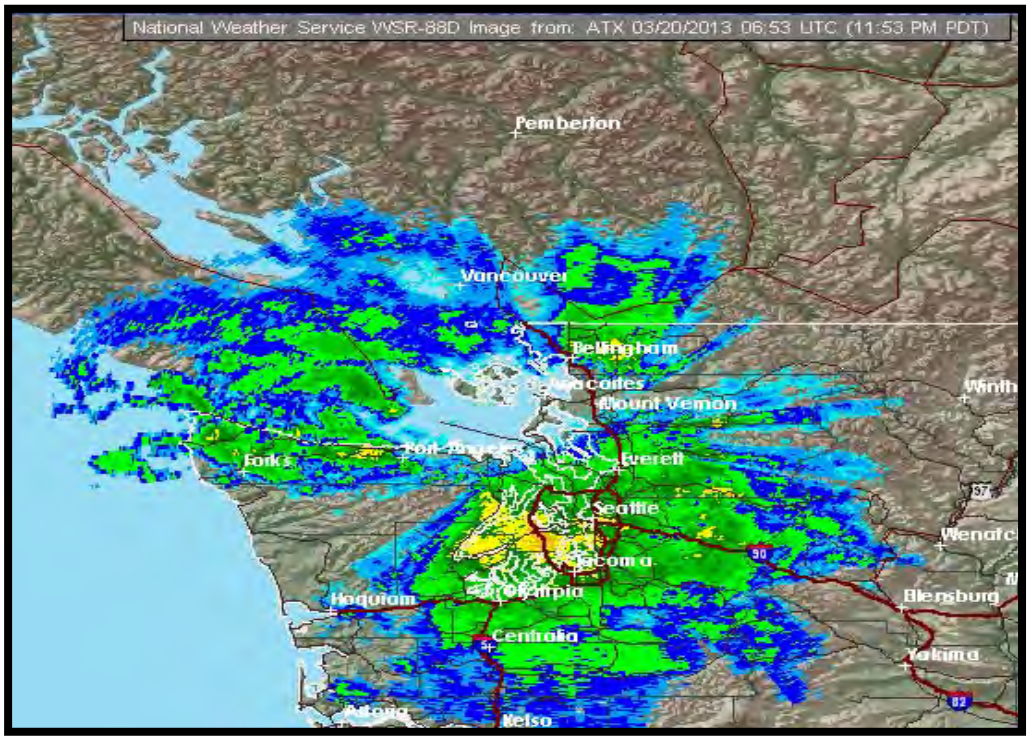
STORM EVENT REPORT SW16
For
Non-Dry Dock Stormwater Monitoring
Conducted at
Puget Sound Naval Shipyard
Bremerton, WA
Project ENVVEST Study Area

March 19, 2013



PNNL Contract No.: N4523A10MP00034 Amendment 2

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 February 24th and March 21st, 2013. This was the third of three events scheduled for the 2012-2013 project year – referred to hereafter as *Phase III*. Overall, this was the fourth event (three scheduled and one unscheduled) for the Phase III season and sixteenth stormwater (SW16) sampling event of the project. SW16 was the final sampling event for Phase III. A summary of the preparatory and sampling event tasks, including site specific conditions, that occurred during SW16 are presented in this report, with supporting information as attachments.

This SW16 Report is organized in the following manner and contains: Section 2, SW16 Event Summary; Section 3, Project Staff Participating in SW16; Section 4, Storm Event SW16 Preparatory Tasks; Section 5, Weather Forecast Information; Section 6, Event Targeting, Precipitation Summary and SW16 Qualification; Section 7, Sampling Information, Management and Validation; Section 8, Basin Runoff Calculations; Section 9, Descriptive Statistics and Discussion of Event Station Monitoring Data; Section 10, Telemetry Data Summary Report; Section 11, Notable Field Anomalies and Variations to the 2012-13 Project Work Plan Addendum (PWPA); and Section 12, 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 SW16 Event Summary

Main SW16 details are provided below as a "*Quick Reference*":

- *Event/s Conducted:* SW16
- *Event Date/s:* maint. items; 2/24 through 3/17/13, station prep.; 3/18/13; and storm event tasks occurring between 3/19 and 3/21/13
- *Monitoring Stations Sampled:* PSNS015, -053, -PB01, -084.1, -115.1 and -126
- *Antecedent Conditions Met?:* Both the 24-hr and 6-hr antecedent dry periods were met unconditionally at all monitoring stations.
- *Start of Rainfall at PSNS Stations:* between 3/19/2013 (1530) at PSNS015 and 3/19/13 (1600) at PSNSPB01.
- *Sampling Period Duration Range:* start = 3/19/13 (1650) @ PSNS015 and stop = 3/20/13 (1846) @ PSNS084.1. Max sampling duration = 23 hrs:44 mins @ PSNS115.1, -084.1, -015 and -PB01
- *Sampling Event Rainfall Total:* PSNSB427 = 1.42", PSNS126 = 1.02", PSNS115.1 = 1.19", PSNS084.1 = 1.26", PSNS053 = 1.32", PSNS015 = 1.46" and PSNSPB01 = 1.52"

- *Samples/Types Collected:* Grab and composite samples were collected at each station (one each at each station) for a total of 12 "normal" samples.
- *Quality Control (QC) Samples Collected:* One grab duplicate was collected at PSNS115.1, and one composite duplicate was collected at PSNSPB01.
- *Based on consideration of storm event and sample validation information, were the samples collected during SW16 valid for project purposes? (Y / N, composite, grab or both):* Yes, all grab and 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.

3.0 Project Staff Participating in SW16

CardnoTEC:

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

Brian Rupert – Field Team Leader

Bruce Beckwith – Field Team Member

Navy C/106 Personnel:

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

Christine Gebhart– Project Manager / Grab sample collection support

4.0 Storm Event SW16 Preparatory Tasks

Between the end of the SW15 event (2/23/13) and prior to the start of the preparation tasks for SW16 (3/18/13) general maintenance items (e.g. transducer calibrations, rain gauge maintenance, etc.) were performed at the monitoring stations as appropriate.

On March 14th a potentially targetable rain event was identified five to six days in advance. The decision was made by PSNS C/106 to continue to track and attempt to collect samples from the pending event. On March 18th all six monitoring stations were visited and appropriately prepared and reset for sample collection. By the conclusion of the preparatory tasks all stations were readied for storm event / stormwater sample collection. At the time of station setup 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 throughout the remainder of the storm event. Final enabling conditions were determined by the Storm Controller closer to the onset of the storm event. See the attached *Storm Control Worksheet* for details.

5.0 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.

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). Detailed *Weather Forecast Information* for SW16 is attached to this report.

A synopsis of the weather model comparison for SW16 is provided below:

"The GFS and the NAM are in decent agreement as to event start time, 3-19-13 1500 and 1600, respectively. The GFS has event rainfall continuous until about 1000 on 3-20 with 0.86" and an additional 0.02" by 1500, for an event total of 0.88". The NAM shows steady rainfall until about 0800 on 3-20 with 0.61" and an additional 0.2 by 1200, for an event total of 0.81". NWS predicted rainfall amounts as follows: 0.46" to 0.52" between 1100 and 2300 3/19, 0.23" more to 0500 on 3/20, with 0.29" more to 1100 and an additional 0.13" to approx. 1700 on 3/20/13.

A potentially qualifying storm event was identified and targeted for 3/19/13. The NWS forecasted the event probability from 87% to 94% for Tuesday 3/19/13, with 24-hour accumulations of between 0.98" and 1.17" into mid-day Wednesday the 20th.

The NWS synopsis for the approaching event was as follows:

Rain will spread into the area from the southwest later today as a front associated with a developing low pressure system approaches the area. This system will bring rain, wind and heavy mountain snow to the area Tuesday night through Wednesday night. Colder air will arrive Wednesday night and Thursday with showery conditions. Weak high pressure could bring a drying trend toward the weekend. Short term, satellite imagery shows the large low pressure system developing over the eastern pacific as it continues to approach our area. The system is complex with a subtropical jet and lots of moisture heading toward CA while a double surface low structure is tracking toward Vancouver Island. All models agree that the low will consolidate and align under the colder northern stream upper trough later tonight allowing for further deepening. While models agree on the general track there are differences in the details which could affect the strength and distribution of wind across the forecast area. Rain will be locally heavy over the lowlands. 1-2 inches of rain is likely across much of the western WA lowlands with over 3 inches possible along some coastal locations.

Based on the weather forecast information available, as summarized above, the "Go" 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, as well as post-event tasks. The 24 and 6 hour antecedent dry period qualifications were met and the autosampler enabling conditions were appropriately set prior to the onset of the rain event.

6.0 Event Targeting, Precipitation Summary and SW16 Qualification

Event Targeting:

Final sampler enabling conditions were appropriately set at each monitoring station between (1230) and (1239) on the afternoon of 3/19/13 (*sampler ready mode*). Table 1 lists the final enabling conditions at each monitoring station that were used for SW16.

Table 1. Monitoring Station Enabling Conditions

[1]Station	Rainfall (in/hr)	Level (ft)	Conductivity (µS/cm)	Repeatable Enable (Y/N)	Pacing (min)
PSNS126	0.03	0.3	2000	No	15
PSNS115.1	0.03	0.3	2000	Yes-cond. only	15
PSNS084.1	0.03	0.20	2000	No	15
PSNS053	0.03	0.10	2000	No	15
PSNS015	0.03	0.30	2000	No	15
PSNSPB01	0.03	0.22	NA	No	15

[1]Station conditions were checked at (~1200) on 3/19/13; final enable conditions set at ~(1230) and (1239)

Precipitation Summary:

Between the end previous sampling event (SW15) and the onset of rainfall for SW16 the average rainfall as measured at the six monitoring stations during this approximately 24 day period was 1.47", with average daily station rainfall total of 0.062". The Navy's rain gauge at Build 427 recorded a total of 1.66" during the same period, with an average daily rainfall amount of 0.07".

Previous rainfall that caused runoff ("*last runoff*") to occur (≥ 0.03" rainfall without 3-hr gap) prior to the onset of SW16 ranged from 42 hours at PSNS084.1 to 74 hours at PSNS015. Rainfall amounts were measured by each stations rain gauge.

The project defined qualifying antecedent dry period (≤0.1" rainfall in previous 24-hrs and 0.0" rainfall in previous 6-hrs) was met at all of the stations prior to the onset of SW16.

Rain began to fall over the project site between 1530 (PSNS015) and 1600 (PSNSPB01) on March 19th. 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-Sample 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	3/17/2013 18:05	1:22	0.00	0.00	3/19/2013 15:45
PSNS115.1	3/17/2013 18:20	1:21	0.00	0.00	3/19/2013 15:40
PSNS084.1	3/17/2013 21:35	1:18	0.00	0.00	3/19/2013 15:55
PSNS053	3/16/2013 13:35	1:22	0.00	0.00	3/19/2013 15:40
PSNS015	3/16/2013 13:35	1:22	0.00	0.00	3/19/2013 15:30
PSNSPB01	3/16/2013 14:20	3:02	0.00	0.00	3/19/2013 16:00

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

Operational checks were conducted via telemetry throughout the evening of March 18th and the morning and afternoon of the 20th, revealing 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 1.02” at PSNS126 to 1.54” at PSNSPB01. The Navy’s rain gauge at B427 recorded 1.42” over the entire combined length of the sampling period for all project monitoring stations.

Sampling routines at all of the project monitoring stations had run their programmed courses between 1634 and 1849 on March 20th, as the storm event was over and runoff and/or tidal influences had returned along with non-rain conditions. Sampling durations (the range of time covering bottles used in the formulation of the overall station composite sample) ranged from 16:30(hrs:mins) at PSNS053 to 23:44(hrs:mins) at PSNS115.1, -084.1, -015 and -PB01.

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 SW16. 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	3/19/2013 19:05	3/20/2013 13:34	18:29	1.02
PSNS115.1	3/19/2013 17:11	3/20/2013 16:55	23:44	1.19

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)
PSNS084.1	3/19/2013 19:02	3/20/2013 18:46	23:44	1.26
PSNS053	3/19/2013 18:58	3/20/2013 11:28	16:30	1.32
PSNS015	3/19/2013 16:50	3/20/2013 16:34	23:44	1.46
PSNSPB01	3/19/2013 17:35	3/20/2013 17:19	23:44	1.54
[1]B427	3/19/2013 16:50	3/20/2013 18:46	25:56	1.42

[1]B427 start/stop and duration incorporates the total span from all monitoring stations

SW16 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"), antecedent dry period (≤0.1" rainfall in previous 24-hrs and 0.0" rainfall in previous 6-hrs), storm duration (≥2hrs) and runoff occurrence / hydrograph stage (elevated above base flow). Table A-1 (*Storm Event Summary and Sampling Information, Validation Checklist)*, documents the particular SW16 qualification criteria listed above.

7.0 Sampling Information, Management and Validation

Grab Sampling:

Grab sample collection was lead and performed by the Navy C/106 Team, with storm control assistance (limited to station status checks via telemetry) from CardnoTEC as necessary. Grab sampling was conducted at all six of the monitoring stations. Grab samples were collected as per methodologies described in the 2012-13 PWPA. Parameters included total petroleum hydrocarbons (NW-TPH-Dx) and fecal coliform. Grab samples were collected between 1210 (PSNS053) and 1552 (PSNS015) on 3/20/2013. Attempts were made to coordinate the collection of grab samples with low or lower tidal conditions, ensuring that proper conductivity conditions would exist. Grab sampling times are indicated on the attached hydrographs to illustrate the water level stage during collection. Grab sample IDs, along with the other pertinent sampling information is listed in Section 3 of the *Stormwater Field Sampling Forms* and in Table A-1 (both are attached). Table 4 summarizes these results.

Table 4. Grab Sampling Information for SW16

Sample Collection Criteria:	PSNS126	PSNS115.1	PSNS084.1	PSNS053	PSNS015	PSNSPB01
Grab sample ID	SW16-0003	SW16-0005	SW16-0004	SW16-0001	SW16-0007	SW16-0002

Table 4. Grab Sampling Information for SW16

Sample Collection Criteria:	PSNS126	PSNS115.1	PSNS084.1	PSNS053	PSNS015	PSNSPB01
Grab Date /Time	3/20/2013 13:02	3/20/2013 14:35	3/20/2013 13:50	3/20/2013 12:10	3/20/2013 15:52	3/20/2013 12:34
Grab sample conductivity value (μS/cm)	90	75	96	26	273	39
Hydrograph stage at grab collection	falling limb	falling limb	falling limb	elevated base flow	falling limb	intra-event rising limb
Grab parameters collected per PSNS PWPA?	Yes	Yes	Yes	Yes	Yes	Yes

Composite Sampling:

Composite sample retrieval tasks and formulation procedures were managed and lead by CardnoTEC with support from PNNL/MSL personnel as needed. Composite sample collection period and duration is noted in Table 3.

Discrete one-hour samples were collected at all six monitoring stations via autosamplers which were operated and synchronized by custom telemetered control systems. Discrete sample (wedge) bottles, contained in each autosampler base, were brought back the C/106 Stormwater Lab at B147 for processing. Composite formulation occurred between 1000 and 1440 on March 21st. The numeric identification, number of wedge bottles and volumes utilized from each that was used for the composite sample formulation and those that were discarded are noted in Section 5 of the attached *Stormwater Field Sampling Forms*.

Methods used in site / sampling preparation, autosampler collection, retrieval and formulation of the composite samples were conducted in a routine manner as per the 2012-13 PWPA. Composite sample parameters included: hardness, TOC, DOC, TSS, total metals, dissolved metals, conductivity and turbidity.

The total number of discrete wedge bottles collected, along with the total number of those bottles used in the stations' 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 during the corresponding sampling event period.

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 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 for SW16

Sample Collection Criteria:	PSNS126	PSNS115.1	PSNS084.1	PSNS053	PSNS015	PSNSPB01
Composite sample ID	SW16-0008	SW16-0011	SW16-0012	SW16-0010	SW16-0009	SW16-0013
Composite Date /Time	3/20/2013 13:34	3/20/2013 16:55	3/20/2013 17:46	3/20/2013 11:27	3/20/2013 16:34	3/20/2013 17:19
Overall Composite conductivity value (µS/cm)	235	209	87	43	67	66
Overall Composite turbidity value (NTU)	11	11	11	9	22	6
Composite volume (ml)	7,000	8000	8,000	8,500	7,000	7,200
Number of Bottles Collected During Sampling Event	19	24	24	17	24	12 (2-hr sets)
Number of Bottles Included in Composite Sample	19	22	20	17	24	12 (2-hr btls)
Percentage of Total Sampling Period that Freshwater Conditions Occurred	100%	92%	96%	100%	100%	100%
Composite parameters collected per PSNS PWPA?	Yes	Yes	Yes	Yes	Yes	Yes

All sampling and vault monitoring equipment operated as designed and programmed - except for PSNS084.1. 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 PSNS084.1 is further explained in Section 11 of this report.

QC Samples:

During SW16 duplicate grab and composite samples, one each, were collected at PSNS115.1 and PSNSPB01, respectively. Field equipment blanks were previously collected at each monitoring station (and from representative grab sampling equipment) prior to the SW13 storm sampling event. Equipment blank identification information is listed in Table A-1. Table 6 summarizes the quality control sample collection information for SW16.

Table 6. Summary of Quality Control Sampling Information for SW16

Sample Collection Criteria:	PSNS115.1	PSNSPB01
Grab sample duplicate ID	SW16-0006	
Grab sample duplicate date and time	3/20/2013 14:35	
Grab sample duplicate conductivity value (µS/cm)	75	
Composite sample Duplicate ID		SW16-0014
Composite sample duplicate date and time		3/20/2013 17:19
Overall Composite Duplicate conductivity value (µS/cm)		66
Overall Composite Duplicate turbidity value (NTU)		6
Composite Duplicate volume (ml)		7,200

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, grab and composite samples were placed into coolers and iced and/or into a secure refrigerator at the C/106 Stormwater Laboratory to maintain temperatures between 2 and 6 °C.

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 on March 21st, 2013. 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.

8.0 Basin Runoff Calculations

Rainfall runoff volumes during the SW16 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 Event Summary and Sampling Information, Validation Checklist*) (attached). Table 7 summarizes the results from these calculations.

Table 7. Runoff Calculations for SW16

Station	Type of Surface	Area of Basin Surface Type (ft^2)	[1]Runoff Coefficient	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	1.02	0.0850	376,344
	Pervious	9,613	0.4				
115.1	Impervious	449,104	0.9	409,792	1.19	0.0992	303,991
	Pervious	13,938	0.4				
84.1	Impervious	23,958	0.9	21,562	1.26	0.1050	16,936
53	Impervious	209,720	0.9	190,460	1.32	0.1100	156,721
	Pervious	4,280	0.4				
15	Impervious	2,009,431	0.8	2,411,321	1.46	0.1217	2,194,615
	Pervious	2,009,431	0.4				
PB01	Impervious	130,681	0.9	117,613	1.54	0.1283	112,908

9.0 Descriptive Statistics and Discussion of Event Station Monitoring Data

Descriptive statistics for the SW16 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	0.23	265	2.00	7.95	3.47
	Max	0.12	2.62	524	2.00	11.38	10.08
	Average	0.05	1.08	350	2.00	9.27	8.05
	Median	0.06	0.93	350	2.00	9.00	8.22
	Storm Total	**1.02**					
PSNS115.1	**Min**	0.00	0.71	24	2.00	7.82	1.70
	Max	0.13	9.79	4,034	3.12	10.86	10.08
	Average	0.05	6.78	287	2.01	9.28	7.06
	Median	0.05	7.67	38	2.00	9.39	7.61
	Storm Total	**1.19**					
PSNS084.1	**Min**	0.00	0.22	217	2.00	9.28	1.78
	Max	0.14	5.94	650	2.00	30.81	10.08
	Average	0.05	3.31	274	2.00	13.66	7.04
	Median	0.05	3.88	232	2.00	11.16	7.62
	Storm Total	**1.26**					
PSNS053	**Min**	0.00	0.08	12	2.00	9.13	3.02
	Max	0.17	5.23	42	2.00	15.75	10.08
	Average	0.08	2.87	20	2.00	10.66	7.97
	Median	0.08	3.43	19	2.00	10.40	8.23
	Storm Total	**1.32**					
PSNS015	**Min**	0.00	0.51	14	2.00	8.35	1.65
	Max	0.17	6.93	346	2.00	22.57	10.08
	Average	0.06	4.15	63	2.00	9.89	7.02
	Median	0.06	4.87	30	2.00	9.83	7.59
	Storm Total	**1.46**					
PSNSPB01	**Min**	0.00	0.19	51	NA	8.04	NA

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)
	Max	0.28	1.04	262	NA	12.11	NA
	Average	0.06	0.43	96	NA	9.32	NA
	Median	0.06	0.46	93	NA	9.47	NA
	Storm Total	**1.54**					

[1]Level data for PSNSPB01 applies to Sump Level

[2]Salinity calculations are based on an algorithm that has a lower range cut-off value of 2ppt. Actual field values may have been lower. NA = not applicable

Hydrograph Assessment:

Hydrographs for each monitoring station (except PSNSPB01) showed typical PSNS basin rainfall runoff and tidally influenced responses. The Navy's rain gauge atop B427 reflected a similar rainfall signature as compared with the monitoring stations.

