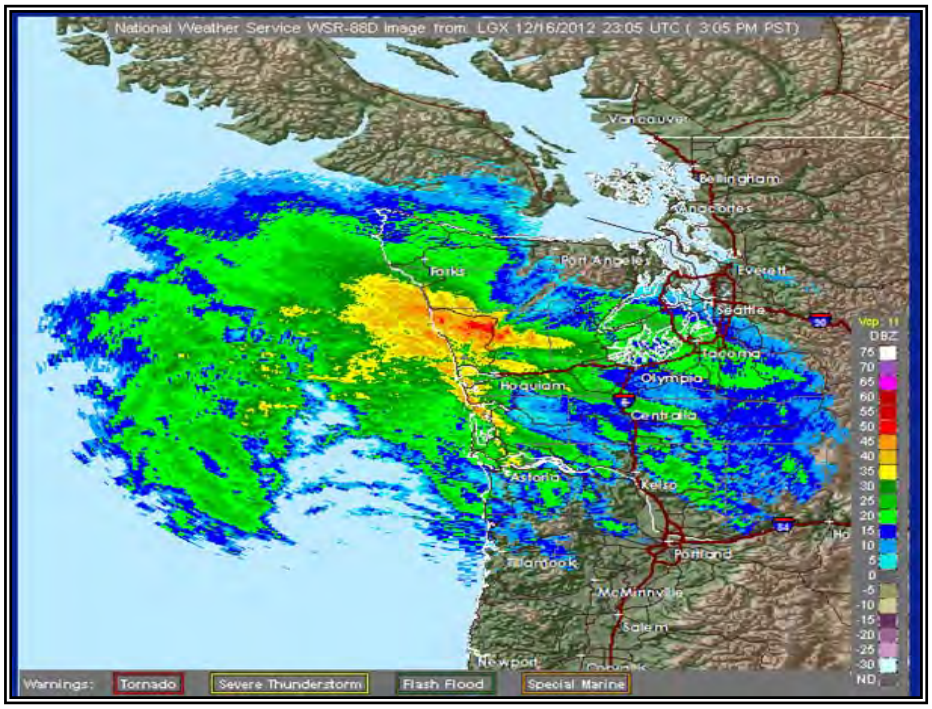
STORM EVENT REPORT SW13
For
Non-Dry Dock Stormwater Monitoring
Conducted at
Puget Sound Naval Shipyard
Bremerton, WA
Project ENVVEST Study Area

December 16, 2012



PNNL Contract No.: N4523A10MP00034 Amendment 2

Cardno TEC
Shaping the Future

Pacific Northwest
NATIONAL LABORATORY

1.0 Introduction

Cardno TEC conducted non-dry dock stormwater sampling event tasks within the Puget Sound Naval Shipyard (PSNS) and adjacent areas within Naval Base Kitsap (NBK); collectively comprising the Project ENVVEST study area, between December 14th and 17th 2012. This was the first of three scheduled events for the 2012-2013 project year – referred to hereafter as *Phase III*. Overall, this was the thirteenth stormwater (SW13) sampling event of the project. A summary of the preparatory and sampling event tasks, including site specific conditions, that occurred during SW13 are presented in this report, with supporting information as attachments.

This SW13 Report is organized in the following manner and contains: Section 2, Phase III Preparatory Tasks; Section 3, SW13 Event Summary; Section 4, Project Staff Participating in SW13; Section 5, Storm Event SW13 Preparatory Tasks; Section 6, Weather Forecast Information; Section 7, Event Targeting, Precipitation Summary and SW13 Qualification; Section 8, Sampling Information, Management and Validation; Section 9, Basin Runoff Calculations; Section 10, Descriptive Statistics and Discussion of Event Station Monitoring Data; Section 11, Telemetry Data Summary Report; Section 12, Notable Field Anomalies and Variations to the 2012-13 PWPA; and Section 13, Action Items.

Attachments to this report include: Table A-1*, Storm Event Summary and Sampling Information, Validation Checklist* (spreadsheet); Storm Event Controller Notes and Stormwater Field Sampling Forms; Chain of Custody Forms; (basin) Runoff Calculation Worksheet; Station Hydrographs; Autosampler Reports and Weather Forecast Information.

2.0 Phase III Preparatory Tasks

At the conclusion of Phase II, several demobilization tasks were conducted as necessary and in preparation for continued future stormwater sampling events. These demobilization tasks included the following:

- Demobilization of all transducers (except from PSNS015), multimeters, autosamplers and batteries from the field (April/May 2012),
- Calibration checks of all current and reserve station (Isco) rain gauges (late May/early June 2012),
- Refurbishment / calibration of select rain gauges by the manufacturer (June/July 2012),
- Station maintenance visits (June/August 2012), and
- Station equipment enclosure re-location, general housekeeping and inventory tasks (early Fall 2012).

Site visits and initial monitoring station setup planning and field tasks began in early October, 2012. By mid-November five out of six Phase III monitoring stations (PSNS015, PSNS053, PSNS084.1, PSNS115.1 and PSNS126) had been either reinstalled or newly installed and were fully operational. The monitoring station PSNSPB01, located at the Pier B Quay Wall water quality treatment system, remained essentially “off-line” until early December - when it was fully installed

and made operational. This delay in setup was due to access constraints and monitoring system configuration issues. A Sample Collection Event Kick-off meeting was conducted on 03 December. This meeting was attended by the Navy and Cardno TEC, with the purpose to review the Phase III station setups, discuss their particulars and to complete site visits. By 10 December, 2012 all six Phase III monitoring stations were fully operational and ready for stormwater collection. Figure 1 shows the general location of the PSNS and NBK monitoring sites.

Between 02 and 05 November, 2012 field equipment blanks were collected at each of the six monitoring stations. Teflon®-lined polyethylene sampling lines coupled with platinum-cured Tygon® Isco autosampler pump head tubing, at each monitoring station, was thoroughly back flushed with laboratory supplied DI water prior to and immediately after field blank collection. Sampling lines at each station were made ready for storm event sample collection. An equipment blank, using the same batch of laboratory supplied DI water, was also collected from a representative stainless steel dip-cup used for grab-style parameter (total petroleum hydrocarbon) collection.

3.0 SW13 Event Summary

Main SW13 details are provided below as a "*Quick Reference*":

- *Event/s Conducted:* SW13
- *Event Date/s:* maint. items; 12/10 through 12/13/12, station prep.; 12/14 and 12/15/12; and storm event tasks occurred between 12/16 and 12/17/12
- *Monitoring Stations Sampled:* PSNS015, -053, -PB01, -84.1, -115.1 and -126
- *Antecedent Conditions Met?:* the 24-hr Conditional antecedent (≤20% of total rainfall) was met at all stations except -PB01 (additional 9.5%); the 6-hr antecedent (0.00" preceding the storm/sampling event) was met at all of the stations.
- *Start of Rainfall at PSNS Stations:* 12/16/12 between (1015) @ PSNS126 and (1110) @ PSNS115.1
- *Sampling Period Duration Range:* start = 12/16/12 (1049) @ PSNSPB01 and stop = 12/17/12 (1018) @ PSNSPB01. Max sampling duration = 23 hrs:29 mins @ PSNSPB01
- *Sampling Event Rainfall Total:* PSNSB427 = 1.52", PSNS126 = 1.04", PSNS115.1 = NA, PSNS084.1 = 1.25", PSNS053 = 1.40", PSNS015 = 1.49 and PSNSPB01 = 1.42"
- *Samples/Types Collected:* Composite samples were collected at all stations, except for PSNS115.1, for a total of 5 "normal" samples. No grab samples collected.
- *Quality Control (QC) Samples Collected:* One composite (PSNS084.1) duplicate sample was collected during SW13.
- *Based on consideration of storm event and sample validation information, were the samples collected during SW13 valid for project purposes? (Y / N, composite, grab or both):* Yes, all composite samples collected during this event were valid.

See Table A-1; *Storm Event Summary and Sampling Information, Validation Checklist*, for additional event summary details.

4.0 Project Staff Participating in SW13

CardnoTEC:

Dave Metallo – Project Manager, Storm Controller, Field Event and QC Manager

Brian Rupert – Field Team Leader

Ian Sahlberg – Field Team Member

Navy Personnel:

Bob Johnston – Project Technical Lead / Oversight / Grab sample collection lead

5.0 Storm Event SW13 Preparatory Tasks

By December 15th, 2012 all six Phase III stormwater monitoring stations (PSNS015, PSNS053, PSNSPB01, PSNS084.1, PSNS115.1 and PSNS126) were initially set up for and readied for storm event / stormwater sample collection. At the time of the initial station setups all of the monitoring equipment was deemed to be functioning properly, was operational and "sample ready" (see Sections 1 and 2 of the attached *Stormwater Field Sampling Forms).*

All stations were programmed with pre-determined autosampler enable and pacing conditions set "high" to prevent premature enabling (*sample disable mode*). Station operation was passed to the CardnoTEC Storm Controller to be managed via telemetry. Final enabling conditions were determined by the Storm Controller closer to the onset of the storm event. See the *Storm Control Worksheet* for details.

6.0 Weather Forecast Information

The Nation Weather System (NWS) was one of the main sources used for the assessment of weather forecasting and conditions. Provided below is a link to the NWS-Bremerton, WA webpage; (http://forecast.weather.gov/MapClick.php?site=sew&textField1=47.56751&textField2=-122.63127&smap=1). A host of other internet available weather forecasting, observational and data sources were used for field and reporting purposes as appropriate. Detailed *Weather Forecast Information* is attached to this report.

Routinely referenced weather models used to gain forecast information regarding the Pacific Northwest included the MM5-NAM http://www.atmos.washington.edu/mm5rt/rt/naminit.12km.html) and the GFS-WRF (http://www.atmos.washington.edu/mm5rt/rt/gfsinit.frame1.html) (both hosted by the University of WA and initialized for the PNW). Below is a synopsis of the model comparison for SW13:

"Model predictions (GFS and NAM) are showing rain arriving between 10 (NAM) and 1400 (GFS) on 12/16/12. The GFS has rain becoming heavy throughout most of the day and night into the early morning hours, finally tampering off in the mid-morning hours, with passing bands and periods of no rain until 1400 Monday, with totals around 1.75". The NAM shows heavy rain from 1000 to about 2000, then lighter rain until around midnight Sunday 12/16/12, tampering to little to

no rain until mid-morning morning Monday 12/17 when passing bands return to add to a little more depth to the total of about 1.5".

A potentially qualifying storm event (event probability and forecast rainfall depth) was identified and targeted for 12/16/12. Rain was forecast at between 90% to 100% probability for Sunday 12/16/12, with 24-hour accumulations of between 1.02" (NWS) to 1.75" (GFS) into late morning of Monday the 17th.

The NWS synopsis for the approaching event was as follows: *A strong pacific storm will race toward the area today (Sunday). This system will bring the potential for damaging winds across the Lowlands and heavy snow to the mountains tonight and Monday. Look For showery weather to prevail in the wake of the occluded front that will move across the region Monday morning. The snow levels will also fall to near sea level Monday night as a colder air mass settles over the area. Higher pressure aloft will slowly build in from the west during the day Tuesday.*

Based on the weather forecast information available, as summarized above, the decision was made by the Navy to continue preparing for stormwater sample collection. The CardnoTEC Storm Controller coordinated with internal staff, PNNL and Navy personnel regarding schedule, grab and composite collection and post-event tasks. The antecedent dry period continued to be monitored and the sampler enabling conditions were appropriately set.

7.0 Event Targeting, Precipitation Summary and SW13 Qualification

Event Targeting:

Final sampler enabling conditions were appropriately set at each monitoring station between (2342) on the 15th and (1216) on the 16th (*sample ready mode*). Table 1 lists the final enabling conditions at each monitoring station that were used for SW13.

Table 1. Monitoring Station Enabling Conditions

Station	Rainfall (in/hr)	Level (ft)	Conductivity (µS/cm)	Repeatable Enable (Y/N)	Pacing (min)
PSNS126	0.05	0.3	2000	N	15
PSNS115.1	0.05	0.3	2000	Y-cond	15
PSNS084.1	0.05	0.3	2000	N	15
PSNS053	0.05	0.3	2000	N	15
PSNS015	0.05	0.3	2000	N	15
PSNSPB01	0.05	0.24	NA	Y-level	15

[1]Conditions as checked at (0900-1205) on 12/16/12; final enable conditions set at ~(0000) on 12/15/12

Precipitation Summary:

Between December 10th (all stations fully operational) and just prior to the onset of SW13 (12/16/12 @ 1015) the average rainfall as measured at the six monitoring stations during this approximately 6 day period was 0.62". The Navy's rain gauge at Build 427 recorded a total of 0.63" during the same period.

Previous rainfall that caused runoff to occur (≥ 0.03" rainfall without 3-hr gap) prior to the onset of SW13 ranged from 18 hours at PSNS053 to 20 hours at PSNS115.1 and PSNS084.1. These rainfall amounts were measured by each stations rain gauge.

The project defined qualifying antecedent dry period (≤0.1" rainfall in 24-hrs prior to storm event) was not met at any of the stations prior to the onset of SW13. However, the 6-hr antecedent condition (0.00" of rainfall) was met at all of the stations. Upon examination of the post-event rainfall data it was determined that five of the six stations met the conditional antecedent dry period (≤20% of the total event rainfall in prior 24-hrs), with PSNSPB01 being the exception at with an 9.5% overage.

Rain began to fall over the project site between 1015 (PSNS126) and 1110 (PSNS115.1) on December 16th. Table 2 details the period since last runoff, antecedent duration prior to the start of the storm event, rainfall amounts in the 24 and 6 hour periods prior to the event start, as well as the rainfall start date/time at each monitoring station.

Table 2. Pre-Rain Event Conditions

Station	Last Runoff[1] (Date/Time)	Antecedent Dry Period (Days: Hrs)	Rainfall Prior 24-hrs to Rain Event Start (in)	Rainfall Prior 6-hrs to Rain Event Start (in)	Start of Rainfall (Date/Time)
PSNS126	12/15/12 15:10	0:19	0.23	0.00	12/16/12 10:15
PSNS115.1	12/15/12 15:25	0:20	0.22	0.00	12/16/12 11:10
PSNS084.1	12/15/12 15:25	0:20	0.26	0.00	12/16/12 10:50
PSNS053	12/15/12 16:00	0:18	0.31	0.00	12/16/12 10:20
PSNS015	12/15/12 15:45	0:19	0.31	0.00	12/16/12 10:20
PSNSPB01	12/15/12 15:55	0:19	0.42	0.00	12/16/12 10:30

[1]Last runoff period is defined as ≥ 0.03" of rainfall without a 3-hr gap

Operational checks via telemetry throughout the day and evening of December 16th and the morning of the 17th revealed that all of the stations enabled their sampling routines as programmed; with rainfall, pipe level and conductivity values being in satisfaction of their threshold values, (as listed in Table 1).

Station sampling period rainfall totals ranged from 1.04" at PSNS126 to 1.49" at PSNS015. The Navy's rain gauge at B427 recorded 1.52" over the entire combined length of the sampling period for all project monitoring stations.

Sampling routines at all of the stations were manually stopped via telemetry on the morning of the December 17th, as the storm event was over and runoff and/or tidal influences had returned to non-rain conditions. Sampling durations (the range of time covering bottles used in the formulation of the overall station composite sample) ranged from 11:44(hrs:mins) at PSNS084.1 to 23:29(hrs:mins) at PSNSPB01.

Table 3 summarizes the sampling period start, sampling period end, sampling period duration, as well as the total rainfall amounts for each monitoring station and the PSNS project rain gauge at B427. Rainfall amounts listed occurred during the station's sampling period associated with SW13. Table A-1 (*Storm Event Summary and Sampling Information, Validation Checklist*), attached to this report, provides additional sampling period rainfall information.

Table 3. Sampling Period Information and Rainfall Totals for Project Monitoring Stations

Station	Sampling Period Start (Date/Time)	Sampling Period End (Date/Time)	Sampling Period Duration (Hrs:Mins)	Total Sampling Period Rainfall (in)
PSNS126	12/16/12 14:16	12/17/2012 5:00	14:44	1.04
[1]PSNS115.1	NA	NA	NA	NA
PSNS084.1	12/16/12 14:59	12/17/2012 2:43	11:44	1.25
PSNS053	12/16/12 14:36	12/17/2012 6:20	15:44	1.40
PSNS015	12/16/12 13:20	12/17/2012 5:04	15:44	1.49
PSNSPB01	12/16/12 10:49	12/17/2012 10:18	23:29	1.42
[2]B427	12/16/12 10:49	12/17/2012 10:18	23:29	1.52

[1]Programming/communication issue prevented sampler at PSNS115.1 from enabling and collecting samples
[2]B427 start/stop and duration incorporates the total span from all monitoring stations

SW11 Qualification Summary:

All storm qualification conditions were met for this event. Storm event qualification conditions included wet season event date range (Oct 1 – May 1), forecast probability (≥70%), forecasted storm depth (≥0.1"), storm duration (≥2hrs) and runoff occurrence / hydrograph stage (elevated above base flow). Antecedent dry period (≤0.1" rain in previous 24hrs and 0" rain in previous 6hrs) qualification for SW13 was conditionally met, as detailed above, except at PSNSPB01. However, due to the "flashy" nature of the drainage basin and the unique structure of this outfall (water quality treatment system), the Navy decided that samples from PB01 would be acceptable from this event. Table A-1 (*Storm Event Summary and Sampling Information, Validation Checklist)*, documents the particular SW13 qualification criteria listed above.

8.0 Sampling Information, Management and Validation

Grab Sampling:

No grab samples were collected during this event.

Table 4. Grab Sampling Information

Sample Collection Criteria:	PSNS126	PSNS115.1	PSNS084.1	PSNS053	PSNS015	PSNSPB01
Grab sample ID	N/A	N/A	N/A	N/A	N/A	N/A
Grab Date /Time	N/A	N/A	N/A	N/A	N/A	N/A
Grab sample conductivity value (μS/cm)	N/A	N/A	N/A	N/A	N/A	N/A
Hydrograph stage at grab collection	N/A	N/A	N/A	N/A	N/A	N/A
Grab parameters collected per PSNS PWP?	N/A	N/A	N/A	N/A	N/A	N/A

Composite Sampling:

Composite sample retrieval tasks and formulation procedures were managed and lead by CardnoTEC with support from PNNL/MSL personnel as needed. Composite samples were collected from five of the six monitoring stations - PSNS115.1 being the exception.

Composite samples were collected via autosamplers which were operated and synchronized by a custom designed telemetered water quality control system. The composite sample collection period and duration for each monitoring station is noted in Table 3.

Discrete sample (wedge) bottles from each station (contained in the autosampler bases) were brought back the C106 Stormwater Lab at B147 for processing. Composite formulation occurred on December 17th between 1230 and 1545. The numeric identification and amount of wedge bottles that were used for the composite sample formulation and those that were discarded were noted in Section 5 of the attached *Stormwater Field Sampling Forms*.

Methods used in preparation, autosampler collection, retrieval and formulation of the composite samples were conducted in a routine manner as per the 2012-13 PWPA. Samplers at each station were enabled as per the conditions stated in Section 7 of this report. Composite sample parameters included: hardness, TOC, DOC, TSS, total metals, dissolved metals, conductivity and turbidity.

The total number of discrete wedge bottles collected at each sampler, along with the total number of those bottles used in the station's composite sample is noted below in Table 5. Dividing the number of wedge bottles used in the composite sample formulation by the total number of wedge

bottles collected during the span of the entire sampling period provides an estimation of the amount of time (as a percentage of that stations entire collection period) where freshwater (i.e. runoff) conditions occurred at each station during the corresponding sampling event period.

