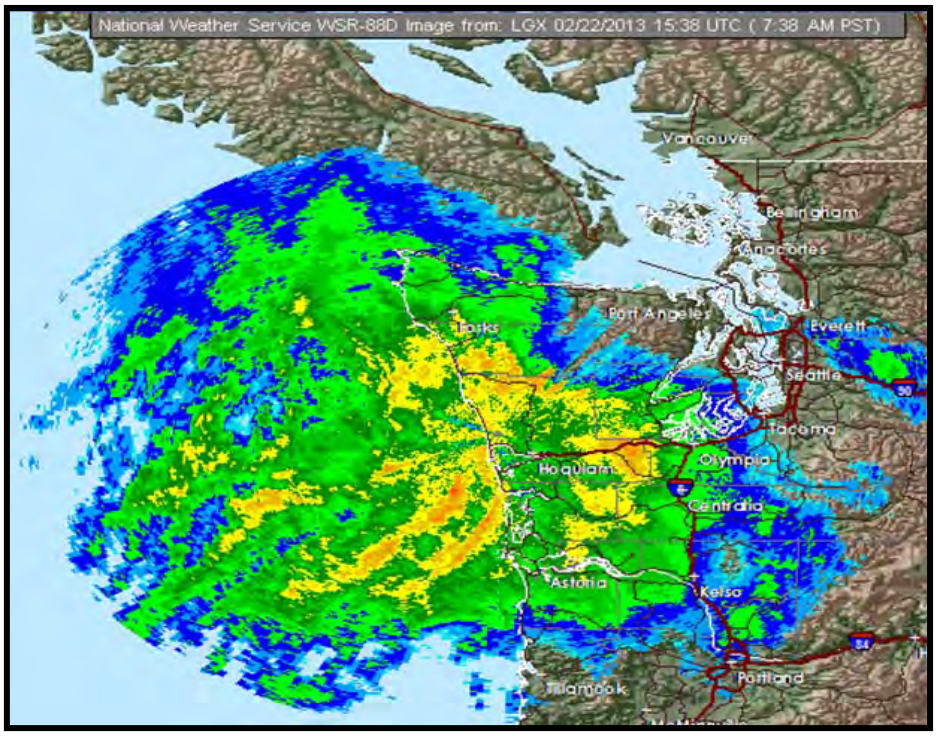
STORM EVENT REPORT SW15
For
Non-Dry Dock Stormwater Monitoring
Conducted at
Puget Sound Naval Shipyard
Bremerton, WA
Project ENVVEST Study Area

February 22, 2013



PNNL Contract No.: N4523A10MP00034 Amendment 2

Cardno TEC
Shaping the Future

Pacific Northwest
NATIONAL LABORATORY

1.0 Introduction

Cardno TEC conducted non-dry dock stormwater sampling event tasks within the Puget Sound Naval Shipyard (PSNS) and adjacent areas within Naval Base Kitsap (NBK); collectively comprising the Project ENVVEST study area, between January 10th and February 22nd 2012. This was the second of three events scheduled for the 2012-2013 project year – referred to hereafter as *Phase III*. Overall, this was the fifteenth stormwater (SW15) sampling event of the project. A summary of the preparatory and sampling event tasks, including site specific conditions, that occurred during SW15 are presented in this report, with supporting information as attachments.

This SW15 Report is organized in the following manner and contains: Section 2, SW15 Event Summary; Section 3, Project Staff Participating in SW15; Section 4, Storm Event SW15 Preparatory Tasks; Section 5, Weather Forecast Information; Section 6, Event Targeting, Precipitation Summary and SW15 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 SW15 Event Summary

Main SW15 details are provided below as a "*Quick Reference*":

- *Event/s Conducted:* SW15
- *Event Date/s:* maint. items; 1/10 through 2/19/13, station prep.; 2/20/13; and storm event tasks occurring between 2/21 and 2/23/13
- *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 2/22/2013 (0445) at PSNS053 and 2/22/13 (0520) at PSNS126, -084.1 and -PB01.
- *Sampling Period Duration Range:* start = 2/22/13 (0747) @ PSNS015 and stop = 2/23/13 (0748) @ PSNS126. Max sampling duration = 23 hrs:44 mins @ PSNS126
- *Sampling Event Rainfall Total:* PSNSB427 = 0.49", PSNS126 = 0.34", PSNS115.1 = 0.29", PSNS084.1 = 0.50", PSNS053 = 0.61", PSNS015 = 0.56" and PSNSPB01 = 0.50"
- *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 (PSNS015) and one composite (PSNS084.1) sample duplicates were collected during the SW15 event.
- *Based on consideration of storm event and sample validation information, were the samples collected during SW15 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 SW15

CardnoTEC:

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

Ian Sahlberg – Field Team Leader

Bruce Beckwith – Field Team Member

Navy Personnel:

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

Eric Mollerstuen – Field Team Member

4.0 Storm Event SW15 Preparatory Tasks

Between the end of the SW14 event (1/10/13) and prior to the start of the preparation tasks for SW15 (2/19/13) general maintenance items (e.g. transducer calibrations, rain gauge maintenance, etc.) were performed at the monitoring stations as appropriate.

On February 18th a targetable rain event was identified. The decision was made by PSNS C106 to continue to track and attempt to collect samples from the pending event. Between February 18th and 20th 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 *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* is attached to this report.

A synopsis of the weather model comparison for SW15 is provided below:

"GFS model: event start = (0000) 2/22, break from 0600-0800, event stop 1200 2/22 with a total event rainfall of 0.27" ; NAM model: event start = (2300) 2/21/13, break between 0001-0008, event stop 1400 2/22 with a total event rainfall of 0.40"; NWS rainfall predications: 0.04 for Thursday 2/21 to 2200, 0.09" from 2200 to 0400 2/22, 0.30" to 1000, 0.24 to 1600, then tailing off after 1600 with about another 0.04 to 0.07 in following hours.