Composite sample markers have been applied to all hydrographs to indicate total collection time (i.e. sample event period). Grab sample collection times are also noted on each hydrograph. The monitoring station hydrographs, as well as the rainfall graph for B427, are attached.

PSNS126, -115.1, -084.1 and -015: Hydrographs of the rainfall and water level responses (within their associated pipes) at these stations were similar. The SW16 event rainfall had a bimodal pattern, registering at the site gauges in two main waves, each separated by only a brief one to two hour lessening of intensity. Each station exhibits freshwater storage in their piping systems that raise and fall with the corresponding tide stage. Due to PSNS126's higher elevation, its system exhibits a greater degree of pipe emptying during slack tide.

Conductivity was generally low as the SW16 event started and remained low throughout the event, rising sharply at the conclusion of the rain, which was also coincident with low tide. One curious observation was that the conductivity (and salinity) spiked sharply (>2,000 µS/cm) at PSNS115.1 after approximately 0.14" of rain had fallen and the tide stage was rising, for approximately 45 minutes. The repeatable enable feature programmed at this station suspended sampling during this high conductivity period, and then resumed sampling once the conductivity level was below the acceptable threshold. One additional observation was at PSNS126; its conductivity signature varied greatly within a range of about 250-500 µS/cm, as if there were a conductivity source that was being newly eroded and pulsed into the piping system.

Temperature signatures at PSNS015 and -084.1 were similar in that they remained low (between 10 and 11°C) and relatively steady throughout the event, rising only once the rainfall ceased and the piping systems emptied during low tide. Stations PSNS115.1 and -126 have temperature

signatures with greater variability (between 8 and 11°C) during the rain event and which seem to show more of a response to runoff and tide stage.

PSNS053: The bimodal rainfall signature was also seen at PSNS053. However, due to its higher elevation and upland position in the basin (further than most stations), tidal fluctuations do not tend to influence the hydrograph as drastically as at other project monitoring stations. Consequently, PSNS053 is more prone to be influenced by short duration rainfall spikes and has less pipe storage capacity - which lends to its "flashy" nature. The stations' pipe water level tracked along somewhat with the tide hydrograph - more so than during the last SW event, mainly due to the increase in the amount of runoff input to the system. Conductivity remained fairly constant, <30 µS/cm, for the majority of the rainfall event. Not until the end of the rainfall event does the conductivity rise sharply, likely due to ionic concentrations increasing in the remaining runoff. Temperature is "choppy", but remains between 9 and 11°C for nearly the entire event, rising only at the end of the event.

PSNSPB01: PSNSPB01 is not tidally influenced since it is not directly connected to Sinclair Inlet. Water levels for both the vault interior (filter chamber) and the sump (terminal collection point for the under-drain system) are shown on the station hydrograph. Canister filter cycles are noted in the vault level's hydrograph signature, building to a certain stage, and then draining back down once the internal float mechanisms released from their seated position.

Temperature is driven down at the onset of the storm event, but steady raises as the rainfall tails off. Conductivity decreased from its initial concentration of about 260 µS/cm at the onset of runoff generation, until reaching a plateau of approximately 100 µS/cm; remaining there for a large portion of the event. Once the water level in the sump dropped below about 0.3' the conductivity sensor was exposed to air, and thus stopped generating representative values.

10.0 Telemetry Data Summary Report: (TDSR)

A review of the telemetry data collected at all six project monitoring stations since the end of SW15 (2/24/13 0000) to the end point of each monitoring station's data collection period (varied between 3/22 at PSNS126 to 5/2/13 at PSNS084.1), including the SW16 storm event, was conducted.

There were some minor and/or generally acceptable anomalies in nearly all of the station data sets mainly due to the Daylight Savings Time change, transducer maintenance and temperature issues (mainly at PSNS084.1). Overall, data gaps and other anomalies were not noted, or were of non-significance, during the actual SW16 storm event period (3/19 - 3/20/13). All sensors were in reasonable and accurate operation during the SW16 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 2/24/2013 to 5/2/2013[1]

Site	Parameter	Issue	Start Date/Time	End Date/Time	G.A.R Level of Concern	Comments
15	All	Data Gap	3/11/2013 0:05	3/11/2013 1:05	Green	1 Data Gap anomaly due to Daylight Savings Time ending.
15	Temperature	>20°C	3/20/13 16:20	3/20/13 16:25	Green	2 anomalously high temperature readings. Cause unknown.
15	Conductivity	Negative Values	3/7/2013 19:35	3/10/2013 10:50	Amber	193 instances of negative conductivity values at various times over the date range reported. Anomalies that occurred on 3/7 were a result of calibration tasks. Other instances may have been due to exposure of the sensor at very low tides, otherwise, unknown cause.
15	Salinity	Missing Value	3/7/2013 19:35	3/10/2013 10:20	Amber	193 missing values due to corresponding negative conductivity values.
15	Salinity	Null Data	3/10/2013 10:25	3/10/2013 10:50	Amber	6 null records noted where corresponding conductivity values should have generated a positive salinity calculation - cause unknown
53	All	Data Gap	3/11/2013 0:05	3/11/2013 1:05	Green	1 Data Gap anomaly due to Daylight Savings Time ending.
53	Temperature	Missing Value	3/7/2013 17:00	3/7/2013 17:05	Green	2 missing temperature values occurred during calibration tasks.
53	Salinity	Missing Value	3/7/2013 17:00	3/7/2013 17:05	Green	2 missing salinity values occurred during calibration tasks.

Table 9. TDSR- QA/QC Data Review from 2/24/2013 to 5/2/2013[1]

Site	Parameter	Issue	Start Date/Time	End Date/Time	G.A.R Level of Concern	Comments
53	Level	Negative Values	3/1/2013 1:50	3/7/2013 17:15	Green	2 negative level values, occurred during calibration tasks.
PB01	All	Data Gap	3/11/2013 0:05	3/11/2013 1:05	Green	1 Data Gap anomaly due to Daylight Savings Time ending.
84.1	All	Data Gap	3/11/2013 0:05	3/11/2013 1:05	Green	1 Data Gap anomaly due to Daylight Savings Time ending.
84.1	Temperature	>20°C	2/24/2013 0:00	5/2/2013 13:00	Amber	6,120 high temperature readings throughout review period data set. Exact cause unknown - likely a nearby steam condensate line input . Field confirmation of these high temperatures has been noted.
115.1	All	Data Gap	3/11/2013 0:05	3/11/2013 1:05	Green	1 Data Gap anomaly due to Daylight Savings Time ending.
126	All	Data Gap	3/11/2013 0:05	3/11/2013 1:05	Green	1 Data Gap anomaly due to Daylight Savings Time ending.

[1]Final Data Set End Points:

PSNS015	4/30/2013 12:45	**PSNS084.1**	5/02/2013 13:00
PSNS053	4/23/2013 09:05	**PSNS115.1**	4/30/2013 12:55
PSNSPB01	4/23/2013 08:55	**PSNS126**	3/22/2013 1:00

Table 10. TSDR - Data Set Summary Statistics from 2/24/2013 to 5/2/2013

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
15	18862	1	0.0%	0	0.0%	2	0.0%	193	1.0%	199	1.1%	97.9%
53	16802	1	0.0%	2	0.0%	2	0.0%	0	0.0%	2	0.0%	100.0%
PB01	16800	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	100.0%
84.1	19481	1	0.0%	0	0.0%	6120	31.4%	0	0.0%	0	0.0%	68.6%
115.1	18864	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	100.0%
126	7489	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	100.0%

[1]Elevated temperatures are noted at PSNS084.1 on a regular basis. Exact cause is unknown, but likely a result of inflow from a nearby steam condensate line drainage source.

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

There was one notable field anomaly that occurred during SW16. This was an errant setting on the PSNS084.1 autosampler. This field anomaly is further described below;

- It was noted during the last telemetry check that sample markers (feedback from the autosampler as to what discrete sample it has progressed to in the overall programming scheme) were in excess of the 96 maximum that are typically programmed. The sampler was immediately shut down. Upon further inspection, through examination of the sampler report (via telemetric inquiry), it was discovered that the "run continuously" function had not been deactivated. This was further confirmed in the field during sample retrieval tasks as evidenced by discrete autosampler (wedge) bottles in carousel positions 1-3 being overfilled, with a large puddle of water in the sampler base. Once the autosampler had finished its 96-aliquot (sample) program (4 samples / discrete bottle = 24 bottles) the setting that normally stops the sampling was not set properly, thus allowing the sampler to continue - re-filling bottles 1 and 2 completely (with an additional 4 aliquots) and partially re-filling bottle 3 (with an additional 3 aliquots). The course of action taken was to note this event on the *Stormwater Field Sampling Form* (attached) and to disqualify Bottles 1-3 from use in the overall composite sample formulation.

The issue described above did not adversely affect the collection or representation of the remaining discrete bottles in the autosampler unit, nor the overall composite formulation / sample.

There were no anomalies either observed or otherwise noted after completion of the sampling event or during the review of the associated data that would have caused any of the SW16 samples to be deemed as 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, except otherwise noted above. 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.

12.0 Action Items

This was the last field sampling event of the Phase III season. Therefore routine operation and maintenance items, station reset tasks, as well as field data collection (precipitation and in-vault parameters) efforts will cease. Demobilization of monitoring equipment and associated equipment will begin as soon as practicable. During this demobilization phase, as opportunities are presented, attempts will be made to collect in-vault sediment samples.

Other non-routine action items include maintenance of the Navy's rain gauge atop B427, conducting inventory tasks, packaging equipment for storage / equipment management and manhole lid position checks and C/106 Stormlab general housekeeping 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 #16 (3/19/13)

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) #	16
Event Forecast Probability (%)	94%
PSNS B427 Rain Gauge - Sample Event Total (in.)	1.42

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)	3/17/2013 18:05	3/17/2013 18:20	3/17/2013 21:35	3/16/2013 13:35	3/16/2013 13:35	3/16/2013 14:20
Antecedent Dry Period (days: hrs)	1:22	1:21	1:18	1:22	1:22	3:02
Rainfall Prior 24-hrs to Rain Event Start (in)	0.00	0.00	0.00	0.00	0.00	0.00
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)	3/19/2013 15:45	3/19/2013 15:40	3/19/2013 15:55	3/19/2013 15:40	3/19/2013 15:30	3/19/2013 16:00
Sampling Period Start Date & Time	3/19/2013 19:05	3/19/2013 17:11	3/19/2013 19:02	3/19/2013 18:58	3/19/2013 16:50	3/19/2013 17:35
Sampling Period End Date & Time	3/20/2013 13:34	3/20/2013 16:55	3/20/2013 18:46	3/20/2013 11:28	3/20/2013 16:34	3/20/2013 17:19
Sampling Period Duration (hrs:mins)	18:29	23:44	23:44	16:30	23:44	23:44
Sampling Period Duration (hours)	18.48	23.73	23.73	16.50	23.73	23.73
Sampling Period Total Rainfall (in)	1.02	1.19	1.26	1.32	1.46	1.54
Sampling Period Max 1-hr Rainfall Intensity (in/hr)	0.12	0.13	0.14	0.17	0.17	0.28
Sampling Period Average 1-hr Rainfall Intensity (in/hr)	0.05	0.05	0.05	0.05	0.06	0.06
Runoff volume calculated for sampling period (gallons)	376,344	303,991	16,936	156,721	2,194,615	112,908
[1] Sample Collection Criteria:						
Grab sample ID	SW16-0003	SW16-0005	SW16-0004	SW16-0001	SW16-0007	SW16-0002
Grab Date /Time	3/20/2013 13:02	3/20/2013 14:35	3/20/2013 13:50	3/20/2013 12:10	3/20/2013 15:52	3/20/2013 12:34
Grab sample conductivity value (µS/cm)	90	75	96	26	273	39
Hydrograph stage at grab collection	falling limb	falling limb	falling limb	elevated base flow	falling limb	intra-evnt rising limb
Grab parameters collected per PSNS PWP ?	Yes	Yes	Yes	Yes	Yes	Yes
Composite sample ID	SW16-0008	SW16-0011	SW16-0012	SW16-0010	SW16-0009	SW16-0013
Composite Date /Time	3/20/2013 13:34	3/20/2013 16:55	3/20/2013 17:46	3/20/2013 11:27	3/20/2013 16:34	3/20/2013 17:19
Overall Composite conductivity value (mS/cm)	235	209	87	43	67	66
Overall Composite turbidity value (NTU)	11	11	11	9	22	6
Composite volume (ml)	7,000	8000	8,000	8,500	7,000	7,200
Number of Bottles Collected During Sampling Event	19	24	24	17	24	12 (2-hr sets)
Number of Bottles Included in Composite Sample[2]	19	22	20	17	24	12 (2-hr btls)
Percentage of Total Sampling Period that Freshwater Conditions Occurred	100%	92%	96%	100%	100%	100%
Composite parameters collected per PSNS PWP ?	Yes	Yes	Yes	Yes	Yes	Yes
[1] QC Sample Summary Information:						
Grab sample duplicate ID	NA	SW16-0006	NA	NA	NA	NA
Grab sample duplicate date and time	NA	3/20/2013 14:35	NA	NA	NA	NA
Grab sample duplicate conductivity value (µS/cm)	NA	75	NA	NA	NA	NA
Composite sample duplicate ID	NA	NA	NA	NA	NA	SW16-0014
Composite sample duplicate date and time	NA	NA	NA	NA	NA	3/20/2013 17:19
Overall Composite Duplicate conductivity value (µS/cm)	NA	NA	NA	NA	NA	66
Overall Composite Duplicate turbidity value (NTU)	NA	NA	NA	NA	NA	6
Composite Duplicate volume (ml)	NA	NA	NA	NA	NA	7,200
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	Yes	Yes	Yes	Yes	Yes
What was the total antecedent period amount overage, as % of rain event ?	NA	NA	NA	NA	NA	NA
Was runoff occurring OR was the hydrograph at least 10% above background pipe level during grab collection ? If no, explain in summary narrative.	Yes	Yes	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	Yes	Yes	Yes	Yes	Yes
Were all 1-hr sampler bottles used for the Composite sample ≤2000 µS/cm ?	Yes	Yes	Yes	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	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 - both	Yes - both	Yes - both	Yes - both	Yes - both	Yes - both

[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.

[2] Due to an errant setting, BTLs 1-3 were over/ re-filled and therefore not utilized.

Validation Check List Completed By: Dave Metallo **Reviewed By / Date:** Curtis Nickerson 5/2/2013

PSNS NDDSW Monitoring Project Storm Control Work Sheet *Sht Rev. 121412* Sheet 1 of 2

Date:	3/19/2013			**Sampling Support Personnel:**	
STE#	16	**Antecedent Dry Cond. Met ?**	Yes	**Tidal Info:**	2013-03-19 00:02 PDT 9.88' High 05:44 7.12' Low 10:40 9.42' High 17:40 1.66' Low; 2013-03-20 01:26 PDT 9.89' High 07:27 7.13' Low 11:47 8.97' High 18:43 1.87' Low
Storm Controller:	Dave Metallo			**Grab sampling Info.**	grab samples collected at all monitoring stations by C106 personnel
Pre-Storm / Weather Details:	The GFS and the NAM are in decent agreement as to event start time, 3-19-13 1500 and 1600, respectively. The GFS has event rainfall continuous until about 1000 on 3-20 with 0.86" and an additional 0.02" by 1500, for an event total of 0.88" . The NAM shows steady rainfall until about 0800 on 3-20 with 0.61" and an additional 0.2 by 1200, for an event total of 0.81". The NWS shows 1.04" to 1.11 of total event rainfall from 1100 on 3-19 to 1100 on 3-20.				

Telemetry Measurements:	**DATE/TIME (24HR)**												
STATION:	3-19-13 (0925)	1230	1900	2355	3-20-13 (0645)	2115							
PSNS015 Rain[1]	0 / 0	0 / 0	.17/.06	.56/.11	1.11/.07	1.17/0	Event over, all sampler units had run their course, data downloaded.						
PSNS015 Level	4.93	3.89	0.76	6.2	4.42	0.99							
PSNS015 Cond.	46,300	8,000	37	18	20	439							
Smpl Marker	0	0	9	28	56	96							
PSNS053 Rain	.01/0	0/0	.17/.06	.56/.10	1.13/.08	1.18/0							
PSNS053 Level	0.07	0.08	0.13	3.79	3.74	0.07							
PSNS053 Cond.	6	6	25	18	17	6							
Smpl Marker	0	0	1	20	48	96							
PSNS PB01 Rain	0/0	0/0	.13/.05	.49/.09	.96/.06	1.32/0.0							
PB01 Sump Level	0.17	0.17	0.44	0.53	0.45	0.18							
PSNS PB01 Cond.	51	51	178	98	91	51							
Smpl Marker	0	0	6	26	53	96							
PSNS084.1 Rain	0/0	0/0	.15/.06	.53/.09	1.0/.06	1.09 / 0							
PSNS084.1 Level	4.06	2.92	0.26	5.35	3.44	0.85							
PSNS084.1 Cond.	43,500	31,200	305	224	232	29,100							
Smpl Marker	0	0	1	20	47	108							
PSNS115.1 Rain	0/0	0/0	.15/.06	.51/.09	.97/.06	.93/0							
PSNS115.1 Level	7.85	6.66	1.7	9.19	7.28	4.71							
PSNS115.1 Cond.	44,700	5,555	356	34	42	10,240							
Smpl Marker	0	0	8	25	53	94							
PSNS126 Rain	0/0	0/0	.14/.05	.48/.09	.91/.06	.84/0							
PSNS126 Level	0.72	0.11	0.28	2.07	0.23	0.12							
PSNS126 Cond.	608	247	408	349	397	247							
Smpl Marker	0	0	1	20	47	96							

[1]Rain dephs are reported as 24-hr / 1-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:	3/18/2013				**Sampling Support Personnel:**		Metallo, Rupert, Beckwith						
STE #	16	**Storm Controller:**	Dave Metallo		**Strm Evnt Start / Stp**		Start = 3-19-13 ~1600 and Stop (sampling) = 3-20-13 ~1900						
Enabling Information:													
Sample Staion:	PSNS126		PSNS115.1		PSNS084.1		PSNS053		PSNS015		PSNSPB01		
Rain enable (in/hr)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	
Level Enable (ft)	20	0.3	20	0.3	20	0.2	20	0.1	20	0.3	20	0.22	
Cond. (µS/cm)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	NA	NA	
Repeat. Cond Set ?	No	No	Yes	Yes	No	No	No	No	No	No	NA	NA	
Pacing Rate (min)	15	15	15	15	15	15	15	15	15	15	15	15	
Logger Batt Vdc	12.52	12.45	13.74	14.21	13.6	13.64	13.76	13.9	13.27	13.13	13.76	13.63	
Sampler Batt Vdc	12.65	12.61	12.71	12.65	12.85	12.8	12.78	12.74	12.91	12.85	12.74	12.7	
Pre-event Smpl Mrk Value	0	0	0	0	0	0	0	0	0	0	0	0	
Date	18-Mar	19-Mar	18-Mar	19-Mar	18-Mar	19-Mar	18-Mar	19-Mar	18-Mar	19-Mar	18-Mar	19-Mar	
Time	1200	1239	1200	1236	1200	1234	1200	1231	1200	1230	1200	1232	
Comp Dup ? / where:			PSNSPB01				**Grab Dup ? / where:**		PSNS115.1				

EVENT NOTES:

1. Adjusted the cond offset at 053 from 300 to 145
2. Station check at (0925) 3-19 revealed that antecedent dry period has been met at all stations
3. Lowered the enable level to 0.1 at PSNS053 3-19-13 1857
4. Lowered the enable level to 0.2 at PSNS084.1 3-19-13 1901
5. Lowered the enable level to 0.2 at PSNS126 3-19-13 1905
6. A check of the stations at 0645 3-20-13, all equip operational, all batteries still have a good charge

Cardno TEC
Shaping the Future

15.25
- 10.48
4.76

PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Cardno TEC**

ver.113012

Station: PSNS 015	MH/CB#:	Loc. Descrip. 015	Page: 1 of 2 pages per station

Section 1. Station Reset and Inspection

Personnel: BR/BB	Weather: Partly Sunny, temp 50's	Arrival Date/Time:	3/19/13 @ 1130
Carry-over maintenance to do prior to set-up:	None		done? —
Sampler Battery Voltage	12.74	Changed? Y (N) Added new	New voltage —
Modem Battery Voltage	13.76	Changed? Y (N) —	New voltage —
Sample Tubing & Strainer OK?	OK	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	OK
Trands. Cable OK?	OK	Internal Sampler Tubing OK?	OK
Trands. Desiccant OK (Yes/No)	OK	Tubing Replaced? (Yes/No)	NO
Telem. Box Desiccant OK (Yes/No)	OK	Normal Smpler Program or Dup. ?	Normal
Modem Status	Operational	Bottles Loaded ?	
Rain Gauge Maint.: *Level/ed*_____ *Mount OK*_____ *Wiring*_____		Lid Status?	off off
*Funnel/Throat Clean*_____ *Buckets clean/ed*_____ *Tips During Maint.*_____		Backflushed with DI?	Yes
Notes (including channel condition):		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen..	