Specific details regarding the composite formulation, results from individual bench top testing of the discrete bottles, sample IDs, sample date/time and resultant overall conductivity and turbidity values, as well as the number of wedge bottles collected during the sampling event and those used for the composite sample formulation are detailed in the *Stormwater Field Sampling Forms, Chain-of-Custody (CoC)* forms and in Table A-1 (all are attached). Table 5 summarizes these results.

Table 5. Composite Sampling Details

Sample Collection Criteria:	PSNS126	PSNS115.1	PSNS084.1	PSNS053	PSNS015	PSNSPB01
Composite sample ID	SW13-0001	N/A	SW13-0002	SW13-0006	SW13-0005	SW13-0004
Composite Date /Time	12/17/2012 5:00	N/A	12/17/2012 2:43	12/17/2012 6:20	12/17/2012 5:04	12/17/2012 10:18
Overall Composite conductivity value (μS/cm)	330	N/A	231	84	228	51
Overall Composite turbidity value (NTU)	3	N/A	8	7	14	5
Composite volume (ml)	6,000	N/A	5,250	6,000	6,400	7,200
Number of Bottles Collected During Sampling Event	22	N/A	11 (22hr span)	20	21	24
Number of Bottles Included in Composite Sample	15	N/A	6 (12hr span)	15	16	24
Percentage of Total Sampling Period that Freshwater Conditions Occurred	68%	N/A	55%	75%	76%	100%
Composite parameters collected per PSNS PWP?	Yes	N/A	Yes	Yes	Yes	Yes

All sampling and vault monitoring equipment operated as designed and programmed - except for PSNS115.1. Details pertaining to autosampler programming and event-specific operation of each monitoring stations' autosampler unit are contained in the attached *Sampler Reports*. The anomaly at PSNS115.1 is further explained in Section 11 of this report.

QC Samples:

During SW13 one composite duplicate sample was collected at PSNS084.1. As mentioned in Section 2, field equipment blanks were collected at each monitoring station (and from representative grab sampling equipment) prior to the SW13 storm sampling event. These are the only planned equipment blanks that will be collected for the 2012-13 Phase III sampling events. Equipment blank identification information is listed in Table A-1. Table 6 summarizes the quality control sample collection information for SW13.

Table 6. Summary of Quality Control Sampling Information for SW13

Sample Collection Criteria:	PSNS084.1
Grab sample duplicate ID	
Grab sample duplicate date and time	
Grab sample duplicate conductivity value (µS/cm)	
Composite sample Duplicate ID	SW13-0003
Composite sample duplicate date and time	12/17/2012 2:43
Overall Composite Duplicate conductivity value (µS/cm)	315
Overall Composite Duplicate turbidity value (NTU)	8
Composite Duplicate volume (ml)	5,250

Sample Management:

All samples were handled and managed as per Section 9 of the 2012-13 PWPA and in a manner acceptable and within industry standards regarding practices typical for tasks of this nature. Once collected, both grab and composite samples were placed into coolers and put on ice and/or into the secure Stormwater Laboratory refrigerator to maintain temperatures between 2 and 6 °C.

All sample IDs, collection date and time, matrix, requested parameter analysis and other associated information were documented on *Chain of Custody* (*CoC) Forms* (attached). Samples were in direct control of project and/or laboratory personnel at all times. Samples were delivered to the testing facility, Battelle Marine Science - Pacific Northwest National Laboratory in Sequim, WA, in good, useable and properly chilled condition. Adequate sample volume was collected from the targeted stations to proceed with the scheduled analysis of all parameters per the 2012-13 PWPA.

Sample Validation Summary:

All sample validation criteria were met for this event per Section 8.2.6 of the 2012-13 PWPA. Prior to processing the samples and transferring custody to the analytical laboratory, the CardnoTEC Field Event Lead validated the samples against certain criteria. These validation criteria included runoff occurrence / hydrograph stage, sample preparation and handling review, requested parameters, ≥2 hour sampling duration or 75% storm hydrograph coverage, minimum number of

aliquots, minimum sample volume collected for required parameters, discrete and composite samples conductivity measurement results, quality control sample collection and anomalous conditions assessment. Table A-1 (*Storm Event Summary and Sampling Information, Validation Checklist*), documents the particular SW-event qualification listed above.

9.0 Basin Runoff Calculations

Rainfall runoff volumes during the SW13 sampling period were calculated for each of the basins associated with the six Phase III monitoring stations. These calculations are based on the modified Runoff Coefficient Method (RCM) as described in Section 7.4 of the 2012-13 PWPA.

The value ranges for the various land use/land cover categories assigned to each basin are listed in the attached *Runoff Calculation Tables*. Calculated runoff values are also presented in Table A-1 (*Storm Qualification and Sample Validation Information Checklist*) (attached). Table 7 summarizes the results from these calculations.

Table 7. Runoff Calculations for SW13

Station	Type of Surface	Area of Basin Surface Type (ft^2)	[1]Runoff Coefficient Range	Combined Drainage Area (Ft^2)	Sample Event Rain Total (In)	Sample Event Rain Total (Ft)	Sample Event Period Runoff Vol. (Gal)
126	Impervious	653,373	0.9	591,881	1.04	0.0867	383,723
	Pervious	9,613	0.4				
115.1	Impervious	449,104	0.9	409,792	0	0	0
	Pervious	13,938	0.4				
84.1	Impervious	23,958	0.9	21,562	1.25	0.1042	16,802
53	Impervious	209,720	0.9	190,460	1.4	0.1167	166,220
	Pervious	4,280	0.4				
15	Impervious	2,009,431	0.8	2,411,321	1.49	0.1242	2,239,710
	Pervious	2,009,431	0.4				
PB01	Impervious	130,681	0.9	117,613	1.42	0.1183	104,110

10.0 Descriptive Statistics and Discussion of Event Station Monitoring Data

Descriptive statistics for the SW13 sampling period at each monitoring station are provided in Table 8, below. These statistics include minimum, maximum, average and median at static 1-hour interval periods for vault level, conductivity, salinity, transducer water temperature, and tidal stage. The method by which the rainfall statistics are calculated is on a “rolling 1-hour data window’ in an attempt to provide a more accurate and representative assessment of the actual rainfall

conditions. Sampling period rainfall totals are also included as part of each station's rainfall information.

Table 8. Sampling Period Rainfall and Vault Parameter Descriptive Statistics

Station ID	Statistics	Rainfall (1 hr) (in)	Vault level (ft)	Conductivity (uS/cm)	[1]Salinity (ppt)	trans temp (^{o}C)	Tide Stage (ft)
PSNS126	**Min**	0.00	0.15	-17	2.00	4.13	-1.19
	Max	0.16	3.98	3,093	2.89	8.27	10.80
	Average	0.07	1.14	208	2.01	5.98	5.37
	Median	0.06	0.38	90	2.00	5.93	6.41
	Storm Total	**1.04**					
PSNS115.1	**Min**	N/C	N/C	N/C	N/C	N/C	N/C
	Max	N/C	N/C	N/C	N/C	N/C	N/C
	Average	N/C	N/C	N/C	N/C	N/C	N/C
	Median	N/C	N/C	N/C	N/C	N/C	N/C
	Storm Total	N/C					
PSNS084.1	**Min**	0.00	0.14	152	2.00	4.99	-1.19
	Max	0.21	7.46	2,175	2.02	9.92	10.80
	Average	0.10	3.33	300	2.00	6.83	5.47
	Median	0.09	3.44	220	2.00	6.75	7.28
	Storm Total	**1.25**					
PSNS053	**Min**	0.00	0.01	104	2.00	4.42	-1.19
	Max	0.23	5.92	372	2.00	23.45	11.27
	Average	0.09	3.18	130	2.00	7.49	5.69
	Median	0.08	3.78	119	2.00	7.19	6.88
	Storm Total	**1.40**					
PSNS015	**Min**	0.00	0.42	54	2.00	4.17	-1.19
	Max	0.24	8.44	1,619	2.00	10.24	10.80
	Average	0.09	3.67	217	2.00	6.26	5.42
	Median	0.08	3.17	128	2.00	6.17	6.24

Table 8. Sampling Period Rainfall and Vault Parameter Descriptive Statistics

Station ID	Statistics	Rainfall (1 hr) (in)	Vault level (ft)	Conductivity (uS/cm)	[1]Salinity (ppt)	trans temp (^{o}C)	Tide Stage (ft)
	Storm Total	**1.49**					
PSNSPB01	**Min**	0.00	0.18	-42	0.00	3.73	-1.19
	Max	0.22	1.09	74	0.00	8.77	13.63
	Average	0.07	0.44	5	0.00	5.64	7.18
	Median	0.06	0.45	2	0.00	5.79	7.72
	Storm Total	**1.42**					

[1]salinity calculations are based on an algorithm that has a lower range cut-off value of 2ppt. Actual field values may have been lower. N/C = values not calculated.

Hydrograph Assessment:

Hydrographs for each monitoring station (except PSNSPB01) showed typical PSNS basin rainfall responses. The Navy's rain gauge atop B427 reflected a similar rainfall signature as compared with the monitoring stations. Pipe level generally increased and decreased following the tidal fluctuation pattern - while rain water runoff kept the conductivity concentrations within the project designated freshwater range (≤2,000 µS/cm). This indicates freshwater storage or at least downstream movement of the expected salinity interface within the piping system. Temperatures generally decreased with the inflow of rainwater runoff and began to increase as the rain event tailed off and as pipe water levels decreased with outflow during the receding tidal stage. Backflow from rising tidal conditions, sans rainwater runoff, also caused temperatures to increase.

Since PSNSPB01 is not directly connected to Sinclair Inlet it does not receive tidewater, nor is it influenced (particularly regarding pressure effects) by tide level fluctuations. Water level for both the vault interior (filter chamber) and the sump (collection point for the under-drain system) are shown on the station hydrograph. Canister filter cycles are noted building to a certain level and then draining the vault level back down once their interior float mechanism is released from its seated position. A corresponding signature is noted in the sump hydrograph. Temperature is driven down during periods of runoff input and rises when the rainfall tails off. Conductivity is somewhat "choppy" on either side of the rain event. When enough runoff is available to submerge the conductivity probe a consistent reading is obtained - generally very low, less than 100 µS/cm.

Of note is a curious conductivity spike at PSNS126 around mid-event. This may have been caused by some turbulent mixing within the pipe as it drained down to a point of less-than-full. Two long-duration temperature spikes were noted at PSNS053 around mid-event. This station experiences frequent inputs of warm water (perhaps from a steam condensate line). The receding

tide may have caused a rapid release from a buildup of this condensate into the vault, raising temperatures during two one-hour spikes.

Composite sample markers have been applied to the hydrographs to indicate total collection time (i.e. sample event period). Note that during this event no grab samples were collect and no samples of either type were collected at PSNS115.1. The monitoring station hydrographs, as well as the rainfall graph for B427, are attached.

11.0 Telemetry Data Summary Report: (TDSR)

A review of the telemetry data collected since the installation of the monitoring stations to a point just shortly after SW13 (11/15 to 12/17/12) was conducted. There were some minor anomalies in nearly all of the stations data sets due to initial installation and/or transducer maintenance tasks, as well as other issues described below.

Overall, data gaps and other anomalies during the actual SW13 storm event period were not noted, or were of non-significance. All sensors were in reasonable and accurate operation during the SW13 event. A TDSR report, comprised of a QA/QC data review and data set summary statistics, Tables 9 and 10 respectively, detailing issues associated with the collected vault and rainfall data and its general overall quality is included below.

Table 9. TDSR- QA/QC Data Review from 11/15 to 12/17/2012

Site	Parameter	Issue	Start Date/Time	End Date/Time	G.A.R Level of Concern	Comments
84.1	Level	Tidal and rainfall correlation	various	various	Amber	During periods of no rainfall, level within the vault does not match with corresponding tide stage. Indication of substantial base flow or other issues associated with drainpipe structure.
84.1	Temp	>20°C	various	various	Amber	1486 anomalous high temperature readings throughout review period data set. Exact cause unknown. Field confirmation of these high temperatures has been noted.
15	Temp	>20°C	various	various	Amber	9 anomalous high temperature readings throughout review period data set. Likely cause of these readings was maintenance activities.
15	All	Data Gap	12/15/2012 10:00	12/15/2012 10:10	Green	10 minute data gap, unknown reason, likely maintenance / event prep related
PB01	All	Data Gap	12/12/2012 13:05	12/12/2012 15:15	Green	2.25 hr data gap (temp data exists from 1440), likely caused by transducer adjustment / re-positioning and calibration event

Table 9. TDSR- QA/QC Data Review from 11/15 to 12/17/2012

Site	Parameter	Issue	Start Date/Time	End Date/Time	G.A.R Level of Concern	Comments
PB01	Conductivity	Negative values	various	various	Green	Although there were over 1700 occurrences of negative conductivity values, the concern is very low. The cause is due to the position of the cond. sensor being out of the water during most non-storm / non-runoff periods
PB01	Vault Level	Negative values	12/10/2012 14:15	12/10/2012 14:55	Green	40 minute period of negative vault transducer level, due to initial installation, corrected via calibration
115.1	All	Data Gap	various	various	Green	4 data gaps were identified where all data was effected. Cause unknown.
115.1	Conductivity	Negative values	various	various	Amber	226 negative conductivity readings, due to ultra-freshwater conditions mostly associated with storm event run-off
115.1	Conductivity	Missing data	11/16/2012 10:15	11/19/2012 14:55	Amber	921 missing conductivity records during this period due to transducer / datalogger connection issues
115.1	Salinity	Null data	various	various	Amber	26 null records where corresponding conductivity values should have generated a positive salinity calculation - cause unknown
115.1	Salinity	Missing data	11/16/2012 10:15	11/19/2012 14:55	Amber	921 missing conductivity records during this period due to transducer / datalogger connection issues.
115.1	Salinity	Missing data	various	various	Amber	226 additional missing salinity records due to corresponding negative conductivity values
126	All	Data Gap	various	various	Green	4 data gaps were identified where all data was effected. Cause unknown.
126	Conductivity	Negative values	various	various	Amber	594 negative conductivity readings, due to ultra-freshwater conditions mostly associated with storm event run-off
126	Salinity	Null data	various	various	Amber	62 null records where corresponding conductivity values should have generated a positive salinity calculation - cause unknown
126	Salinity	Missing data	various	various	Amber	594 missing salinity records due to corresponding negative conductivity values

Table 10. TSDR - Data Set Summary Statistics from 11/15 to 12/17/2012

Station	No. of Rcds	No. of Data Gaps	% Data Gap	Level Anomalies (# Rcds)	% Level Anomalies	Temp. Anomalies (# Rcds)	% Temp Anomalies	Cond. Anomalies (# Rcds)	% Cond Anomalies	Sal. Anomalies (# Rcds)	% Sal. Anomalies	Overall Data Set Completeness
84.1	8064	0	0.0%	101	125.0%	1486	18.4%	0	0.0%	0	0.0%	80.3%
15	8928	1	0.0%	0	0.0%	9	0.1%	0	0.0%	0	0.0%	99.9%
53	8064	0	0.0%	0	0.0%	14	0.2%	0	0.0%	0	0.0%	99.8%
[1]PB01	1997	21	1.1%	9	0.5%	0	0.0%	1784	89.3%	0	0.0%	9.2%
115.1	8925	2072	23.2%	0	0.0%	0	0.0%	226	2.5%	26	0.3%	74.0%
126	9213	660	7.2%	0	0.0%	0	0.0%	594	6.4%	62	0.7%	85.7%

[1]Conductivity anomalies (negative values) at PB01 are mainly due to transducer installation constraints, causing the conductivity sensor portion of the transducer assembly to be in open-air during most non-storm / no run-off periods, thus causing the sensor to indicate negative values. These negative conductivity readings do not adversely affect the quality of the overall data set.

12.0 Notable Field Anomalies and Variations to the 2012-13 PWPA

There were two notable field anomalies that occurred during SW13. These were; 1) no grab samples collected at any of the stations, and, 2) a composite sample was not generated at PSNS115.1.

- Grab samples were not collected from any of the monitoring stations at the direction of the Navy - mainly due to logistical considerations.
- A composite sample was not generated at PSNS115.1 during SW13 because discrete one-hour samples were not collected. Discrete samples were not collected due to a datalogger programming issue that existed, which was not observed during the testing phase. PSNS115.1 is the only station where the datalogger fully and completely controls the operation of the autosampler unit. In this mode additional “handshake” commands are required. One of these commands was missing, causing the autosampler not to response to pulses and other control and response queues - causing the autosampler to sit idle during the event.

There were no anomalies either observed or otherwise noted after completion of the sampling event and review of the associated data that would have caused any of the SW13 samples to be non-representative of the conditions from which they were collected.

There were no deviations from or variations to methodologies described in the 2012-13 PWPA. As reported above, all project qualified samples were submitted to PNNL MSL within holding times and without incident. All support and sampling tasks, as well as collected samples, were managed as appropriate per the 2012-13 PWPA.

13.0 Action Items

Routine action items include resetting (reloading bottles, charging batteries, back flushing with DI water, etc.) all six monitoring stations for the next targetable / qualified storm sampling event and re-stocking of supplies. Routine station maintenance items (e.g. sensor cleaning and calibration, rain gauge maintenance, etc.) as well as storm set-up tasks will need to be completed as necessary and appropriate.

Non-routine action items include assessing and correcting the programming issue associated with the PSNS115.1 datalogger - autosampler communication protocol and maintenance of the Navy’s rain gauge atop B427.

The current focus of the field efforts will be in maintaining proper station and equipment operational status, data and resource management and storm-tracking tasks.

