow)	G
Pin D (Red)	C4 (RX)
Pin E (Orange)	C3 (TX)

12V Power

Pin A (White)	G on power plug
Pin B (Red)	12V on power plug

APPENDIX I:

FIELD FORMS

PSNS NDDSW Monitoring Project Storm Control Work Sheet *Sht Rev. 112111* Sheet 1 of ___

Date:				**Sampling Support Personnel:**	
STE #		**Antecedent Dry Cond. Met ?**		**Tidal Info:**	
Storm Controller:				**Grab sampling Info.**	
Pre-Storm / Weather Details:					

Telemetry Measurements:	**DATE/TIME (24HR)**												
STATION:													
PSNS015 Rain[1]													
PSNS015 Level													
PSNS015 Cond.													
Smpl Marker													
PSNS084.1 Rain													
PSNS084.1 Level													
PSNS084.1 Cond.													
Smpl Marker													
PSNS115.1 Rain													
PSNS115.1 Level													
PSNS115.1 Cond.													
Smpl Marker													
PSNS124 Rain													
PSNS124 Level													
PSNS124 Cond.													
Smpl Marker													
PSNS124.1 Rain													
PSNS124.1 Level													
PSNS124.1 Cond.													
Smpl Marker													
PSNS126 Rain													
PSNS126 Level													
PSNS126 Cond.													
Smpl Marker													

[1]Rain dephs are reported as 1-hr / 24-hr totals

PSNS NDDSW Monitoring Project Storm Control Work Sheet, Continued *Sht Rev. 112111* Sheet 2 of ___

Date:				**Sampling Support Personnel:**									
STE #		**Storm Controller:**			**Strm Evnt Start / Stp**								
Enabling Information:													
Sample Staion:	PSNS015		PSNS084.1		PSNS115.1		PSNS124		PSNS124.1		PSNS126		
Rain enable (in/hr)													
Level Enable (ft)													
Cond. (µS/cm)													
Repeat. Cond Set ?													
Pacing Rate (min)													
Date													
Time													
Comp Dup ? / where:							**Grab Dup ? / where:**						

EVENT NOTES:

PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

ver.020411

Station:	**MH/CB#:**	**Loc. Descrip.**

Section 1. Station Reset and Inspection			
Personnel:	Weather:	Arrival Date/Time:	
Carry-over maintenance to do prior to set-up:			done?
Sampler Battery Voltage		Changed? **Y N**	New voltage
Modem Battery Voltage		Changed? **Y N**	New voltage
Sample Tubing & Strainer OK?		**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	
Trands. Cable OK?		Internal Sampler Tubing OK?	
Trands. Desiccant OK (Yes/No)		Tubing Replaced? (Yes/No)	
Telem. Box Desiccant OK (Yes/No)		Normal Smpler Program or Dup. ?	
Modem Status		Bottles Loaded ?	
Notes (including channel condition):		Lid Status?	
		Backflushed with DI?	
		Suction line & quick connect attached?	
		Smplr Status (on/off) / last screen..	

Section 2. Storm Setup and Inspection			
Personnel:	Weather:	Arrival Date/Time:	
Sampler Battery Voltage		Changed? **Y N**	New voltage
Modem Battery Voltage		Changed? **Y N**	New voltage
Sample Tubing & Strainer OK?		**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	
Transducer Cable OK?		Aliquot Vol. Cal.'ed (Y/N & vol.)	
Multi-meter Cable OK		Program Reviewed (Yes/No), Dup ?	
Recorded Level (FT)		Lids off bottles?	
Measured Level (FT)		Diagnostics/Distrubutor arm check?	
Offset Diff (FT)		Backflush with DI?	
Level Adjusted ?		Storm Reset (1, enter) Completed	
Cond. Sonde Type (YSI6820 or INW-CT2X)		Last screen…	
Cond. Sonde Cal. Info. : Recorded Val. =	Meas. Val. =	Diff. =	(>10% adj. offset); Offset = New Rec Val =
Notes: (e.g. enabling values, cond cal. meter make/model/ser#, etc.)			

Section 3. Grab Sample Collection				
Personnel:	Weather:	Arrival Date/Time:		
On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):		
Grab Parameters Collected		Salinity Reading (PPT):		
Grab Sample ID		Temp. Reading (°C):		
Grab Date/Time		Turbidity Reading (NTU)		
Grab Dup ID		Equipment running correctly?		
Grab Dup Date/Time		Sampler Battery Voltage (Changed?):		
Sample Observations (notify storm controller if sample turbidity, odor, color, foam, or sheen look out of the ordinary): which?:				
Storm Contoller notified (Y or N/A)?:		Grab MS/MSD Collected ? Y / N	Ice OK?	
Notes: (what meter was used for site readings, etc.)				