Section 2. Storm Setup and Inspection

Personnel: BR/BB	Weather: Partly Sunny, temp 50's	Arrival Date/Time:	3/19/13 @ 1130
Sampler Battery Voltage	12.74	Changed? Y (N) Added new	New voltage —
Modem Battery Voltage	13.76	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
Multi-meter Cable OK	OK	Program Reviewed (Yes/No), Dup ?	Normal
Recorded Level (FT)	4.76	Lids off bottles?	Yes
Measured Level (FT)	4.66	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT)	0.32 (New)	Backflush with DI?	Yes
Level Adjusted ?	Yes	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	CT2X	Last screen... Prog Disa 3/18	18 @ 1149
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.)
IUL = 20' / Rain = 0.03' / Cond = 2K Repeat = NO
level Cal'ed several times why tide was low falling.

Section 3. Grab Sample Collection

Personnel: Johnston/Gebhart	Weather: Partly Cloudy	Arrival Date/Time:	3/20/13 1550
On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	272.5
Grab Parameters Collected		Salinity Reading (PPT):	0.2
Grab Sample ID	SW16-grab-07	Temp. Reading (°C):	12.7
Grab Date/Time	3/20/13 1552	Turbidity Reading (NTU)	44.83
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.)
YSI EC 300 / MICRO TPI

Cardno TEC

Shaping the Future

PSNS NPDES Non-dry Dock Monitoring and Support | Telemetry, 24-1L bottle set-up | Cardno TEC

Station: PSNS 015 continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)			
Personnel: Beckwith, Rupert	Weather: Sunny 40's	Arrival Date/Time: ~~30~~ 3-21-13 (0820)	
Sampler Battery Voltage	Good	Changed? Y (N) Removed	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)	3-19-13 (1650)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	3-20-13 (1634) 24 4/4		
Total Composite Sample Volume Collected	100% all 24 btls		
Aliquots missed/NLD (date/time/bott #/aliq #)	None		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)?	OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: All good, typical			
Maintenance Needed: None, Last event for season - Demob pending			

Section 5. Compositing Scheme and QC Sampling			
Personnel: Metallo, Rupert		Date/Time: 3-21-13 (1100)	
Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)	YSI EC300 Cond. (ser# JC02275 ~~20110925~~) Micro-TPI (ser# 20110925)		
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. 103 / 16 / Y	7. ~~10~~ 19/17/Y	13. 20/20/Y	19. 80/12/Y
2. 48/25/Y	8. 17/12/Y	14. 18/18/Y	20. 105/22/Y
3. 36/12/Y	9. 16/11/Y	15. 22/27/Y	21. 118/12/Y
4. 37/9/Y	10. 19/9/Y	16. 18/25/Y	22. 122/13/Y
5. 28/14/Y	11. 27/5/Y	17. 18/35/Y	23. 164/11/Y
6. 25/10/Y	12. 28/5/Y	18. 75/29/Y	24. 290/75/Y
Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample)	Used btls 1-24 ~300 ml from ea. btl.		
Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis)	Cond. = 67 µS/cm Turb. = 22 NTU Vol. = ~7000 ml Analysis per PWPA		
Composite Sample ID & Time:	SW16-0009 (1634) 3-20-13		
Field Blank Collected? (date/time)	collected previous		
Blank ID:	NA		
Duplicate comp sample? Yes/No	No		
Duplicate sample ID	NA		

NOTES:

Cardno TEC
Shaping the Future

PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Cardno TEC**

ver.113012

Station: 053	MH/CB#:	Loc. Descrip. 053

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Section 1. Station Reset and Inspection

Personnel: BR/BB	Weather: Overcast, temp 40's	Arrival Date/Time: 3/18/13 @ 1034	
Carry-over maintenance to do prior to set-up: None			done?
Sampler Battery Voltage	12.70	Changed? Y (N) Added new	New voltage
Modem Battery Voltage	13.00	Changed? Y (N)	New voltage
Sample Tubing & Strainer OK?	OK	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	OK
Trands. Cable OK?	OK	Internal Sampler Tubing OK?	OK
Trands. Desiccant OK (Yes/No)	OK	Tubing Replaced? (Yes/No)	NO
Telem. Box Desiccant OK (Yes/No)	OK	Normal Smpler Program or Dup. ?	Normal
Modem Status	Operational	Bottles Loaded ?	Yes
Rain Gauge Maint.: *Level/ed*_____ *Mount OK*_____ *Wiring*_____		Lid Status?	off
*Funnel/Throat Clean*_____ *Buckets clean/ed*_____ *Tips During Maint.*_____		Backflushed with DI?	Yes
Notes (including channel condition):		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen..	off

Section 2. Storm Setup and Inspection

Personnel: RR/BB	Weather: Overcast, temp 40's	Arrival Date/Time: 3/18/13 @	
Sampler Battery Voltage	12.70	Changed? Y (N) added new	New voltage —
Modem Battery Voltage	13.00	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
Multi-meter Cable OK	OK	Program Reviewed (Yes/No), Dup ?	Yes / Normal
Recorded Level (FT)	Not Enough	Lids off bottles?	Yes
Measured Level (FT)	Water	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT)		Backflush with DI?	Yes
Level Adjusted ?		Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	CT2X	Last screen... Pros Disch	3/18/13 @ 1051
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.) LVL = 20" / Rain 0.03 / Cond ok

Not enough water to Calibrate Volume 1 / cond Repeat NO

Section 3. Grab Sample Collection

Personnel: Johnston / Gebhart	Weather: Shower	Arrival Date/Time: 1200 28 Mar 2013	
On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	26.3 mS
Grab Parameters Collected		Salinity Reading (PPT):	0.0
Grab Sample ID	SW16-grab-01	Temp. Reading (°C):	12.4
Grab Date/Time	3/20/13 1210	Turbidity Reading (NTU)	20.1
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.)

YSI EC300 / MicroTPI Very low flow but Showers enough for Sample. Sample from very bottom of vault.

Cardno TEC
Shaping the Future

PSNS NPDES Non-dry Dock Monitoring and Support | Telemetry, 24-1L bottle set-up | Cardno TEC

Station: PSNS 053 | continued from previous page | Page: 2 of 2

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

Personnel: Beckwith, Rupert	Weather: Sunny 40's	Arrival Date/Time: 3-21-13 (0800)	
Sampler Battery Voltage	Good	Changed? Y N Removed	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)	3-19-13 (1858)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	3-20-13 (1127) 17 3/4		
Total Composite Sample Volume Collected	100% for btls of 4-aliquots, less for others, see below		
Aliquots missed/NLD (date/time/bott #/aliq #)	1 3/4 NM, 1 4/4 NL, 2 1/4 NL, 3 1/4 NL, 17 4/4 → 24 4/4 NL		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)? OK			
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: Typical station particulars			
Maintenance Needed: None, Last event for season, Demob pending			

Section 5. Compositing Scheme and QC Sampling

Personnel: Metallo, Rupert	Date/Time: 3-21-13 (1200)

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

YSI EC300 (ser# ~~20110925~~ JC02275) Micro-TPI (ser# 20110925)

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. 336/12/Y	7. 18/5/Y	13. 13/6/Y	19. Empty
2. 43/10/Y	8. 19/7/Y	14. 12/9/Y	20.
3. 35/6/Y	9. 20/5/Y	15. 18/4/Y	21.
4. 25/6/Y	10. 22/8/Y	16. 24/10/Y	22.
5. 16/17/Y	11. 15/8/Y	17. 51/8/Y	23.
6. 13/7/Y	12. 13/7/Y	18. Empty	24. ↓

Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample)

Used btl's 1-17 ~500ml from ea.; 18-24 were empty

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

Cond.=43 µS/cm Turb.=9 NTU Vol. ~8500 ml Analysis per PWPA

Composite Sample ID & Time:	SW16-0010 (1127) 3-20-13
Field Blank Collected? (date/time)	previously collected
Blank ID:	NA
Duplicate comp sample? Yes/No	No
Duplicate sample ID	NA

NOTES:

Cardno TEC
Shaping the Future

PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Cardno TEC**

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Station: PB-01	MH/CB#:	Loc. Descrip. PB01	Page: 1 of 2

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Section 1. Station Reset and Inspection

Personnel: BR/BB | Weather: overcast, temp 50's | Arrival Date/Time: 3/18/13 @ 1057

Carry-over maintenance to do prior to set-up: none | done?

Sampler Battery Voltage	12.70	Changed? Y (N) added new	New voltage —
Modem Battery Voltage	14.40	Changed? Y (N)	New voltage —
Sample Tubing & Strainer OK?	OK	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	
Trands. Cable OK?	OK	Internal Sampler Tubing OK?	OK
Trands. Desiccant OK (Yes/No)	OK	Tubing Replaced? (Yes/No)	NO
Telem. Box Desiccant OK (Yes/No)	OK	Normal Smpler Program or Dup. ?	Dup
Modem Status	operational	Bottles Loaded ?	Yes
Rain Gauge Maint.: *Level/ed*_____ *Mount OK*_____ *Wiring*_____		Lid Status?	off
*Funnel/Throat Clean*_____ *Buckets clean/ed*_____ *Tips During Maint.*_____		Backflushed with DI?	Yes
Notes (including channel condition):		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen..	off

Section 2. Storm Setup and Inspection

Personnel: BR/BB | Weather: overcast, temp 50's | Arrival Date/Time: 3/18/13 @ 1057

Sampler Battery Voltage	12.70	Changed? Y (N) Added new	New voltage
Modem Battery Voltage	14.40	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
Multi-meter Cable OK	OK	Program Reviewed (Yes/No) (Dup ?)	Dup
Recorded Level (FT)	0.16	Lids off bottles?	off
Measured Level (FT)	NA	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT)	NA	Backflush with DI?	Yes
Level Adjusted ?	NA	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	CT2X	Last screen... Prog Disab.	3/18/13 @

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.) Sump: .21 17' Vault: .35'
Rain 0.03 / Sump level = 20'

Section 3. Grab Sample Collection

Personnel: Johnston / Gebhart | Weather: overcast break in rain | Arrival Date/Time: 3/20/13 1230

On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	39.0
Grab Parameters Collected		Salinity Reading (PPT):	0.0
Grab Sample ID	SW16_grab_02	Temp. Reading (°C):	9.7
Grab Date/Time	3/20/13 1234	Turbidity Reading (NTU)	11.29
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.)
YSI EC300 / Micro TPI vault 10" deep

Cardno TEC
Shaping the Future

PSNS NPDES Non-dry Dock Monitoring and Support | Telemetry, 24-1L bottle set-up | Cardno TEC

Station: PSNS PB01 continued from previous page

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

Personnel: Beckwith, Rupert	Weather: Sunny, 40's	Arrival Date/Time: 3-21-13 (0810)	
Sampler Battery Voltage	Good	Changed? Y N Removed	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)	3-19-13 (1735)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	3-20-13 (1719) BTL 23/24 4/4		
Total Composite Sample Volume Collected	100%		
Aliquots missed/NLD (date/time/bott #/aliq #)	None		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)?	OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: Duplicate Sample Collect at this Station			
Maintenance Needed: None, Last event of season, Demob pending			

Section 5. Compositing Scheme and QC Sampling

Personnel: Metallo, Rupert | Date/Time: 3-21-13 (1440)

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

YSI EC300 (Ser#JC02275) Micro-TPI (Ser# 20110902S)

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. 131-8-Y	7. 50-6-Y	13. 44-7-Y	19. 52-5-Y
2. 127-10-Y	8. 49-7-Y	14. 44-3-Y	20. 51-4-Y
3. 97-7-Y	9. 50-4-Y	15. 42-9-Y	21. 64-5-Y
4. 97-6-Y	10. 50-4-Y	16. 42-6-Y	22. 63-4-Y
5. 66-7-Y	11. 58-3-Y	17. 49-5-Y	23. 84-4-Y
6. 66-8-Y	12. 55-3-Y	18. 48-4-Y	24. 84-4-Y

Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample)

ODD # BTLs = Normal Sample; Used ~650 ml from ea. btl, 1-23 (odds) 12 total

Even# BTLs = Dup Sample; Used ~650 ml from ea. btl, 2-24 (evens) 12 total

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

Normal Sample; Cond. 66 µS/cm Turb. 6 NTU Vol. ~7200 ml Analysis per PWPA

Composite Sample ID & Time: Normal = SW16-0013 (1719) 3-20-13	
Field Blank Collected? (date/time)	previously
Blank ID:	NA
Duplicate comp sample? Yes/No	Yes
Duplicate sample ID	SW16-0014 (1719) 3-20-13

NOTES:

Dup Sample; Cond.=66 µS/cm Turb.=6 NTU Vol. ~7200 ml

Analysis per PWPA

12.47
- 7.24
5.23 (0.15)

Cardno TEC
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PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Cardno TEC**

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Station: 84.1	MH/CB#:	Loc. Descrip. 84.1	Page: 1 of 2

pages per station

Section 1. Station Reset and Inspection

Personnel: BR/BB | Weather: overcast, temp 40's | Arrival Date/Time: 3/19/13 @ 1000

Carry-over maintenance to do prior to set-up: None | done?

Sampler Battery Voltage	12.80	Changed? Y (N) Added new	New voltage —
Modem Battery Voltage	13.00	Changed? Y (N)	New voltage —
Sample Tubing & Strainer OK?		**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	OK
Trands. Cable OK?	OK	Internal Sampler Tubing OK?	OK
Trands. Desiccant OK (Yes/No)	OK	Tubing Replaced? (Yes/No)	N
Telem. Box Desiccant OK (Yes/No)	OK	Normal Smpler Program or Dup. ?	Normal
Modem Status	Operational	Bottles Loaded ?	Yes
Rain Gauge Maint.: *Level/ed*_____ *Mount OK*_____ *Wiring*_____		Lid Status?	OFF
*Funnel/Throat Clean*_____ *Buckets clean/ed*_____ *Tips During Maint.*_____		Backflushed with DI?	Yes
Notes (including channel condition):		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen..	off

Section 2. Storm Setup and Inspection

Personnel: BR/BB | Weather: overcast, temp 40's | Arrival Date/Time: 3/18/13 @

Sampler Battery Voltage	12.80	Changed? Y (N) added new	New voltage —
Modem Battery Voltage	13.00	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
Multi-meter Cable OK	OK	Program Reviewed (Yes/No), Dup ?	Yes - Normal
Recorded Level (FT)	5.38	Lids off bottles?	Yes
Measured Level (FT)	5.23	Diagnostics/Distrubutor arm check?	yes
Offset Diff (FT)	(0.15) New offset	Backflush with DI?	Yes
Level Adjusted ?	Yes =0.06	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	CT2X	Last screen... Prog Disa.	3/18/13 @ 1023

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.) LUL = 20' / Rain = 0.03"/HR / Cond 21K Repeat = N

Section 3. Grab Sample Collection

Personnel: Johnston / Gebhart | Weather: overcast | Arrival Date/Time: 3/20/13 1345

On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	96.4
Grab Parameters Collected		Salinity Reading (PPT):	0.1
Grab Sample ID	SW16-grab-04	Temp. Reading (°C):	15.1
Grab Date/Time	3/20/13 1350	Turbidity Reading (NTU)	10.50
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.)

Cardno TEC
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PSNS NPDES Non-dry Dock Monitoring and Support | Telemetry, 24-1L bottle set-up | Cardno TEC

Station: PSNS 084.1 continued from previous page

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

Personnel: Beckwith, Rupert	Weather: Sunny, 40°s	Arrival Date/Time: 3-21-13 (0850)	
Sampler Battery Voltage	Good	Changed? Y N Removed	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)	3-19-13 (1902)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	3-20-13 (1846) 24 4/4		
Total Composite Sample Volume Collected	100%		
Aliquots missed/NLD (date/time/bott #/aliq #)	NONE		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor...)? OK			
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: (1) Errant autosampler setting, "Run Continuously" - causing btls 1,2&3 to be re-filled - These btls will not be utilized for comp. purposes			
Maintenance Needed: None, Last event of season, Demob pending			

Section 5. Compositing Scheme and QC Sampling

Personnel: Metallo, Rupert | Date/Time: 3-21-13 (1345)

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

YSI EC 300 (Ser# JC02275) Micro-TPI (Ser# 20110925)

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.) 215-6-(1)N	7. 25-5-Y	13. 45-23-Y	19. 103-11-Y
(2.) 156-5-(1)N	8. 30-5-Y	14. 45-11-Y	20. 108-9-Y
(3.) 8740-5-(1)N	9. 38-4-Y	15. 42-19-Y	21. 132-9-Y
4. 333-5-Y	10. 97-3-Y	16. 28-17-Y	22. 380-5-Y
5. 46-8-Y	11. 50-13-Y	17. 37-16-Y	23. 320-7-Y
6. 30-8-Y	12. 35-14-Y	18. 49-10-Y	(24.) 277-3-N (Base flow)

Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample)

BTLs 1-3 see NOTES in Section 4, BTL 24 not used - rep'ed baseflow conditions

Used BTL's 4-23; 400-ml from ea btl

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

Cond. = 87 µS/cm Turb. = 11 Vol.: ~8,000 ml Analysis per PWPA

Composite Sample ID & Time: SW16-0012 (1746) 3-20-13

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

NOTES:

Cardno TEC
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16.45
- 7.31
9.14

PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Cardno TEC**

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Station: 115.1	MH/CB#:	Loc. Descrip. 115.1

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Section 1. Station Reset and Inspection

Personnel: BR/BB	Weather: overcast, temp 40's	Arrival Date/Time: 3/19/13 @ 0938	
Carry-over maintenance to do prior to set-up: none			done?
Sampler Battery Voltage	12.70	Changed? Y (N) Added new	New voltage —
Modem Battery Voltage	12.67	Changed? Y (N)	New voltage —
Sample Tubing & Strainer OK?	OK	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	
Trands. Cable OK?	OK	Internal Sampler Tubing OK?	OK
Trands. Desiccant OK (Yes/No)	OK	Tubing Replaced? (Yes/No)	NO
Telem. Box Desiccant OK (Yes/No)	OK	Normal Smpler Program or Dup. ?	Normal
Modem Status	Operational	Bottles Loaded ?	Yes
Rain Gauge Maint.: *Level/ed*_____ *Mount OK*_____ *Wiring*_____		Lid Status?	Off
*Funnel/Throat Clean*_____ *Buckets clean/ed*_____ *Tips During Maint.*_____		Backflushed with DI?	Yes
Notes (including channel condition):		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen..	Off

Section 2. Storm Setup and Inspection

Personnel: BR/BB	Weather: overcast, temp 40's	Arrival Date/Time: 3/18/13 @ 0938	
Sampler Battery Voltage	12.70	Changed? Y (N) added new	New voltage —
Modem Battery Voltage	12.67	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
Multi-meter Cable OK	OK	Program Reviewed (Yes/No), Dup ?	Normal
Recorded Level (FT)	9.14	Lids off bottles?	@ Yes
Measured Level (FT)	9.115	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT)	+ 0.03	Backflush with DI?	Yes
Level Adjusted ?	NO	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	CT2X	Last screen... Prog. D:S	3/19/13 @ 0958
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.)	LVL = 20' Rain = 0.03/hr / Cond = 2K Repeat Yes		

Section 3. Grab Sample Collection

Personnel: Johnston/Gebhart	Weather: Partly Cloudy	Arrival Date/Time: 3/20/13 1430	
On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	75.4
Grab Parameters Collected		Salinity Reading (PPT):	0.0
Grab Sample ID	5016-grab-05	Temp. Reading (°C):	10.9
Grab Date/Time	3/20/13 1435	Turbidity Reading (NTU)	12.51
Grab Dup ID	3/20/13 1435	Equipment running correctly?	
Grab Dup Date/Time	5016-grab-06	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.)			