Figure 1. Phase III Stormwater Monitoring Locations within the Puget Sound Naval Shipyard

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ATTACHMENTS

- Storm Event Summary and Sampling Information, Validation Checklist (Table A-1)
- Event Storm Controller Notes and Stormwater Field Sampling Forms
- Chain-of-Custody Forms
- Runoff Calculation Worksheet
- Station Hydrographs
- Autosampler Reports
- Weather Forecast Information

Table A-1. PSNS Non-Dry Dock Stormwater Monitoring Tasks
Storm Event Summary and Sampling Information, Validation Checklist
Stormwater Sampling Event #13 (12/16/12)

This form acknowledges representativeness criteria described in the project PWP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] *Storm Event Data:*	
Project Storm Event (SW) #	13
Event Forecast Probability (%)	99-100%
PSNS B427 Rain Gauge - Sample Event Total (in.)	1.52

Rainfall and Runoff Summary:	PSNS126	PSNS115.1	PSNS084.1	PSNS053	PSNS015	PSNSPB01
Last Runoff (≥ 0.03" rainfall without 3-hr gap) Prior to STE Start (Date/Time)	12/15/12 15:10	12/15/12 15:25	12/15/12 15:25	12/15/12 16:00	12/15/12 15:45	12/15/12 15:55
Antecedent Dry Period (days: hrs)	0:19	0:20	0:20	0:18	0:19	0:19
Rainfall Prior 24-hrs to Rain Event Start (in)	0.23	0.22	0.26	0.31	0.31	0.42
Rainfall Prior 6-hrs to Rain Event Start (in)	0.00	0.00	0.00	0.00	0.00	0.00
Start of Rainfall (Date/Time)	12/16/12 10:15	12/16/12 11:10	12/16/12 10:50	12/16/12 10:20	12/16/12 10:20	12/16/12 10:30
Sampling Period Start Date & Time	12/16/12 14:16	NA	12/16/12 14:59	12/16/12 14:36	12/16/12 13:20	12/16/12 10:49
Sampling Period End Date & Time	12/17/2012 5:00	NA	12/17/2012 2:43	12/17/2012 6:20	12/17/2012 5:04	12/17/2012 10:18
Sampling Period Duration (hrs:mins)	14:44	NA	11:44	15:44	15:44	23:29
Sampling Period Duration (hours)	14.73	NA	11.73	15.73	15.73	23.48
Sampling Period Total Rainfall (in)	1.04	NA	1.25	1.40	1.49	1.42
Sampling Period Max 1-hr Rainfall Intensity (in/hr)	0.16	NA	0.21	0.23	0.16	0.22
Sampling Period Average 1-hr Rainfall Intensity (in/hr)	0.07	NA	0.10	0.09	0.07	0.07
Runoff volume calculated for sampling period (gallons)	383,723	NA	16,802	166,220	2,239,710	104,110
[1] *Sample Collection Criteria:*						
Grab sample ID	N/A	No samples collected during this event	N/A	N/A	N/A	N/A
Grab Date /Time	N/A		N/A	N/A	N/A	N/A
Grab sample conductivity value (µS/cm)	N/A		N/A	N/A	N/A	N/A
Hydrograph stage at grab collection	N/A		N/A	N/A	N/A	N/A
Grab parameters collected per PSNS PWP ?	N/A		N/A	N/A	N/A	N/A
Composite sample ID	SW13-0001		SW13-0002	SW13-0006	SW13-0005	SW13-0004
Composite Date /Time	12/17/2012 5:00		12/17/2012 2:43	12/17/2012 6:20	12/17/2012 5:04	12/17/2012 10:18
Overall Composite conductivity value (mS/cm)	330		231	84	228	51
Overall Composite turbidity value (NTU)	3		8	7	14	5
Composite volume (ml)	6,000		5,250	6,000	6,400	7,200
Number of Bottles Collected During Sampling Event	22		11 (22hr span)	20	21	24
Number of Bottles Included in Composite Sample	15		6 (12hr span)	15	16	24
Percentage of Total Sampling Period that Freshwater Conditions Occurred	68%		55%	75%	76%	100%
Composite parameters collected per PSNS PWP ?	Yes		Yes	Yes	Yes	Yes
[1] *QC Sample Summary Information:*						
Grab sample duplicate ID	N/A	No samples collected during this event	N/A	N/A	N/A	N/A
Grab sample duplicate date and time	N/A		N/A	N/A	N/A	N/A
Grab sample duplicate conductivity value (µS/cm)	N/A		N/A	N/A	N/A	N/A
Composite sample duplicate ID	N/A		SW13-0003	N/A	N/A	N/A
Composite sample duplicate date and time	N/A		12/17/2012 2:43	N/A	N/A	N/A
Overall Composite Duplicate conductivity value (µS/cm)	N/A		315	N/A	N/A	N/A
Overall Composite Duplicate turbidity value (NTU)	N/A		8	N/A	N/A	N/A
Composite Duplicate volume (ml)	N/A		5,250	N/A	N/A	N/A
Associated Equipment Blank	SW0011	SW0012	SW0013	SW0015	SW0017	SW0016
[1] *Storm and Sample Validation:*						
Did event antecedent qualifiy per PSNS PWPA? (if no, then see next line)	Yes	NA	Yes	Yes	Yes	No
What was the total antecedent period amount overage, as % of rain event ?	NA	NA	NA	NA	NA	9.50%
Was runoff occurring OR was the hydrograph at least 10% above background pipe level during grab collection ? If no, explain in summary narrative.	Yes	NA	Yes	Yes	Yes	Yes
Were a minimum of 8 aliquots collected OR does the composite sample represent at least 75% of the stations storm event rain volume ?	Yes	NA	Yes	Yes	Yes	Yes
Were all 1-hr sampler bottles used for the Composite sample ≤2000 µS/cm ?	Yes	NA	Yes	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	NA	No	No	No	No
Based on consideration of the information above, was the sample collected during the STE valid for project purposes ? (Y / N, composite, grab or both)	Yes-comp	NA	Yes-comp	Yes-comp	Yes-comp	Yes-comp

[1] If the answer to any of these questions is "No" OR indicate non-representative conditions, then these items should be explained in the Event Narrative.

Validation Check List Completed By: Ian Sahlberg **Reviewed By / Date:** Dave Metallo 01/15/2013

PSNS NDDSW Monitoring Project Storm Control Work Sheet *Sht Rev. 121412* Sheet 1 of ___2__

Date:	12/15/2012 (2342)			**Sampling Support Personnel:**	D. Metallo, B. Rupert
STE#	13	**Antecedent Dry Cond. Met ?**	Conditional	**Tidal Info:**	2012-12-16 00:33 PST -2.67 feet Low-Low Tide 2012-12-16 07:45 PST 13.53 feet High-High Tide 2012-12-16 13:39 PST 6.14 feet High-Low Tide 2012-12-16 18:29 PST 10.84 feet Low-High Tide
Storm Controller:	D. Metallo			**Grab sampling Info.**	Navy has suspended grab sampling for this event
Pre-Storm / Weather Details:	model predictions (GFS and NAM) are showing rain arriving between 10 (NAM) and 1400 (GFS) tomorrow. The GFS has rain becoming heavy throughout most of the day and night in the early morning hours, finally tampering off in the mid-morning hours, with passing bands and periods of no rain until 1400 Monday, with totals around 1.75". The NAM shows heavy rain from 1000 to about 2000, then lighter rain until around midnight Sunday, tampering to little to no rain until mid-morning morning Monday when passing bands return to add to little more depth to the total of about 1.5".				

Telemetry Measurements:	**DATE/TIME (24HR)**											
STATION:	12/15/12 (2342)	12/16/12 (0900)	12/16/12 (1205)	12/16/12 (1410)	12/16/12 (1510)	12/16/12 (1808)	12/17/12 (0005)	12/17/12 (0905)	12/17/12 (1000-1130)			
PSNS015 Rain[1]	.53/0.0	.31/0.0	.24/.01	.17/.07		.59/.10	1.30/.09	1.56/0.0	Sampler Prgms manally ended, shut off samplers, storm over			
PSNS015 Level	0.19	8.92	3.74	2.74		7.89	0.78	10.66				
PSNS015 Cond.	1605	42,900	32147	222		84	153	40,450				
Smpl Marker	4	4	4	8		24	47	83				
PSNS084.1 Rain	0.37/0.0	.35/0.0	.22/.01	.16/.06	.20/.06	54/.08	1.20/.07	1.46/0.0				
PSNS084.1 Level	0.04	8.06	2.86	1.89	2.88	7.03	0.24	9.85				
PSNS084.1 Cond.	2202	46,500	36,500	5,140	789	214	537	46,000				
Smpl Marker	3	3	3	3	4	16	40	76				
PSNS115.1 Rain	.30/0.0	.29/0.0	.18/0.0	.12/.06		.50/.08	1.13/.06	1.31/0.0				
PSNS115.1 Level	0.05	11.96	6.76	5.89		10.85	0.96	13.68				
PSNS115.1 Cond.	4733	47100	10,500	1,848		4	269	47,100				
Smpl Marker	2	2	2	3		16	40	76				
PSNS053 Rain	.42/0.0	.39/0.0	.24/.01	no	.24/.07	.61/.11	1.30/.07	1.57/0.0				
PSNS053 Level	0.01	3	0.01	connection	0.77	4.61	3.13	4.02				
PSNS053 Cond.	98	46,200	889		145	128	120	43,600				
Smpl Marker	7	7	7		10	22	45	81				
PSNS126 Rain	.29/0.0	.28/0/0	.17/.01	.14/.06		.44/.06	.96/.05	1.14/0.0				
PSNS126 Level	0.13	4.8	0.16	0.3		3.63	0.33	6.46				
PSNS126 Cond.	2018	45600	5308	226		8	36	45,750				
Smpl Marker	0	0	0	1		16	40	76				
PSNS PB01 Rain	.53/0.0	.51/0.0	.19/.02	.16/.06		.50/.06	no	1.42/0.0				
PSNS PB01 Level	0.18	0.18	0.29	0.47		0.54	connection	0.2				
PSNS PB01 Cond.	na	na	na	22		8		na				
Smpl Marker	7	7	13	21		36		97				

[1]Rain dephs are reported as 1-hr / 24-hr totals

yellow highlight indicates station actively sampling

PSNS NDDSW Monitoring Project Storm Control Work Sheet, Continued *Sht Rev. 121412* Sheet 2 of 2

Date:	12/15/2012				**Sampling Support Personnel:**		D.Metallo, B. Rupert							
STE #	13	**Storm Controller:**	D. Metallo		**Strm Evnt Start / Stp**		Sampling Start 12/16/12 (1049) @ PB01; Stop 12/17/12 @ 84.1 (1128), rain start 1030 12/16 015 & PB01, end 0515 @ PB01							
Enabling Information:														
Sample Staion:	PSNS015		PSNS084.1		PSNS115.1		PSNS 053		PSNS126		PSNSPB01			
Rain enable (in/hr)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
Level Enable (ft)	20	0.3	20	0.3	20	0.3	20	0.3	20	0.3	20	0.24		
Cond. (µS/cm)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	NA	NA		
Repeat. Cond Set ?	no	no	no	no	yes	yes	no	no	no	no	yes-level	yes-level		
Pacing Rate (min)	15	15	15	15	15	15	15	15	15	15	15	15		
Sampler Batt Vdc	12.66	12.63	12.69	12.43	12.52	12.51	12.59	12.59	12.74	12.74	12.62	12.61		
Pre-event Smpl Mrk Value	4	4	3	3	2	2	7	7	3	0	7	7		
Date	15-Dec	15-Dec	15-Dec	15-Dec	15-Dec	15-Dec	15-Dec	15-Dec	15-Dec	15-Dec	15-Dec	16-Dec		
Time	1630	2342	1630	2347	1630	2355	1630	2351	1630	2356	1630	1216		
Comp Dup ? / where:			PSNS084.1				**Grab Dup ? / where:**			None (no grabs collected this event)				

EVENT NOTES:

1. Logger Batt @ 115.1 = 11.88 vdc 12/15 (1621) - need to swap out
2. PB01 - station is being triggered via rain and sump level only. The repeatable function is set on for sump level
3. Called Bob Johnston to discuss current storm situation and targeting/triggering particulars. Will continue to monitor rainfall and approaching fronts. Will arm all stations with "live" triggering conditions later this evening (~2200 to 2300).
4. PB01 enabled @ 1049 12/16/12

TAYLOR ASSOCIATES, INC.

PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.** ver.020411

Station: 126	MH/CB#: 5110	Loc. Descrip. Build 460	Page: 1 of 2 pages per station

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	Blue	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: B. Rupert	Weather: Overcast, temp 50's	Arrival Date/Time:	14/5 12/14/12
Sampler Battery Voltage	12.76	Changed? Y (N)	New voltage —
Modem Battery Voltage	11.97	Changed? (Y) N	New voltage
Sample Tubing & Strainer OK?	OK	**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	Yes
Transducer Cable OK?	OK	Aliquot Vol. Cal.'ed (Y/N & vol.)	Yes @ 240 mL
Multi-meter Cable OK	OK	Program Reviewed (Yes/No), Dup ?	Yes / Normal
Recorded Level (FT)	2.42	Lids off bottles?	Yes
Measured Level (FT)	2.38	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT)	old = -0.18 / new -0.24	Backflush with DI?	NO
Level Adjusted ?	Yes - level good	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (YSI6820 or INW-CT2X)		Last screen... PrgDis	1455 FR 14-Dec
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.)	No grabs collected during this event		

TAYLOR ASSOCIATES, INC.

PSNS NPDES Non-dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

Station: 126 | continued from previous page | Page: 2 of 2

Section 4. Post-Storm Sample Collection (for grab, comp or both)

Personnel: BR, IS	Weather: Mostly sunny, breezy, 30's	Arrival Date/Time: 12/17/12 1115	
Sampler Battery Voltage	Good	Changed? Y (N)	New voltage —
Telemtery Battery Voltage	Good	Changed? Y (N)	New voltage —
Additional Grabs (IDs, date/time)	NA		
Additional Dup Grab (IDs, date/time)	NA		
Composite Begin Time (date/time)	12-16-12 ~~(1320)~~ 1416	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	12-17-12 ~~(1004)~~ ~~BTL 21 4/4~~ (1115) 22 1/1		
Total Composite Sample Volume Collected	21 btls.		
Aliquots missed/NLD (date/time/bott #/aliq #)	~~11 4/4~~, ~~13 2/4 & 3/4~~, ~~14 2/4~~ all = NM Liquid 14 3/4 & 4/4, 15 1/4, 2/4 & 3/4		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor...)?	OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes:	Manually paused 12/17/12 (1004) BTL 21 4/4		
Maintenance Needed:	Re-sets		

Section 5. Compositing Scheme and QC Sampling

Personnel: DM, BR, IS | Date/Time: 12-17-12 (1230)

Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)

Cond. = YSI EC300 Turb = Scientific Inc. MicroTPI ; Navy meters

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):

1 717/3/Y	7 400/6/Y	13 225/1/Y	19 43480/1/N
2 310/8/Y	8 120/5/Y	14 344/1/Y	20 43320/1/N
3 240/9/Y	9 415/2/Y	15 570/1/Y	21 42210/1/N
4 260/5/Y	10 163/3/Y	16 23360/1/N	22 ~~NC~~ 37001/1/N
5 57/5/Y	11 142/2/Y	17 42580/1/N	23 NC
6 65/8/Y	12 74/2/Y	18 42920/1/N	24 NC

Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample) BTL 15 had ~400 ml and was used as the "volume" control BTL measure

Used BTLs 1-15 @ 400-ml each

Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis)

Cond = 330 uS/cm Turb = 3 NTU Vol. = 6000 ml Analysis = per PWPA

Composite Sample ID & Time: SW13-0001 (0500)

Field Blank Collected? (date/time)	previously
Blank ID:	NA
Duplicate comp sample? Yes/No	NO
Duplicate sample ID	NA

NOTES:

NC = not collected

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PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

ver.020411

Station: 115.1	MH/CB#: B 4860	Loc. Descrip. near B879	Page: 1 of 2

pages per station

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: B. Rupert	Weather: ove-cast - temp 50's	Arrival Date/Time: 12/14/12 (15:15)	
Sampler Battery Voltage	12.51	Changed? Y (N)	New voltage
Modem Battery Voltage	12.03	Changed? Y (N)	New voltage
Sample Tubing & Strainer OK?	OK	**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	OK
Transducer Cable OK?	OK	Aliquot Vol. Cal.'ed (Y/N & vol.)	Yes @ 240 mL
Multi-meter Cable OK	OK	Program Reviewed (Yes/No), Dup ?	Yes - No-mal
Recorded Level (FT)	10.80	Lids off bottles?	Yes
Measured Level (FT)	10.93	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT) old offset = 0.14	@ new 0.00	Backflush with DI?	NO
Level Adjusted ?	Yes - good	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (YSI6820 or INW-CT2X)	N/A	Last screen... Prog Dis 1400	FR 12-14
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.)

No grab samples collected during this event

TAYLOR ASSOCIATES, INC.

PSNS NPDES Non-dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

Station: PSNS 115 1 continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)			
Personnel: BR, IS	Weather: Sunny, 30's, Windy	Arrival Date/Time:	12-17-12 (1100)
Sampler Battery Voltage	Good	Changed? Y (N)	New voltage
Telemtery Battery Voltage	Good	Changed? Y (N)	New voltage
Additional Grabs (IDs, date/time)	No		
Additional Dup Grab (IDs, date/time)	No		
Composite Begin Time (date/time)	(1)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	(1)		
Total Composite Sample Volume Collected	No Samples Collected		
Aliquots missed/NLD (date/time/bott #/aliq #)	NA		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)?			
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: (1) Sampler did not function as designed, no water collected during event			
Maintenance Needed: Assess functionality glitch & conduct typical reset for next sampl. event			

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) No comp. Sample collected	
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:

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Station: B4.1	MH/CB#: 551	Loc. Descrip. B983	Page: 1 of 2 pages per station

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: B. Rupert	Weather: overcast - Night Time	Arrival Date/Time:	12-14-12 @ 1630
Sampler Battery Voltage	12.58	Changed? Y (N)	New voltage —
Modem Battery Voltage	12.72	Changed? Y (N)	New voltage ~
Sample Tubing & Strainer OK?	OK	**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	OK
Transducer Cable OK?	OK	Aliquot Vol. Cal.'ed (Y/N & vol.)	Yes @ 120mL
Multi-meter Cable OK	OK	Program Reviewed (Yes/No), Dup ?	Yes - Dup
Recorded Level (FT)	2.27 HH	Lids off bottles?	Yes
Measured Level (FT)	7.92	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT) Old offset = 2.54	New 0.21	Backflush with DI?	—
Level Adjusted ?	New level = 7.92 (Good)	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (YSI6820 or INW-CT2X)	—	Last screen... Prog Dis 1656	Fri 14-Dec
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.)	No grab samples collected during this event		

TAYLOR ASSOCIATES, INC.

PSNS NPDES Non-dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

Station: PSNS084.1 continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)

Personnel: BR, IS	Weather: Mostly sunny, breezy, 30°s	Arrival Date/Time:	12-17-12 (1130)
Sampler Battery Voltage	Good	Changed? Y (N)	New voltage
Telemtery Battery Voltage	Good	Changed? Y (N)	New voltage
Additional Grabs (IDs, date/time)	NO		
Additional Dup Grab (IDs, date/time)	NO		
Composite Begin Time (date/time)	12-16-12 (1459)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	12-17-12 BTL 21-22 3/3 (1128)		
Total Composite Sample Volume Collected	22 BTLS		
Aliquots missed/NLD (date/time/bott #/aliq #)	NONE		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor...)?	OK-typical		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: Location set up for duplicate collection			
Maintenance Needed: Re-set station for next sampling event			

Section 5. Compositing Scheme and QC Sampling

Personnel: DM, BR, IS	Date/Time: 12-17-12 (1320)

Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)

Cond = YSI EC300 Turb = Scientific Inc. TPI MicroTip ; both Navy meters

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):

1. 457 / 12 / Y	7. 195 / 11 / Y	13. 16210 / 2 / N	19. 42600 / 1 / N
(2.) 326 / 10 / Y	(8.) 203 / 8 / Y	(14.) 16000 / 2 / N	(20.) 42390 / 1 / N
3. 86 / 12 / Y	9. 241 / 17 / Y	15. 41570 / 1 / N	21. 42500 / 1 / N
(4.) 78 / 10 / Y	(10.) 238 / 9 / Y	(16.) 42300 / 1 / N	(22.) 42700 / 1 / N
5. 46 / 8 / Y	11. 124 / 5 / Y	17. 42900 / 1 / N	23. Empty
(6.) 47 / 7 / Y	(12.) 119 / 3 / Y	(18.) 41900 / 1 / N	24. Empty

Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample) ODD BTL's = normal Sample: used BTL's 1,3,5,7,9,11 ~875 ml from ea.

Even BTL's = duplicate Sample:

Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis) vol. = 5250 ml

Normal: Cond = ~~550~~ 231 µS/cm 8 NTU vol. = 5250 ml Dup: cond = 315 µS/cm 8 NTU

Composite Sample ID & Time:	SW13-0002 (0243)
Field Blank Collected? (date/time)	previously
Blank ID:	NA
Duplicate comp sample? Yes/No	YES
Duplicate sample ID	SW13-0003 (0243)

NOTES:

TAYLOR ASSOCIATES, INC.

PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

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Station: 053	**MH/CB#:** 2749	**Loc. Descrip.** NE Corner B449	Page: 1 of 2 pages per station

Section 1. Station Reset and Inspection			
Personnel:	Weather:	Arrival Date/Time: 12-14-12 (1730)	
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?	RN	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: B. Rupert	Weather: Over-cast - Night Time	Arrival Date/Time: 12-14-12 @ 1736	
Sampler Battery Voltage	12.64	Changed? Y (N)	New voltage
Modem Battery Voltage	12.43	Changed? Y (N)	New voltage
Sample Tubing & Strainer OK?	OK	**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	OK
Transducer Cable OK?	OK	Aliquot Vol. Cal.'ed (Y/N & vol.)	OK @ 240 mL
Multi-meter Cable OK	OK	Program Reviewed (Yes/No), Dup ?	Yes - Normal
Recorded Level (FT)	2.02	Lids off bottles?	Yes
Measured Level (FT)	2.16	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT) 0.12 offset = 0.25	New = 0.17	Backflush with DI?	—
Level Adjusted ?	New level = 2.01 (good)	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (YSI6820 or INW-CT2X)	—	Last screen... Prog Dis, 1754	FR 14-Dec
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.) No grab samples collected during this event				

TAYLOR ASSOCIATES, INC.