A potentially qualifying storm event was identified and targeted for 2/22/13. The NWS forecasted the event probability from 83% to 96% for Friday 2/22/13, with 24-hour accumulations of between 0.68" and 0.71" into early Saturday morning the 23rd.

The NWS synopsis for the approaching event was as follows:

A vigorous frontal system will move through the area Friday. Expect blustery winds as the Portland-Bellingham gradient gets up to around +11mb and the Olympia-Bellingham (gradient) peaks at 6mb Friday afternoon. Snow will become heavy in the mountains and snow showers behind the front will continue in the cascades and Olympics through Friday night in strong onshore flow and good orographics. The Puget Sound Convergence Zone wind pattern will set up Friday evening with a band of heavy showers possible in the cascades Near highway 2. Southerly winds with the front and post frontal Westerly's will be flirting with speeds that are in the wind Advisory category. Drier northwest flow aloft and some ridging will develop Saturday and Saturday night...breezy onshore flow will ease and scattered showers will decrease.

Based on the weather forecast information available, as summarized above, the decision was made by the Navy to continue preparing for stormwater sample collection. The CardnoTEC Storm Controller coordinated with internal staff, PNNL and Navy personnel regarding schedule, grab and composite collection, 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 SW15 Qualification

Event Targeting:

Final sampler enabling conditions were appropriately set at each monitoring station between (0035) and (0046) on the morning of the 22nd (*sampler ready mode*). Table 1 lists the final enabling conditions at each monitoring station that were used for SW15.

Table 1. Monitoring Station Enabling Conditions

Station	Rainfall (in/hr)	Level (ft)	Conductivity (µS/cm)	Repeatable Enable (Y/N)	Pacing (min)
PSNS126	0.03	0.29	2000	N	15
PSNS115.1	0.03	0.29	2000	Y-cond	15
PSNS084.1	0.03	0.29	2000	N	15
PSNS053	0.03	0.20	2000	N	15
PSNS015	0.03	0.29	2000	N	15
PSNSPB01	0.03	0.24	NA	No	15

[1]Conditions as checked at (~2200) on 2/21/13; final enable conditions set at ~(0040) on 2/22/13

Precipitation Summary:

Between the end previous sampling event (SW14) and the onset of SW15 the average rainfall as measured at the six monitoring stations during this approximately 44 day period was 1.43". The Navy's rain gauge at Build 427 recorded a total of 1.62" during the same period.

Previous rainfall that caused runoff to occur (≥ 0.03" rainfall without 3-hr gap) prior to the onset of SW15 ranged from 34 hours at PSNS126 and -015 to 36 hours at PSNS115.1 and PSNS084.1. These rainfall amounts were measured by each stations rain gauge.

The project defined qualifying antecedent dry period (≤0.1" rainfall in previous 24-hrs and 0.0" rainfall in previous 6-hrs) was met at all of the stations prior to the onset of SW15.

Rain began to fall over the project site between 0445 (PSNS053) and 0520 (PSNS126, -084.1 and -PB01) on February 22nd. Table 2 details the period since last runoff, antecedent duration prior to the start of the storm event, rainfall amounts in the 24 and 6 hour periods prior to the event start, as well as the rainfall start date/time at each monitoring station.

Table 2. Pre-Rain Event Conditions

Station	Last Runoff[1] (Date/Time)	Antecedent Dry Period (Days: Hrs)	Rainfall Prior 24-hrs to Rain Event Start (in)	Rainfall Prior 6-hrs to Rain Event Start (in)	Start of Rainfall (Date/Time)
PSNS126	2/20/13 19:10	1:10	0.01	0.00	2/22/13 5:20
PSNS115.1	2/20/13 17:25	1:12	0.00	0.00	2/22/13 5:15
PSNS084.1	2/20/13 17:50	1:12	0.01	0.00	2/22/13 5:20
PSNS053	2/20/13 18:00	1:11	0.00	0.00	2/22/13 4:45
PSNS015	2/20/13 18:25	1:10	0.00	0.00	2/22/13 4:50
PSNSPB01	2/20/13 18:00	1:11	0.00	0.00	2/22/13 5:20

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

Operational checks were conducted via telemetry throughout the day and evening of February 21st and the morning of the 22nd, 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 0.29” at PSNS115.1 to 0.61” at PSNS053. The Navy’s rain gauge at B427 recorded 0.49” over the entire combined length of the sampling period for all project monitoring stations.

Sampling routines at all of the project monitoring stations either ran their courses or were manually stopped via telemetry between 0620 and 0830 on February 23rd, 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 23:44(hrs:mins) at PSNS126 to 8:59(hrs:mins) at PSNSPB01.

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

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

Station	Sampling Period Start (Date/Time)	Sampling Period End (Date/Time)	Sampling Period Duration (Hrs:Mins)	Total Sampling Period Rainfall (in)
PSNS126	2/22/13 8:04	2/23/13 7:48	23:44	0.34
PSNS115.1	2/22/13 8:05	2/22/13 22:05	14:00	0.29

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	2/22/13 8:25	2/23/13 6:09	21:44	0.50
PSNS053	2/22/13 8:10	2/23/13 6:09	21:59	0.61
PSNS015	2/22/13 7:47	2/23/13 6:01	22:14	0.56
PSNSPB01	2/22/13 7:50	2/22/13 16:49	8:59	0.50
[1]B427	2/22/13 7:47	2/23/13 7:48	24:01	0.49

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

SW15 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 SW15 qualification criteria listed above.