Cardno TEC
Shaping the Future

PSNS NPDES Non-dry Dock Monitoring and Support | Telemetry, 24-1L bottle set-up | Cardno TEC

Station: PSNS 115-1 continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)			
Personnel: Beckwith, Rupert	Weather: Sunny 40°s	Arrival Date/Time: 3-21-13 (0840)	
Sampler Battery Voltage	Good	Changed? Y N Removed	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)	3-19-13 (1711)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	3-20-13 (1655) 24 4/4		
Total Composite Sample Volume Collected	100%		
Aliquots missed/NLD (date/time/bott #/aliq #)	None		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)?	OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: Typical station particulars			
Maintenance Needed: None, Last event for season, Demob pending			

Section 5. Compositing Scheme and QC Sampling			
Personnel: Metallo, Rupert		Date/Time: 3-21-13 (1300)	
Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)	YSI EC 300 (Ser # JC02275) Micro-TPI (Ser# 20110902S)		
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. 456-12-Y	7. 26-6-Y	13. 30-13-Y	19. 30-11-Y
2. 492-8-Y	8. 24-7-Y	14. 32-5-Y	20. 72-8-Y
(3) 3959-6-N	9. 24-4-Y	15. 34-12-Y	21. 77-7-Y
(4) 4680-5-N	10. 29-4-Y	16. 27-13-Y	22. 106-8-Y
5. 1162-6-Y	11. 36-3-Y	17. 24-16-Y	23. 430-6-Y
6. 69-6-Y	12. 33-4-Y	18. 28-13-Y	24. 1232-6-Y
Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample)	Used BTLs 1&2, 5-24. BTLs 3&4 disqualified due to high cond. Used ~350 ml from 22 btls		
Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis)	Cond. = 209 Turb. = 11 Vol. = ~8,000 ml Analysis per PWPA		
Composite Sample ID & Time:	SW16-0011 (1655) 3-20-13		
Field Blank Collected? (date/time)	previously		
Blank ID:	NA		
Duplicate comp sample? Yes/No	NO		
Duplicate sample ID	NA		

NOTES:

Cardno TEC
Shaping the Future

9.84
- 7.92
1.92 HH=1.87

PSNS NPDES Non-Dry Dock Monitoring and Support | **Telemetry, 24-1L bottle set-up** | **Cardno TEC**

ver.113012

Station: 126	MH/CB#: S110	Loc. Descrip. 126	Page: 1 of 1 (pages per station)

Section 1. Station Reset and Inspection			
Personnel: RR/BB	Weather: overcast, temp 40's	Arrival Date/Time: 3/18/13 0900	
Carry-over maintenance to do prior to set-up:	NO		done?
Sampler Battery Voltage	12.70	Changed? Y (N) added new	New voltage
Modem Battery Voltage	12.40	Changed? Y (N)	New voltage
Sample Tubing & Strainer OK?	OK	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	
Trands. Cable OK?	OK	Internal Sampler Tubing OK?	OK
Trands. Desiccant OK (Yes/No)	OK	Tubing Replaced? (Yes/No)	NO
Telem. Box Desiccant OK (Yes/No)	OK	Normal Smpler Program or Dup. ?	normal
Modem Status	operational	Bottles Loaded ?	yes
Rain Gauge Maint.: *Level/ed*___	*Mount OK*___ *Wiring*___	Lid Status?	off
*Funnel/Throat Clean*___ *Buckets clean/ed*___	*Tips During Maint.*___	Backflushed with DI?	yes
Notes (including channel condition):		Suction line & quick connect attached?	yes
		Smplr Status (on/off) / last screen..	off

Section 2. Storm Setup and Inspection			
Personnel: RR/BB	Weather: overcast, temp 40's	Arrival Date/Time: Same as above	
Sampler Battery Voltage	12.70	Changed? Y (N) added new	New voltage —
Modem Battery Voltage	12.40	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
Multi-meter Cable OK	OK	Program Reviewed (Yes/No), Dup ?	normal
Recorded Level (FT)	1.87	Lids off bottles?	off
Measured Level (FT)	1.92	Diagnostics/Distrubutor arm check?	yes
Offset Diff (FT)	.05	Backflush with DI?	yes
Level Adjusted ?	yes / new offset	Storm Reset (1, enter) Completed	yes
Cond. Sonde Type (INW-CT2X)	CT2X = -0.18	Last screen...	Disab. 3/19/12 @ 0926
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.)	Enab Rain = 0.03/hr	Lvl = 20'	Cond = 216 Repeat No

Section 3. Grab Sample Collection			
Personnel: Johnston / Gebhart	Weather: overcast	Arrival Date/Time: 3/20/13 1300	
On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	89.5
Grab Parameters Collected		Salinity Reading (PPT):	0.1
Grab Sample ID	SW16-grab-03	Temp. Reading (°C):	10.9
Grab Date/Time	20 Mar 1302	Turbidity Reading (NTU)	13.94
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.) YSI EC300 / Micro TPI			

Cardno TEC
Shaping the Future

PSNS NPDES Non-dry Dock Monitoring and Support | Telemetry, 24-1L bottle set-up | Cardno TEC

Station: PSNS 126 continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)			
Personnel: Beckwith, Rupert	Weather: Sunny, 40°s	Arrival Date/Time: 3-21-13 (0900)	
Sampler Battery Voltage	Good	Changed? Y N Removed	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)	3-19-13 (1905)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	3-20-13 (1334) BTL 19 3/4		
Total Composite Sample Volume Collected	100% BTLs 1-18 75% BTL 19 BTLs 20-24 empty		
Aliquots missed/NLD (date/time/bott #/aliq #)	NL BTL 19 3/4 —thru→ 24 4/4		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)?	OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: Station to be demob'ed ASAP due to adjecent const.			
Maintenance Needed: None, Last event for season - Demob pending			

Section 5. Compositing Scheme and QC Sampling

Personnel: Beckwith, Rupert, Metallo | Date/Time: 3/~~20~~ DN 21/13 (1000)

Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)
YSI EC300 (Ser # JCO2275) Cond. MicroTPI (Ser # 20110902S) Turbidity

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):

1 263/17 Y	7 231/5 Y	13 110/17 Y	19 137/15 Y
2 246/9 Y	8 161/7 Y	14 74/~~3~~16 Y	20 Empty NO
3 203/9 Y	9 191/6 Y	15 183/11 Y	21 Liquid
4 163/7 Y	10 134/18 Y	16 229/11 Y	22
5 166/9 Y	11 92/20 Y	17 233/8 Y	23
6 143/8 Y	12 172/12 Y	18 170/14 Y	24

Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample)
Used BTLs 1-19; btls 20-24 were empty
used ~500 ml from 19 btls

Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis)
Cond. = 235 µS/cm Turb. = 11.3 Vol. = ~7000ml Analysis per PWPA

Composite Sample ID & Time:	SW16-0008 (1334) 3-20-13
Field Blank Collected? (date/time)	collected previous
Blank ID:	NA
Duplicate comp sample? Yes/No	NO
Duplicate sample ID	NA

NOTES: Overall Cond. = 235 µS/cm Time = 1334
Turb = 11.3

SW16 Composite Samples; an additional comp sample is included on the "grab" COC, below

PSNS NDDSW MONITORING

SAMPLE CHAIN OF CUSTODY FORM

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

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

					Analyze parameters per QAP/FSP														
Sample Label	Station ID	Collection Date/Time	Matrix	Hardness	TOC	DOC	TSS	TME/DME	TPH	Turbidity (1)						No. containers	Sample Type (Grab vs. Comp)	Storm#	Notes / Comp. Cond. (µS/cm) and Turb. (NTU) Readings
SW16-0009	PSNS015	3-20-13 (1634)	SW	X	X	X	X	X								1	Comp	16	67 / 22
SW16-0010	PSNS053	3-20-13 (1127)	SW	X	X	X	X	X								1	Comp	16	43 / 9
SW16-0011	PSNS115.1	3-20-13 (1655)	SW	X	X	X	X	X								1	Comp	16	209 / 11
SW16-0012	PSNS084.1	3-20-13 (1746)	SW	X	X	X	X	X								1	Comp	16	87 / 11
SW16-0013	PSNS PB01	3-20-13 (1719)	SW	X	X	X	X	X								1	Comp	16	666 / 6
(2) SW16-0014	PSNS PB01 DUP	3-20-13 (1719)	SW	X	X	X	X	X								1	Comp	16	666 / 6

Relinquished by: D.C. Metallo 3-21-13 (1530) Signature Date Time David C. Metallo CardnoTEC Printed Name Company	Received by: Signature Brian Rupert Printed Name	**Total # of Containers:** **Shipment Method:** Hand Delivery Sample Disposition:
Relinquished by: Signature 3/21/13 Date 1740 Time Brian Rupert CARDNOTEC Printed Name Company	Received by: Signature Li-Jang Kuo Printed Name	Distribution: 1) PNNL 2) CAS 3) TAI

(1) Turbidity measured at Navy SW Lab w/ Micro-TPI (Ser# 20110925) – See Cond. + Turb readings above

* Note: Comp Sample SW16-0008 (PSNS126) included on Separate COC along w/ grab Samples w/ 235 µS/cm + 11 NTU

(2) SW16-0014 = Duplicate comp Sample of SW16-0013 (PSNS PB01)

SAMPLE CHAIN OF CUSTODY FORM
Date: 3/20/2013
Page: 1 of 1
COC Number:

SW16 Grab Samples; plus comp sample SW16-0008

Battelle
Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382

Project No.:
Project Name: PSNS NDDSW Monitoring
Project Manager: Jill Brandenberger
Phone: (360) 681-3668

EVENT: SW16 ~~grab~~ DM

Laboratory: Battelle MSL
Address: 1529 W. Sequim Bay Road
Sequim, WA 98382
Attention: Jill Brandenberger

Testing Parameters

Observations, Instructions

Lab. Use only: Lab ID	① SW16- ~~SW16-grab~~ DM Sample ID	Sample Lable	20 march 13 Collection Date/Time	Matrix	TPH	Hardness	TOC	DOC	TSS	TME/DME				No. of containers	StationID	Comments
	-0001	PSNS 053	1210	SW	X									2	PSNS053	
	-0002	P801	1234	SW	X									(	PSNSP801	Diesel trk running in vicinity
	-0003	126	1302	SW	X										PSNS126	
	-0004	84.1	1350	SW	X										PSNS84.1	
	-0005 •	115.1	1435	SW	X										PSNS115.1	
	-0006 •	115.1 Dup	1435	SW	X										PSNS115.1	
	-0007 •	015	1552	SW	X										PSNS015	
	SW16-0008	PSNS126	1334	SW		X	X	X	X	X					PSNS126	Cond. = 235 µS/cm Turb = 11.3 NTU
	Created @ MSL 3/21/13															
3174-	SW16-~~0009~~	PSNS126		SW		X										
	~~-10~~						X									
Moved to COC	~~-11~~							X								
MSL	~~-12~~								X							
	~~-13~~									X						
	End															

Relinquished by:
Signature | Date | Time
Printed Name | Company

Received by: [signature] 3/21/13 0900
Signature
BG Beckwith
Printed Name

Total # of Containers: 15
Shipment Method: Hand delivery
Shipment Method:

Relinquished by: [signature] 3/21/13 1230
Signature | Date | Time
BG Beckwith | Cardno TEC
Printed Name | Company

Received by: [signature] MSL 1235
Signature
C. Susuen 3/21/13
Printed Name

Sample Disposition:
Distribution:
1) 2 copies to the Laboratory
2) 1 copy to project manager
3) Return completed original to Battelle Marine Sciences Laboratory

① Sample IDs are SW16-0001, -0002 . . . . .

PSNS NDDSW Monitoring **Stormwater Sampling Event SW16 (3/19/2013)**

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)

Table 7. Runoff Calculations

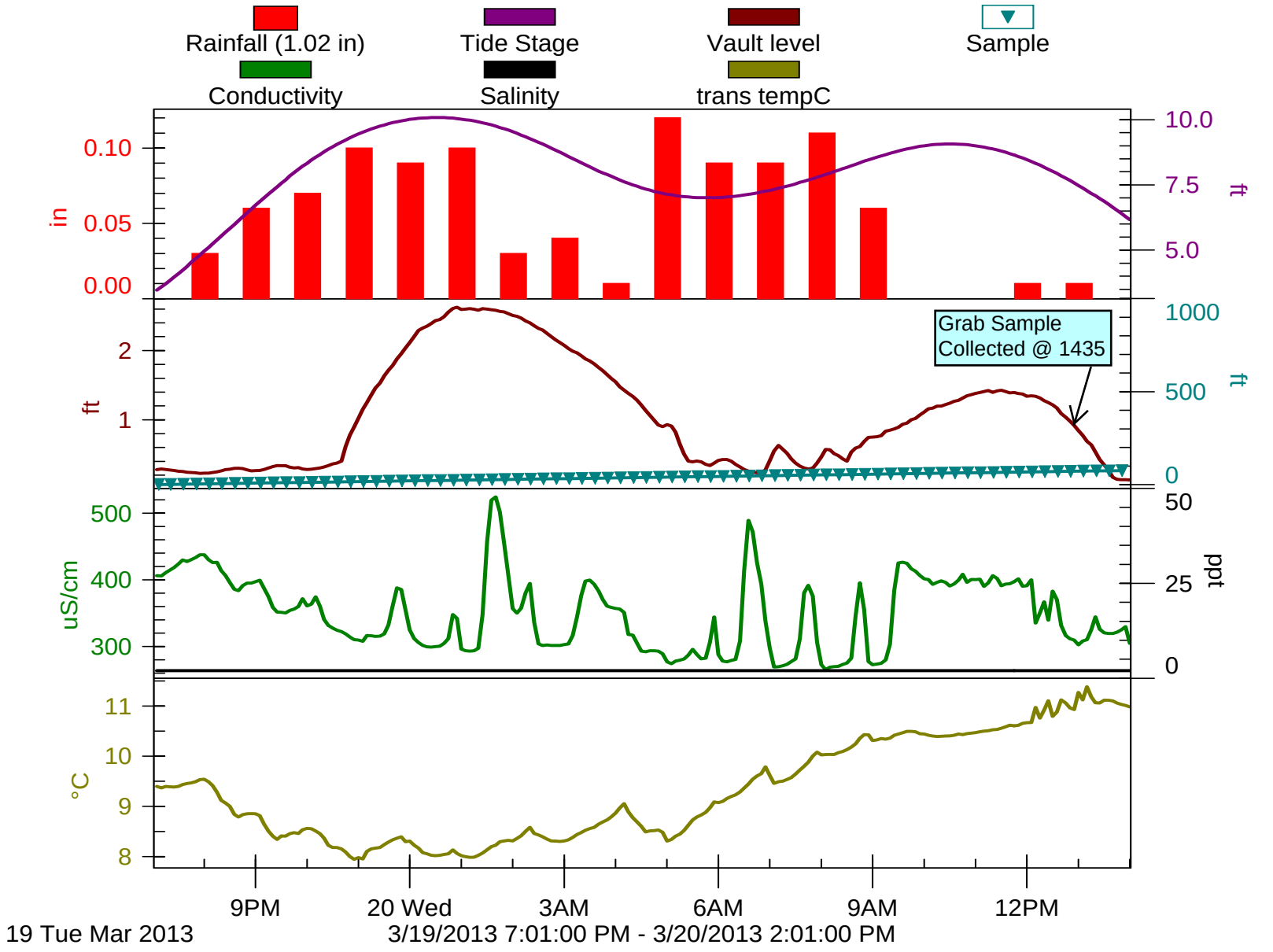
Station	Type of Surface	Area of Basin Surface Type (ft^2)	[1]Runoff Coefficient Range	Combined Drainage Area (Ft^2)	Sample Event Rain Total (In)	Sample Event Rain Total (Ft)	Sample Event Period Runoff Vol. (Gal)
126	Impervious	653,373	0.9	591,881	1.02	0.0850	376,344
	Pervious	9,613	0.4				
115.1	Impervious	449,104	0.9	409,792	1.19	0.0992	303,991
	Pervious	13,938	0.4				
84.1	Impervious	23,958	0.9	21,562	1.26	0.1050	16,936
53	Impervious	209,720	0.9	190,460	1.32	0.1100	156,721
	Pervious	4,280	0.4				
15	Impervious	2,009,431	0.8	2,411,321	1.46	0.1217	2,194,615
	Pervious	2,009,431	0.4				
PB01	Impervious	130,681	0.9	117,613	1.54	0.1283	112,908

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	1.02	0.0850	376,344
115.1	409,792	1.19	0.0992	303,991
84.1	21,562	1.26	0.1050	16,936
53	190,460	1.32	0.1100	156,721
15	2,411,321	1.46	0.1217	2,194,615
PB01	117,613	1.54	0.1283	112,908