Station:	continued from previous page	Page:___of___

Section 4. Post-Storm Sample Collection (for grab, comp or both)			
Personnel:	Weather:	Arrival Date/Time:	
Sampler Battery Voltage		Changed? **Y** **N**	New voltage
Telemtery Battery Voltage		Changed? **Y** **N**	New voltage
Additional Grabs (IDs, date/time)			
Additional Dup Grab (IDs, date/time)			
Composite Begin Time (date/time)		Sampler Report Downloaded ?	
Last Aliquot Taken (date/time, bott #, aliq #)			
Total Composite Sample Volume Collected			
Aliquots missed/NLD (date/time/bott #/aliq #)			
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)?			
Storm Contoller notified (Y or N/A)?:	Which parameter?:		
Notes:			
Maintenance Needed:			

Section 5. Compositing Scheme and QC Sampling			
Personnel:		Date/Time:	
Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)			
Conductivity & Turbidity Testing (List ind. smplr bottle; cond. reading in µS/cm; turb. reading in NTU; will ind. smpl be included in comp smpl Y/N):			
Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample)			
Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis)			
Composite Sample ID & Time:			
Field Blank Collected? (date/time)			
Blank ID:			
Duplicate comp sample? Yes/No			
Duplicate sample ID			

NOTES:

SAMPLE CHAIN OF CUSTODY FORM

Date:

Page: _____ of _____

Project No.: N4523A10MP00034 Amend.1

Project: PSNSNon-dry Dock SW 2010

Battelle
Marine Sciences Laboratory
1529 West Sequim Bay Road
Laboratory: Battelle MSL
Attention: Jill Brandenberger
Phone: (360) 681-4564

				Analyze parameters per QAP/FSP														
Sample Label	**Station ID**	**Collection Date/Time**	**Matrix**	Hardness	TOC	DOC	TSS	TME/DME	TPH	Turbidity					No. containers	**Sample Type (Grab vs. Comp)**	**Storm#**	**Notes / Comp. Cond. (µS/cm) and Turb. (NTU) Readings**

Relinquished by: _____

Signature Date Time

_____

Printed Name Company

Received by: _____

Signature

_____

Printed Name

Total # of Containers:

Shipment Method:

Sample Disposition:

Relinquished by: _____

Signature Date Time

_____

Printed Name Company

Received by: _____

Signature

_____

Printed Name

Distribution:
1) PNNL
2) CAS
3) TAI

Puget Sound Naval Shipyard Confined Space/Hazardous Area Entry Permit		
Job Location/Site Description:	Date:	
	Permit Expires At	
	Date:	Time:
Reason for Entry:		
Type of Entry:		
Entry Supervisor:		
Standby Person (if present):		

SPECIFIC HAZARDS THAT MAY BE ENCOUNTERED:

ATMOSPHERIC ☐ PHYSICAL ☐ OTHER (explain) ☐ _____

AUTHORIZED ENTRANTS	TIME IN	TIME OUT
1.		
2.		
3.		
Attendant:	N/A	N/A

HAZARD CONTROL:

Physical Hazard Requirements	Yes	No	Notes
Fall Protection Equipment			
Lighting (Intrinsically Safe)			
Hearing Protection			
Secure Area and Monitor			
Personal Protective Equipment			
Hard Hats			
Onsite Rescue Equipment Required	**Yes**	**No**	**Notes**
Fire Extinguisher			
Respirator / SCBA			
Communications Devices			
Retrieval Equipment			
Atmospheric Equipment Required	**Yes**	**No**	**Notes**
Gas/O_2/LEL Detector			
Blower/Ventilator			

EMERGENCY RESCUE INFORMATION: In the event of a life threatening emergency at PSNS, dial **911** and explain the situation and your location. Notify PSNS Emergency Line @ **360-476-3333** and request coordination assistance. For additional information refer to the project Health and Safety Plan.

I certify that I have evaluated the situation and the assigned personnel and the procedures to be followed are in compliance with Taylor Associates, Inc. Confined Space Program.

Signed_____. Print Name_____.

PLEASE KEEP COMPLETED PERMIT ON FILE.

Puget Sound Naval Shipyard
Confined Space/Hazardous Area Entry Permit
Continued

Atmospheric Requirements Continued					
Acceptable Limits for Entry					
Oxygen (O_2): 19.5 – 23.5 %					
Combustible Gas – Lower Explosion Limit (LEL): 10% Max					
Hydrogen Sulfide (H_2S) : 10 PPM Max					
Carbon Monoxide (CO): 35 PPM Max					
Other (explain):					
Time (24-hr)	**O_2**	**LEL**	**H_2S**	**CO**	**Other_____**
Pre-Entry					
Entry					

Gas Detector Information		
Unit #:	Unit Operational	
Last Calibrated:	Battery Check	

NOTES:

TAYLOR ASSOCIATES, INC.