7.0 Sampling Information, Management and Validation

Grab Sampling:

Grab sample collection was lead and performed by the Navy Team, with storm control assistance (limited to station status checks via telemetry) from CardnoTEC as necessary. Grab sampling was conducted at all of the monitoring stations, except PSNS053. 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 1605 (PSNS126) and 1820 (PSNS015) on 2/22/2013. 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

Sample Collection Criteria:	PSNS126	PSNS115.1	PSNS084.1	PSNS053	PSNS015	PSNSPB01
Grab sample ID	SW15-0001	SW15-0003	SW15-0004	NA	SW15-0006	SW15-0002

Table 4. Grab Sampling Information

Sample Collection Criteria:	PSNS126	PSNS115.1	PSNS084.1	PSNS053	PSNS015	PSNSPB01
Grab Date /Time	2/22/2013 16:05	2/22/2013 17:25	2/22/2013 17:55	NA	2/22/2013 18:20	2/22/2013 17:00
Grab sample conductivity value (μS/cm)	1809	77	1592	NA	259	60
Hydrograph stage at grab collection	Elevated Flow	Falling Limb	Falling Limb	NA	Falling Limb	Elevated Flow
Grab parameters collected per PSNS PWPA?	Yes	Yes	Yes	NA	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 C106 Stormwater Lab at B147 for processing. Composite formulation occurred between 0900 and 1130 on February 23rd. 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

Sample Collection Criteria:	PSNS126	PSNS115.1	PSNS084.1	PSNS053	PSNS015	PSNSPB01
Composite sample ID	SW15-0012	SW15-0011	SW15-0009	SW15-0008	SW15-0013	SW15-0014
Composite Date /Time	2/22/2013 16:33	2/22/2013 17:49	2/22/2013 18:09	2/22/2013 15:24	2/22/2013 18:31	2/22/2013 16:49
Overall Composite conductivity value (µS/cm)	239	107	424	62	143	186
Overall Composite turbidity value (NTU)	23	11	19	14	18	16
Composite volume (ml)	7,000	8500	5,000	7,000	9,200	8,000
Number of Bottles Collected During Sampling Event	16	14	11 (2-hr sets)	12	23	10
Number of Bottles Included in Composite Sample	9	10	6 (2-hr sets)	8	11	10
Percentage of Total Sampling Period that Freshwater Conditions Occurred	56%	71%	55%	67%	48%	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 PSNSPB01. 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 PSNSPB01 is further explained in Section 11 of this report.

QC Samples:

During SW15 duplicate grab and composite samples, one of each, were collected at PSNS015 and PSNS084.1, 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 SW15.

Table 6. Summary of Quality Control Sampling Information for SW15

Sample Collection Criteria:	PSNS015	PSNS084.1
Grab sample duplicate ID	SW15-0007	
Grab sample duplicate date and time	2/22/2013 18:30	

Table 6. Summary of Quality Control Sampling Information for SW15

Sample Collection Criteria:	PSNS015	PSNS084.1
Grab sample duplicate conductivity value (µS/cm)	259	
Composite sample Duplicate ID		SW15-0010
Composite sample duplicate date and time		2/22/2013 18:09
Overall Composite Duplicate conductivity value (µS/cm)		445
Overall Composite Duplicate turbidity value (NTU)		19
Composite Duplicate volume (ml)		5,000

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 C106 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 February 23rd, 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 SW13 sampling period were calculated for each of the basins associated with the six Phase III monitoring stations. These calculations are based on the modified Runoff Coefficient Method (RCM) as described in Section 7.4 of the 2012-13 PWPA.

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

Table 7. Runoff Calculations for SW15

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	0.34	0.0283	125,448
	Pervious	9,613	0.4				
115.1	Impervious	449,104	0.9	409,792	0.29	0.0242	74,082
	Pervious	13,938	0.4				
84.1	Impervious	23,958	0.9	21,562	0.50	0.0417	6,721
53	Impervious	209,720	0.9	190,460	0.61	0.0508	72,424
	Pervious	4,280	0.4				
15	Impervious	2,009,431	0.8	2,411,321	0.56	0.0467	841,770
	Pervious	2,009,431	0.4				
PB01	Impervious	130,681	0.9	117,613	0.50	0.0417	36,659

9.0 Descriptive Statistics and Discussion of Event Station Monitoring Data

Descriptive statistics for the SW15 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	0.13	270	2.00	6.39	6.59
	Max	0.11	2.03	1,251	2.00	9.83	9.98
	Average	0.03	0.88	410	2.00	8.03	8.28
	Median	0.01	0.44	361	2.00	7.85	8.29
	Storm Total	**0.34**					
PSNS115.1	**Min**	0.00	5.44	44	2.00	6.42	5.63
	Max	0.09	9.17	816	2.00	8.99	9.98
	Average	0.03	7.42	112	2.00	7.69	8.11
	Median	0.00	7.28	74	2.00	7.92	8.00
	Storm Total	**0.29**					
PSNS084.1	**Min**	0.00	0.30	209	2.00	7.57	4.35
	Max	0.15	5.38	5,262	2.92	23.54	9.98
	Average	0.04	3.50	692	2.01	10.04	7.99
	Median	0.03	3.49	342	2.00	10.45	8.00
	Storm Total	**0.50**					
PSNS053	**Min**	0.00	0.08	112	2.00	6.78	6.59
	Max	0.19	4.19	378	2.00	54.50	9.98
	Average	0.07	2.33	161	2.00	11.68	8.29
	Median	0.06	2.95	132	2.00	8.08	8.38
	Storm Total	**0.61**					
PSNS015	**Min**	0.00	0.45	57	2.00	6.60	3.66
	Max	0.18	6.13	2,930	2.34	11.36	9.98
	Average	0.04	4.11	187	2.00	8.30	7.81
	Median	0.00	4.06	76	2.00	8.42	7.69
	Storm Total	**0.56**					
PSNSPB01	**Min**	0.00	0.21	118	NA	6.32	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	0.16	0.75	826	NA	8.97	NA
	Average	0.05	0.44	278	NA	7.36	NA
	Median	0.03	0.46	186	NA	7.40	NA
	Storm Total	**0.50**					