PSNS 126

SW16 3-19-2013

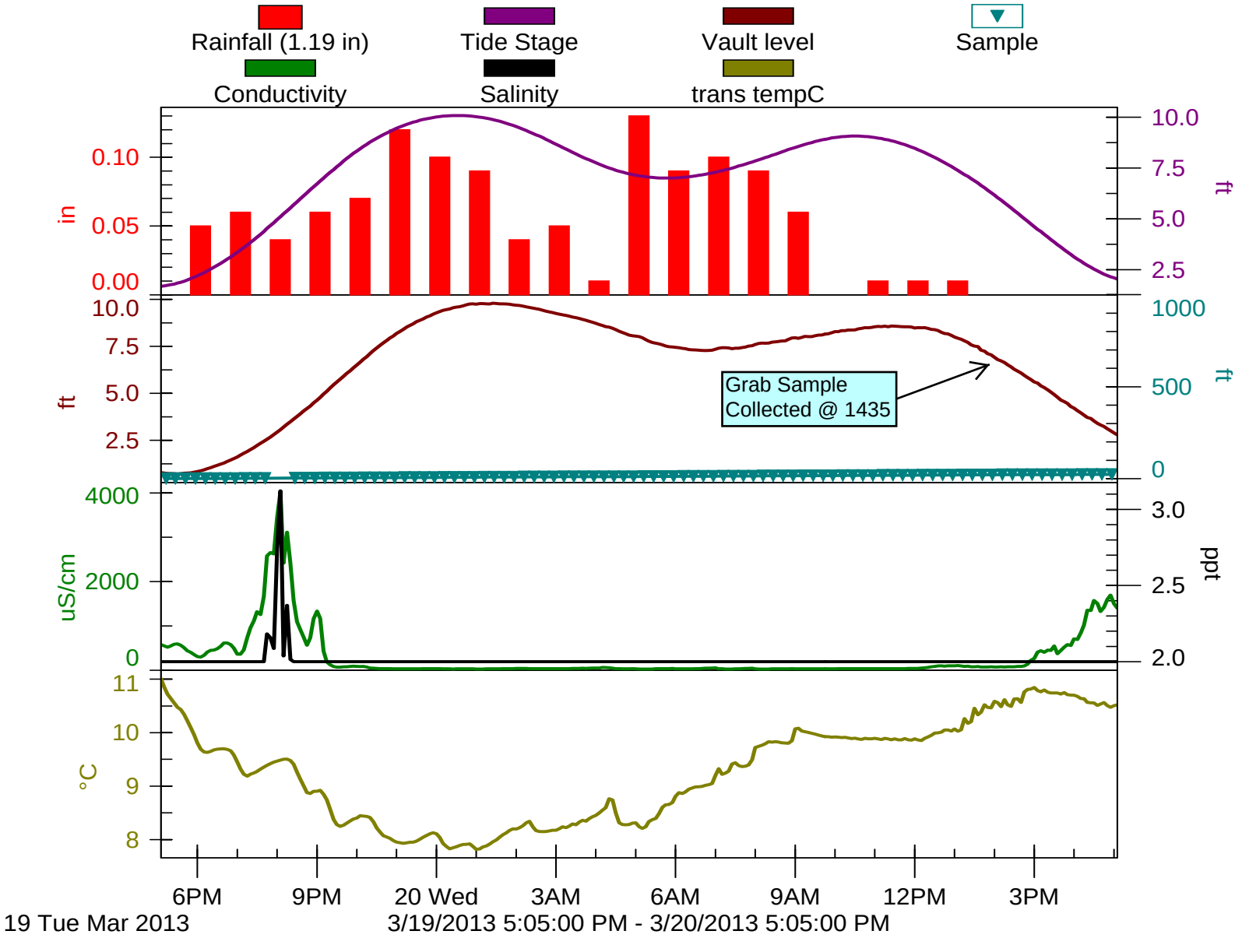


19 Tue Mar 2013

3/19/2013 7:01:00 PM - 3/20/2013 2:01:00 PM

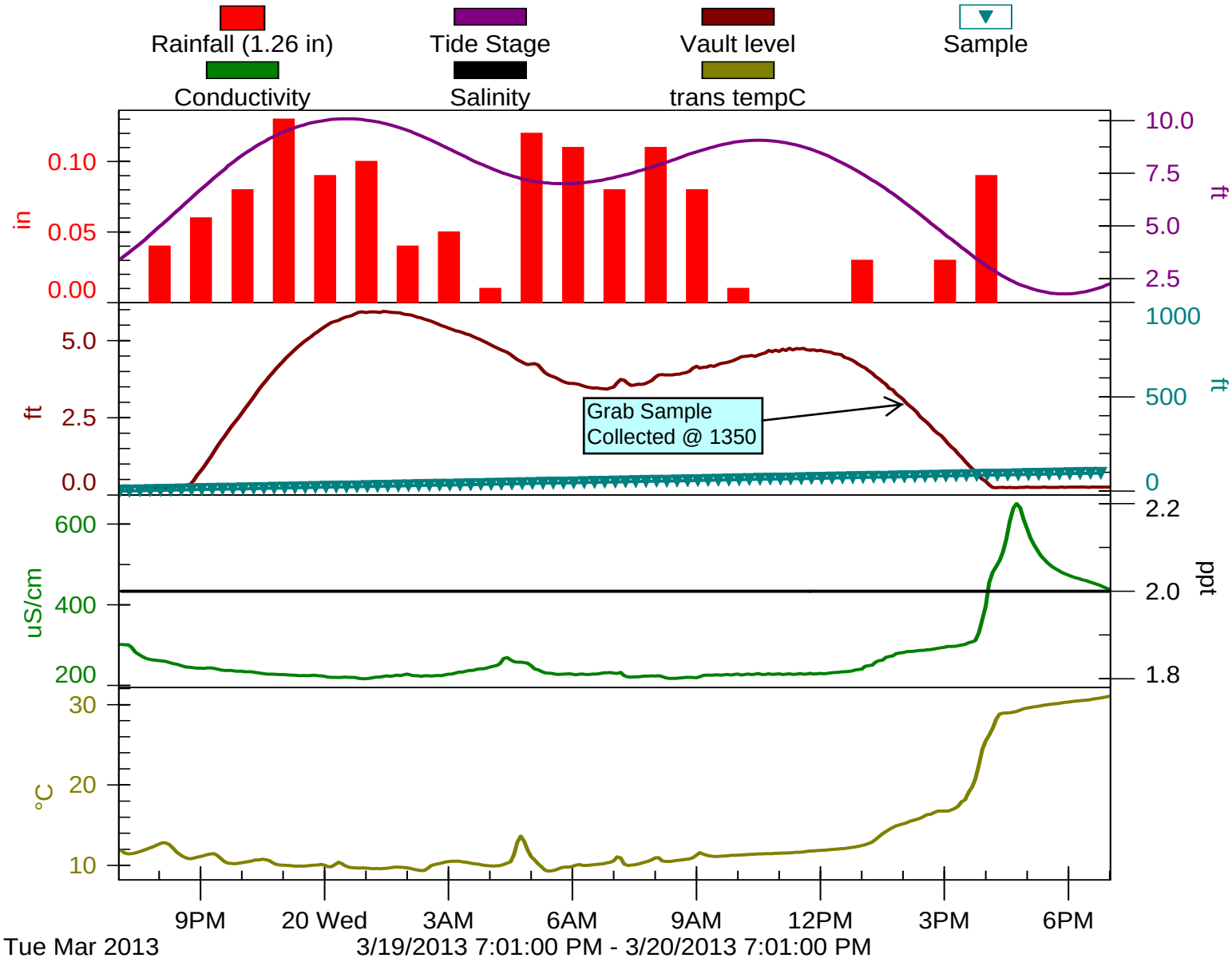
PSNS 115_1

SW16 3-19-2013



PSNS 084_1

SW16 3-19-2013



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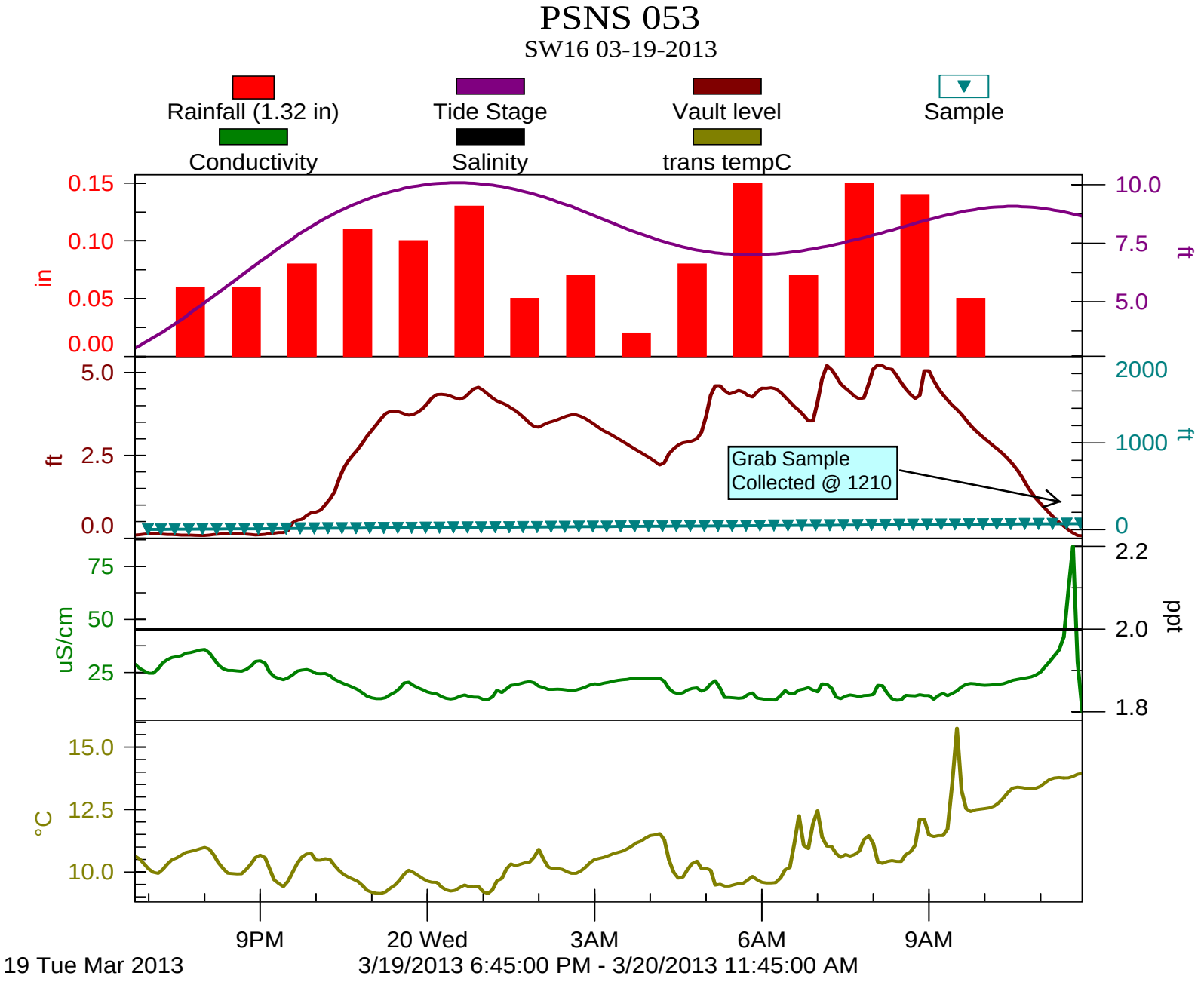
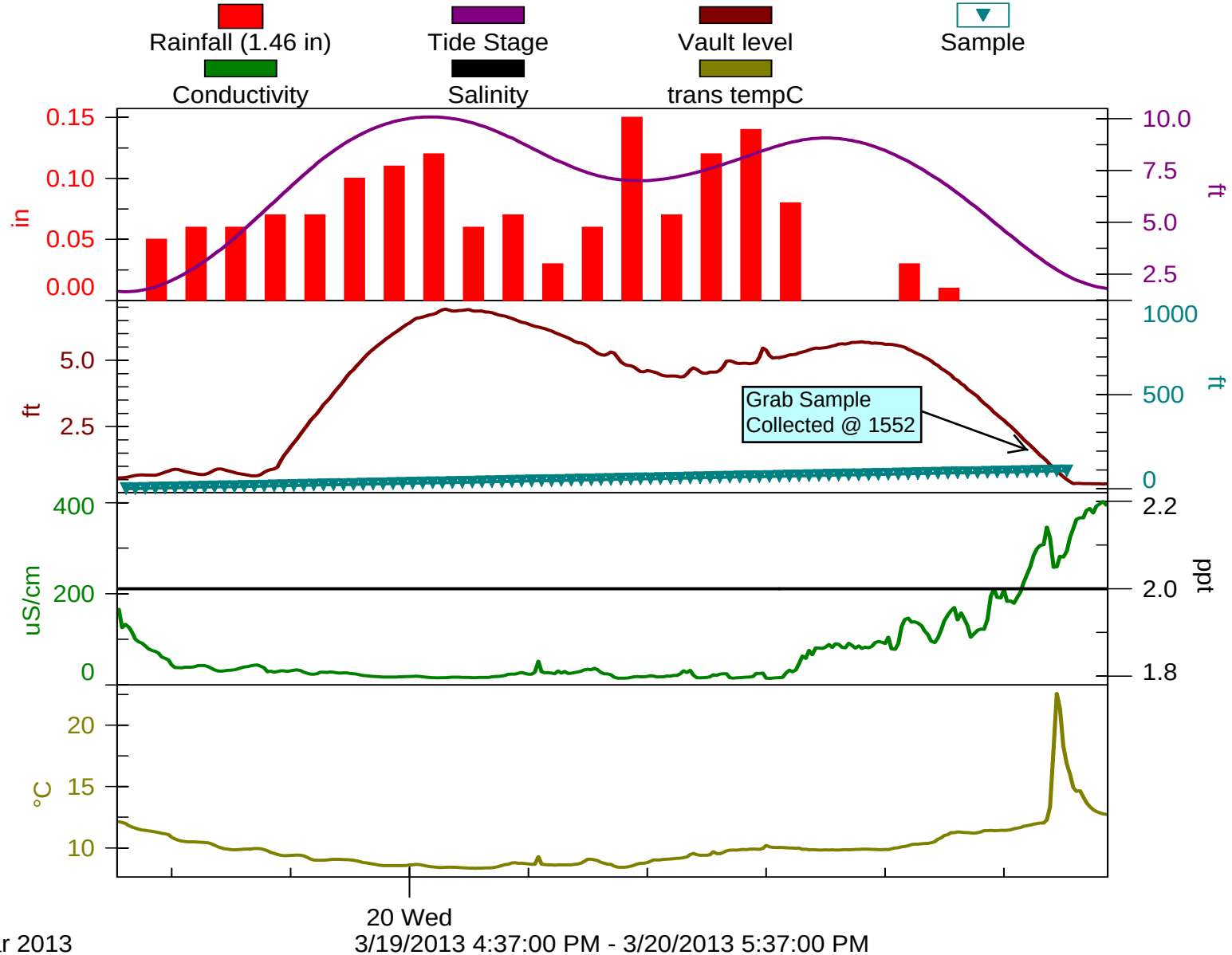

PSNS 053
SW16 03-19-2013
Rainfall (1.32 in)
Tide Stage
Vault level
Sample
Conductivity
Salinity
trans tempC
in
0.15
0.10
0.05
0.00
ft
10.0
7.5
5.0
ft
5.0
2.5
0.0
2000
1000
0
Grab Sample
Collected @ 1210
uS/cm
75
50
25
ppt
2.2
2.0
1.8
°C
15.0
12.5
10.0
9PM
20 Wed
3AM
6AM
9AM
19 Tue Mar 2013
3/19/2013 6:45:00 PM - 3/20/2013 11:45:00 AM

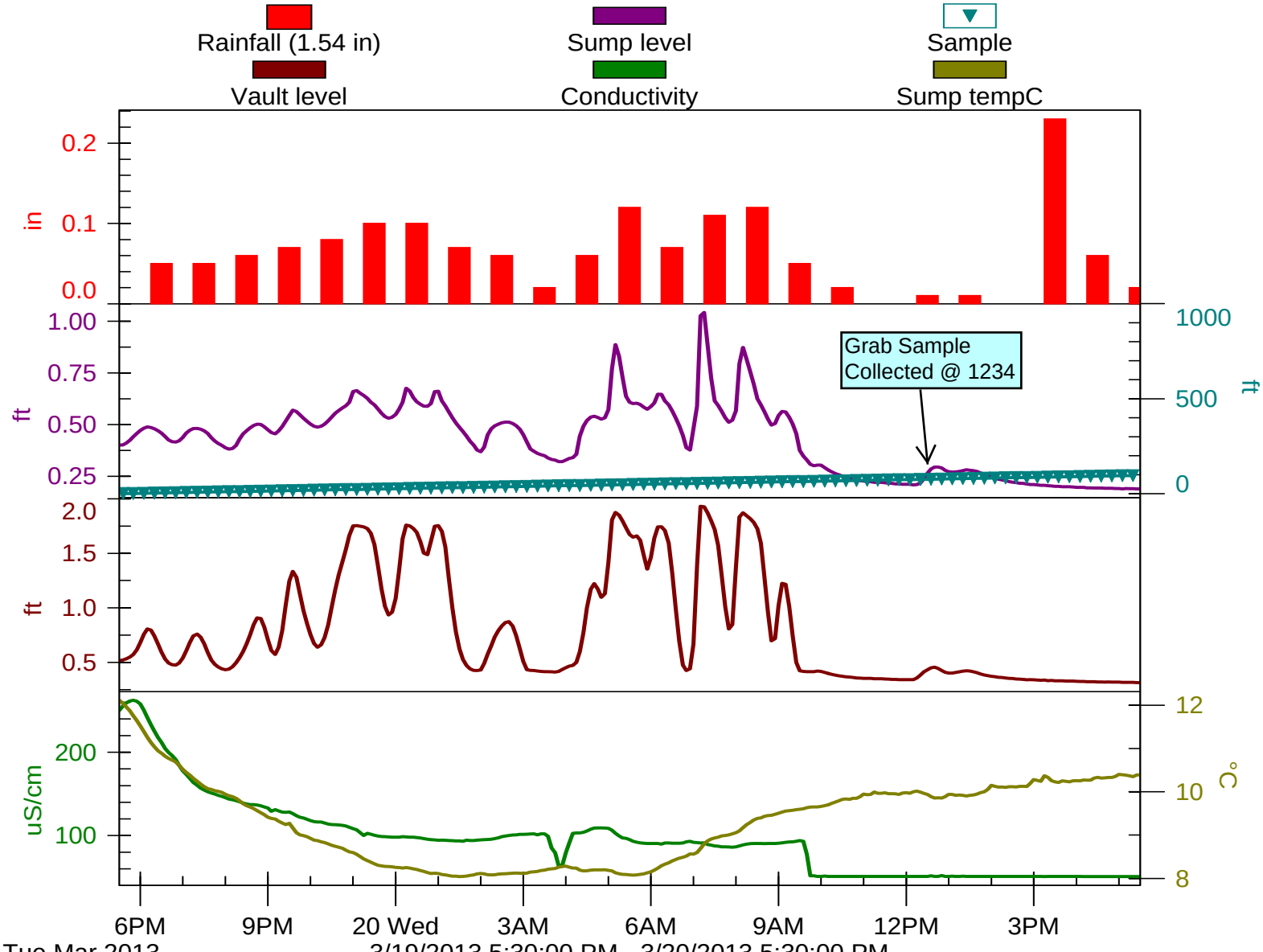
PSNS 015

SW16 03-19-2013



PSNS PB01

SW16 3-19-2013

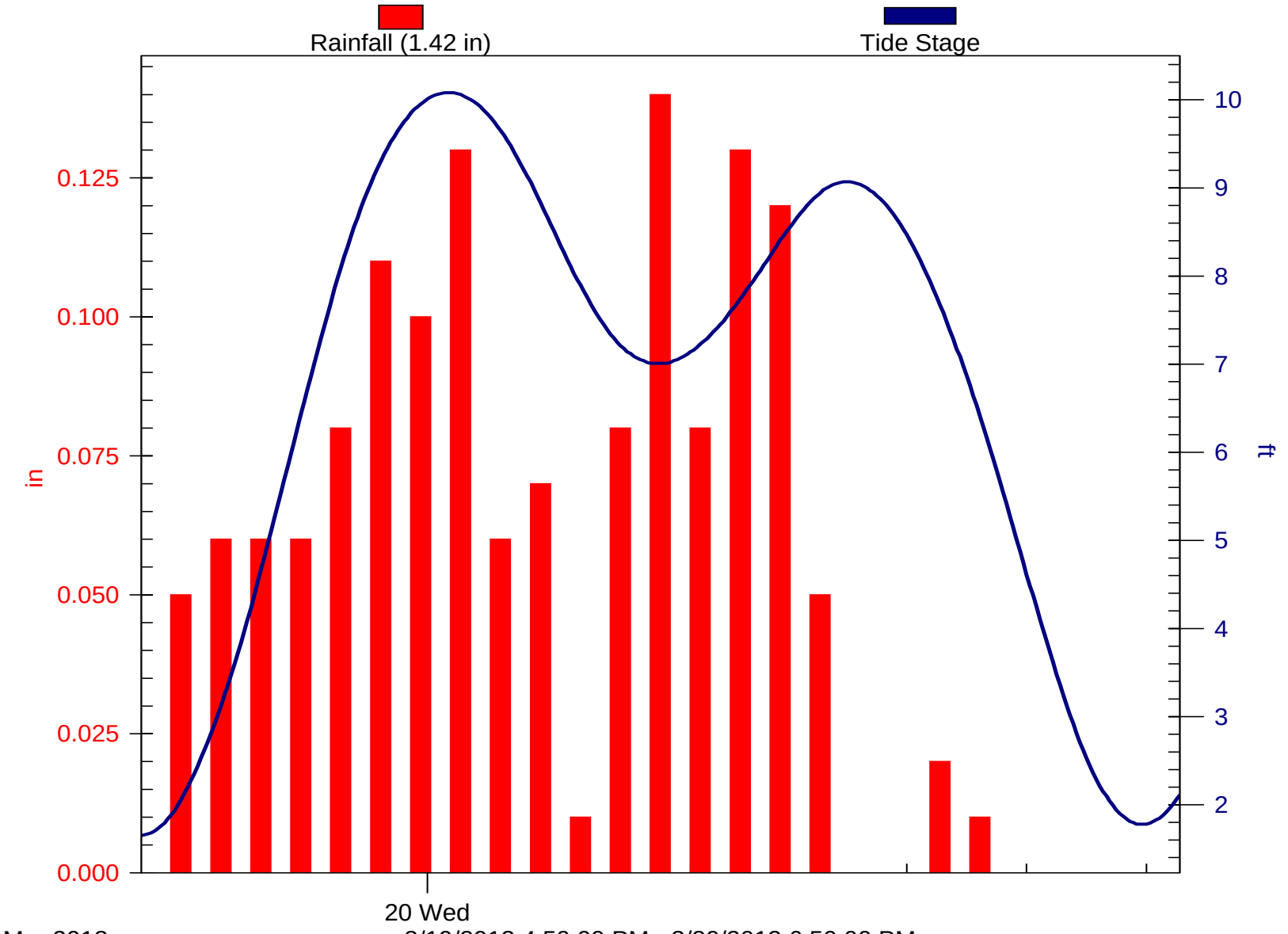


19 Tue Mar 2013

3/19/2013 5:30:00 PM - 3/20/2013 5:30:00 PM

B427 Rainfall

SW16 03-19-2013



```
*** Model 6700  HW Rev:     B2  SW Rev: 3.26.0000  ID 3293179321
> REPORT
SAMPLER ID# 3293179321  22:19 20-MAR-13
  Hardware: B2      Software: 3.26
********** 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 22:19 20-MAR-13
Hardware: B2 Software: 3.26
********** SAMPLING RESULTS **********
SITE: PSNS126
PROGRAM: PSNS126
Program Started at 09:29 MO 18-MAR-13
Nominal Sample Volume = 240 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		09:29	PGM DISABLED		
---------- TU 19-MAR-13 ----------					
		19:05	PGM ENABLED		
1,4	1	19:05	E		489

2,4	1	19:19	F	489
3,4	1	19:34	F	488
4,4	1	19:49	F	487
1,4	2	20:04	F	489
2,4	2	20:19	F	493
3,4	2	20:34	F	489
4,4	2	20:49	F	493
1,4	3	21:04	F	490
2,4	3	21:19	F	492
3,4	3	21:34	F	493
4,4	3	21:49	F	491
1,4	4	22:04	F	491
2,4	4	22:19	F	491
3,4	4	22:34	F	492
4,4	4	22:49	F	487
1,4	5	23:04	F	485
2,4	5	23:19	F	485
3,4	5	23:34	F	486
4,4	5	23:49	F	483
---------- WE 20-MAR-13 ----------				
1,4	6	00:04	F	479
2,4	6	00:19	F	479
3,4	6	00:34	F	481
4,4	6	00:49	F	478
1,4	7	01:04	F	478
2,4	7	01:19	F	477
3,4	7	01:34	F	481
4,4	7	01:49	F	477
1,4	8	02:04	F	479
2,4	8	02:19	F	479
3,4	8	02:34	F	477
4,4	8	02:49	F	481
1,4	9	03:04	F	483
2,4	9	03:19	F	481
3,4	9	03:34	F	483
4,4	9	03:49	F	487
1,4	10	04:04	F	483
2,4	10	04:19	F	483
3,4	10	04:34	F	489
4,4	10	04:49	F	493
1,4	11	05:04	F	491
2,4	11	05:19	F	495
3,4	11	05:34	F	491
4,4	11	05:49	F	491
1,4	12	06:04	F	496
2,4	12	06:19	F	491

3,4	12	06:34	F		491
4,4	12	06:49	F		494
1,4	13	07:04	F		520
2,4	13	07:19	F		495
3,4	13	07:34	F		495
4,4	13	07:49	F		491
1,4	14	08:04	F		524
2,4	14	08:19	F		495
3,4	14	08:34	F		491
4,4	14	08:49	F		491
1,4	15	09:04	F		491
2,4	15	09:19	F		491
3,4	15	09:34	F		491
4,4	15	09:49	F		491
1,4	16	10:04	F		486
2,4	16	10:19	F		489
3,4	16	10:34	F		489
4,4	16	10:49	F		492
1,4	17	11:04	F		485
2,4	17	11:19	F		491
3,4	17	11:34	F		489
4,4	17	11:49	F		492
1,4	18	12:04	F		489
2,4	18	12:19	F		485
3,4	18	12:34	F		492
4,4	18	12:49	F		489
1,4	19	13:04	F		491
2,4	19	13:19	F		497
3,4	19	13:34	F		486
4,4	19	13:49	F	NL	*
1,4	20	14:04	F	NL	*
2,4	20	14:19	F	NL	*
3,4	20	14:34	F	NL	*
4,4	20	14:49	F	NL	*
1,4	21	15:04	F	NL	*
2,4	21	15:19	F	NL	*
3,4	21	15:34	F	NL	*
4,4	21	15:49	F	NL	*
1,4	22	16:04	F	NL	*
2,4	22	16:19	F	NL	*
3,4	22	16:34	F	NL	*
4,4	22	16:49	F	NL	*
1,4	23	17:04	F	NL	*
2,4	23	17:19	F	NL	*
3,4	23	17:34	F	NL	*
4,4	23	17:49	F	NL	*