PSNS NPDES Non-dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

Station: PSNS 053 — continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)

Personnel: BR, IS	Weather: 30°, mostly sunny, windy	Arrival Date/Time:	12-17-12 (1015)
Sampler Battery Voltage	Good	Changed? Y (N)	New voltage —
Telemtery Battery Voltage	Good	Changed? Y (N)	New voltage —
Additional Grabs (IDs, date/time)	NO		
Additional Dup Grab (IDs, date/time)	No		
Composite Begin Time (date/time)	12-16-12 (1436)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	12-17-12 (1005)	BTL 20 3/3	
Total Composite Sample Volume Collected	20 BTLs, 1 empty + 2 partials		

Aliquots missed/NLD (date/time/bott #/aliq #): from 14 2/4 → 16 2/4 - missed - NL (no liquid detect)
BTLs 21-24 empty due to manual stop

Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)? OK

Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA

Notes: Manually paused/stopped (1020) 12-17 BTL 20 @ 3/3

Maintenance Needed: Typical resets

Section 5. Compositing Scheme and QC Sampling

Personnel: BR, DM, IS — Date/Time: 12-17-12 (1545)

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):

1. 264 / 5 / Y	7. 12 / 6 / Y	13. 15 / 8 / Y	19. 28380 / 2 / N
2. 35 / 9 / Y	8. 12 / 13 / Y	14. 60 / 15 / Y	20. 28550 / 2 / N
3. 20 / 9 / Y	9. 19 / 7 / Y	15. empty	21. Empty
4. 13 / 4 / Y	10. 16 / 5 / Y	16. 139 / 9 / Y	22. ↓
5. 11 / 5 / Y	11. 12 / 4 / Y	17. 18270 / 4 / N	23. ↓
6. 7 / 6 / Y	12. 10 / 3 / Y	18. 27560 / 3 / N	24. ↓

Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample) Used BTLs 1-14 + 16, 400-ml from ea = ~6,000 ml
BTL's 17-20 too high cond. to qualify, BTLs 15 & 21-24 empty

Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis)
Cond. = 84 µs/cm, Turb = 7 NTU, Vol. = 6000-ml Analysis per PWPA

Composite Sample ID & Time:	SW13-00006 (0620)
Field Blank Collected? (date/time)	Previously
Blank ID:	NA
Duplicate comp sample? Yes/No	NO
Duplicate sample ID	NA

NOTES:

TAYLOR ASSOCIATES, INC.

PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

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Station: PSNS 015	MH/CB#: A42	Loc. Descrip. McD's Drive-thru	Page: 1 of 2

pages per station

Section 1. Station Reset and Inspection

Personnel: DM, BR	Weather: Raining, 30's	Arrival Date/Time: 1005 12-15-12	
Carry-over maintenance to do prior to set-up: Initial Set up			done?
Sampler Battery Voltage	12.61	Changed? Y (N)	New voltage —
Modem Battery Voltage	12.38	Changed? Y (N)	New voltage —
Sample Tubing & Strainer OK?	Yes	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	D'ed to correct
Trands. Cable OK?	Yes	Internal Sampler Tubing OK?	Y
Trands. Desiccant OK (Yes/No)	Yes	Tubing Replaced? (Yes/No)	N
Telem. Box Desiccant OK (Yes/No)	Yes	Normal Smpler Program or Dup. ?	Nor.
Modem Status	Operational	Bottles Loaded ?	Y
Notes (including channel condition):		Lid Status?	Off
- Re-prgm'ed Isco, initial for Phase III		Backflushed with DI?	Y
		Suction line & quick connect attached?	Y
		Smplr Status (on/off) / last screen..	Prgm Dis. 1036

Section 2. Storm Setup and Inspection

Personnel: DM, BR	Weather:	Arrival Date/Time: 12-15-12 1005	
Sampler Battery Voltage	12.61	Changed? Y (N)	New voltage
Modem Battery Voltage	12.38	Changed? Y (N)	New voltage
Sample Tubing & Strainer OK?	Y	**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	OK
Transducer Cable OK?	Y	Aliquot Vol. Cal.'ed (Y/N & vol.)	Y
Multi-meter Cable OK	NA	Program Reviewed (Yes/No), Dup ?	Y - Normal
Recorded Level (FT)	5.34	Lids off bottles?	Y
Measured Level (FT)	5.34	Diagnostics/Distrubutor arm check?	Y
Offset Diff (FT)	~~0.00~~ 0.17'	Backflush with DI?	Y
Level Adjusted ?	N	Storm Reset (1, enter) Completed	Y
Cond. Sonde Type (YSI6820 or INW-CT2X)	CT2X	Last screen...	Prgm Dis. 1036
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.) Cond. Cal'ed Mid-Nov, 12			

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.) No grab samples collected during this event			

TAYLOR ASSOCIATES, INC.

PSNS NPDES Non-dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

Station: PSNS 015 continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)

Personnel: BR, IS	Weather: Mostly sunny, 30's, windy		Arrival Date/Time: 12-17-12 (1000)
Sampler Battery Voltage	Good	Changed? Y (N)	New voltage —
Telemtery Battery Voltage	Good	Changed? Y (N)	New voltage —
Additional Grabs (IDs, date/time)	NA		
Additional Dup Grab (IDs, date/time)	NA		
Composite Begin Time (date/time)	12-16-12 (1320)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	12-17-12 (1004) BTL 21 4/4		
Total Composite Sample Volume Collected	100% all bottles		
Aliquots missed/NLD (date/time/bott #/aliq #)	BTL 13 2&3 of 4, BTL 14 2of4, BTL 11 3of4 all missed were "NM" ("No more liquid")		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor...)?	OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: Manually stopped sampler at end of BTL 21			
Maintenance Needed: Typical Re-Sets			

Section 5. Compositing Scheme and QC Sampling

Personnel: DM BR IS | Date/Time: 12-17-12 (1510)

Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)

Cond.= EC300 YSI Turb.= Scientific Inc. MicroTip TPI; both Navy inst. 5

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):

1. 574 / 14 / Y	7. 17 / 20 / Y	13. 45/6/ Y	19. 29860/1/N
2. 380 / 16 / Y	8. 37 / 11 / Y	14. 79/3/ Y	20. 30120/1/N
3. 137 / 21 / Y	9. 63 / 17 / Y	15. 215/6/ Y	21. 30420/1/N
4. 33 / 35 / Y	10. 100 / 11 / Y	16. 725/4/ Y	22. Empty
5. 30 / 28 / Y	11. 76 / 6 / Y	17. 27720/2/ XN	23. ↓
6. 20 / 16 / Y	12. 71 / 5 / Y	18. 28340/2/ XN	24. ↓

Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample) Used BTLs 1-16 for comp sample, 400-ml from each BTL, 17-21 did not qualify, BTLs 22-24 were empty due to manual stop

Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis)

Cond.=228 µs/cm Turb.= 14 NTU Vol.= 6400-ml Analysis per PWPA

Composite Sample ID & Time:	SW13-0005 (0504)
Field Blank Collected? (date/time)	previously
Blank ID:	NA
Duplicate comp sample? Yes/No	NO
Duplicate sample ID	NA

NOTES:

TAYLOR ASSOCIATES, INC.

PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

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Station: PSNS PB01	MH/CB#: SDMH-01D	Loc. Descrip. Pier B Quay Wall	Page: 1 of 2 pages per station

Section 1. Station Reset and Inspection

Personnel: DM, BR	Weather: Rain/Sleet, 30°s	Arrival Date/Time: 12-15-12 (1130)	
Carry-over maintenance to do prior to set-up:	Initial Set-up for Phase III		done?
Sampler Battery Voltage	12.29	Changed? Y (N)	New voltage
Modem Battery Voltage	12.60	Changed? Y (N)	New voltage
Sample Tubing & Strainer OK?	Yes	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	OK
Trands. Cable OK?	Y	Internal Sampler Tubing OK?	Y
Trands. Desiccant OK (Yes/No)	Y	Tubing Replaced? (Yes/No)	N
Telem. Box Desiccant OK (Yes/No)	Y	Normal Smpler Program or Dup. ?	Normal
Modem Status	Operational	Bottles Loaded ?	Y
Notes (including channel condition):		Lid Status?	Off
		Backflushed with DI?	Y
		Suction line & quick connect attached?	Y
		Smplr Status (on/off) / last screen..	On Prgm Dis

Section 2. Storm Setup and Inspection

Personnel: DM / BR	Weather: Rawning/Sleet, 34°	Arrival Date/Time: 12-15	
Sampler Battery Voltage	12.29	Changed? Y (N)	New voltage —
Modem Battery Voltage	12.60	Changed? Y (N)	New voltage —
Sample Tubing & Strainer OK?		**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	Yes
Transducer Cable OK?	Y	Aliquot Vol. Cal.'ed (Y/N & vol.)	Yes
Multi-meter Cable OK	NA	Program Reviewed (Yes/No), Dup ?	Yes - Normal
Recorded Level (FT)	0.45 (vault) 0.43	Lids off bottles?	Off - Yes
Measured Level (FT)	0.48 0.43 sump	Diagnostics/Distrubutor arm check?	Y
Offset Diff (FT)	0.03 / 0.00	Backflush with DI?	Y
Level Adjusted ?	Yes for Vault	Storm Reset (1, enter) Completed	Y
Cond. Sonde Type (YSI6820 or INW-CT2X)	CT2X	Last screen... Prgm Dis, 1256	
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.)	Cal'ed mid-NOV		

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.)	No grab samples collected during this event.		

TAYLOR ASSOCIATES, INC.

PSNS NPDES Non-dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Taylor Associates, Inc.**

Station: PSNS PB01 continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)			
Personnel: BR, IS	Weather: Mostly Sunny, 30°s, Windy	Arrival Date/Time: 12-17-12 (1030)	
Sampler Battery Voltage	Good	Changed? Y (N)	New voltage
Telemtery Battery Voltage	Good	Changed? Y (N)	New voltage
Additional Grabs (IDs, date/time)	NO		
Additional Dup Grab (IDs, date/time)	NA		
Composite Begin Time (date/time)	12-16-12 (1049)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	12-17-12 BTL 24 3/3 (1018)		
Total Composite Sample Volume Collected	100% 23 BTLs & BTL 24 is 75% (3 of 4 aliquots)		
Aliquots missed/NLD (date/time/bott #/aliq #)	NONE 24		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)?	Typical/vault OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes:			
Maintenance Needed: Typical Re-set for next storm event			

Section 5. Compositing Scheme and QC Sampling			
Personnel: DM, BR, IS		Date/Time: 12-17-12 (1420)	
Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)	Cond = YSI EC300 Turb = Scientific Inc. MicroTip TPI, both Navy Meters		
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):			
1. 85/10/ Y	7. 38/10/ Y	13. 38/3/ Y	19. 43/1/ Y
2. 80/10/ Y	8. 41/4/ Y	14. 48/2/ Y	20. 45/1/ Y
3. 97/14/ Y	9. 34/5/ Y	15. 42/4/ Y	21. 45/1/ Y
4. 76/12/ Y	10. 31/4/ Y	16. 37/3/ Y	22. 49/1/ Y
5. 61/10/ Y	11. 37/5/ Y	17. 39/2/ Y	23. 51/1/ Y
6. 50/14/ Y	12. 33/4/ Y	18. 41/1/ Y	24. 51/1/ Y
Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample)	Used ~300ml from each of the 24 btls. ~7200ml		
Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis)	Cond. = 51 µS/cm Turb. = 5 NTU Vol. = 7200ml. Analysis per PWPA		
Composite Sample ID & Time:	SW13-0004 (1018)		
Field Blank Collected? (date/time)	previously collected		
Blank ID:	NA		
Duplicate comp sample? Yes/No	NO		
Duplicate sample ID	NA		

NOTES:

EQUIPMENT BLANK SAMPLES, PRE SW-13

SAMPLE CHAIN OF CUSTODY FORM

Date:
Page: 1 of 1
Project No.: N4523A10MP00034 Amend.2
Project: PSNSNon-dry Dock SW 2012-13

EB are analyzed only for chemicals of concern per QAPP (2012) gms 11/5/12

Battelle
Marine Sciences Laboratory
1529 West Sequim Bay Road
Laboratory: Battelle MSL
Attention: Jill Brandenberger
Phone: (360) 681-4564

SW13-EBs

3174*	Sample Label	Station ID	Collection Date/Time	Matrix	Analyze parameters per QAP/FSP: Hardness	TOC	DOC	TSS	TME/DME gms	TPH	Turbidity						No. containers	Sample Type (Grab vs. Comp)	3174* ~~Storm#~~	Notes / Comp. Cond. (µS/cm) and Turb. (NTU) Readings
171	SW0011	PSNS 126	11/2/12 (1400)	W	X	X	X	X	X								1	grab		Equipment Blanks
172	SW0012	PSNS 115.1	11/2/12 (1600)	W	X	X	X	X	X								1			
173	SW0013	PSNS 84.1	11/2/12 (1700)	W	X	X	X	X	X								1			
	SW0014	ProGrab Equip	11/5/12 (0830)	W	~~X~~	~~X~~				X							1			
174	SW0015	PSNS 053	11/5/12 (1030)	W	X	X	X	X	X								1			
175	SW0016	PSNS WOOW	11/5/12 (1100)	W	X	X	X	X	X								1			
176	SW0017	PSNS 015	11/5/12 (1330)	W	X	X	X	X	X								1			
8																				

Relinquished by: 11/5/12 1520
Signature Date Time
Brian Rupert CARGO-TEC
Printed Name Company

Received by: 11/5/12 1530
Signature
Jill Brandenberger
Printed Name

Total # of Containers:
Shipment Method: Hand delivery
Sample Disposition:

Relinquished by:
Signature Date Time
Printed Name Company

Received by:
Signature
Printed Name

Distribution:
1) PNNL
2) CAS
3) TAI

SAMPLE CHAIN OF CUSTODY FORM

Date: 12/17/2012

Page: 1 of 1

Project No.: N4523A10MP00034 Amend.2

Project: PSNSNon-dry Dock SW 2012-13

SW-13 STORMWATER SAMPLES

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	(1) Matrix	Hardness	TOC	DOC	TSS	TME/DME	TPH	Turbidity (2)						No. containers	Sample Type (Grab vs. Comp)	Storm#	Notes / Comp. Cond. (µS/cm) and Turb. (NTU) Readings
SW13-0001	PSNS 126	12-17-12 (0500)	SW	X	X	X	X	X									Comp	SW13	330 / 3
SW13-0002	PSNS 084.1	12-17-12 (0243)	SW	X	X	X	X	X									↓	231	330 DM / 8
SW13-0003	DUP 084.1	12-17-12 (0243)	SW	X	X	X	X	X										↓	315 / 8
SW13-0004	PSNS PB01	12-17-12 (1019)	SW	X	X	X	X	X											51 / 5
SW13-0005	PSNS 015	12-17-12 (0504)	SW	X	X	X	X	X											228 / 14
SW13-0006	PSNS 053	12-17-12 (0620)	SW	X	X	X	X	X									↓	↓	84 / 7
	DCM																		

Relinquished by: Dave Metallo 12-17-12 (1640) Signature Date Time Dave Metallo Cardno-TEC Printed Name Company	Received by: 12/19/12 1845 Signature Li-Jung Kuo Printed Name	Total # of Containers: 6 Shipment Method: Sample Disposition:
Relinquished by: Signature Date Time Printed Name Company	Received by: Signature Printed Name	Distribution: 1) PNNL 2) CAS 3) TAI

(1) Storm water Samples

(2) Turbidity measured @ Stormwater lab w/ Scientific Inc. Microtip TPI

PSNS NDDSW Monitoring **Stormwater Sampling Event SW13 (12/16/2013)**

Stormwater Outfall Total Discharge Volume Estimation Equations

PSNS Drainage Basin	Total Basin Area (ft^2)	Type of Surface	Percentage	Area of Basin Surface Type (ft^2)	[1]Runoff Coefficient	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	0.9	588,036	R(591,881)
		Pervious	1.45	9,613	0.4	3,845	
115.1	463,042	Impervious	97	449,151	0.9	404,236	R(409,792)
		Pervious	3	13,891	0.4	5,556	
84.1	23,958	Impervious	100	23,958	0.9	21,562	R(21,562)
53	214,000	Impervious	98	209720	0.9	188,748	R(190,460)
		Pervious	2	4,280	0.4	1,712	
15	4,018,862	Impervious	50	2,009,431	0.8	1,607,549	R(2,411,321)
		Pervious	50	2,009,431	0.4	803,772	
PB01	130,681	Impervious	100	130,681	0.9	117,613	R(117,613)

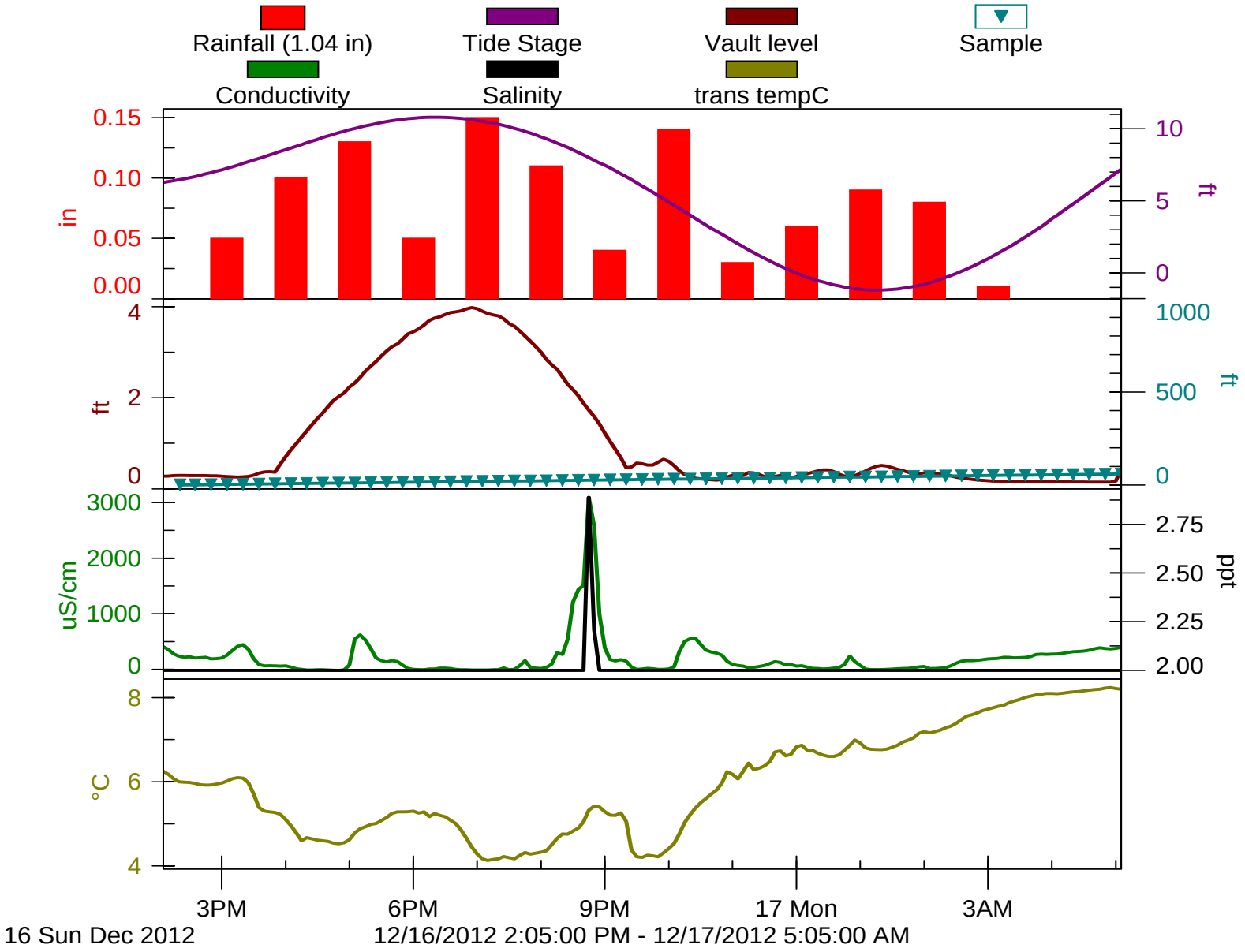
Calculation Worksheet:

STATION	Combined Drainage Area (FT^2)	ENTER: Smpl Evnt Rain Total (in)	Sampl Evnt Rain Total (FT)	STE Runoff Vol. (gal)
126	591,881	1.04	0.0867	383,723
115	409,792	0.00	0.0000	0
84.1	21,562	1.25	0.1042	16,802
53	190,460	1.40	0.1167	166,220
15	2,411,321	1.49	0.1242	2,239,710
PB01	117,613	1.42	0.1183	104,110

No Grab Samples Collected During Event

PSNS 126

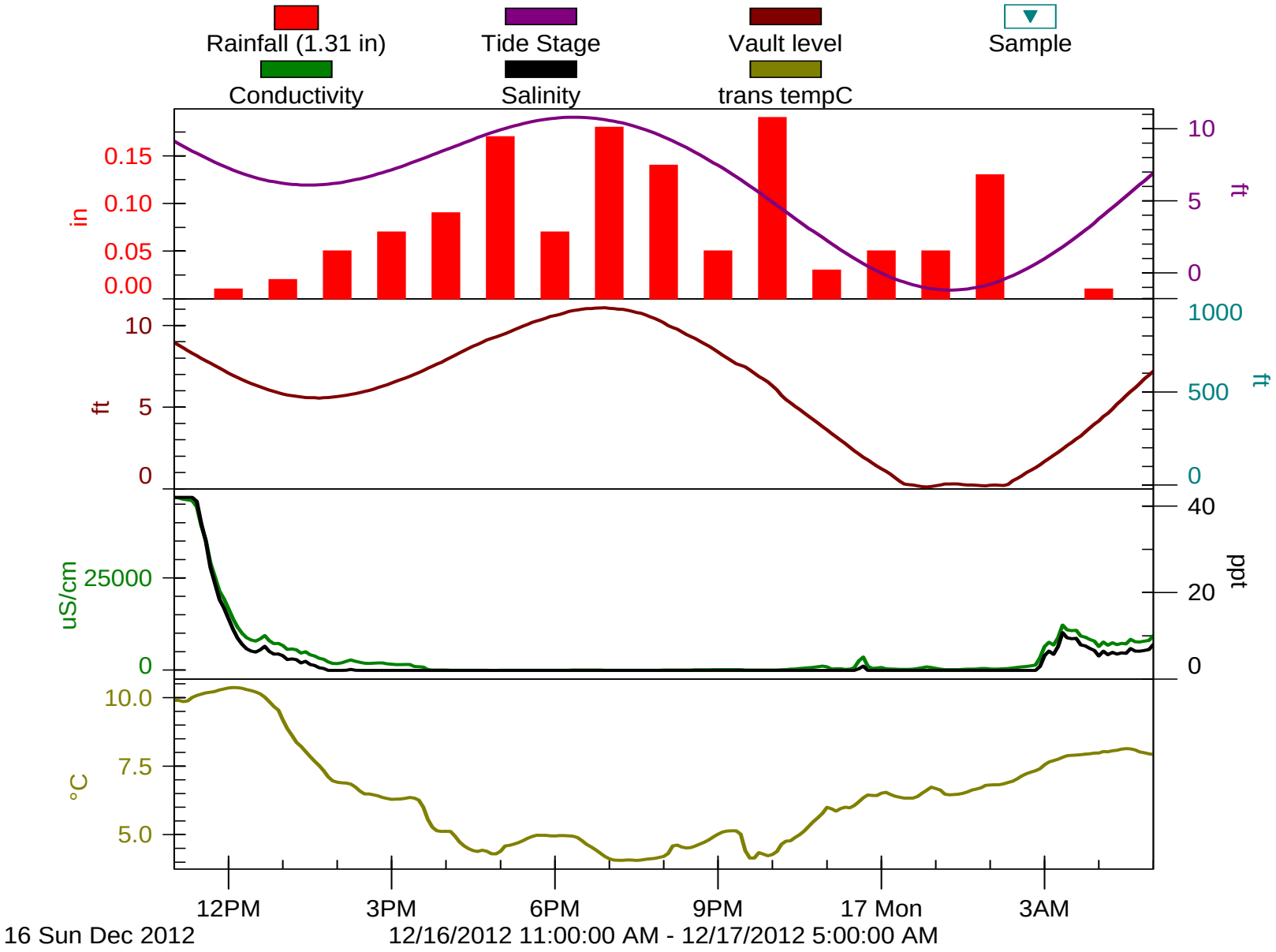
SW13 12-16-2012



No Samples Collected During Event

PSNS 115_1

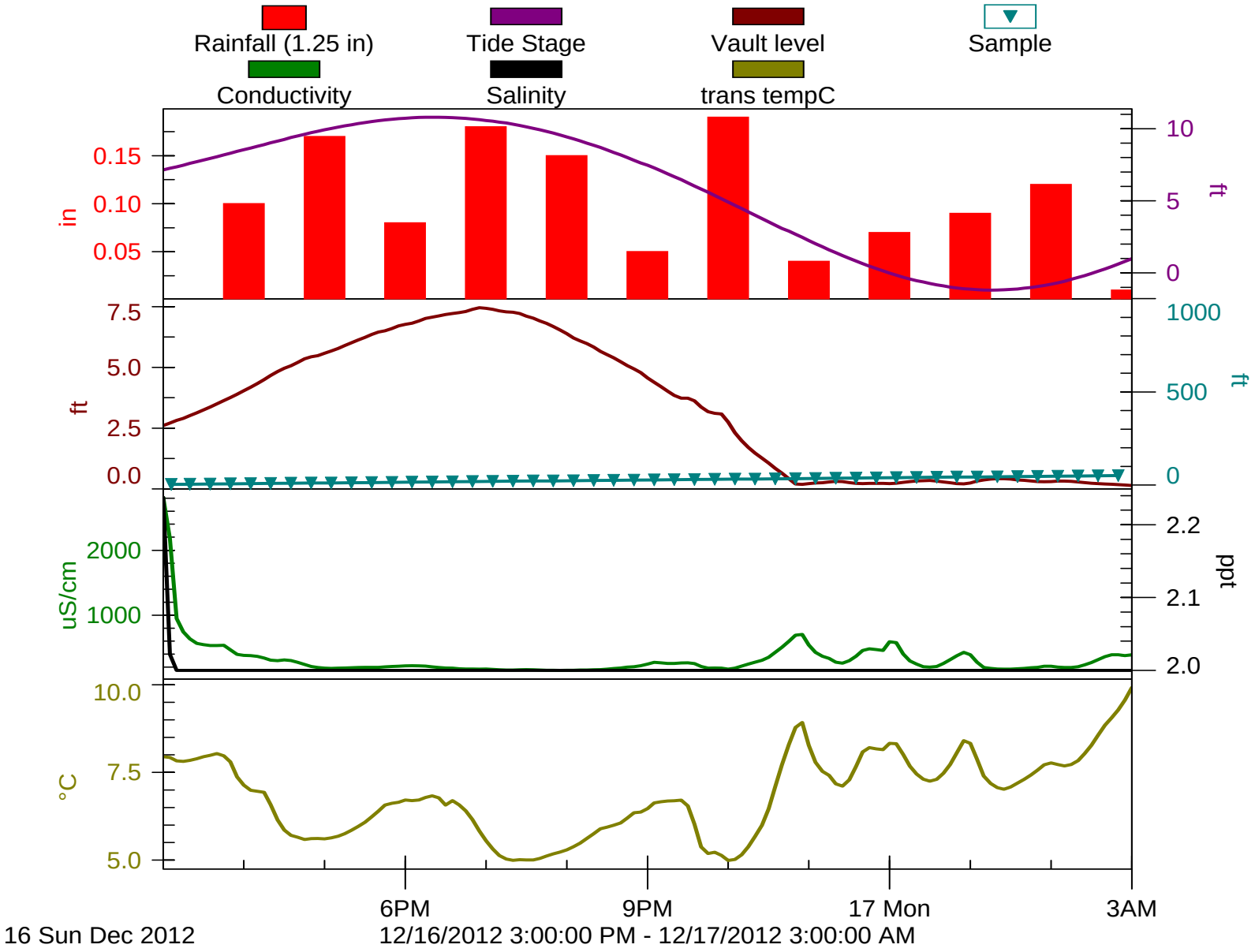
SW13 12-16-2012



No Grab Samples Collected During Event

PSNS 084_1

SW13 12-16-2012



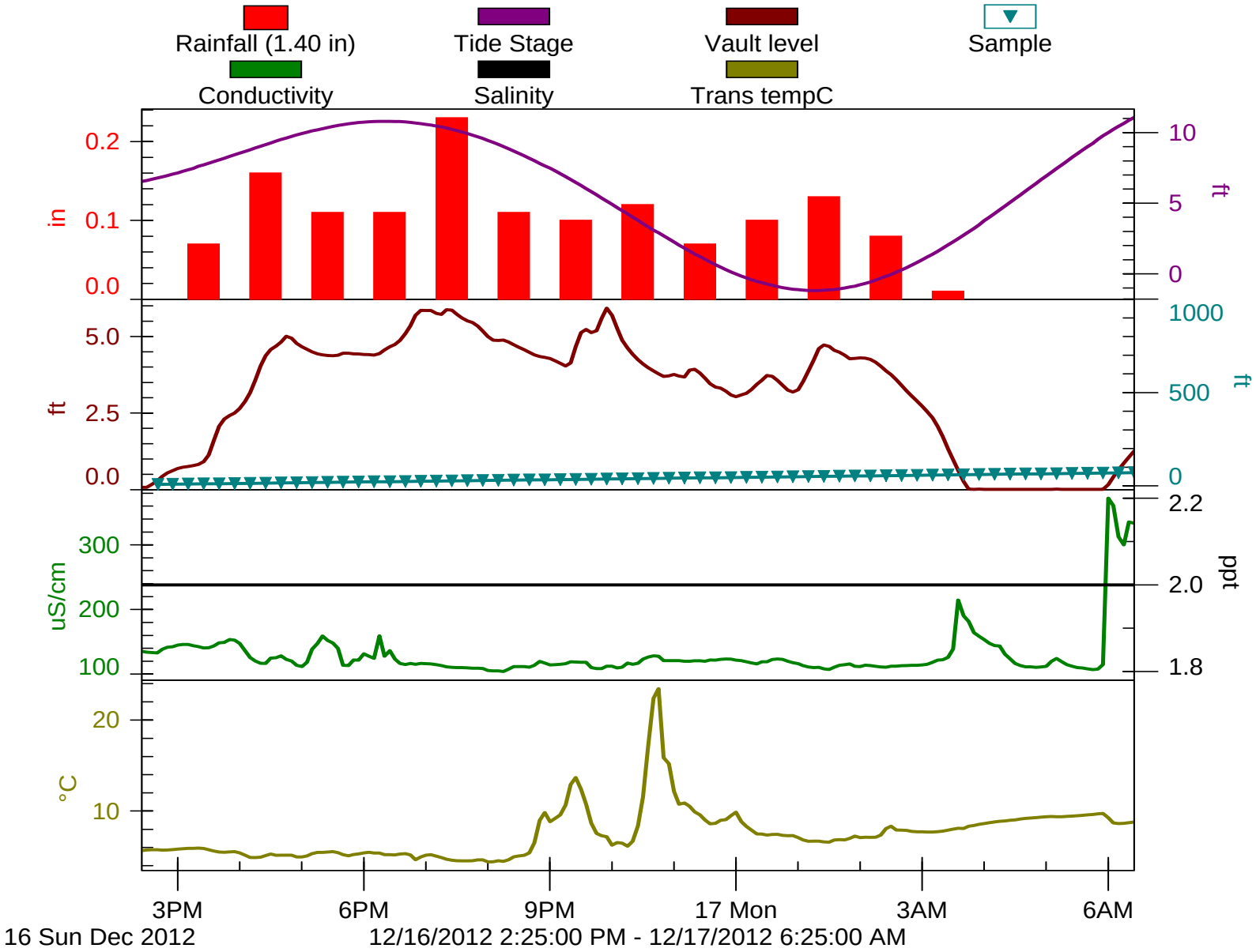
16 Sun Dec 2012

12/16/2012 3:00:00 PM - 12/17/2012 3:00:00 AM

No Grab Samples Collected During Event

PSNS 053

SW13 12-16-2012



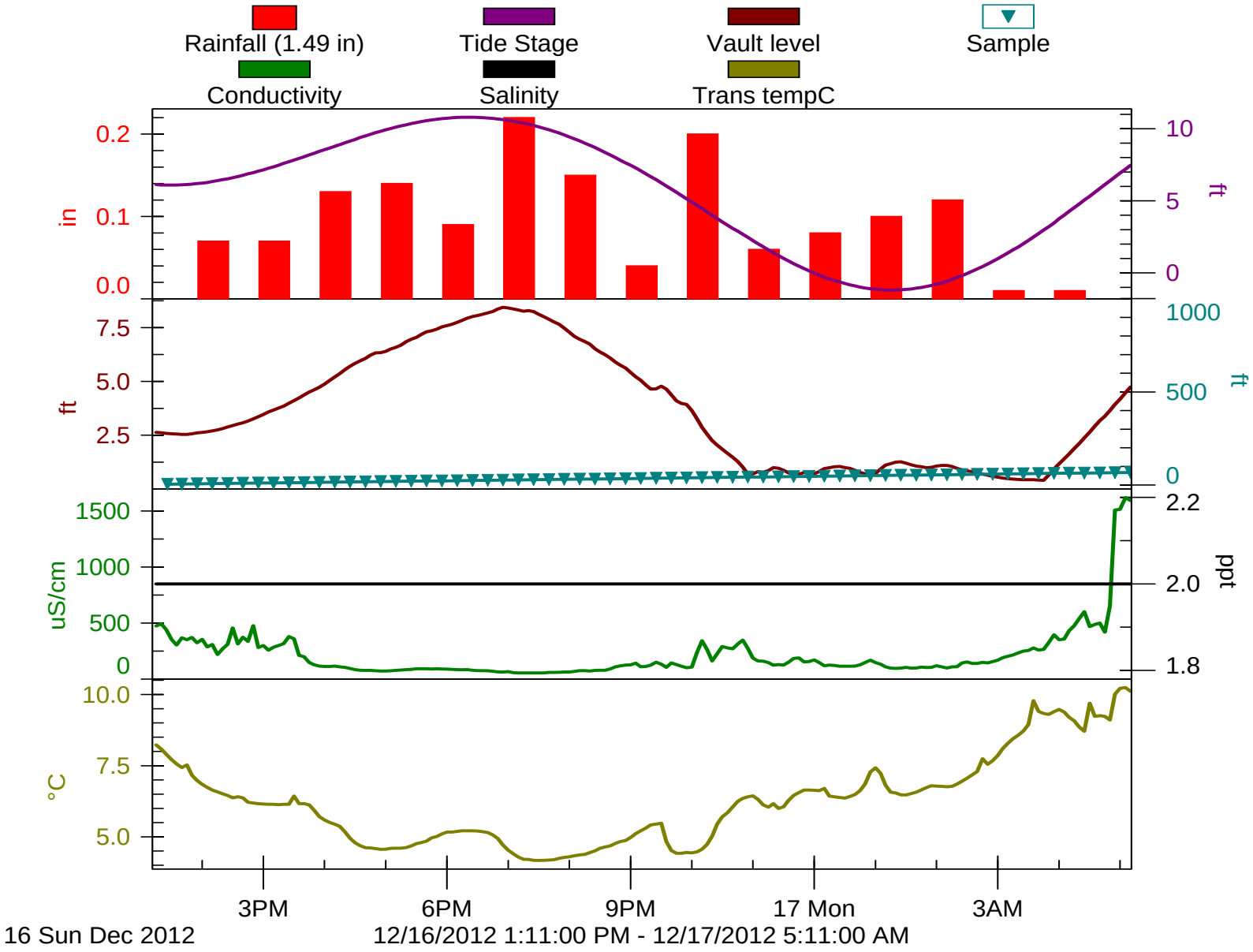
16 Sun Dec 2012

12/16/2012 2:25:00 PM - 12/17/2012 6:25:00 AM

No Grab Samples Collected During Event

PSNS 015

SW13 12-16-2012



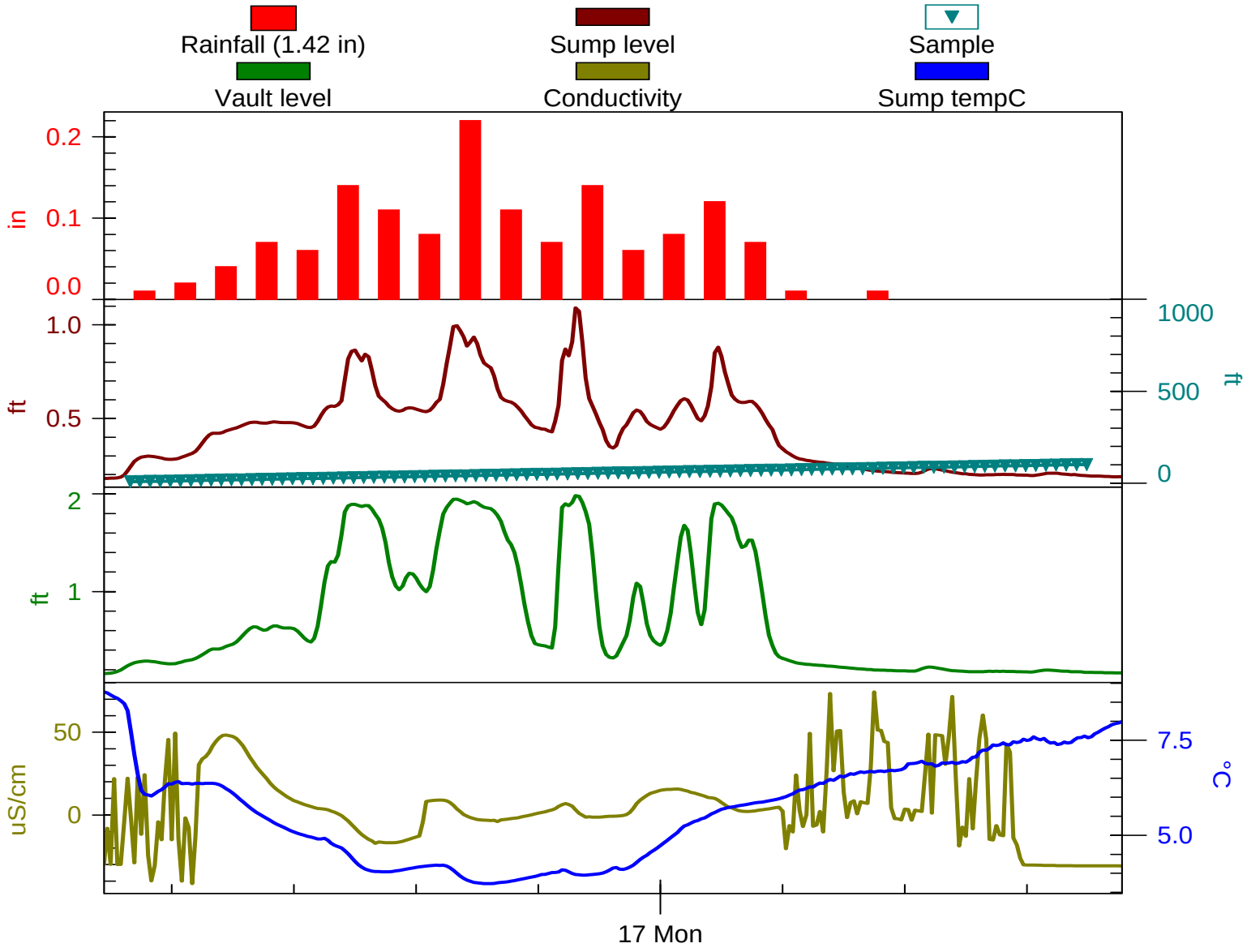
16 Sun Dec 2012

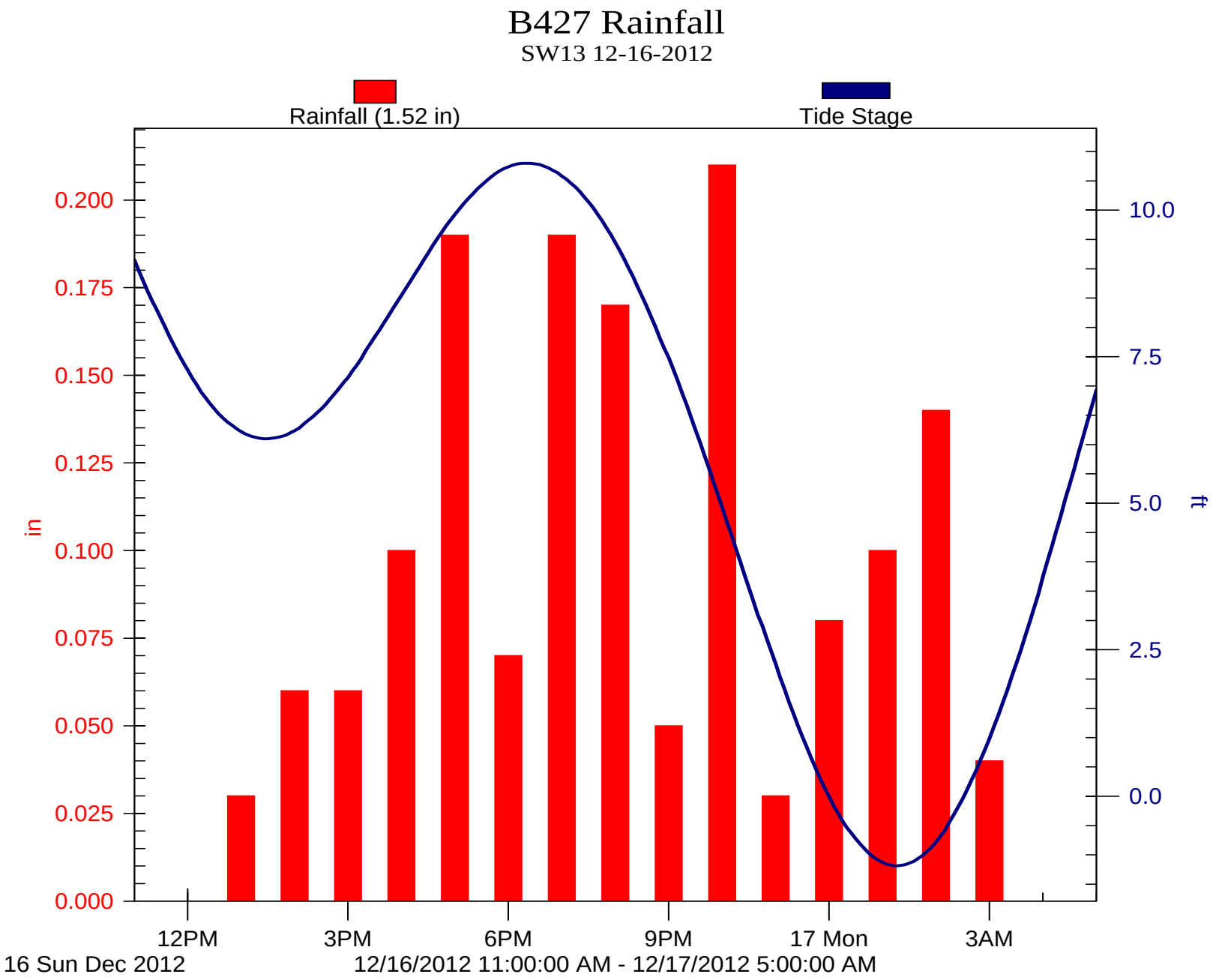
12/16/2012 1:11:00 PM - 12/17/2012 5:11:00 AM

No Grab Samples Collected During Event

PSNS PB01

SW13 12-16-2012




B427 Rainfall
SW13 12-16-2012
Rainfall (1.52 in)
Tide Stage
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
in
10.0
7.5
5.0
2.5
0.0
ft
12PM
3PM
6PM
9PM
17 Mon
3AM
16 Sun Dec 2012
12/16/2012 11:00:00 AM - 12/17/2012 5:00:00 AM

********** PROGRAM SETTINGS **********

PROGRAM NAME:
"PSNS126 "
SITE DESCRIPTION:
"PSNS126 "

UNITS SELECTED:
LENGTH: ft

24, 1000 ml BTLS
19 ft SUCTION LINE
13 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
----------------------------------------
SAMPLER ID# 3293179321  11:29 17-DEC-12
  Hardware: B2      Software: 3.26
********** SAMPLING RESULTS **********
   SITE: PSNS126
PROGRAM: PSNS126
Program Started at 15:56 FR 14-DEC-12
Nominal Sample Volume =  240 ml
                              COUNT
                                TO
SAMPLE  BOTTLE TIME  SOURCE ERROR LIQUID
------- ------ ----      -- --    ------
            15:56  PGM DISABLED
------------- SU 16-DEC-12 -------------
            14:16  PGM ENABLED
  1,4     1   14:16      E          492
  2,4     1   14:30      F          489
  3,4     1   14:45      F          490
  4,4     1   15:00      F          493
  1,4     2   15:15      F          495
  2,4     2   15:30      F          490
```

3,4	2	15:45	F	493
4,4	2	16:00	F	489
1,4	3	16:15	F	491
2,4	3	16:30	F	486
3,4	3	16:45	F	487
4,4	3	17:00	F	478
1,4	4	17:15	F	481
2,4	4	17:30	F	473
3,4	4	17:45	F	475
4,4	4	18:00	F	471
1,4	5	18:15	F	473
2,4	5	18:30	F	471
3,4	5	18:45	F	467
4,4	5	19:00	F	470
1,4	6	19:15	F	471
2,4	6	19:30	F	471
3,4	6	19:45	F	473
4,4	6	20:00	F	481
1,4	7	20:15	F	483
2,4	7	20:30	F	483
3,4	7	20:45	F	483
4,4	7	21:00	F	490
1,4	8	21:15	F	496
2,4	8	21:30	F	499
3,4	8	21:45	F	495
4,4	8	22:00	F	495
1,4	9	22:15	F	501
2,4	9	22:30	F	501
3,4	9	22:45	F	501
4,4	9	23:00	F	501
1,4	10	23:15	F	501
2,4	10	23:30	F	501
3,4	10	23:45	F	497
---------- MO 17-DEC-12 ----------				
4,4	10	00:00	F	495
1,4	11	00:15	F	495
2,4	11	00:30	F	497
3,4	11	00:45	F	497
4,4	11	01:00	F	493
1,4	12	01:15	F	496
2,4	12	01:30	F	498
3,4	12	01:45	F	499
4,4	12	02:00	F	495
1,4	13	02:15	F	498
2,4	13	02:30	F	499
3,4	13	02:45	F	496

```
 4,4   13  03:00     F         503
 1,4   14  03:15     F         503
 2,4   14  03:30     F         569
 3,4   14  03:45     F  NM       *
 4,4   14  04:00     F  NM       *
 1,4   15  04:15     F  NM       *
 2,4   15  04:30     F  NM       *
 3,4   15  04:45     F  NM       *
 4,4   15  05:00     F         497
 1,4   16  05:15     F         490
 2,4   16  05:30     F         487
 3,4   16  05:45     F         480
 4,4   16  06:00     F         476
 1,4   17  06:15     F         475
 2,4   17  06:30     F         466
 3,4   17  06:45     F         463
 4,4   17  07:00     F         460
 1,4   18  07:15     F         458
 2,4   18  07:30     F         463
 3,4   18  07:45     F         454
 4,4   18  08:00     F         459
 1,4   19  08:15     F         457
 2,4   19  08:30     F         453
 3,4   19  08:45     F         459
 4,4   19  09:00     F         461
 1,4   20  09:15     F         454
 2,4   20  09:30     F         463
 3,4   20  09:45     F         462
 4,4   20  10:00     F         465
 1,4   21  10:15     F         468
 2,4   21  10:30     F         466
 3,4   21  10:45     F         473
 4,4   21  11:00     F         477
 1,1   22  11:15     F         477
         11:16  MANUAL PAUSE
         11:16  PGM STOPPED 17-DEC
  SOURCE E  ==> ENABLE
  SOURCE F  ==> FLOW
   ERROR NM ==> NO MORE LIQUID!
----------------------------------------
```

********** PROGRAM SETTINGS **********

PROGRAM NAME:
"PSNS084DUP"
SITE DESCRIPTION:
"PSNS084DUP"

UNITS SELECTED:
LENGTH: ft
---
5 MINUTE
DATA INTERVAL

24, 1000 ml BTLS
16 ft SUCTION LINE
15 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
RUN CONTINUOUSLY

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
   0.01 inch TIP
    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
----------------------------------------
SAMPLER ID# 3293179316  11:48 17-DEC-12
  Hardware: B2      Software: 3.26
********** SAMPLING RESULTS **********
   SITE: PSNS084DUP
PROGRAM: PSNS084DUP
Program Started at 16:47 FR 14-DEC-12
Nominal Sample Volume =  120 ml
                              COUNT
                                TO
SAMPLE  BOTTLE TIME  SOURCE ERROR LIQUID
------- ------ ----      -- --    ------
            16:47  PGM DISABLED