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

Hydrograph Assessment:

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

PSNS126, -115.1, -084.1 and -015: Due to the smaller rainfall amounts generated during SW15, water levels in the various pipes more closely mirrored daily tidal fluctuations. Freshwater storage in the piping systems was noted, as during past events, in the examination of the conductivity/salinity graphs. Temperature signatures at these stations showed a decrease with the inflow of rainwater runoff, but then steadily increase as tide levels rebounded and as rainfall tailed off.

PSNS053: 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. During SW15 this stations' pipe water level did not track with the tide hydrograph. Conductivity remained fairly constant, <150 µS/cm, for the majority of the rainfall event. A curious hour-long spike in conductivity (~400 µS/cm) is noted as the pipe water level hydrograph shows its initial maximum response to rainfall - indicating a flushing of material through the system. The conductivity climbs once rainfall ceases, causing concentrations to increase in the remaining runoff. Temperature remains constantly low throughout the runoff event, rising sharply once the rainfall ends.

PSNSPB01: Since PSNSPB01 is not directly connected to Sinclair Inlet it is not tidally influenced. Water levels for both the vault interior (filter chamber) and the sump (collection point for the under-drain system) are shown on the station hydrograph. Canister filter cycles are noted in the vault level 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 surges with the initial onset

of runoff through the system (peaking around 850 µS/cm), but decreases as the storm event and the rainfall intensity wanes. During the majority of the rainfall event, conductivity values remained below 400 µS/cm. A (minor) sharp decrease in the conductivity value around 1330 on 2/22/13 indicates the point at which the water level in the sump has dropped below the sensor window.

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.

10.0 Telemetry Data Summary Report: (TDSR)

A review of the telemetry data collected at all six project monitoring stations since the end of SW14 (1/10/13 0000) to a point just shortly after SW15 (2/24/13 0000) was conducted.

There were some minor and/or generally acceptable anomalies in nearly all of the station data sets. Overall, data gaps and other anomalies were not noted, or were of non-significance, during the actual SW15 storm event period (2/21 - 2/22/13). All sensors were in reasonable and accurate operation during the SW15 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 1/10/2013 to 2/24/2013

Site	Parameter	Issue	Start Date/Time	End Date/Time	G.A.R Level of Concern	Comments
15	All	None	1/10/2013 0:00	2/24/2013 0:00	Green	Data set 100% complete for evaluation period
53	Temperature	>20°C	2/22/13 15:15	2/22/2013 17:25	Amber	27 anomalous high temperature readings. Exact cause unknown. Possible steam condensate influence from nearby vault. Anomalies began near very end of sampling period.
PB01	Temperature	Missing value	2/22/2013 12:45	2/22/2013 12:50	Green	1 Missing temp value, unknown cause
PB01	Conductivity	Missing value	2/22/2013 12:45	2/22/2013 12:50	Green	1 Missing cond value, unknown cause
PB01	Level	Missing value	2/22/2013 12:45	2/22/2013 12:50	Green	1 Missing level value, unknown cause
84.1	Level	Negative values	1/11/2013 0:00	1/21/2013 23:00	Amber	657 negative level values, ranging from -0.261 to -0.001, all occurring during periods of no rainfall. Likely caused by slight calibration deviation during this period
84.1	Temperature	>20°C	1/10/2013 0:00	2/24/2013 0:00	Amber	4106 anomalous high temperature readings throughout review period data set. Exact cause unknown. Field confirmation of these high temperatures has been noted. None occurred during SW15 sampling period.
115.1	All	Data Gap	1/22/2013 19:05	1/26/2013 1:05	Amber	6 data gaps were identified where all data was effected. Cause unknown.
115.1	Temperature	Missing value	1/22/2013 17:55	1/22/2013 19:25	Amber	16 missing temperature values over the listed range. Cause due to maintenance activities.

Table 9. TDSR- QA/QC Data Review from 1/10/2013 to 2/24/2013

Site	Parameter	Issue	Start Date/Time	End Date/Time	G.A.R Level of Concern	Comments
115.1	Salinity	Missing value	1/22/2013 17:55	1/22/2013 19:30	Amber	17 missing salinity values over the listed range. Cause due to maintenance activities.
126	All	Data Gap	1/10/2013 0:55	1/26/2013 1:05	Green	4 data gaps were identified where all data was effected. Cause unknown.
126	Salinity	Null data	1/10/2013 4:30	1/22/2013 14:55	Amber	11 null records where corresponding conductivity values should have generated a positive salinity calculation - cause unknown

Table 10. TSDR - Data Set Summary Statistics from 1/10/2013 to 2/24/2013

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	12961	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	100.0%
53	12961	0	0.0%	0	0.0%	27	0.2%	0	0.0%	0	0.0%	99.8%
PB01	12961	0	0.0%	1	0.0%	1	0.0%	1	0.0%	0	0.0%	100.0%
[1]84.1	12961	0	0.0%	657	5.1%	4106	31.7%	0	0.0%	0	0.0%	63.3%
115.1	12957	6	0.0%	0	0.0%	16	0.1%	0	0.0%	17	0.1%	99.7%
126	12959	4	0.0%	0	0.0%	0	0.0%	0	0.0%	11	0.1%	99.9%