```
 1,4   24   18:04     F  NL       *
 2,4   24   18:19     F  NL       *
 3,4   24   18:34     F  NL       *
 4,4   24   18:49     F  NL       *
          18:50  PGM DONE 20-MAR
  SOURCE E  ==> ENABLE
  SOURCE F  ==> FLOW
   ERROR NL ==> NO LIQUID DETECTED!
----------------------------------------
```

SW16 - PSNS115.1

*** Model 6712 HW Rev: B0 SW Rev: 2.34.0000 ID 1313656803
> REPORT
SAMPLER ID# 1313656803 22:24 20-MAR-13
  Hardware: B0 Software: 2.34
********** PROGRAM SETTINGS **********

  PROGRAM NAME:
  "PSNS115-1 "
 SITE DESCRIPTION:
  "PSNS115-1 "

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

 24, 1000 ml BTLS
 44 ft SUCTION LINE
 20 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
QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER 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

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

0.01 inch TIP
RAIN GAUGE

NO SDI-12 SONDE
AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE
---
0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1313656803 22:24 20-MAR-13
Hardware: B0 Software: 2.34
********** SAMPLING RESULTS **********
SITE: PSNS115-1
PROGRAM: PSNS115-1
Program Started at 09:57 MO 18-MAR-13
Nominal Sample Volume = 240 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		09:57	PGM DISABLED		
TU 19-MAR-13					
240 ml	1	17:11	M		1347
240 ml	1	17:25	M		1335
240 ml	1	17:40	M		1351
240 ml	1	17:55	M		1349
240 ml	2	18:10	M		1345
240 ml	2	18:25	M		1321
240 ml	2	18:40	M		1333
240 ml	2	18:55	M		1336
240 ml	3	19:10	M		1329
240 ml	3	19:25	M		1315
240 ml	3	19:40	M		1303
240 ml	4	20:25	M		1255
240 ml	4	20:40	M		1245
240 ml	4	20:55	M		1244
240 ml	5	21:10	M		1229
240 ml	5	21:25	M		1216
240 ml	5	21:40	M		1203
240 ml	5	21:55	M		1192
240 ml	6	22:10	M		1184
240 ml	6	22:25	M		1173
240 ml	6	22:40	M		1153
240 ml	6	22:55	M		1143
240 ml	7	23:10	M		1145
240 ml	7	23:25	M		1129
240 ml	7	23:40	M		1121
240 ml	7	23:55	M		1129

---------- WE 20-MAR-13 ----------

240 ml	8	00:10	M	1126
240 ml	8	00:25	M	1115
240 ml	8	00:40	M	1111
240 ml	8	00:55	M	1114
240 ml	9	01:10	M	1123
240 ml	9	01:25	M	1125
240 ml	9	01:40	M	1108
240 ml	9	01:55	M	1113
240 ml	10	02:10	M	1115
240 ml	10	02:25	M	1126
240 ml	10	02:40	M	1140
240 ml	10	02:55	M	1141
240 ml	11	03:10	M	1141
240 ml	11	03:25	M	1133
240 ml	11	03:40	M	1129
240 ml	11	03:55	M	1132
240 ml	12	04:10	M	1149
240 ml	12	04:25	M	1148
240 ml	12	04:40	M	1154
240 ml	12	04:55	M	1160
240 ml	13	05:10	M	1173
240 ml	13	05:25	M	1165
240 ml	13	05:40	M	1168
240 ml	13	05:55	M	1171
240 ml	14	06:10	M	1159
240 ml	14	06:25	M	1176
240 ml	14	06:40	M	1179
240 ml	14	06:55	M	1183
240 ml	15	07:10	M	1180
240 ml	15	07:25	M	1173
240 ml	15	07:40	M	1177
240 ml	15	07:55	M	1159
240 ml	16	08:10	M	1168
240 ml	16	08:25	M	1170
240 ml	16	08:40	M	1170
240 ml	16	08:55	M	1158
240 ml	17	09:10	M	1163
240 ml	17	09:25	M	1153
240 ml	17	09:40	M	1156
240 ml	17	09:55	M	1151
240 ml	18	10:10	M	1158
240 ml	18	10:25	M	1145
240 ml	18	10:40	M	1150
240 ml	18	10:55	M	1148
240 ml	19	11:10	M	1161

240 ml	19	11:25	M	1154
240 ml	19	11:40	M	1161
240 ml	19	11:55	M	1153
240 ml	20	12:10	M	1172
240 ml	20	12:25	M	1165
240 ml	20	12:40	M	1166
240 ml	20	12:55	M	1159
240 ml	21	13:10	M	1166
240 ml	21	13:25	M	1175
240 ml	21	13:40	M	1184
240 ml	21	13:55	M	1189
240 ml	22	14:10	M	1196
240 ml	22	14:25	M	1201
240 ml	22	14:40	M	1214
240 ml	22	14:55	M	1220
240 ml	23	15:10	M	1238
240 ml	23	15:25	M	1241
240 ml	23	15:40	M	1259
240 ml	23	15:55	M	1274
240 ml	24	16:10	M	1273
240 ml	24	16:25	M	1297
240 ml	24	16:40	M	1298
240 ml	24	16:55	M	1345

SOURCE M ==> COMMAND SAMPLE

*** Model 6700 HW Rev: B2 SW Rev: 3.26.0000 ID 3293179316
> REPORT
SAMPLER ID# 3293179316 21:57 20-MAR-13
  Hardware: B2   Software: 3.26
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "PSNS 84-1 "
 SITE DESCRIPTION:
    "PSNS 84-1 "

   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:
   4 SAMPLES/BOTTLE
  RUN CONTINUOUSLY

      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
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 21:57 20-MAR-13
Hardware: B2 Software: 3.26
********** SAMPLING RESULTS **********
SITE: PSNS 84-1
PROGRAM: PSNS 84-1
Program Started at 10:23 MO 18-MAR-13
Nominal Sample Volume = 240 ml
COUNT
TO

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	LIQUID
		10:23	PGM DISABLED		
---------- TU 19-MAR-13 ----------					
		19:02	PGM ENABLED		
1,4	1	19:02	E		516
2,4	1	19:16	F		517
3,4	1	19:31	F		518
4,4	1	19:46	F		517
1,4	2	20:01	F		518
2,4	2	20:16	F		518
3,4	2	20:31	F		518
4,4	2	20:46	F		517
1,4	3	21:01	F		512
2,4	3	21:16	F		511
3,4	3	21:31	F		505
4,4	3	21:46	F		505
1,4	4	22:01	F		500
2,4	4	22:16	F		499
3,4	4	22:31	F		498
4,4	4	22:46	F		497
1,4	5	23:01	F		494
2,4	5	23:16	F		492
3,4	5	23:31	F		491
4,4	5	23:46	F		488
---------- WE 20-MAR-13 ----------					
1,4	6	00:01	F		486
2,4	6	00:16	F		486
3,4	6	00:31	F		487
4,4	6	00:46	F		483
1,4	7	01:01	F		486
2,4	7	01:16	F		488
3,4	7	01:31	F		486
4,4	7	01:46	F		486
1,4	8	02:01	F		486
2,4	8	02:16	F		486
3,4	8	02:31	F		487
4,4	8	02:46	F		492
1,4	9	03:01	F		487
2,4	9	03:16	F		488
3,4	9	03:31	F		492
4,4	9	03:46	F		492
1,4	10	04:01	F		494
2,4	10	04:16	F		492
3,4	10	04:31	F		494
4,4	10	04:46	F		497

1,4	11	05:01	F	494
2,4	11	05:16	F	498
3,4	11	05:31	F	498
4,4	11	05:46	F	503
1,4	12	06:01	F	500
2,4	12	06:16	F	504
3,4	12	06:31	F	499
4,4	12	06:46	F	504
1,4	13	07:01	F	503
2,4	13	07:16	F	500
3,4	13	07:31	F	504
4,4	13	07:46	F	498
1,4	14	08:01	F	498
2,4	14	08:16	F	498
3,4	14	08:31	F	499
4,4	14	08:46	F	498
1,4	15	09:01	F	498
2,4	15	09:16	F	498
3,4	15	09:31	F	498
4,4	15	09:46	F	497
1,4	16	10:01	F	495
2,4	16	10:16	F	500
3,4	16	10:31	F	497
4,4	16	10:46	F	495
1,4	17	11:01	F	498
2,4	17	11:16	F	497
3,4	17	11:31	F	495
4,4	17	11:46	F	498
1,4	18	12:01	F	498
2,4	18	12:16	F	498
3,4	18	12:31	F	498
4,4	18	12:46	F	498
1,4	19	13:01	F	498
2,4	19	13:16	F	504
3,4	19	13:31	F	505
4,4	19	13:46	F	507
1,4	20	14:01	F	505
2,4	20	14:16	F	512
3,4	20	14:31	F	511
4,4	20	14:46	F	517
1,4	21	15:01	F	520
2,4	21	15:16	F	523
3,4	21	15:31	F	524
4,4	21	15:46	F	529
1,4	22	16:01	F	533
2,4	22	16:16	F	536

3,4	22	16:31	F	536
4,4	22	16:46	F	536
1,4	23	17:01	F	535
2,4	23	17:16	F	532
3,4	23	17:31	F	536
4,4	23	17:46	F	530
1,4	24	18:01	F	531
2,4	24	18:16	F	530
3,4	24	18:31	F	529
4,4	24	18:46	F	536
1,4	1	19:01	F	536
2,4	1	19:16	F	535
3,4	1	19:31	F	532
4,4	1	19:46	F	530
1,4	2	20:01	F	528
2,4	2	20:16	F	531
3,4	2	20:31	F	532
4,4	2	20:46	F	529
1,4	3	21:01	F	527
2,4	3	21:16	F	528
3,4	3	21:31	F	522
4,4	3	21:46	F	528

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

*** Model 6700 HW Rev: B2 SW Rev: 3.26.0000 ID 3293179322
> REPORT
SAMPLER ID# 3293179322 21:23 20-MAR-13
  Hardware: B2 Software: 3.26
********** 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 21:23 20-MAR-13
Hardware: B2 Software: 3.26
********** SAMPLING RESULTS **********
SITE: PSNS 053
PROGRAM: PSNS 053
Program Started at 10:50 MO 18-MAR-13
Nominal Sample Volume = 240 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		10:50	PGM DISABLED		
---------- TU 19-MAR-13 ----------					
		18:58	PGM ENABLED		

1,4	1	18:58	E		490
2,4	1	19:12	F		493
3,4	1	19:27	F	NM	*
4,4	1	19:42	F	NL	*
1,4	2	19:57	F	NL	*
2,4	2	20:12	F		495
3,4	2	20:27	F		494
4,4	2	20:42	F		494
1,4	3	20:57	F	NL	*
2,4	3	21:12	F		492
3,4	3	21:27	F		493
4,4	3	21:42	F		487
1,4	4	21:57	F		486
2,4	4	22:12	F		481
3,4	4	22:27	F		476
4,4	4	22:42	F		475
1,4	5	22:57	F		470
2,4	5	23:12	F		470
3,4	5	23:27	F		470
4,4	5	23:42	F		469
1,4	6	23:57	F		465
---------- WE 20-MAR-13 ----------					
2,4	6	00:12	F		464
3,4	6	00:27	F		465
4,4	6	00:42	F		464
1,4	7	00:57	F		464
2,4	7	01:12	F		469
3,4	7	01:27	F		469
4,4	7	01:42	F		469
1,4	8	01:57	F		469
2,4	8	02:12	F		469
3,4	8	02:27	F		469
4,4	8	02:42	F		469
1,4	9	02:57	F		470
2,4	9	03:12	F		471
3,4	9	03:27	F		469
4,4	9	03:42	F		475
1,4	10	03:57	F		474
2,4	10	04:12	F		476
3,4	10	04:27	F		475
4,4	10	04:42	F		473
1,4	11	04:57	F		469
2,4	11	05:12	F		464
3,4	11	05:27	F		464
4,4	11	05:42	F		463
1,4	12	05:57	F		464

2,4	12	06:12	F		463
3,4	12	06:27	F		465
4,4	12	06:42	F		464
1,4	13	06:57	F		465
2,4	13	07:12	F		463
3,4	13	07:27	F		465
4,4	13	07:42	F		465
1,4	14	07:57	F		462
2,4	14	08:12	F		463
3,4	14	08:27	F		464
4,4	14	08:42	F		470
1,4	15	08:57	F		463
2,4	15	09:12	F		469
3,4	15	09:27	F		463
4,4	15	09:42	F		464
1,4	16	09:57	F		469
2,4	16	10:12	F		471
3,4	16	10:27	F		479
4,4	16	10:42	F		481
1,4	17	10:57	F		487
2,4	17	11:12	F		488
3,4	17	11:27	F		494
4,4	17	11:42	F	NL	*
1,4	18	11:57	F	NL	*
2,4	18	12:12	F	NL	*
3,4	18	12:27	F	NL	*
4,4	18	12:42	F	NL	*
1,4	19	12:57	F	NL	*
2,4	19	13:12	F	NL	*
3,4	19	13:27	F	NL	*
4,4	19	13:42	F	NL	*
1,4	20	13:57	F	NL	*
2,4	20	14:12	F	NL	*
3,4	20	14:27	F	NL	*
4,4	20	14:42	F	NL	*
1,4	21	14:57	F	NL	*
2,4	21	15:12	F	NL	*
3,4	21	15:27	F	NL	*
4,4	21	15:42	F	NL	*
1,4	22	15:57	F	NL	*
2,4	22	16:12	F	NL	*
3,4	22	16:27	F	NL	*
4,4	22	16:42	F	NL	*
1,4	23	16:57	F	NL	*
2,4	23	17:12	F	NL	*
3,4	23	17:27	F	NL	*

```
  4,4    23   17:42      F  NL        *
  1,4    24   17:57      F  NL        *
  2,4    24   18:12      F  NL        *
  3,4    24   18:27      F  NL        *
  4,4    24   18:42      F  NL        *
           18:43  PGM DONE 20-MAR
   SOURCE E  ==> ENABLE
   SOURCE F  ==> FLOW
    ERROR NL ==> NO LIQUID DETECTED!
    ERROR NM ==> NO MORE LIQUID!
----------------------------------------
```

*** Model 6700 HW Rev: B2 SW Rev: 3.26.0000 ID 2483481595
> REPORT
SAMPLER ID# 2483481595 21:26 20-MAR-13
  Hardware: B2 Software: 3.26
********** 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  21:26 20-MAR-13
  Hardware: B2      Software: 3.26
********** SAMPLING RESULTS **********
   SITE: PSNS015
PROGRAM: PSNS015
Program Started at 11:48 MO 18-MAR-13
Nominal Sample Volume =  240 ml
                              COUNT
                                TO
SAMPLE  BOTTLE TIME  SOURCE ERROR LIQUID
------- ------ ----      -- --    ------
            11:48  PGM DISABLED
------------- TU 19-MAR-13 -------------
            16:50  PGM ENABLED
```

1,4	1	16:50	E	857
2,4	1	17:04	F	853
3,4	1	17:19	F	854
4,4	1	17:34	F	854
1,4	2	17:49	F	854
2,4	2	18:04	F	859
3,4	2	18:19	F	877
4,4	2	18:34	F	853
1,4	3	18:49	F	853
2,4	3	19:04	F	853
3,4	3	19:19	F	851
4,4	3	19:34	F	848
1,4	4	19:49	F	857
2,4	4	20:04	F	853
3,4	4	20:19	F	853
4,4	4	20:34	F	853
1,4	5	20:49	F	833
2,4	5	21:04	F	829
3,4	5	21:19	F	817
4,4	5	21:34	F	811
1,4	6	21:49	F	809
2,4	6	22:04	F	797
3,4	6	22:19	F	791
4,4	6	22:34	F	781
1,4	7	22:49	F	779
2,4	7	23:04	F	775
3,4	7	23:19	F	769
4,4	7	23:34	F	767
1,4	8	23:49	F	763
---------- WE 20-MAR-13 ----------				
2,4	8	00:04	F	763
3,4	8	00:19	F	757
4,4	8	00:34	F	755
1,4	9	00:49	F	757
2,4	9	01:04	F	761
3,4	9	01:19	F	756
4,4	9	01:34	F	757
1,4	10	01:49	F	761
2,4	10	02:04	F	755
3,4	10	02:19	F	757
4,4	10	02:34	F	761
1,4	11	02:49	F	762
2,4	11	03:04	F	761
3,4	11	03:19	F	761
4,4	11	03:34	F	761
1,4	12	03:49	F	767

2,4	12	04:04	F	770
3,4	12	04:19	F	773
4,4	12	04:34	F	775
1,4	13	04:49	F	780
2,4	13	05:04	F	781
3,4	13	05:19	F	785
4,4	13	05:34	F	787
1,4	14	05:49	F	786
2,4	14	06:04	F	787
3,4	14	06:19	F	791
4,4	14	06:34	F	793
1,4	15	06:49	F	787
2,4	15	07:04	F	785
3,4	15	07:19	F	791
4,4	15	07:34	F	793
1,4	16	07:49	F	782
2,4	16	08:04	F	787
3,4	16	08:19	F	781
4,4	16	08:34	F	786
1,4	17	08:49	F	781
2,4	17	09:04	F	781
3,4	17	09:19	F	785
4,4	17	09:34	F	781
1,4	18	09:49	F	781
2,4	18	10:04	F	779
3,4	18	10:19	F	781
4,4	18	10:34	F	779
1,4	19	10:49	F	776
2,4	19	11:04	F	781
3,4	19	11:19	F	787
4,4	19	11:34	F	787
1,4	20	11:49	F	787
2,4	20	12:04	F	787
3,4	20	12:19	F	787
4,4	20	12:34	F	782
1,4	21	12:49	F	788
2,4	21	13:04	F	788
3,4	21	13:19	F	793
4,4	21	13:34	F	794
1,4	22	13:49	F	799
2,4	22	14:04	F	805
3,4	22	14:19	F	817
4,4	22	14:34	F	817
1,4	23	14:49	F	823
2,4	23	15:04	F	835
3,4	23	15:19	F	841

```
 4,4    23   15:34      F          847
 1,4    24   15:49      F          853
 2,4    24   16:04      F          865
 3,4    24   16:19      F          865
 4,4    24   16:34      F          895
           16:35  PGM DONE 20-MAR
  SOURCE E  ==> ENABLE
  SOURCE F  ==> FLOW
----------------------------------------
```