------------ SU 16-DEC-12 ------------
            14:59  PGM ENABLED
```

1,8	1-2	14:59	E	504
2,8	1-2	15:13	F	497
3,8	1-2	15:28	F	497
4,8	1-2	15:43	F	495
5,8	1-2	15:58	F	496
6,8	1-2	16:13	F	494
7,8	1-2	16:28	F	494
8,8	1-2	16:43	F	490
1,8	3-4	16:58	F	489
2,8	3-4	17:13	F	488
3,8	3-4	17:28	F	485
4,8	3-4	17:43	F	488
5,8	3-4	17:58	F	484
6,8	3-4	18:13	F	484
7,8	3-4	18:28	F	482
8,8	3-4	18:43	F	484
1,8	5-6	18:58	F	486
2,8	5-6	19:13	F	482
3,8	5-6	19:28	F	483
4,8	5-6	19:43	F	487
5,8	5-6	19:58	F	492
6,8	5-6	20:13	F	491
7,8	5-6	20:28	F	496
8,8	5-6	20:43	F	497
1,8	7-8	20:58	F	496
2,8	7-8	21:13	F	502
3,8	7-8	21:28	F	508
4,8	7-8	21:43	F	510
5,8	7-8	21:58	F	516
6,8	7-8	22:13	F	522
7,8	7-8	22:28	F	528
8,8	7-8	22:43	F	535
1,8	9-10	22:58	F	536
2,8	9-10	23:13	F	532
3,8	9-10	23:28	F	531
4,8	9-10	23:43	F	532
5,8	9-10	23:58	F	532
---------- MO 17-DEC-12 ----------				
6,8	9-10	00:13	F	532
7,8	9-10	00:28	F	534
8,8	9-10	00:43	F	532
1,8	11-12	00:58	F	532
2,8	11-12	01:13	F	532
3,8	11-12	01:28	F	532
4,8	11-12	01:43	F	531
5,8	11-12	01:58	F	532

6,8	11-12 02:13	F	532
7,8	11-12 02:28	F	532
8,8	11-12 02:43	F	532
1,8	13-14 02:58	F	534
2,8	13-14 03:13	F	536
3,8	13-14 03:28	F	534
4,8	13-14 03:43	F	534
5,8	13-14 03:58	F	528
6,8	13-14 04:13	F	525
7,8	13-14 04:28	F	520
8,8	13-14 04:43	F	516
1,8	15-16 04:58	F	503
2,8	15-16 05:13	F	501
3,8	15-16 05:28	F	498
4,8	15-16 05:43	F	492
5,8	15-16 05:58	F	485
6,8	15-16 06:13	F	484
7,8	15-16 06:28	F	480
8,8	15-16 06:43	F	474
1,8	17-18 06:58	F	473
2,8	17-18 07:13	F	472
3,8	17-18 07:28	F	470
4,8	17-18 07:43	F	470
5,8	17-18 07:58	F	468
6,8	17-18 08:13	F	468
7,8	17-18 08:28	F	468
8,8	17-18 08:43	F	468
1,8	19-20 08:58	F	469
2,8	19-20 09:13	F	470
3,8	19-20 09:28	F	472
4,8	19-20 09:43	F	473
5,8	19-20 09:58	F	475
6,8	19-20 10:13	F	480
7,8	19-20 10:28	F	478
8,8	19-20 10:43	F	481
1,3	21-22 10:58	F	482
2,3	21-22 11:13	F	488
3,3	21-22 11:28	F	490

11:40 MANUAL PAUSE
11:41 PGM STOPPED 17-DEC
SOURCE E ==> ENABLE
SOURCE F ==> FLOW

********** PROGRAM SETTINGS **********

PROGRAM NAME:
"PSNS 053 "
SITE DESCRIPTION:
"PSNS 053 "

UNITS SELECTED:
LENGTH: ft

24, 1000 ml BTLS
19 ft SUCTION LINE
11 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
----------------------------------------
SAMPLER ID# 3293179322  10:50 17-DEC-12
  Hardware: B2      Software: 3.26
********** SAMPLING RESULTS **********
   SITE: PSNS 053
PROGRAM: PSNS 053
Program Started at 17:53 FR 14-DEC-12
Nominal Sample Volume =  240 ml
                              COUNT
                                TO
SAMPLE  BOTTLE TIME  SOURCE ERROR LIQUID
------- ------ ----      -- --    ------
            17:54  PGM DISABLED
------------- SU 16-DEC-12 -------------
            14:36  PGM ENABLED
  1,4     1   14:36      E          479
  2,4     1   14:50      F          476
  3,4     1   15:05      F          475
  4,4     1   15:20      F          476
  1,4     2   15:35      F          468
  2,4     2   15:50      F          470
```

3,4	2	16:05	F	464
4,4	2	16:20	F	456
1,4	3	16:35	F	455
2,4	3	16:50	F	457
3,4	3	17:05	F	458
4,4	3	17:20	F	462
1,4	4	17:35	F	461
2,4	4	17:50	F	458
3,4	4	18:05	F	462
4,4	4	18:20	F	461
1,4	5	18:35	F	457
2,4	5	18:50	F	452
3,4	5	19:05	F	450
4,4	5	19:20	F	455
1,4	6	19:35	F	452
2,4	6	19:50	F	456
3,4	6	20:05	F	461
4,4	6	20:20	F	458
1,4	7	20:35	F	461
2,4	7	20:50	F	458
3,4	7	21:05	F	455
4,4	7	21:20	F	451
1,4	8	21:35	F	453
2,4	8	21:50	F	449
3,4	8	22:05	F	457
4,4	8	22:20	F	458
1,4	9	22:35	F	450
2,4	9	22:50	F	449
3,4	9	23:05	F	451
4,4	9	23:20	F	457
1,4	10	23:35	F	463
2,4	10	23:50	F	463
---------- MO 17-DEC-12 ----------				
3,4	10	00:05	F	464
4,4	10	00:20	F	462
1,4	11	00:35	F	470
2,4	11	00:50	F	469
3,4	11	01:05	F	463
4,4	11	01:20	F	458
1,4	12	01:35	F	462
2,4	12	01:50	F	463
3,4	12	02:05	F	461
4,4	12	02:20	F	464
1,4	13	02:35	F	467
2,4	13	02:50	F	469
3,4	13	03:05	F	474

4,4	13	03:20	F		481
1,4	14	03:35	F		487
2,4	14	03:50	F	NL	*
3,4	14	04:05	F	NL	*
4,4	14	04:20	F	NL	*
1,4	15	04:35	F	NL	*
2,4	15	04:50	F	NL	*
3,4	15	05:05	F	NL	*
4,4	15	05:20	F	NL	*
1,4	16	05:35	F	NL	*
2,4	16	05:50	F	NL	*
3,4	16	06:05	F		482
4,4	16	06:20	F		481
1,4	17	06:35	F		475
2,4	17	06:50	F		476
3,4	17	07:05	F		471
4,4	17	07:20	F		470
1,4	18	07:35	F		470
2,4	18	07:50	F		469
3,4	18	08:05	F		463
4,4	18	08:20	F		459
1,4	19	08:35	F		461
2,4	19	08:50	F		463
3,4	19	09:05	F		463
4,4	19	09:20	F		459
1,3	20	09:35	F		463
2,3	20	09:50	F		464
3,3	20	10:05	F		465

10:20 MANUAL PAUSE
10:20 PGM STOPPED 17-DEC
SOURCE E ==> ENABLE
SOURCE F ==> FLOW
ERROR NL ==> NO LIQUID DETECTED!

********** PROGRAM SETTINGS **********

PROGRAM NAME:
"PSNS015 "
SITE DESCRIPTION:
"PSNS015 "

UNITS SELECTED:
LENGTH: ft

24, 1000 ml BTLS
22 ft SUCTION LINE
18 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
----------------------------------------
SAMPLER ID# 2483481595  10:53 17-DEC-12
  Hardware: B2      Software: 3.26
********** SAMPLING RESULTS **********
   SITE: PSNS015
PROGRAM: PSNS015
Program Started at 10:36 SA 15-DEC-12
Nominal Sample Volume =  240 ml
                              COUNT
                                TO
SAMPLE  BOTTLE TIME  SOURCE ERROR LIQUID
------- ------ ----      -- --    ------
            10:36  PGM DISABLED
------------- SU 16-DEC-12 -------------
            13:20  PGM ENABLED
  1,4     1   13:20      E          817
  2,4     1   13:34      F          829
  3,4     1   13:49      F          811
  4,4     1   14:04      F          797
  1,4     2   14:19      F          800
  2,4     2   14:34      F          809
```