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

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

There were two notable field anomalies that occurred during SW15. These were; 1) grab samples were not collected at PSNS053 and, 2) a power failure at PSNSPB01. These field anomalies are further described below;

- Grab samples were not collected from PSNS053 due to low water (flow) conditions within the pipe during the attempted collection time. The Navy may elect to re-collect additional grab samples from this location during a future rain event - independent from composite sample collection.
- It was noted that a power failure had occurred at PSNSPB01 around the tail end of the storm event. The bottle position at the time of the power failure was coincident with the hydrograph returning to base flow at this station. The issue did not adversely affect the collection or representation of the composite 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 SW15 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. 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

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

Non-routine action items include assessing and correcting the power failure issue associated with PSNSPB01, assess a minor formatting glitch with the PSNS115.1 autosampler report output and maintenance of the Navy's rain gauge atop B427.

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

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

Page Intentionally Left Blank

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 #15 (2/22/13)

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) #	15
Event Forecast Probability (%)	96%
PSNS B427 Rain Gauge - Sample Event Total (in.)	0.49

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)	2/20/13 19:10	2/20/13 17:25	2/20/13 17:50	2/20/13 18:00	2/20/13 18:25	2/20/13 18:00
Antecedent Dry Period (days: hrs)	1:10	1:12	1:12	1:11	1:10	1:11
Rainfall Prior 24-hrs to Rain Event Start (in)	0.01	0.00	0.01	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)	2/22/13 5:20	2/22/13 5:15	2/22/13 5:20	2/22/13 4:45	2/22/13 4:50	2/22/13 5:20
Sampling Period Start Date & Time	2/22/13 8:04	2/22/13 8:05	2/22/13 8:25	2/22/13 8:10	2/22/13 7:47	2/22/13 7:50
Sampling Period End Date & Time	2/23/13 7:48	2/22/13 22:05	2/23/13 6:09	2/23/13 6:09	2/23/13 6:01	2/22/13 16:49
Sampling Period Duration (hrs:mins)	23:44	14:00	21:44	21:59	22:14	8:59
Sampling Period Duration (hours)	23.73	14.00	21.73	21.98	22.23	8.98
Sampling Period Total Rainfall (in)	0.34	0.29	0.50	0.61	0.56	0.50
Sampling Period Max 1-hr Rainfall Intensity (in/hr)	0.11	0.09	0.15	0.19	0.18	0.16
Sampling Period Average 1-hr Rainfall Intensity (in/hr)	0.03	0.03	0.04	0.07	0.04	0.05
Runoff volume calculated for sampling period (gallons)	125,448	74,082	6,721	72,424	841,770	36,659
[1] *Sample Collection Criteria:*						
Grab sample ID	SW15-0001	SW15-0003	SW15-0004	NA	SW15-0006	SW15-0002
Grab Date /Time	2/22/2013 16:05	2/22/2013 17:25	2/22/2013 17:55	NA	2/22/2013 18:20	2/22/2013 17:00
Grab sample conductivity value (µS/cm)	1809	77	1592	NA	259	60
Hydrograph stage at grab collection	Elevated Flow	Falling Limb	Falling Limb	NA	Falling Limb	Elevated Flow
Grab parameters collected per PSNS PWP ?	Yes	Yes	Yes	NA	Yes	Yes
Composite sample ID	SW15-0012	SW15-0011	SW15-0009	SW15-0008	SW15-0013	SW15-0014
Composite Date /Time	2/22/2013 16:33	2/22/2013 17:49	2/22/2013 18:09	2/22/2013 15:24	2/22/2013 18:31	2/22/2013 16:49
Overall Composite conductivity value (mS/cm)	239	107	424	62	143	186
Overall Composite turbidity value (NTU)	23	11	19	14	18	16
Composite volume (ml)	7,000	8500	5,000	7,000	9,200	8,000
Number of Bottles Collected During Sampling Event	16	14	11 (2-hr sets)	12	23	10
Number of Bottles Included in Composite Sample	9	10	6 (2-hr sets)	8	11	10
Percentage of Total Sampling Period that Freshwater Conditions Occurred	56%	71%	55%	67%	48%	100%
Composite parameters collected per PSNS PWP ?	Yes	Yes	Yes	Yes	Yes	Yes
[1] *QC Sample Summary Information:*						
Grab sample duplicate ID	NA	NA	NA	NA	SW15-0007	NA
Grab sample duplicate date and time	NA	NA	NA	NA	2/22/2013 18:30	NA
Grab sample duplicate conductivity value (µS/cm)	NA	NA	NA	NA	259	NA
Composite sample duplicate ID	NA	NA	SW15-0010	NA	NA	NA
Composite sample duplicate date and time	NA	NA	2/22/2013 18:09	NA	NA	NA
Overall Composite Duplicate conductivity value (µS/cm)	NA	NA	445	NA	NA	NA
Overall Composite Duplicate turbidity value (NTU)	NA	NA	19	NA	NA	NA
Composite Duplicate volume (ml)	NA	NA	5,000	NA	NA	NA
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.