*** Model 6700 HW Rev: B2 SW Rev: 3.26.0000 ID 2425546782
> REPORT
SAMPLER ID# 2425546782 21:31 20-MAR-13
  Hardware: B2 Software: 3.26
********** PROGRAM SETTINGS **********

  PROGRAM NAME:
  "PSNSPB01DU"
SITE DESCRIPTION:
  "PSNSPB01DU"

  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:
2 BOTTLES/SAMPLE
 8 SAMPLES/BOTTLE

  VOLUME:
120 ml SAMPLES

  ENABLE:
NONE PROGRAMMED

  ENABLE:
 ONCE ENABLED,
 STAY ENABLED
SAMPLE AT ENABLE

  ENABLE:
0 PAUSE & RESUMES

```
    ----------
 NO DELAY TO START
    ----------
    ----------
    ----------
  LIQUID DETECT ON
    NO RAIN GAGE
    ----------
    NO YSI SONDE
    ----------
  MASTER/SLAVE OFF
BTL FULL DETECT OFF
  TIMED BACKLIGHT
    ----------
  EVENT MARK SENT
 DURING PUMP CYCLE
    ----------
  PUMP COUNTS FOR
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
    ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE
    ----------
  0 ANALOG OUTPUTS
    NO PERIODIC
   SERIAL OUTPUT
    ----------
     NO DIALOUT
   CONDITIONS SET
----------------------------------------
SAMPLER ID# 2425546782  21:31 20-MAR-13
  Hardware: B2      Software: 3.26
********** SAMPLING RESULTS **********
   SITE: PSNSPB01DU
PROGRAM: PSNSPB01DU
Program Started at 11:14 MO 18-MAR-13
Nominal Sample Volume =  120 ml
                              COUNT
                                TO
SAMPLE  BOTTLE TIME  SOURCE ERROR LIQUID
------- ------ ----      -- --    ------
             11:14  PGM DISABLED
------------- TU 19-MAR-13 -------------
```

17:35 PGM ENABLED

1,8	1-2	17:35	E	789
2,8	1-2	17:49	F	785
3,8	1-2	18:04	F	785
4,8	1-2	18:19	F	792
5,8	1-2	18:34	F	785
6,8	1-2	18:49	F	785
7,8	1-2	19:04	F	785
8,8	1-2	19:19	F	785
1,8	3-4	19:34	F	785
2,8	3-4	19:49	F	797
3,8	3-4	20:04	F	797
4,8	3-4	20:19	F	797
5,8	3-4	20:34	F	785
6,8	3-4	20:49	F	785
7,8	3-4	21:04	F	785
8,8	3-4	21:19	F	785
1,8	5-6	21:34	F	785
2,8	5-6	21:49	F	791
3,8	5-6	22:04	F	797
4,8	5-6	22:19	F	791
5,8	5-6	22:34	F	797
6,8	5-6	22:49	F	785
7,8	5-6	23:04	F	797
8,8	5-6	23:19	F	797
1,8	7-8	23:34	F	797
2,8	7-8	23:49	F	803

---------- WE 20-MAR-13 ----------

3,8	7-8	00:04	F	803
4,8	7-8	00:19	F	935
5,8	7-8	00:34	F	791
6,8	7-8	00:49	F	797
7,8	7-8	01:04	F	791
8,8	7-8	01:19	F	791
1,8	9-10	01:34	F	785
2,8	9-10	01:49	F	797
3,8	9-10	02:04	F	803
4,8	9-10	02:19	F	803
5,8	9-10	02:34	F	803
6,8	9-10	02:49	F	791
7,8	9-10	03:04	F	798
8,8	9-10	03:19	F	803
1,8	11-12	03:34	F	803
2,8	11-12	03:49	F	791
3,8	11-12	04:04	F	803
4,8	11-12	04:19	F	803

5,8	11-12 04:34	F	797
6,8	11-12 04:49	F	803
7,8	11-12 05:04	F	797
8,8	11-12 05:19	F	791
1,8	13-14 05:34	F	791
2,8	13-14 05:49	F	791
3,8	13-14 06:04	F	791
4,8	13-14 06:19	F	791
5,8	13-14 06:34	F	791
6,8	13-14 06:49	F	791
7,8	13-14 07:04	F	797
8,8	13-14 07:19	F	797
1,8	15-16 07:34	F	803
2,8	15-16 07:49	F	809
3,8	15-16 08:04	F	803
4,8	15-16 08:19	F	791
5,8	15-16 08:34	F	791
6,8	15-16 08:49	F	791
7,8	15-16 09:04	F	791
8,8	15-16 09:19	F	803
1,8	17-18 09:34	F	797
2,8	17-18 09:49	F	803
3,8	17-18 10:04	F	797
4,8	17-18 10:19	F	801
5,8	17-18 10:34	F	809
6,8	17-18 10:49	F	801
7,8	17-18 11:04	F	813
8,8	17-18 11:19	F	813
1,8	19-20 11:34	F	813
2,8	19-20 11:49	F	807
3,8	19-20 12:04	F	803
4,8	19-20 12:19	F	809
5,8	19-20 12:34	F	809
6,8	19-20 12:49	F	809
7,8	19-20 13:04	F	809
8,8	19-20 13:19	F	801
1,8	21-22 13:34	F	795
2,8	21-22 13:49	F	801
3,8	21-22 14:04	F	807
4,8	21-22 14:19	F	797
5,8	21-22 14:34	F	801
6,8	21-22 14:49	F	795
7,8	21-22 15:04	F	807
8,8	21-22 15:19	F	807
1,8	23-24 15:34	F	801
2,8	23-24 15:49	F	801

3,8	23-24 16:04	F	795
4,8	23-24 16:19	F	795
5,8	23-24 16:34	F	797
6,8	23-24 16:49	F	801
7,8	23-24 17:04	F	803
8,8	23-24 17:19	F	797

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

Terminal Emulation Inactive.

National Weather Service National Headquarters

National Weather Service

Area Forecast Discussion

Issued by NWS Seattle/Tacoma, WA

Current Version | Previous Version | Text Only | Print | Product List | Glossary Off
Versions: **1**2345678910111213141516171819202122232425262728293031323334 35

000
FXUS66 KSEW 191621 CCA
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
900 AM PDT TUE MAR 19 2013

.SYNOPSIS...RAIN WILL SPREAD INTO THE AREA FROM THE SOUTHWEST LATER TODAY AS A FRONT ASSOCIATED WITH A DEVELOPING LOW PRESSURE SYSTEM APPROACHES THE AREA. THIS SYSTEM WILL BRING RAIN...WIND...AND HEAVY MOUNTAIN SNOW TO THE AREA TUESDAY NIGHT THROUGH WEDNESDAY NIGHT. COLDER AIR WILL ARRIVE WEDNESDAY NIGHT AND THURSDAY WITH SHOWERY CONDITIONS. WEAK HIGH PRESSURE COULD BRING A DRYING TREND TOWARD THE WEEKEND.

&&

.SHORT TERM...SATELLITE IMAGERY SHOWS THE LARGE LOW PRESSURE SYSTEM DEVELOPING OVER THE ERN PACIFIC AS IT CONTINUES TO APPROACH OUR AREA. THE SYSTEM IS COMPLEX WITH A SUBTROPICAL JET AND LOTS OF MOISTURE HEADING TOWARD CA WHILE A DOUBLE SURFACE LOW STRUCTURE IS TRACKING TOWARD VANCOUVER ISLAND. ALL MODELS AGREE THAT THE LOW WILL CONSOLIDATE AND ALIGN UNDER THE COLDER NRN STREAM UPPER TROUGH LATER TONIGHT ALLOWING FOR FURTHER DEEPENING. WHILE MODELS AGREE ON THE GENERAL TRACK THERE ARE DIFFERENCES IN THE DETAILS WHICH COULD AFFECT THE STRENGTH AND DISTRIBUTION OF WIND ACROSS THE FORECAST AREA.

THE 00Z ECMWF HAS NOT CHANGED MUCH THE PAST COUPLE RUNS AND BRINGS A DEEPENING 984 MB LOW INTO N VANCOUVER ISLAND BY 5 AM WEDNESDAY MORNING. THIS SOLUTION HAS LESS THAN +10 MB PDX-KBLI GRADIENT WITH THE BENT BACK BRUSHING THE NRN PORTION OF WRN WA. WIND ADVISORY CRITERIA MIGHT BE MET ALONG THE COAST AND THE N INTERIOR IN THIS SCENARIO. THE NAM-12 HAS A SIMILAR TRACK AND DEPTH BUT IS A BIT STRONGER WITH THE BENT BACK FEATURE LIFTING THROUGH THE AREA BY LATE WEDNESDAY AFTERNOON. PEAK KBLI-KPDX FORECAST GRADIENTS ARE ABOUT +13 MB. WINDS WOULD BE A BIT STRONGER WITH THIS SOLUTION RAISING SOME CONCERN OF HIGH WIND OVER PARTS OF THE N INTERIOR AND ALSO WITH A WLY SURGE DOWN THE STRAIT INTO WHIDBEY ISLAND. THE LESS RELIABLE BUT MORE RECENT 06Z/12Z GFS HAS A PEAK GRADIENT OF +16 MB WITH A DIRECT HIT FROM THE BENT BACK FEATURE. WILL WATCH MODELS AS THEY CONTINUE TO COME IN TODAY AND WILL BE PARTICULARLY INTERESTED IN ANY CHANGES IN THE 12Z ECMWF RUN. IF MODELS CONTINUE THE STRONGER TREND THEN HIGH WIND WATCHES COULD BE NEEDED FOR PORTIONS OF THE N INTERIOR AND POSSIBLY THE COAST. THE CHANGING CONDITIONS ARE HIGHLIGHTED IN THE SPECIAL STATEMENT AND NOT MAKE ANY CHANGES TO THE FORECAST/STATEMENTS UNTIL THE AFTERNOON FORECAST PACKAGE.

THE WINTER STORM WATCH WAS CONVERTED TO A WARNING OVERNIGHT WHICH LOOKS GOOD. QPF AMOUNTS ARE HIGHEST OVER THE OLYMPICS AND ALONG S/W FACING SLOPES OF VOLCANOES IN THE N/CENTRAL CASCADES. THE FLOW AHEAD OF THE FRONT IS NOT AS FAVORABLE FOR HEAVY SNOW IN THE PASSES ALTHOUGH THERE WILL BE ACCUMULATION. HEAVIER SNOW IN THE PASSES WILL BE ALONG AND FRONT AND BEHIND THE FRONT AS STRONG WLY FLOW AND STRONG COLD AIR ADVECTION ARRIVES. THERE MAY STILL BE A WEDGE OF WARM AIR INTRUDING INTO THE OLYMPICS AND POSSIBLY GETTING INTO THE CENTRAL CASCADES BUT MODIFYING. SNOW LEVELS MAY FLUCTUATE BUT WILL GENERALLY BE IN THE 3000-4000 FOOT RANGE OVER THE OLYMPICS AND CENTRAL CASCADES...LOWER OVER THE N CASCADES. SNOQUALMIE PASS COULD SEE A CHANGE TO RAIN EARLY WEDNESDAY MORNING BUT WILL GO BACK OVER TO SNOW AS HEAVIER OROGRAPHIC PRECIP INCREASES THROUGH THE AFTERNOON. STEVENS PASS IS LIKELY TO STAY ALL SNOW. 24 HOUR TOTALS IN THE PASSES OF 1 FOOT WITH LOCALLY HIGHER AMOUNTS LOOK GOOD. STORM TOTALS IN THE PASSES COULD BE CLOSE TO 2 FEET...ESPECIALLY AT STEVENS. THE HIGHER TERRAIN SHOULD SEE 2-3 FEET AND MOUNT BAKER STILL LOOKS TO GET THE MOST WITH OVER 3 FEET POSSIBLE THERE.

RAIN WILL BE LOCALLY HEAVY OVER THE LOWLANDS. 1-2 INCHES OF RAIN IS LIKELY ACROSS MUCH OF THE WRN WA LOWLANDS WITH OVER 3 INCHES POSSIBLE ALONG SOME COASTAL LOCATIONS. THESE AMOUNTS WILL CAUSE RIVER RISES ON THE LOWEST BASINS LIKE THE CHEHALIS RIVER. SEE THE HYDRO DISCUSSION FOR DETAILS. THE SNOW LEVEL WILL BE LOW ENOUGH SO THAT FLOODING IS NOT A CONCERN FOR THE MOST PART.

RAIN WILL BECOME MORE SHOWERY BEHIND THE FRONT LATE WEDNESDAY INTO THURSDAY MORNING. A CONVERGENCE ZONE IS POSSIBLE WHICH COULD ENHANCE SNOW TOTALS IN LOCALIZED AREAS IN THE CASCADES OF SNOHOMISH AND KING COUNTIES. THE SNOW LEVEL WILL PLUMMET AS LOW AS 500 FEET BY WEDNESDAY NIGHT AND THURSDAY SO MIXED PRECIPITATION ON THE LOWLAND HILLTOPS ARE POSSIBLE. IT IS A BIT LATE IN THE SEASON TO BE CONCERNED WITH ACCUMULATION. THE EXCEPTION WOULD BE IF AN INTENSE CONVERGENCE ZONE WERE TO SIT OVER ONE AREA FOR A PROLONGED PERIOD OF

TIME. MOST LIKELY THE STRONG FLOW WILL PUSH MOST OF THE CONVERGENCE ZONE UP INTO THE CASCADES. WILL NEED TO WATCH HOW THIS DEVELOPS. MERCER

.LONG TERM...FROM 300 AM DISCUSSION...CONFIDENCE IN THE EXTENDED FORECAST DETAILS REMAINS LOW AS THE MODELS CONTINUE TO HAVE DIFFICULTY RESOLVING UPSTREAM DEVELOPMENTS OVER THE NORTHEAST PACIFIC. BOTH MODELS ARE EDGING TOWARD SOME RIDGING LATE FRIDAY INTO SATURDAY...BUT THE EURO QUICKLY BREAKS THE RIDGE DOWN LATE IN THE WEEKEND WITH ANOTHER SYSTEM WHILE THE GFS KEEPS UPPER LEVEL RIDGING JUST OFFSHORE THROUGH THE WEEKEND. THE CANADIAN IS SIMILAR TO THE EURO. THE EXISTING PARTLY TO MOSTLY CLOUDY WITH A CHANCE OF SHOWERS FOR THE EXTENDED PERIOD LOOKS LIKE THE WAY TO GO FOR NOW. 27

&&

.HYDROLOGY...MODELS INDICATE ABOUT 2-3 INCHES LIQUID OVER THE OLYMPICS AND A LITTLE LESS OVER THE CASCADES. SINCE SNOW LEVELS WILL BE RELATIVELY LOW...3000-4000 FEET AND LOWER UP NORTH....LITTLE IMPACT IS EXPECTED ON RIVERS. ONLY THE LOWEST RIVER BASINS WILL SEE RISES. WILL NEED TO WATCH THE CHEHALIS AND POSSIBLY THE SKOKOMISH RIVER BUT NO FLOODING IS FORECAST. BY THURSDAY PRECIPITATION WILL BE SHOWERY. NO FLOODING IS EXPECTED OUT TO 7 DAYS.

&&

.AVIATION...SOUTHWEST FLOW ALOFT AND MID LEVEL MOISTURE WILL INCREASE THIS MORNING. AREAS OF RAIN WILL DEVELOP WITH LOWERING CIGS IN THE AFTERNOON AND EVENING AS A WARM FRONT REACHES WESTERN WA. THERE IS LOW LEVEL OFFSHORE/EASTERLY FLOW FLOW. THERE IS A CHANCE OF LLWS LATER TODAY IF THE LOW LEVEL EASTERLIES PERSIST WHILE THE WINDS ALOFT INCREASE. THE OLYMPICS SHOULD BECOME OBSCURED IN SNOW AROUND MID AFTERNOON AND THE CASCADES LATE AFTERNOON OR EARLY EVENING. 19

KSEA...CURRENT TAF IS IN THE BALLPARK NO BIG CHANGES EXPECTED FOR THE 18Z TAF. THERE IS A CHANCE THAT LATER TODAY IF THE EASTERLY GAP WIND SQUIRTS OUT AS FAR AS SEATTLE AND THE WINDS ALOFT INCREASE ENOUGH THAT THERE COULD BE SOME AREAS OF LLWS...BUT I HAVE NOT LOOKED CLOSELY AT THE POSSIBILITY YET. MOST LIKELY THAT WILL JUST BE NEAR THE APPROACHES TO THE PASSES AND NOT EFFECT SEA TAC. 19

&&

.MARINE...A 995MB LOW OFFSHORE WILL DEEPEN TO 985MB AND REACH NORTHERN OR CENTRAL VANCOUVER ISLAND BEFORE DAYBREAK WEDNESDAY. THE ASSOCIATED FRONTAL SYSTEM WILL MOVE THROUGH THE AREA TONIGHT AND WEDNESDAY. OFFSHORE EASTERLY FLOW TODAY WILL SWITCH TO SOUTHERLY FLOW TONIGHT AND STRONG WESTERLY FLOW WEDNESDAY NIGHT AS THE SYSTEM MOVES ASHORE. WEAK HIGH PRESSURE WILL BUILD INTO THE AREA LATE IN THE WEEK. 19

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...WINTER STORM WARNING OLYMPICS AND NORTH AND CENTRAL CASCADES TONIGHT THROUGH WEDNESDAY NIGHT.

PZ...GALE WARNING IN EFFECT FOR THE COASTAL WATERS AND WEST ENTRANCE TO THE STRAIT OF JUAN DE FUCA.

SMALL CRAFT ADVISORIES ARE IN EFFECT FOR CENTRAL STRAIT OF JUAN DE FUCA AND THE NORTHERN INLAND WATERS.

A GALE WATCH IS IN EFFECT FOR THE STRAIT OF JUAN DE FUCA... NORTHERN INLAND WATERS...AND ADMIRALTY INLET FOR THIS EVENING THROUGH WEDNESDAY EVENING.

&&

$$

WWW.WEATHER.GOV/SEATTLE

YOU CAN SEE AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION AT 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

Heavy Snow Forecast for New England, Wet Weather in Pacific Northwest

A storm system moving from the Great Lakes into Canada will bring showers and thunderstorms to parts of the Mid-Atlantic and Southeast on Tuesday and snow from the upper Great Lakes into New England. Heavy snow is possible for parts of upstate New York and New England with accumulations of a foot or more are possible for some locations. Meanwhile, wet weather is forecast for the Pacific Northwest.
Read More...

BREMERTON WA

En Español

Fair
39°F
4°C

Humidity	70%
Wind Speed	NE 10 MPH
Barometer	30.06 in
Dewpoint	30°F (-1°C)
Visibility	10.00 mi
Wind Chill	32°F (0°C)

Last Update on 19 Mar 9:15 am PDT

Current conditions at
Bremerton, Bremerton National Airport (KPWT)
Lat: 47.5 Lon: -122.75 Elev: 440ft.

More Local Wx | 3 Day History | Mobile Weather
Share | Share Share Share Share

TODAY	TONIGHT	WEDNESDAY	WEDNESDAY NIGHT	THURSDAY	THURSDAY NIGHT	FRIDAY	FRIDAY NIGHT	SATURDAY
 60%	 90%	 90%	 50%	 40%	 30%	 30%		
Rain Likely	Rain	Showers	Chance Showers	Chance Showers	Chance Showers	Chance Showers	Chance Showers	Chance Rain
High: 50 °F	Low: 44 °F	High: 50 °F	Low: 37 °F	High: 49 °F	Low: 40 °F	High: 52 °F	Low: 41 °F	High: 51 °F

HAZARDOUS WEATHER CONDITIONS

Special Weather Statement

7-DAY FORECAST

Today	Rain likely, mainly after 2pm. Cloudy, with a high near 50. Calm wind becoming southeast 5 to 8 mph in the morning. Chance of precipitation is 60%.
Tonight	Rain. Low around 44. South wind 8 to 18 mph, with gusts as high as 28 mph. Chance of precipitation is 90%.
Wednesday	Showers. High near 50. Breezy, with a southwest wind 22 to 26 mph, with gusts as high as 40 mph. Chance of precipitation is 90%.
Wednesday Night	A 50 percent chance of showers. Mostly cloudy, with a low around 37. Southwest wind 13 to 21 mph, with gusts as high as 31 mph.
Thursday	A 40 percent chance of showers. Partly sunny, with a high near 49. Southwest wind 13 to 15 mph.
Thursday Night	A 30 percent chance of showers. Mostly cloudy, with a low around 40.
Friday	A 30 percent chance of showers. Partly sunny, with a high near 52.
Friday Night	A chance of showers. Mostly cloudy, with a low around 41.
Saturday	A chance of rain. Mostly cloudy, with a high near 51.
Saturday Night	A chance of showers. Mostly cloudy, with a low around 39.
Sunday	A chance of showers. Mostly cloudy, with a high near 51.
Sunday Night	A chance of showers. Mostly cloudy, with a low around 41.
Monday	A chance of showers. Partly sunny, with a high near 52.