3,4	2	14:49	F		794
4,4	2	15:04	F		799
1,4	3	15:19	F		785
2,4	3	15:34	F		787
3,4	3	15:49	F		779
4,4	3	16:04	F		773
1,4	4	16:19	F		765
2,4	4	16:34	F		767
3,4	4	16:49	F		761
4,4	4	17:04	F		757
1,4	5	17:19	F		746
2,4	5	17:34	F		746
3,4	5	17:49	F		745
4,4	5	18:04	F		745
1,4	6	18:19	F		745
2,4	6	18:34	F		734
3,4	6	18:49	F		745
4,4	6	19:04	F		745
1,4	7	19:19	F		739
2,4	7	19:34	F		743
3,4	7	19:49	F		743
4,4	7	20:04	F		755
1,4	8	20:19	F		755
2,4	8	20:34	F		767
3,4	8	20:49	F		767
4,4	8	21:04	F		779
1,4	9	21:19	F		780
2,4	9	21:34	F		797
3,4	9	21:49	F		817
4,4	9	22:04	F		811
1,4	10	22:19	F		821
2,4	10	22:34	F		838
3,4	10	22:49	F		852
4,4	10	23:04	F		1301
1,4	11	23:19	F		891
2,4	11	23:34	F		854
3,4	11	23:49	F		843
---------- MO 17-DEC-12 ----------					
4,4	11	00:04	F	NM	*
1,4	12	00:19	F		1703
2,4	12	00:34	F		878
3,4	12	00:49	F		847
4,4	12	01:04	F		907
1,4	13	01:19	F		879
2,4	13	01:34	F	NM	*
3,4	13	01:49	F	NM	*

```
 4,4   13  02:04     F        1034
 1,4   14  02:19     F         860
 2,4   14  02:34     F  NM       *
 3,4   14  02:49     F         866
 4,4   14  03:04     F         865
 1,4   15  03:19     F         865
 2,4   15  03:34     F         877
 3,4   15  03:49     F         841
 4,4   15  04:04     F         830
 1,4   16  04:19     F         817
 2,4   16  04:34     F         807
 3,4   16  04:49     F         793
 4,4   16  05:04     F         781
 1,4   17  05:19     F         777
 2,4   17  05:34     F         768
 3,4   17  05:49     F         756
 4,4   17  06:04     F         749
 1,4   18  06:19     F         739
 2,4   18  06:34     F         737
 3,4   18  06:49     F         727
 4,4   18  07:04     F         725
 1,4   19  07:19     F         721
 2,4   19  07:34     F         716
 3,4   19  07:49     F         714
 4,4   19  08:04     F         715
 1,4   20  08:19     F         708
 2,4   20  08:34     F         713
 3,4   20  08:49     F         710
 4,4   20  09:04     F         715
 1,4   21  09:19     F         714
 2,4   21  09:34     F         721
 3,4   21  09:49     F         727
 4,4   21  10:04     F         726
         10:10  MANUAL PAUSE
         10:10  PGM STOPPED 17-DEC
  SOURCE E  ==> ENABLE
  SOURCE F  ==> FLOW
   ERROR NM ==> NO MORE LIQUID!
----------------------------------------
```

********** PROGRAM SETTINGS **********

PROGRAM NAME:
"PSNS PB01 "
SITE DESCRIPTION:
"PSNS PB01 "

UNITS SELECTED:
LENGTH: ft

24, 1000 ml BTLS
30 ft SUCTION LINE
9 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

SAMPLER ID# 2425546782 11:06 17-DEC-12
Hardware: B2 Software: 3.26
********** SAMPLING RESULTS **********
SITE: PSNS PB01
PROGRAM: PSNS PB01
Program Started at 12:50 SA 15-DEC-12
Nominal Sample Volume = 240 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		12:50	PGM DISABLED		
---------- SU 16-DEC-12 ----------					
		10:49	PGM ENABLED		
1,4	1	10:49	E		789
2,4	1	11:03	F		783
3,4	1	11:18	F		783
4,4	1	11:33	F		789
1,4	2	11:48	F		783
2,4	2	12:03	F		783

3,4	2	12:18	F	783
4,4	2	12:33	F	783
1,4	3	12:48	F	783
2,4	3	13:03	F	783
3,4	3	13:18	F	789
4,4	3	13:33	F	789
1,4	4	13:48	F	783
2,4	4	14:03	F	789
3,4	4	14:18	F	789
4,4	4	14:33	F	795
1,4	5	14:48	F	795
2,4	5	15:03	F	795
3,4	5	15:18	F	795
4,4	5	15:33	F	789
1,4	6	15:48	F	789
2,4	6	16:03	F	789
3,4	6	16:18	F	789
4,4	6	16:33	F	795
1,4	7	16:48	F	789
2,4	7	17:03	F	795
3,4	7	17:18	F	795
4,4	7	17:33	F	790
1,4	8	17:48	F	795
2,4	8	18:03	F	795
3,4	8	18:18	F	795
4,4	8	18:33	F	791
1,4	9	18:48	F	794
2,4	9	19:03	F	795
3,4	9	19:18	F	795
4,4	9	19:33	F	795
1,4	10	19:48	F	789
2,4	10	20:03	F	791
3,4	10	20:18	F	791
4,4	10	20:33	F	795
1,4	11	20:48	F	795
2,4	11	21:03	F	801
3,4	11	21:18	F	795
4,4	11	21:33	F	789
1,4	12	21:48	F	789
2,4	12	22:03	F	789
3,4	12	22:18	F	795
4,4	12	22:33	F	789
1,4	13	22:48	F	795
2,4	13	23:03	F	795
3,4	13	23:18	F	790
4,4	13	23:33	F	795

1,4	14	23:48	F	790
---------- MO 17-DEC-12 ----------				
2,4	14	00:03	F	795
3,4	14	00:18	F	795
4,4	14	00:33	F	795
1,4	15	00:48	F	797
2,4	15	01:03	F	795
3,4	15	01:18	F	789
4,4	15	01:33	F	791
1,4	16	01:48	F	797
2,4	16	02:03	F	789
3,4	16	02:18	F	795
4,4	16	02:33	F	797
1,4	17	02:48	F	795
2,4	17	03:03	F	801
3,4	17	03:18	F	803
4,4	17	03:33	F	797
1,4	18	03:48	F	795
2,4	18	04:03	F	798
3,4	18	04:18	F	801
4,4	18	04:33	F	801
1,4	19	04:48	F	795
2,4	19	05:03	F	797
3,4	19	05:18	F	795
4,4	19	05:33	F	797
1,4	20	05:48	F	795
2,4	20	06:03	F	803
3,4	20	06:18	F	795
4,4	20	06:33	F	795
1,4	21	06:48	F	791
2,4	21	07:03	F	795
3,4	21	07:18	F	795
4,4	21	07:33	F	791
1,4	22	07:48	F	797
2,4	22	08:03	F	795
3,4	22	08:18	F	795
4,4	22	08:33	F	795
1,4	23	08:48	F	791
2,4	23	09:03	F	791
3,4	23	09:18	F	790
4,4	23	09:33	F	795
1,3	24	09:48	F	795
2,3	24	10:03	F	797
3,3	24	10:18	F	794

10:25 MANUAL PAUSE
10:25 PGM STOPPED 17-DEC

SOURCE E ==> ENABLE
SOURCE F ==> FLOW

National Weather Service National Headquarters

National Weather Service

Area Forecast Discussion

Issued by NWS Seattle/Tacoma, WA

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000
FXUS66 KSEW 161154
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
354 AM PST SUN DEC 16 2012

.SYNOPSIS...A STRONG PACIFIC STORM WILL RACE TOWARD THE AREA TODAY. THIS SYSTEM WILL BRING THE POTENTIAL FOR DAMAGING WINDS ACROSS THE LOWLANDS AND HEAVY SNOW TO THE MOUNTAINS TONIGHT AND MONDAY. LOOK FOR SHOWERY WEATHER TO PREVAIL IN THE WAKE OF THE OCCLUDED FRONT THAT WILL MOVE ACROSS THE REGION MONDAY MORNING. THE SNOW LEVELS WILL ALSO FALL TO NEAR SEA LEVEL MONDAY NIGHT AS A COLDER AIR MASS SETTLES OVER THE AREA. HIGHER PRESSURE ALOFT WILL SLOWLY BUILD IN FROM THE WEST DURING THE DAY TUESDAY.

&&

.SHORT TERM...
SCATTERED...MAINLY LIGHT...SHOWERS CONTINUED OVER THE FORECAST AREA EARLY THIS MORNING. LOOK FOR THE PRECIP TO FILL IN AND BECOME STEADY DURING THE DAY IN ADVANCE OF A STRONG LOW PRESSURE SYSTEM.

THE STRONG SYSTEM DUE TO IMPACT THE PACIFIC NORTHWEST WAS STILL WELL OFFSHORE. THE SURFACE LOW ASSOCIATED WITH THIS SYSTEM IS EXPECTED TO RAPIDLY DEEPEN TO NEAR 975 MB AS IT RACES EAST DURING THE DAY TODAY. THERE WAS STILL SOME DISAGREEMENT IN THE MODELS CONCERNING THE STRENGTH AND TIMING OF THIS FEATURE BUT THEY WERE STARTING TO COME INTO BETTER AGREEMENT. THE OPERATIONAL NAM WAS STILL THE OUTLIER. IT MUCH FASTER THAN THE OTHER MODELS...SO DECIDED TO LEAN TOWARD THE GFS AND ECMWF SOLUTIONS IN REGARDS TO THE TIMING.

WITH THAT IN MIND...ANTICIPATE STRONG...POSSIBLY DAMAGING...WINDS TO DEVELOP OVER THE COAST LATE TONIGHT AHEAD OF THE OCCLUDED FRONT. THE FRONT WILL QUICKLY MOVE EAST ACROSS THE AREA EARLY MONDAY MORNING. DUE TO THE UNCERTAINTY IN THE TRACK OF THE LOW...HAVE CHOSEN TO KEEP THE WATCH UP FOR ALL OF THE LOWLANDS EXCEPT THE CENTRAL COAST. CONFIDENCE OF A HIGH WIND EVENT FOR THE COAST WAS RELATIVELY HIGHER...SO THE WATCH WAS UPGRADED TO A WARNING. IF THE LOW TRACKS ACROSS THE PUGET SOUND AS SOME OF THE MODEL INDICATED...WINDS OVER PARTS OF THE NORTH INTERIOR MIGHT END UP STAYING BELOW ADVISORY CRITERIA. IF THE BENT BACK OCCLUSION MOVE EAST ACROSS THE STRAIT OF JUAN DE FUCA...THERE MAY BE BRIEF HIGH WIND WESTERLIES OVER PARTS OF THE STRAIT OF JUAN DE FUCA AND POSSIBLY WHIDBEY ISLAND AS IT PASSES.

HEAVY SNOW IS STILL ANTICIPATED IN THE MOUNTAINS FROM THIS UPCOMING SYSTEM. THE CASCADES WILL LIKELY RECEIVE ANOTHER 1 TO 3 FEET OF SNOW BY LATE IN THE DAY MON. CONFIDENCE WAS HIGH FOR THE CASCADES...SO THE WINTER STORM WATCH WAS UPGRADED TO A WARNING. KEPT THE ADVISORY GOING FOR THE OLYMPICS THROUGH TODAY AS SNOW WILL BE PICKING UP THERE DURING THE DAY. ALSO...KEPT THE WATCH UP FOR THE OLYMPICS FOR TONIGHT AS AMOUNTS ARE EXPECTED TO BE LOWER.

THE MODELS WERE IN GOOD AGREEMENT THAT THE PRECIP WILL QUICKLY TAPER OFF MON MORNING ACROSS MUCH OF THE AREA. THE EXCEPTION WAS THE CASCADES WHERE LOCALLY HEAVY SNOW SHOWERS WILL CONTINUE THROUGHOUT MUCH OF THE DAY...ALTHOUGH THE INTENSITY WILL GRADUALLY WIND DOWN DURING THE AFTERNOON AS THE OROGRAPHIC FORCING WEAKENS.

THE SNOW LEVELS WILL PLUMMET TO NEAR SEA LEVEL TUE NIGHT...THUS ANTICIPATE THE PRECIP TO CHANGE OVER TO SNOW OR A RAIN/SNOW MIX ACROSS THE LOWLANDS...IF IS PRECIP FALLING. WILL NEED TO WATCH OUT FOR THE PUGET SOUND CONVERGENCE ZONE /PSCZ/ THAT WILL LIKELY DEVELOP LATE MORN MORNING OR EARLY MON AFTERNOON. AT THIS TIME...IT IS EXPECTED TO DEVELOP OVER ITS FAVORITE LOCATION...NEAR THE KING/SNOHOMISH COUNTY LINE. THERE WILL BE THE POTENTIAL FOR SIGNIFICANT SNOWFALL MON NIGHT THROUGH TUE MORNING ACROSS THOSE LOWLAND AREAS IMPACTED BY THE PSCZ.

ANTICIPATE WEATHER CONDITIONS TO GRADUALLY WIND DOWN DURING THE DAY TUE AS HIGHER PRES ALOFT BEGINS BUILDING IN FROM THE WEST.

.LONG TERM...
AN UNSETTLED WEATHER PATTERN WILL PREVAIL OVER THE REGION DURING THIS PERIOD. CONFIDENCE IN THE DETAILS WERE NOT VERY HIGH DUE TO SOME DISAGREEMENT IN THE MODELS AS WELL AS SOME LACK OF CONTINUITY IN THE MODELS.

&&

.HYDROLOGY...
FLOODING IS NOT EXPECTED ON AREA RIVERS THROUGH THE END OF THE WEEK.

&&

.AVIATION...SCATTERED SHOWERS CONTINUE EARLY THIS MORNING IN
WEAKENING ONSHORE FLOW. SOUTHERLY SURFACE WINDS WILL BE TURNING
OFFSHORE LATER THIS MORNING AS A DEEPENING SURFACE LOW APPROACHES
THE REGION. RAIN WILL SPREAD ONSHORE ONCE AGAIN AHEAD OF A STRONG
FRONTAL SYSTEM TODAY. WINDS ALOFT WILL BECOME RATHER STRONG LATE
THIS AFTERNOON WITH SOUTHERLY WINDS OF 50-60 KNOTS NEAR 5000 FEET
EXPECTED BY 00Z.

KSEA...SOME SHORT-LIVED IMPROVEMENT IN CEILINGS EXPECTED LATER THIS
MORNING AS DEVELOPING OFFSHORE GRADIENTS SCOUR OUT SOME LOW LEVEL
MOISTURE. RAIN REDEVELOPING BY EARLY AFTERNOON WITH MVFR RETURNING
AFTER 00Z. SLY SURFACE WINDS TURN OFFSHORE AFTER 18Z WITH E-SE WIND
10 TO 20 KNOTS WITH HIGHER GUSTS AFTER 00Z. STRONG POST-FRONTAL
ONSHORE WIND SHIFT WILL BRING VERY GUSTY SW WIND AFTER 09Z MONDAY.

&&

.MARINE...A STRONG FRONTAL SYSTEM WILL REACH THE AREA LATE TONIGHT
WITH AN ASSOCIATED SURFACE LOW NEAR 977 MILLIBARS MOVING ONSHORE
SOMEWHERE NEAR THE NORTH WASHINGTON COAST DURING THE EARLY HOURS OF
MONDAY MORNING. I HAVE CONVERTED THE STORM WATCHES FOR THE COASTAL
WATERS AND STRAIT OF JUAN DE FUCA INTO STORM WARNINGS. SUSTAINED
WIND SPEEDS OVER THE COASTAL WATERS WILL BE IN THE 35 TO 45 KNOT
RANGE...BUT THERE WILL BE HIGHER GUSTS NEAR 55 KNOTS AT TIMES. THE
00Z RUN OF THE 4KM UW-WRFGFS HAD LARGE SWATHS OF 50 TO 60 KNOT WIND
GUSTS BOTH IMMEDIATELY AHEAD OF AND BEHIND THE SURFACE LOW OVER THE
COASTAL WATERS AND STRAIT. THE TRACK OF THE SURFACE LOW FAVORS A
STRONG WESTERLY SURGE BEHIND IT AS IT MOVES ONSHORE EARLY MONDAY
MORNING. GALES ARE EXPECTED FOR ALL REMAINING WATERS BY EARLY
MONDAY. MODELS CONTINUE TO SHOW A STRONG POST-FRONTAL GRADIENT OF
+13 MB PDX-BLI 18Z MONDAY. THIS ALONG WITH THE NAM12 SHOWING A 6HR
ISALLOBARIC BULLSEYE OF +15MB OVER THE NORTH SOUND SHOULD PRODUCE A
FULL GALE OVER PUGET SOUND.

THE DEEP LOW MONDAY MORNING WILL LIKELY GIVE A STORM SURGE OF A
COUPLE FOOT TIDAL ANOMALY SO TIDAL OVERFLOW IS LIKELY DURING HIGH
TIDE MONDAY MORNING IN THE INTERIOR WATERS AROUND 8 AM. THE TIMING
IS DIFFERENT ON THE COAST WHERE THE FIRST HIGH TIDE AROUND 3AM WILL
HAVE SE GALES AND THE WAVES STILL BUILDING...THEN LOW TIDE MAY
COINCIDE WITH THE HIGHEST TIDAL ANOMALY WHICH HELPS FOR AWHILE. THE
MONDAY AFTERNOON HIGH TIDE WILL SEE HIGH SURF OF 23 TO 28 FEET
COASTAL AREAS. 27

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...WINTER WEATHER ADVISORY IN EFFECT FOR THE OLYMPICS UNTIL 6 PM
THIS EVENING.

WINTER STORM WARNING IN EFFECT FOR THE CASCADES FROM 6 PM THIS
EVENING TO 6 PM MONDAY.

HIGH WIND WARNING IN EFFECT FOR THE CENTRAL COAST FROM MIDNIGHT
TONIGHT UNTIL 10 AM MONDAY.

WINTER STORM WATCH IN EFFECT FOR THE OLYMPICS FROM THIS EVENING
THROUGH MONDAY MORNING.

HIGH WIND WATCH IN EFFECT FOR THE LOWLANDS...EXCEPT THE CENTRAL
COAST...FROM LATE TONIGHT THROUGH MONDAY MORNING.

COASTAL FLOOD WATCHES ARE IN EFFECT FOR THE COAST AND INTERIOR
SHORELINES.

PZ...STORM WARNINGS ARE IN EFFECT FOR THE COASTAL WATERS AND STRAIT
OF JUAN DE FUCA.

GALE WARNINGS ARE IN EFFECT FOR THE REMAINING WATERS FROM
MIDNIGHT TONIGHT TIL 3 PM MONDAY.

SMALL CRAFT ADVISORY IN EFFECT FOR ROUGH GRAYS HARBOR BAR
CONDITIONS UNTIL 4 AM TUESDAY.

&&

$$

WWW.WEATHER.GOV/SEATTLE

FOR THE GRAPHICAL AFD...VISIT
WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML

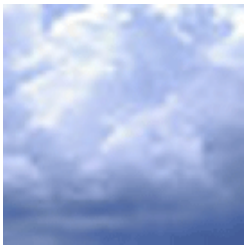
NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Local forecast by "City, St" or ZIP code
Enter location ... Go
Location Help

NWS Wants Your Comments on a Proposed Alternative to Simplify Winter Haza

Are you confused about our terms "Watch," "Warning" and "Advisory"? NWS wants your feed alternative to communicating winter hazard messages. The goal of this demonstration is to ex our messages to improve public understanding. We will create live examples of alternative me comment.
Read More...

BREMERTON WA



Overcast
37°F
3°C

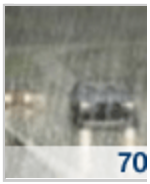
Humidity	81%
Wind Speed	S 10 MPH
Barometer	29.74 in
Dewpoint	32°F (0°C)
Visibility	10.00 mi

Last Update on 16 Dec 8:15 am PST

Current conditi
Bremerto
(KPWT)
Lat: 47.5 Lo

More Local

Share |

TODAY	TONIGHT	MONDAY	MONDAY NIGHT	TUESDAY	TUESDAY NIGHT	WEDNESDAY
 100%	 100%	 100%	 50%	 30%	 50%	 70
Heavy Rain	Heavy Rain	Showers	Chance Rain/Snow	Chance Rain/Snow	Chance Rain	Rain Likely
High: 42 °F	Low: 40 °F	High: 42 °F	Low: 35 °F	High: 40 °F	Low: 36 °F	High: 42 °F

HAZARDOUS WEATHER CONDITIONS

Coastal Flood Watch
High Wind Watch

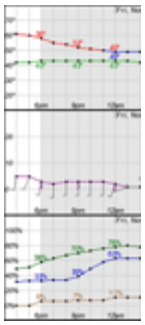
NWS Sea
Point Forec

7-DAY FORECAST

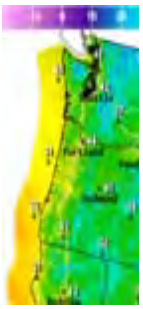
Today	Rain. The rain could be heavy at times. High near 42. South southe of precipitation is 100%.
Tonight	Rain. The rain could be heavy at times. Low around 40. South wind high as 20 mph. Chance of precipitation is 100%.
Monday	Showers, mainly before 4pm. High near 42. Windy, with a south sou gusts as high as 48 mph. Chance of precipitation is 100%.
Monday Night	A chance of rain showers before 10pm, then a chance of snow sho lowering to 0 feet. Mostly cloudy, with a low around 35. Breezy, with mph, with gusts as high as 30 mph. Chance of precipitation is 50%. than a half inch possible.
Tuesday	

	A chance of snow showers before 10am, then a chance of rain sho sunny, with a high near 40. Southwest wind 18 to 21 mph, with gus precipitation is 30%. New snow accumulation of less than a half inc
Tuesday Night	A 50 percent chance of rain. Mostly cloudy, with a low around 36.
Wednesday	Rain likely. Cloudy, with a high near 42. Chance of precipitation is 7
Wednesday Night	Rain likely. Cloudy, with a low around 39.
Thursday	Rain likely. Mostly cloudy, with a high near 44.
Thursday Night	Showers likely. Mostly cloudy, with a low around 38.
Friday	A chance of showers. Mostly cloudy, with a high near 44.
Friday Night	Showers likely. Mostly cloudy, with a low around 39.
Saturday	Rain likely. Mostly cloudy, with a high near 45.