Validation Check List Completed By: Dave Metallo **Reviewed By / Date:** Curtis Nickerson 4/4/2013

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

Date:	2/21/2013			**Sampling Support Personnel:**	Metallo, Sahlberg, Beckwith
STE#	15	**Antecedent Dry Cond. Met ?**	Yes	**Tidal Info:**	2013-02-21 03:36 PST 10.78 feet High Tide, 09:09 PST 7.04 feet Low Tide, 13:30 PST 9.88 feet High Tide, 20:29 PST 0.92 feet Low Tide; 2013-02-22 04:05 PST 11.13 feet High Tide; 09:45 PST 6.53 feet Low Tide, 14:22 PST 10.10 feet High Tide, 21:11 PST 0.61 feet Low Tide
Storm Controller:	Dave Metallo			**Grab sampling Info.**	PSNS C/106; Johnston & Mollerstuen
Pre-Storm / Weather Details:	GFS: event start = (0000) 2/22, break from 0600-0800, event stop 1200 2/22 with a total event rainfall of 0.27" ; NAM: event start = (2300) 2/21/13, break between 0001-0008, event stop 1400 2/22 with a total event rainfall of 0.40"; NWS rainfall predications, 0.04 for Thursday 2/21 to 2200, 0.09" from 2200 to 0400 2/22, 0.31" to 1000, 0.40 to 1600, then tailing off after 1600 with about another 0.05 to 0.1 in following hours.				

Telemetry Measurements:	**DATE/TIME (24HR)**												
STATION:	2-21-13 (1240)	(~2200)	2-22-13 (0050)	0735	0811	~1230	1605	2-23-13 (0620-0830)	0620-0830				
PSNS015 Rain[1]	.08/0.0	.02/0.0	.01/0.0	.06/.02		.61/.06	.64/0.0	.61/0.0	Stopped smplr via telem.				
PSNS015 Level		0.2	2.95	3.95		4.87	5.22	5.95					
PSNS015 Cond.		40	41555	4500		71	134	41,780					
Smpl Marker	0	0	0	0	2	19	33	90					
PSNS084.1 Rain	.07/0.0	.02/0.0	.02/0.0	.05/.02		.56/.06	.60/0.0	.64/0.0	Stopped smplr via telem.				
PSNS084.1 Level		0.29	2.18	3.05		4.15	4.41	5.16					
PSNS084.1 Cond.		1,513	45,500	44,000		277	955	46,000					
Smpl Marker	0	0	0	0	~0830	16	31	88					
PSNS115.1 Rain	.04/0.0	.01/0.0	.01/0.0	.03/.01		.32/.03	.33/0.0	.25/0.0	Smplr Prgm Ended				
PSNS115.1 Level		0.08	6.14	7.02		8.02	8.19	6.32					
PSNS115.1 Cond.		13	44,460	485		44	64	26,500					
Smpl Marker	0	0	0	0	1	18	33	48					
PSNS053 Rain	.08/0.0	.02/0.0	.01/0.0	.07/.03		.67/.06	.71/0.0	.67/0.0	Stopped smplr via telem.				
PSNS053 Level		0.01	0.01	0.03		3.16	0.08	0.08					
PSNS053 Cond.		97	97	167		116	126	43,330					
Smpl Marker	0	0	0	0	1	17	32	89					
PSNS126 Rain	.06/0.0	.01/0.0	.01/0.0	.03/.01		.37/.03	.39/0.0	.28/0.0	Smplr Prgm Ended				
PSNS126 Level		0.11	0.12	0.17		0.76	1.01	0.12					
PSNS126 Cond.		247	247	645		294	572	250					
Smpl Marker	0	0	0	0	1	18	32	96					
PSNS PB01 Rain	.07/0.0	.02/0.0	.01/0.0	.05/.01		.54/.05	.57/0.01	.54/0.0	Stopped smplr via telem.				
PSNS PB01 Level		0.17	0.17	0.29		0.47	0.21	0.17					
PSNS PB01 Cond.		118	118	118		183	118	118					
Smpl Marker	0	0	0	0	1	19	33	42					

[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:	2/21/2013		**Sampling Support Personnel:**	Metallo, Sahlberg, Beckwith	
STE #	15	**Storm Controller:**	Dave Metallo	**Strm Evnt Start / Stp**	Event began around (0450) 2/22, rain ended approx 1300 2/22, sampling ended approx 1800 2/22

Enabling Information:

Sample Staion:	PSNS126		PSNS115.1		PSNS084.1		PSNS053		PSNS015		PSNSPB01		
Rain enable (in/hr)	0.05	0.03	0.05	0.03	0.05	0.03	0.05	0.03	0.05	0.03	0.05	0.03	
Level Enable (ft)	50	0.29	50	0.29	50	0.29	50	0.2	50	0.29	50	0.24	
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	No	No	
Pacing Rate (min)	15	15	15	15	15	15	15	15	15	15	15	15	
Logger Batt Vdc	12.5	12.47	12.81	12.54	13.45	12.71	12.49	12.34	12.51	12.21	12.59	12.32	
Sampler Batt Vdc	12.74	12.74	12.74	12.73	12.63	12.62	12.7	12.69	12.53	12.53	12.62	12.61	
Pre-event Smpl Mrk Value	0	0	0	0	0	0	0	0	0	0	0	0	
Date	19-Feb	22-Feb	19-Feb	22-Feb	19-Feb	22-Feb	19-Feb	22-Feb	19-Feb	22-Feb	19-Feb	22-Feb	
Time	1400	0038	1400	0040	1400	0042	1400	0044	1400	0046	1400	0035	

Comp Dup ? / where:	Yes - PSNS084.1	**Grab Dup ? / where:**	Yes - PSNS015

EVENT NOTES:

1. Stations setup from 0930 - 1400 on 2/19, rain gauges were also checked (except at PSNS126)
2. Storm is upon PSNS, but very weak, no stations kicked yet as of 0735 2-22-13
3. Storm has intensified after 1000, check the 1230 rain totals , 2/22/13
4. Storm is all but over at this point, however, freshwater surface runoff is still occurring , 2/22/13 (1605)
5. Approx 0630 started shutting down each sampler via telemetry, storm long over and tide high, 2/23/13
6. PB01 - discovered that we had a power failure around bottle 10 (1700, 2-22-13), believe to have collected at least through storm period.