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

NWS Seattle, WA

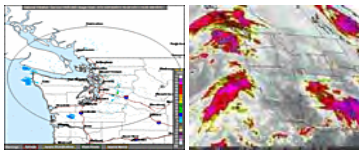
Point Forecast:	Bremerton WA 47.56°N 122.62°W (Elev. 0 ft)
Last Update:	9:16 am PDT Mar 19, 2013
Forecast Valid:	10am PDT Mar 19, 2013-6pm PDT Mar 25, 2013
	Forecast Discussion

KML XML

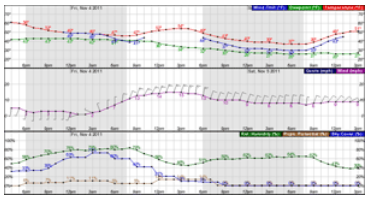
Click Map for Forecast Disclaimer

Requested Location Forecast Area
Lat/Lon: 47.56°N 122.62°W **Elevation:** 0 ft

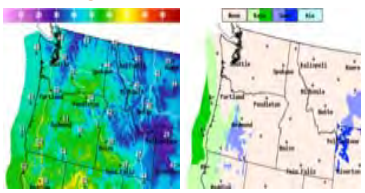
RADAR & SATELLITE IMAGES



HOURLY WEATHER GRAPH



NATIONAL DIGITAL FORECAST DATABASE



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)

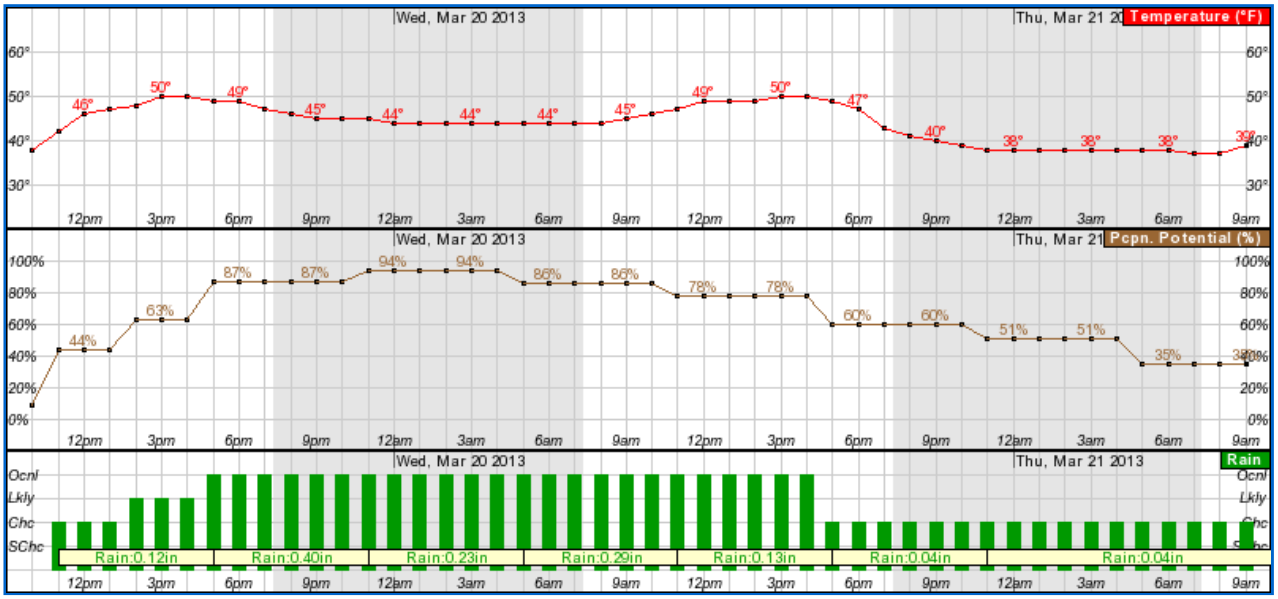
Last Update: 9:16 am PDT Mar 19, 2013

Hourly Weather Forecast Graph

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

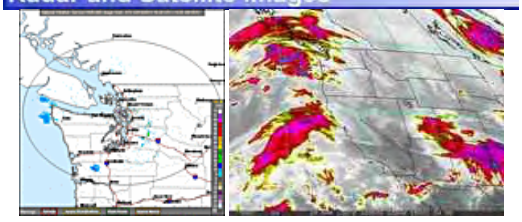
Weather Elements	Weather/Precipitation	Fire Weather
☑ Temperature (°F)	☐ Thunder	☐ Mixing Height (x100ft)
☐ Dewpoint (°F)	☑ Rain	☐ Haines Index
☐ Wind Chill (°F)	☐ Snow	☐ Lightning Activity Level
☐ Surface Wind mph	☐ Freezing Rain	☐ Trans. Wind mph
☐ Sky Coverage	☐ Sleet	
☑ Precipitation Potential		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

48-Hour Period Starting: 10am Tue, Mar 19 2013 Submit Back 2 Days Forward 2 Days



Thursday, March 21 at 8am
Temperature: 37 °F
Precipitation Potential: 35%
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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Warnings and/or Advisories In Effect for this Point:
Special Weather Statement
For warnings and/or advisories in effect for adjacent areas to this point,
see http://www.wrh.noaa.gov/sew

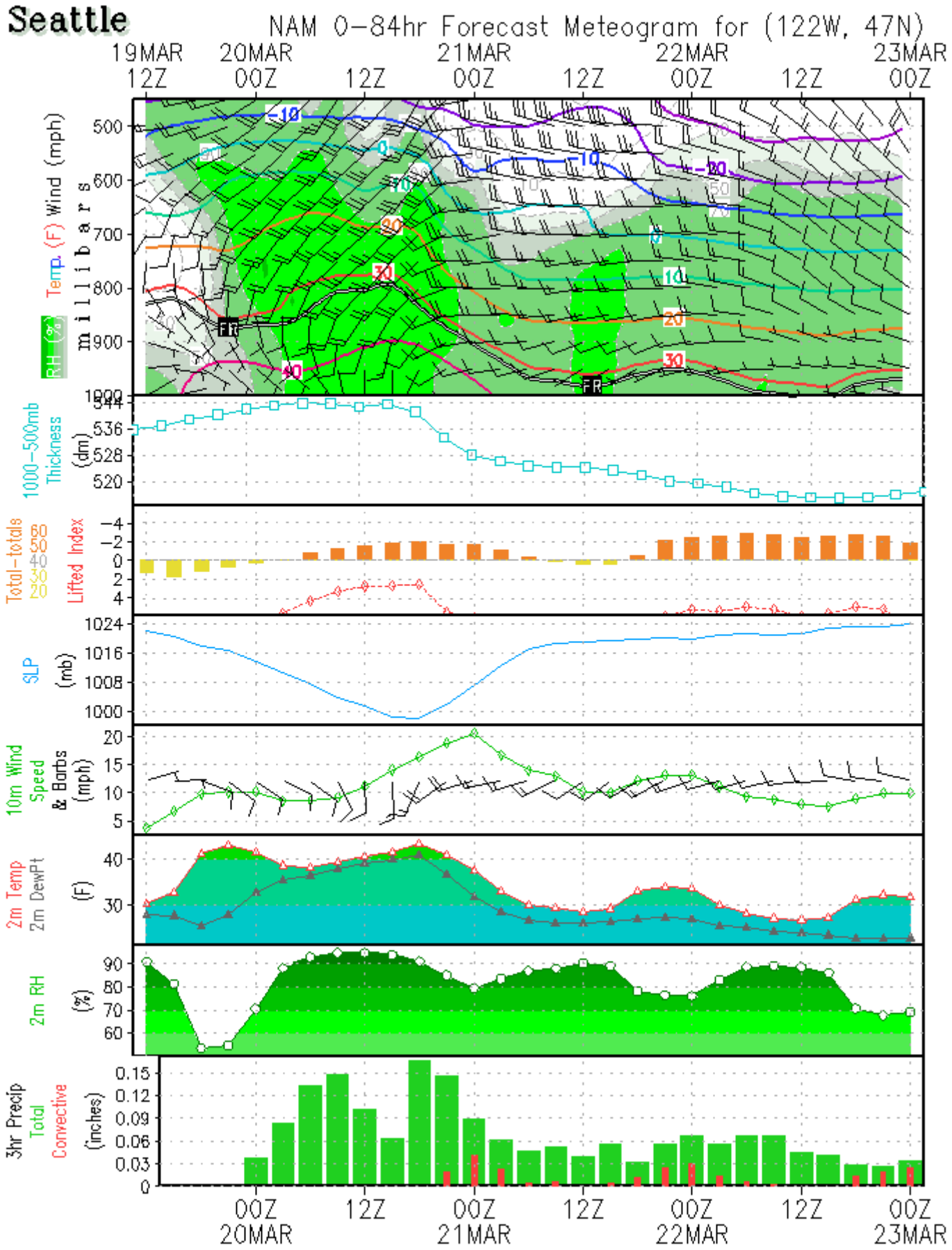
Forecast For Lat/Lon: 47.5620/-122.6230 (Elev. 0 ft)
Bremerton WA

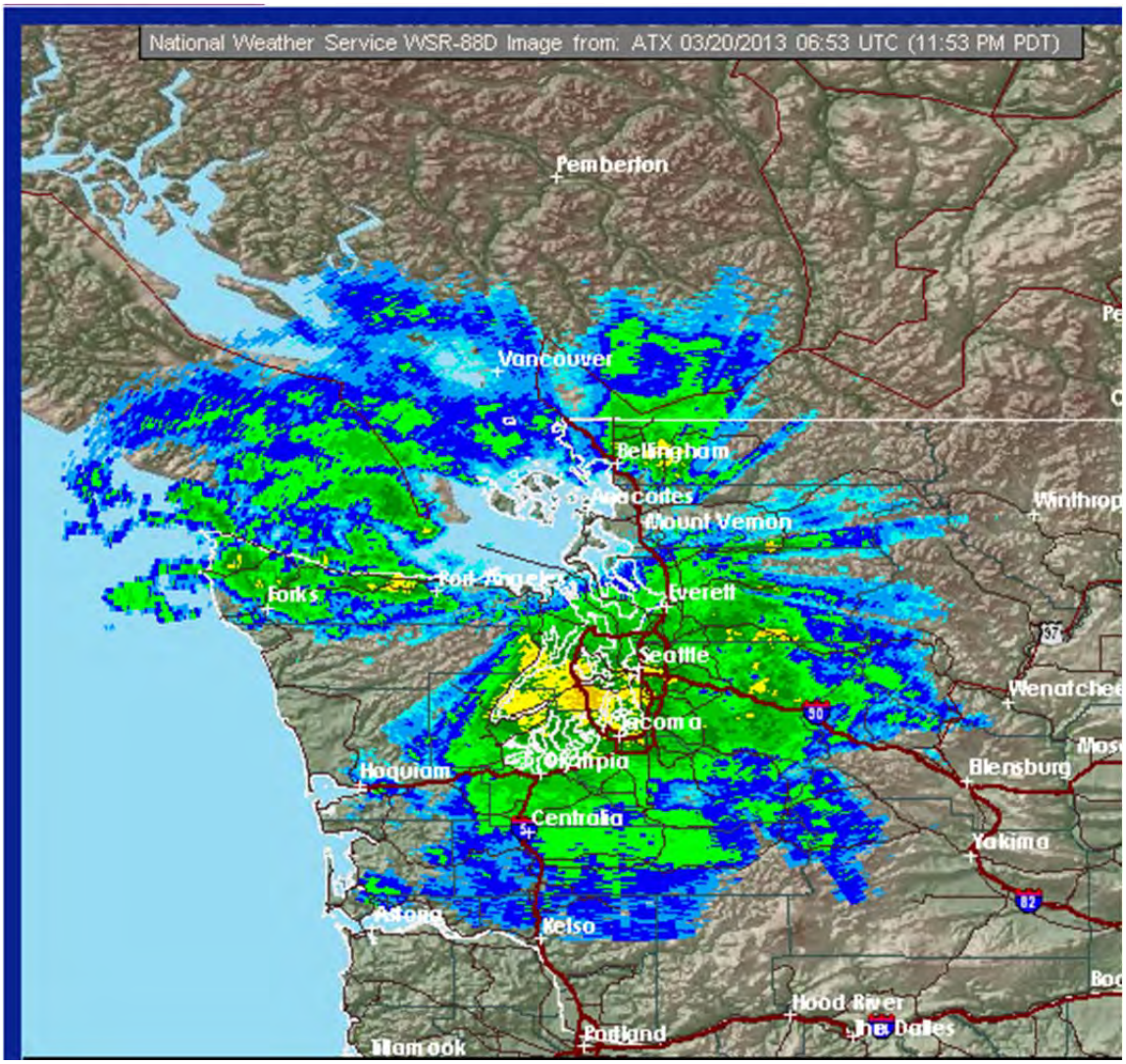
Forecast Created at: 9am PDT Mar 19, 2013

Custom Weather Forecast Table

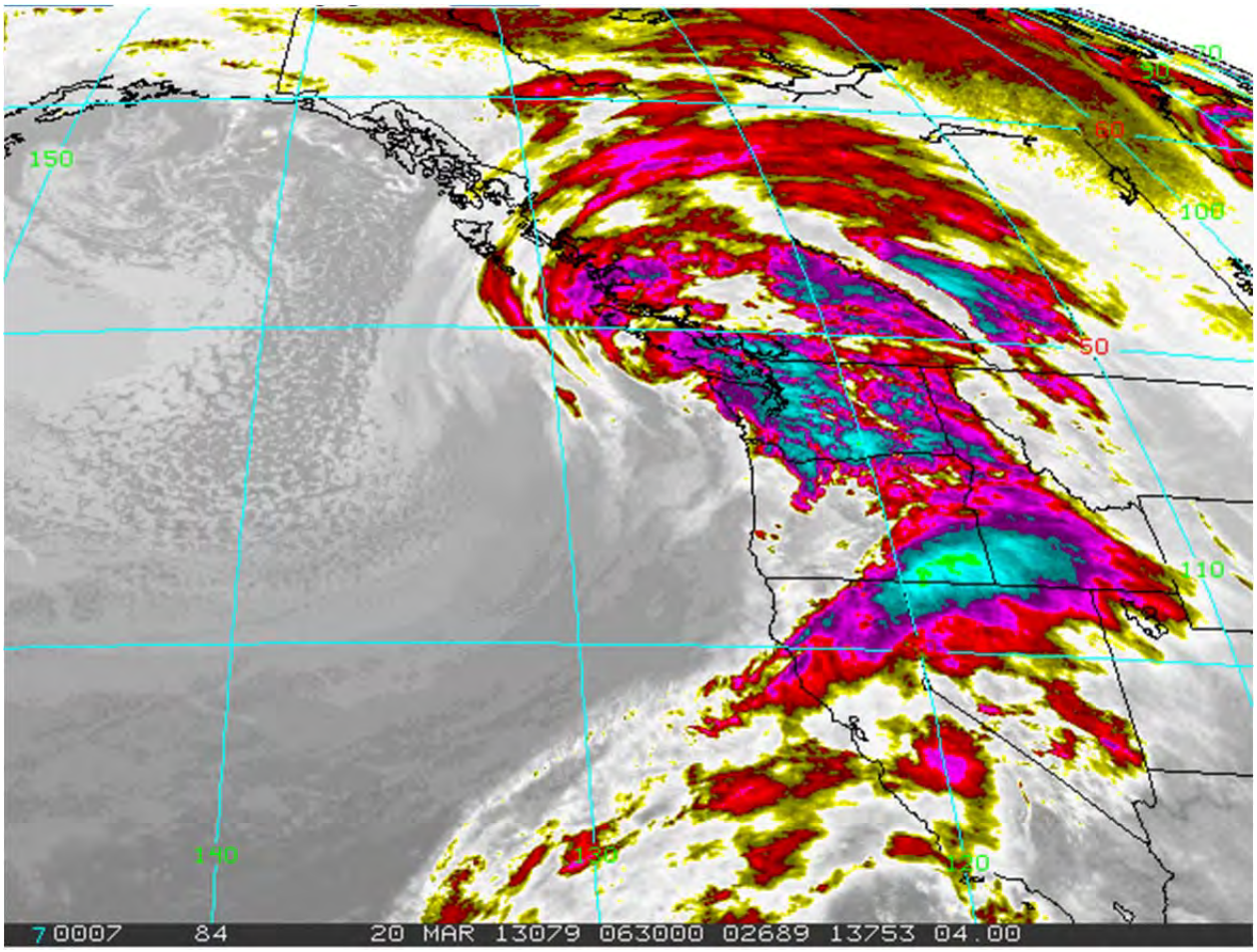
	Tue Mar 19							Wed Mar 20							Thu Mar 21							Fri Mar 22
Weather	Chance Rain		Likely Rain		Rain			Rain Showers and TStorms		Chance Rain Showers and TStorms					Chance Rain Showers							
Daily-Temp			High **50** Low **32**					High **50** Low **44**									High **49** Low **37**					Low **40**
Chance of Precip	10%		45%		85%		95%	85%		80%		60%		50%	35%		35%		30%		30%	
Precip	0.00"		0.06"		0.40"		0.23"	0.29"		0.13"		0.04"		0.02"	0.02"		0.06"		0.04"		0.02"	
12-hr Snow Total		0"				0"			0"				0"					0"				

3-Hour	5am	8am	11am	2pm	5pm	8pm	11pm	2am	5am	8am	11am	2pm	5pm	8pm	11pm	2am	5am	8am	11am	2pm	5pm	8pm	11pm	2am
Temp	33	32	42	48	49	46	45	44	44	44	47	49	49	41	38	38	38	37	44	48	48	43	41	41
Cloudiness	75%	75%	100%	100%	100%	100%	100%	100%	92%	92%	92%	92%	74%	74%	74%	74%	70%	70%	70%	70%	57%	57%	57%	57%
Dewpoint	28	28	34	35	36	37	37	37	38	38	39	38	37	36	36	36	35	35	38	38	37	37	36	36
Relative Humdity	83%	85%	73%	58%	60%	70%	75%	77%	79%	79%	73%	66%	63%	83%	91%	91%	91%	92%	80%	67%	65%	79%	84%	84%
Wind	N 3	N 5	NE 2	SE 8	SE 9	SE 8	S 10	S 18	S 22	S 23	SW 22	SW 26	SW 21	SW 21	SW 13	SW 13	SW 13	SW 13	SW 15	SW 15	SW 3	SW 3	S 6	S 6
Snow Level (ft)	3452	3452	4404	4404	3183	3183	3859	3859	3863	3863	2539	2539	1701	1701	723	723	543	543	1026	1026	1347	1347	1347	1347


Seattle
NAM 0-84hr Forecast Meteogram for (122W, 47N)
19MAR 12Z
20MAR 00Z
20MAR 12Z
21MAR 00Z
21MAR 12Z
22MAR 00Z
22MAR 12Z
23MAR 00Z
Temp. (F) Wind (mph)
RH (%)
millibars
500
600
700
800
900
1000
1000-500mb Thickness (dm)
544
536
528
520
Total-totals
Lifted Index
60
50
40
30
20
-4
-2
0
2
4
SLP (mb)
1024
1016
1008
1000
10m Wind Speed & Barbs (mph)
20
15
10
5
2m Temp
2m DewPt
(F)
40
30
2m RH
(%)
90
80
70
60
3hr Precip
Total
Convective
(inches)
0.15
0.12
0.09
0.06
0.03
0
00Z 20MAR
12Z
00Z 21MAR
12Z
00Z 22MAR
12Z
00Z 23MAR



Seattle radar 3-20-13 (0006), raining hard (0.09/hr) at Shipyard



Satellite picture on 3-20-13 (0011)