HOURLY



NATIONA
DATABA



ADDITIONAL FORECASTS AND INFORMATION

ZONE AREA FORECAST FOR SEATTLE/BREMERTON AREA, WA

Forecast Discussion
Printable Forecast
Text Only Forecast

Hourly Weather Graph
Tabular Forecast
Quick Forecast

Air Quality Forecasts
International System of Units
About Point Forecasts
Forecast Weather Table Interface

weather.gov

National Weather Service Forecast Office
Seattle, WA

Home News Organization Search for: NWS All NOAA Go

Point Forecast: Bremerton WA
47.56N 122.62W (Elev. 0 ft)

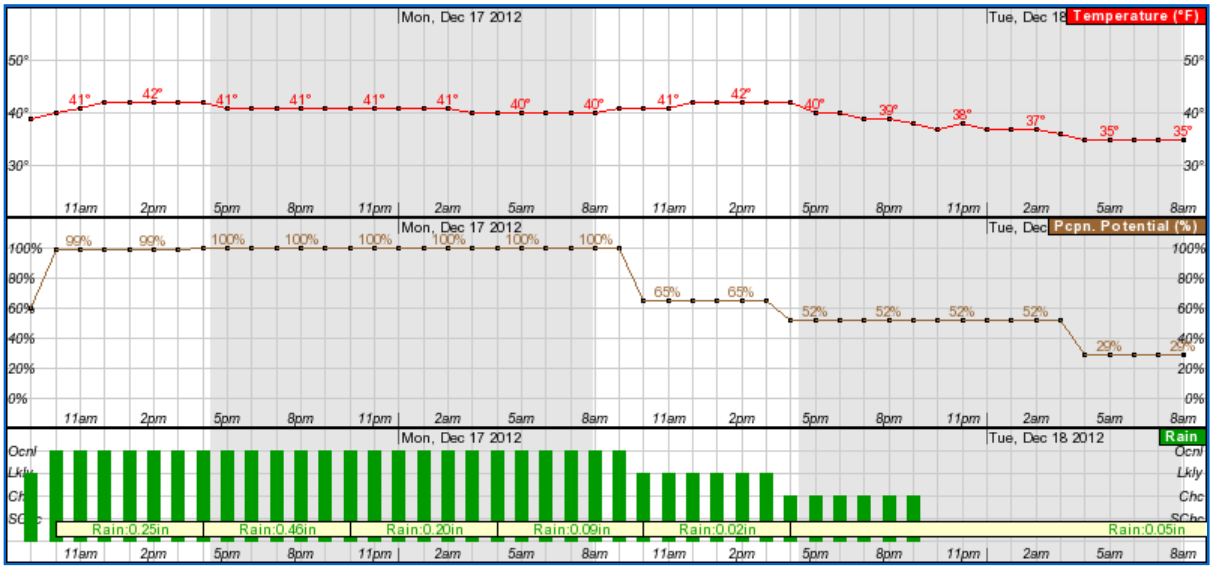
Last Update: 2:53 am PST Dec 16, 2012

Hourly Weather Forecast Graph

[dashes/dots] | [b/w] | [hide menu]

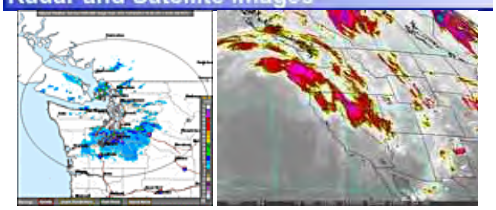
Weather Elements	Weather/Precipitation	Fire Weather
☑ Temperature (°F)	☐ Thunder	☐ Mixing Height (x100ft)
☐ Dewpoint (°F)	☑ Rain	☐ Haines Index
☐ Wind Chill (°F)	☐ Snow	☐ Lightning Activity Level
☐ Surface Wind mph	☐ Freezing Rain	☐ Trans. Wind mph
☐ Sky Coverage	☐ Sleet	
☑ Precipitation Potential		
☐ Relative Humidity		

48-Hour Period Starting: 9am Sun, Dec 16 2012 Submit Back 2 Days Forward 2 Days



Monday, December 17 at 8pm
Temperature: 39 °F
Precipitation Potential: 52%
Rain: Chance (30%-50%)

Radar and Satellite Images



Additional Forecasts & Information

International System of Units
Forecast Discussion
7-Day Forecast
Tabular Forecast
Quick Forecast

Webmaster
NOAA's National Weather Service
Seattle, WA

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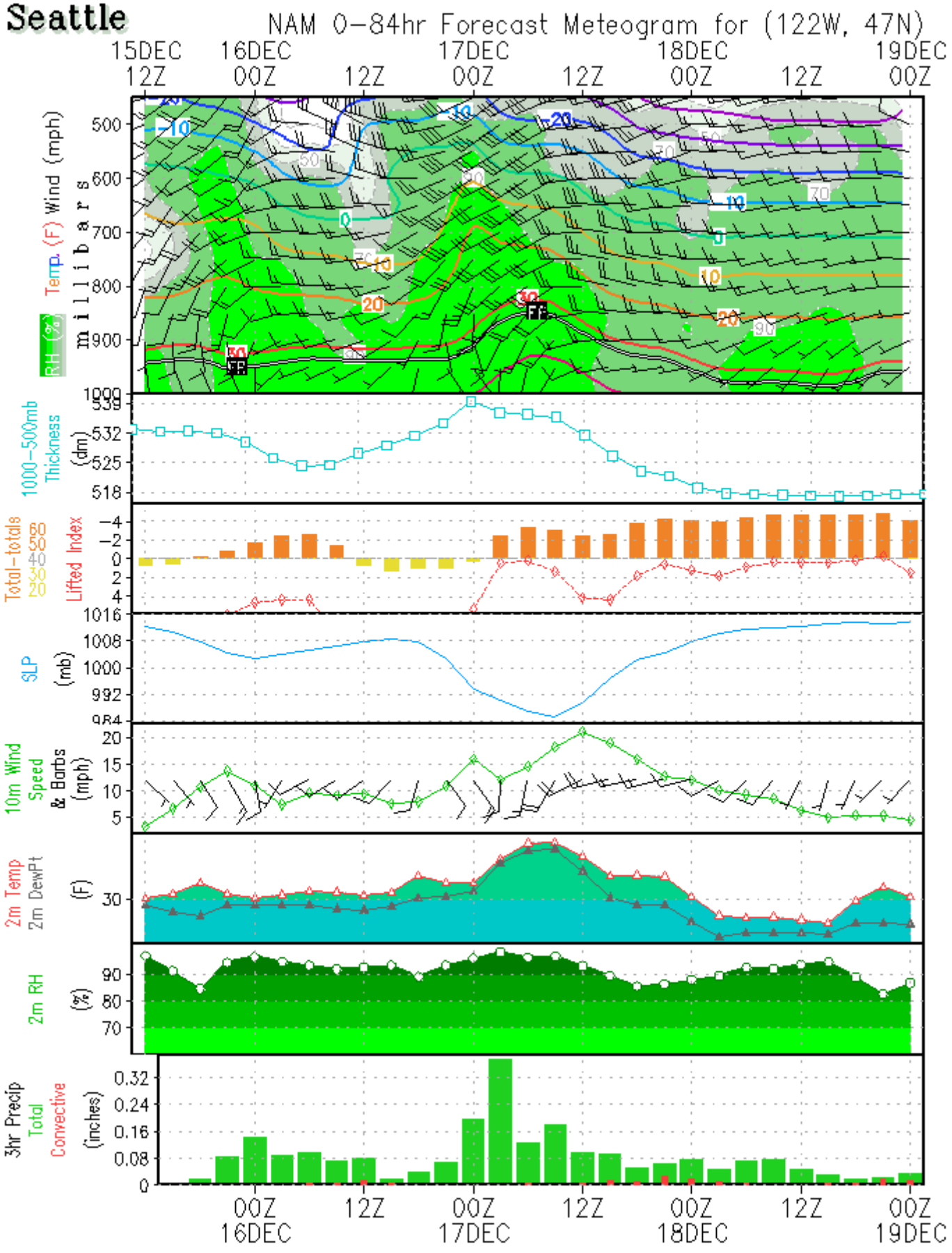
Forecast For Lat/Lon: 47.5620/-122.6230 (Elev. 0 ft)
Bremerton WA

Forecast Created at: 8am PST Dec 16, 2012

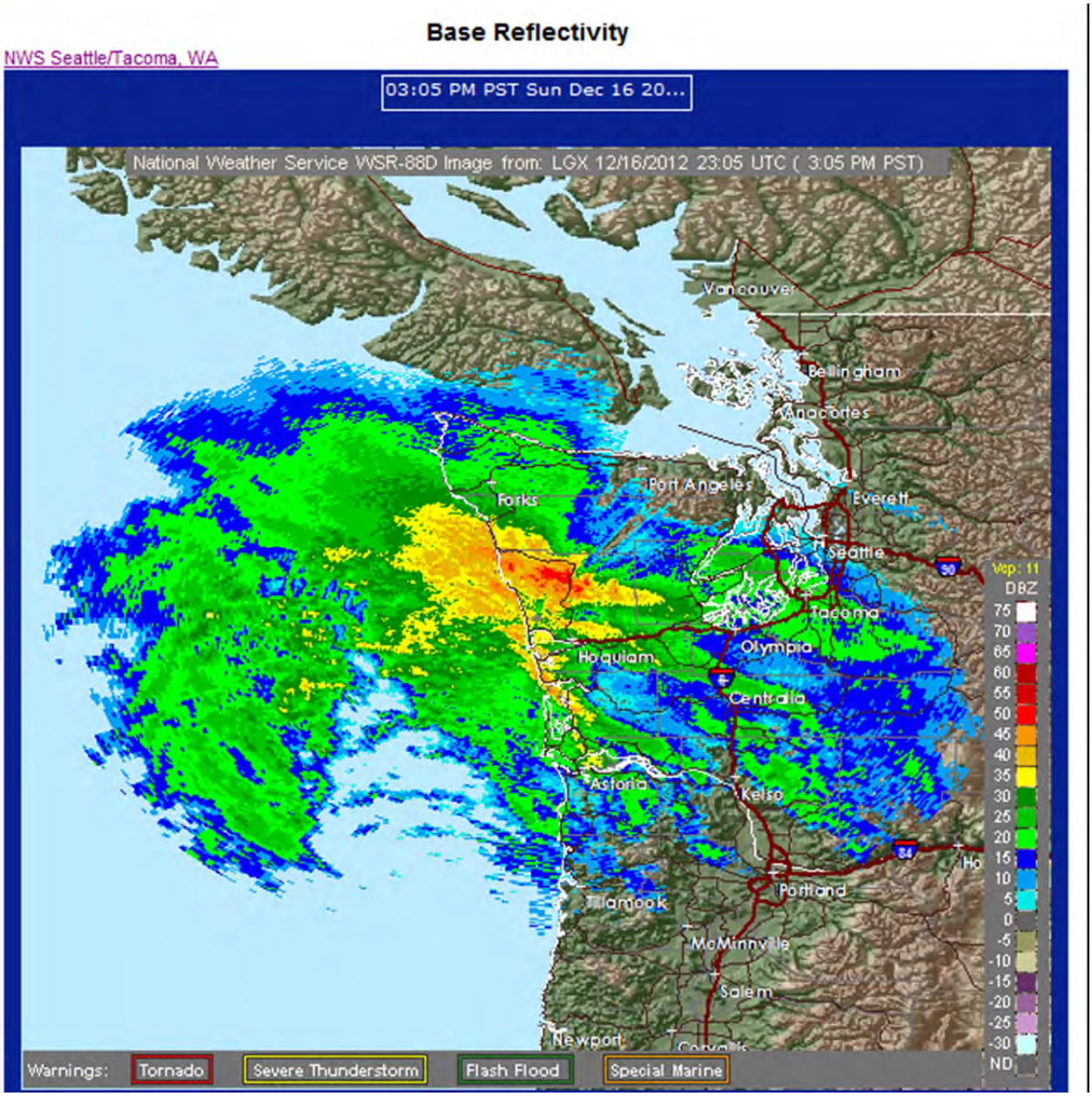
Custom Weather Forecast Table

	Sun Dec 16								Mon Dec 17								Tue Dec 18
Weather	Likely Rain		Rain		Rain		Rain		Rain Showers		Numerous Rain Showers		Chance Rain Showers		Chance Snow Showers		
Daily-Temp			High **42** Low **38**								High **42** Low **40**						Low **35**
Chance of Precip	60%		100%		100%		100%		100%		65%		50%		50%		
Precip	0.02"		0.25"		0.46"		0.20"		0.09"		0.02"		0.01"		0.01"		
12-hr Snow Total	0"				0"				0"				Trc				
3-Hour	4am	7am	10am	1pm	4pm	7pm	10pm	1am	4am	7am	10am	1pm	4pm	7pm	10pm	1am	
Temp	38	38	40	42	42	41	41	41	40	40	41	42	42	39	37	37	
Cloudiness	96%	96%	100%	100%	100%	100%	100%	100%	100%	100%	80%	80%	56%	56%	56%	56%	
Dewpoint	32	33	37	39	39	39	39	38	38	39	39	40	38	39	37	36	
Relative Humdity	79%	82%	89%	89%	89%	93%	93%	89%	92%	94%	94%	93%	86%	100%	100%	96%	
Wind	SW 12	SW 12	S 9	S 14	S 14	SE 12	S 14	S 14	SW 29	S 28	S 28	S 35	SW 23	SW 23	SW 20	SW 20	
Snow Level (ft)	1292	1292	1160	1160	1557	1557	2797	2797	3152	3152	1264	1264	520	520	0	0	

Seattle

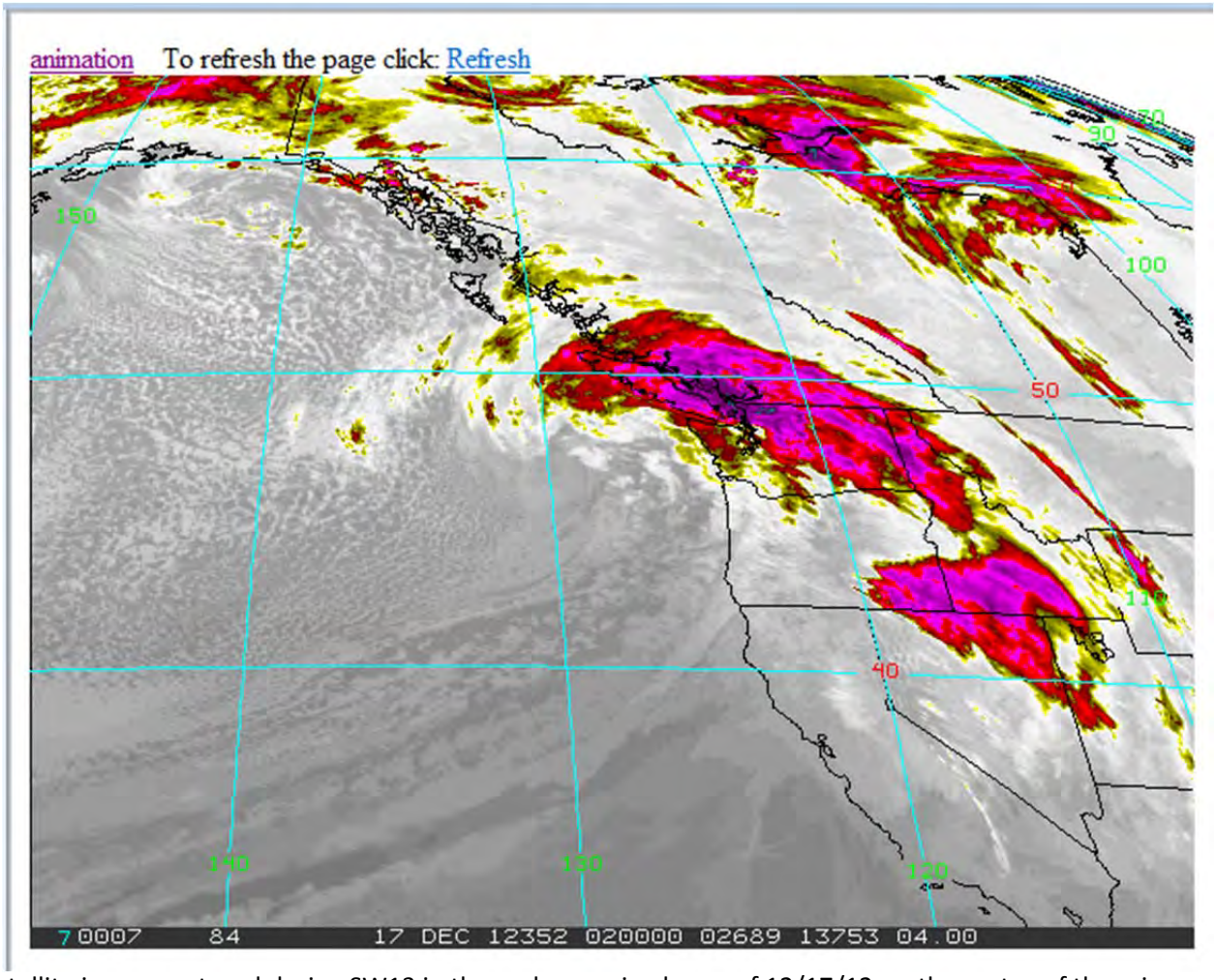

NAM 0-84hr Forecast Meteogram for (122W, 47N)
15DEC 12Z
16DEC 00Z
12Z
17DEC 00Z
12Z
18DEC 00Z
12Z
19DEC 00Z
millibars
500
600
700
800
900
1000
Temp. (F) Wind (mph)
RH (%)
1000-500mb Thickness (dm)
539
532
525
518
Total-totals
Lifted Index
SLP (mb)
1016
1008
1000
992
10m Wind Speed & Barbs (mph)
20
15
10
5
2m Temp
2m DewPt
(F)
30
2m RH (%)
90
80
70
3hr Precip
Total
Convective
(inches)
0.32
0.24
0.16
0.08
0
00Z 16DEC
12Z
00Z 17DEC
12Z
00Z 18DEC
12Z
00Z 19DEC

SW13 Radar Image



Radar Image (from Langley Hill) captured near height of SW13, 12/16/2012 (1505)

SW13 Satellite Image



Satellite image captured during SW13 in the early morning hours of 12/17/12, as the vortex of the rain event passes through the Puget Sound region and southern British Columbia (infrared western US 4KM view).