Cardno TEC
Shaping the Future

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

ver.113012

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

pages per station

Section 1. Station Reset and Inspection

Personnel: Metallo, Sahlberg	Weather: Overcast, 40°s, strg breeze	Arrival Date/Time: 2/20/13 (1115)	
Carry-over maintenance to do prior to set-up:	Full Re-sets		done? N
Sampler Battery Voltage	Fresh	Changed? (Y) N	New voltage ~~12.98~~ 12.92
Modem Battery Voltage	12.21 swap (1) of (2)	Changed? (Y) N	New voltage ~~12.71~~ 12.71
Sample Tubing & Strainer OK?	Yes	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	NO, -1 min
Trands. Cable OK?	OK	Internal Sampler Tubing OK?	OK
Trands. Desiccant OK (Yes/No)	OK, change next visit	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* NA *Mount OK* NA *Wiring* Yes		Lid Status?	Off
Funnel/Throat Clean NA *Buckets clean/ed* NA *Tips During Maint.* 0		Backflushed with DI?	Yes
Notes (including channel condition):		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen..	ON

Section 2. Storm Setup and Inspection

Personnel: Metallo, Sahlberg	Weather:	Arrival Date/Time: Same as above	
Sampler Battery Voltage	12.92	Changed? Y N	New voltage —
Modem Battery Voltage	12.71	Changed? Y N	New voltage —
Sample Tubing & Strainer OK?	Yes	**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	-1 min, D'ed
Transducer Cable OK?	OK	Aliquot Vol. Cal.'ed (Y/N & vol.)	Yes @ 240 ml
Multi-meter Cable OK	NA	Program Reviewed (Yes/No), Dup ?	Yes, normal
Recorded Level (FT)	0.67'	Lids off bottles?	Off
Measured Level (FT)	0.72	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT)	0.05	Backflush with DI?	Yes
Level Adjusted ?	Yes, -0.18 offset	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	INW	Last screen... Prgm Disabled	11:29 Wed 20 Feb

Cond. Sonde Cal. Info. : Recorded Val. = 2.97 Meas. Val. = NA Diff. = NA (>10% adj. offset); Offset = New Rec Val =

Notes: (e.g. enabling values, cond cal. meter make/model/ser#, etc.) 9.84 9.03 / 0.76 9.04 9.84 9.17 0.72 New lvl offset = ~~0.20~~ 0.18 = 0.18

Section 3. Grab Sample Collection

Personnel: Tamsta. / Millerstrom	Weather: Sunny	Arrival Date/Time: 1600	
On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	1809
Grab Parameters Collected	TPH / FC	Salinity Reading (PPT):	0.9
Grab Sample ID	SW150rab-001 A & B	Temp. Reading (°C):	9.7
Grab Date/Time	1/22/13 1605	Turbidity Reading (NTU)	10.79
Grab Dup ID		Equipment running correctly?	yes
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?: Everything OK			
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 Bench Turbidity Meter Heroid Sampler Running

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	Page: 2 of 2

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

Personnel: Sahlberg Beckwith	Weather: Sunny, 40°s	Arrival Date/Time: 2-23-13 (0830)	
Sampler Battery Voltage	Good	Changed? (Y) N Pulled	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)	2-22-13 (0804)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	2-23-13 (0748) BTL 24 4/4		
Total Composite Sample Volume Collected	100% except at BTLS 10-17, 18 partial		
Aliquots missed/NLD (date/time/bott #/aliq #)	Missed (NL) BTL 9 4/4 → 18 3/4 & 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: Sampler prgm ran fine – NO issues, ran its full 24btl course			
Maintenance Needed: Full Re-Set			

Section 5. Compositing Scheme and QC Sampling

Personnel: Metallo, Sahlberg, Beckwith		Date/Time: 2-23-13 (1035)	
Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)			
YSI EC-300 (Ser# JC02275) MicroTPI (Ser# 20110925) 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. 426/53/ Y	7. 212/15/ Y	18-24 Not ~~tested~~	
2. 158/31/ Y	8. 214/14/ Y	too long after	
3. 116/20/ Y	9. 554/11/ Y	rain end &	
4. 187/23/ Y	10. empty	~~btls 18~~ cond. v.	
5. 104/24/Y	11-17 empty	likely too high	
6. 273/18/Y			

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

Used btls 1-9 (btl 9 had only 3/4 aliquots) 10 was empty as were 11-17.
BTLs 18-24; contents were too high for cond. & too long after storm

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

Cond = 239 µS/cm Turb = 23 NTU Vol. = ~7000 ml Analysis per PWPA

Composite Sample ID & Time:	SW15-0012 (1633) 2-22-13
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

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

ver.113012

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

pages per station

Section 1. Station Reset and Inspection

Personnel: Metallo, Sahlberg	Weather: Overcast, 40°s	Arrival Date/Time: 2/20/13 1035	
Carry-over maintenance to do prior to set-up: Full Re-set		done? N	
Sampler Battery Voltage	Fresh	Changed? (Y) N	New voltage 12.50
Modem Battery Voltage	12.84	Changed? Y (N)	New voltage 12.84
Sample Tubing & Strainer OK?	Yes	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	N - 2min
Trands. Cable OK?	Yes	Internal Sampler Tubing OK?	Y - reset counter
Trands. Desiccant OK (Yes/No)	OK - Next time	Tubing Replaced? (Yes/No)	No
Telem. Box Desiccant OK (Yes/No)	Yes - good	Normal Smpler Program or Dup. ?	Normal
Modem Status	Operational	Bottles Loaded ?	Yes
Rain Gauge Maint.: Leveled Y Mount OK Y Wiring Y		Lid Status?	Off
Funnel/Throat Clean Y Buckets clean/ed Y Tips During Maint. 0		Backflushed with DI?	Yes
Notes (including channel condition):		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen..	ON