PSNS Non-Dry Dock Stormwater Monitoring Project
Sediment Grab Sample Collection Field Sheet

Personnel:	**Date/Time:**
Weather	

Station ID:	
Manhole/CB #:	
Location Description:	
Sampling Methodology:	
Sampling Equipment Used:	
Decon'ed per PWP / PSNS Sed QAPP ?:	
Trip Blanks ?:	
Sediment Grab Sample ID:	
Sample time:	**Bottles labeled?:**
Parameters for Testing:	
Sediment Present? Approx depth?	
Water Present? Approx depth?	
Water flowing? Stagnant?	
Sed. color: brown, black, grey, yellow, red, mottled	**Sed. odor:** petroleum, pungent, sewage, earthy, salty
Sed. sheen: none, some, lots	**Sed. consistency:** gravelly, sandy, silty, clayey, organic
Est. % of sample removed (particles ≥ 2 cm):	
Notes:	
Sketch:	

PSNS NDDSW Monitoring Stations
Field Tasks - Daily Notes
Station Maintenance Tasks 2011-12
Date:

Weather:	
Personnel:	
Arrival:	**Departure:**

STATION ID:	TASKS / NOTES

Station Maintenance Tasks:	015	084.1	115.1	124	124.1	126
Batteries (logger / sampler)						
Loggernet connection (modem / datalogger)						
Rain gauge inspection / maintenance (cleaning, leveling, other)						
CT2X Transducer Maint. (level, conductivity)						
YSI 6820 Maint. (calibration)						
Tubing connections						
Wiring connections						
Enclosure housekeeping						
Cable ramps						
Manhole lids / access						
Vault interior (cables/tubing secure, sensors and sampler intake secure, banding in-place, debris-free)						
Other:						

General Notes:

Water Quality Probe Calibration Form

Sonde SN: **Sonde Make/Model:**

Project:

	Before Use	After Use
Location:		
Personnel:		
Date/Time:		

Calibration Standard	pH	Turbid.	Cond.
Standard expiration date			
Date standard opened			
Number of times used			

Conductivity		
Standard Value (mS/cm)		
Standard Description		
Measured Value of Standard (mS/cm)		
Calibrated (Y/N). New Value (mS/cm)		
Relative Percent Difference		
Cal Constant (Range: 5.0 +/- .5)		
Maintenance Performed:		
Cleaned w/ Soft Scrub (Y/N)		
Sensor Replaced (Y/N)		

Dissolved Oxygen		
Standard Value (%)		
Barometric Pressure (mm of Hg) (1in.=25.4mm.)		
DO Charge (Range: 50 +/- 25)		
Measured Value of Standard (% & mg/L)		
Calibrated (Y/N). New value (%)		
DO Gain (Range: 0.7 to 1.5)		
Relative Percent Difference		
Field Calibration Before Use (%)		
Maintenance Performed:		
Membrane Changed (Y/N)		
Anodes Sanded (Y/N)		
O-ring Changed & Greased (Y/N)		
Sensor Replaced (Y/N)		

pH		
Standard 1 Value/Description		
pH MV (Range for pH 7: 0 +/- 50)		
Measured Value of Standard 1		
Calibrated (Y/N). New Value		
Relative Percent Difference		
Standard 2 Value/Description		
pH MV (Range for pH 10: -177 from 7 buffer)		
Measured Value of Standard 2		
Calibrated (Y/N). New Value		
Relative Percent Difference		
*Sensor slope (mV)		
*(Note**:** Slope between pH 4 and pH 7 and slope between pH 7 and pH 10 should be approx. 165 to 180 MV)		
Maintenance Performed:		
Reference Probe Replaced (Y/N)		
pH Probe Replaced (Y/N)		

NOTES:

TAYLOR ASSOCIATES, INC.

Tailgate Safety Meeting Form

Daily Health And Safety Tailgate Meeting Form	
Site Health and Safety Officer Conducting Meeting :	
Date :	**Weather:**
Personnel In Attendance :	
Meeting Minutes (Brief description of topics, special concerns and sites discussed):	
Signature of Attendees' :	
"THE BEST JOB IS ONE DONE SAFELY ! "	

APPENDIX J:

PROJECT DATA QUALIFIERS

Table J-1. Project Data Qualifiers

Method Qualifiers	
A	Method qualifier - Flame AA
AV	Method qualifier - Automated cold vapor
C	Method qualifier - Manual spectrophotometric
CV	Method qualifier- Manual cold vapor
F	Method qualifier - Furnace AA
NR	Method qualifier - Analyte was not required
P	Method qualifier - ICP
X	Method qualifier – XRF screening
I	Method qualifier – Immunoassay screening
Data Qualifiers	
B	Analyte found in both sample and associated blank. The "B" will be reported on the result associated with the field samples, not the blank
C	Presence confirmed by GC/MS (Pesticides only)
D	Dilution run. Initial run outside linear range of instrument. Organics only.
E	Estimate, result outside linear range of instrument. GC/MS only
J	Estimated concentration between the MDL and RL
U	The concentration is less than the MDL, or the analyte was not detected
W	Post-digestion spike out of control limits
Quality Control Qualifiers	
M	Duplicate inject precision did not agree, organics only
N	Spiked sample recovery not within control limits
&	Accuracy result not within control limits (outside recovery of SRM)
*	Precision result not within control limits