Section 2. Storm Setup and Inspection

Personnel: Metallo, Sahlberg	Weather:	Arrival Date/Time:	Same as above
Sampler Battery Voltage	Fresh	Changed? (Y) N	New voltage 12.50
Modem Battery Voltage	12.84	Changed? Y (N)	New voltage
Sample Tubing & Strainer OK?	Yes	**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	N - 2min Used
Transducer Cable OK?	Yes	Aliquot Vol. Cal.'ed (Y/N & vol.)	Y - 240ml
Multi-meter Cable OK	NA	Program Reviewed (Yes/No), Dup ?	Yes - Normal (*)
Recorded Level (FT)	7.75'	Lids off bottles?	Yes
Measured Level (FT)	7.68'	Diagnostics/Distrubutor arm check?	yes
Offset Diff (FT)	0.07'	Backflush with DI?	Yes
Level Adjusted ?	Yes	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	INW	Last screen... RUN "PSNS 115-1" flushing	
Cond. Sonde Cal. Info. : Recorded Val. = 3300 Meas. Val. = NA Diff. = NA (>10% adj. offset); Offset = New Rec Val =			
Notes: (e.g. enabling values, cond cal. meter make/model/ser#, etc.) 8.45 8.77 7.68 :: New lvl offset = 0.03' (*) DL controlled			

Section 3. Grab Sample Collection

Personnel: Johnston / Millerstrom	Weather: Clear Windy	Arrival Date/Time:	
On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	77
Grab Parameters Collected	TPH / FC	Salinity Reading (PPT):	1
Grab Sample ID	SW15Grab-003FB	Temp. Reading (°C):	8.6
Grab Date/Time	1725	Turbidity Reading (NTU)	8.77
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.)
about 3ft of water in vault - flow visable YSI Micro Turbmeter
NOTE: Bottles mislabed as 084.1 should be 115.1

Cardno TEC

Shaping the Future

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

Station: 115.1 continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)			
Personnel: Sahlberg Beckwith	Weather: Sunny, 40°s	Arrival Date/Time: 2-23-13 (0810)	
Sampler Battery Voltage	Good	Changed? Y N	New voltage —
Telemtery Battery Voltage	Good	Changed? Y N	New voltage —
Additional Grabs (IDs, date/time)	NA		
Additional Dup Grab (IDs, date/time)	NA (0805)		
Composite Begin Time (date/time)	2-22-13 ~~(0854)~~	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	2-22-13 (2205) 15 1/4		
Total Composite Sample Volume Collected	14 btls = 100% 15 btl = 25%		
Aliquots missed/NLD (date/time/bott #/aliq #)	BTLs 16-24 cond. too high - no sample collected		
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 set on "repeatable" conductivity enable - worked well No issues to report NOTE: time stamp discrepancy b/w smpl mrkers & smpl rpt (??)			
Maintenance Needed: Full Re-set			

Section 5. Compositing Scheme and QC Sampling			
Personnel: Metallo, Sahlberg, Beckwith		Date/Time: 2-23-13 (1000)	
Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)			
YSI EC-300 (Ser.# JC02275) MicroTPI (Ser.# 20110925) 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. 130/23/ Y	7. 48/9/ Y	13-24 not tested	
2. 120/17/ Y	8. 53/12/ Y	cond. too high	
3. 121/14/ Y	9. 68/8/ Y	+ too long after	
4. 71/12/ Y	10. 3162/8/ Y	rain end.	
5. 45/9/ Y	11. 1250/7/ Y		
6. 42/9/ Y	12. empty		
Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample) Used BTLs 1-10 for comp. BTL 11 excluded - too long after rain end & cond. starting to spike. BTL 12 empty BTLs 13-24 too long/too high cond.			
Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis) Cond. = 107 µS/cm Turb. = 11 NTU Vol. = ~8500 ml Analysis per PWPA			
Composite Sample ID & Time: SW15-0011 (1749) 2-22-13			
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

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

ver.113012

Station: PSNS 84.1	MH/CB#: 551	Loc. Descrip. B983

Page: 1 of 2
pages per station

Section 1. Station Reset and Inspection

Personnel: Metalla, Sahlberg	Weather: Overcast, 40°s	Arrival Date/Time: 2/20/13 (0945)	
Carry-over maintenance to do prior to set-up:	Full Re-set	done? N	
Sampler Battery Voltage	NA	Changed? Y N Fresh	New voltage 12.84
Modem Battery Voltage	13.09	Changed? Y (N)	New voltage —
Sample Tubing & Strainer OK?	Yes	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	N - off 3min, ▽ ed
Trands. Cable OK?	Yes	Internal Sampler Tubing OK?	Yes
Trands. Desiccant OK (Yes/No)	Yes	Tubing Replaced? (Yes/No)	NO
Telem. Box Desiccant OK (Yes/No)	No - Rpl'ed	Normal Smpler Program or Dup. ?	DUP
Modem Status	Good	Bottles Loaded ?	Yes
Rain Gauge Maint.: *Level(ed)* Yes *Mount OK* Y *Wiring* Y		Lid Status?	OFF
Funnel/Throat Clean Y *Buckets clean/ed* Y *Tips During Maint.* 0		Backflushed with DI?	Yes
Notes (including channel condition): 12.47 / 9.99 — 3.48 / 3.60 — -.12 = 0.19		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen.. ON	ON

Section 2. Storm Setup and Inspection

Personnel: Metalla Sahlberg	Weather:	Arrival Date/Time: Same as above	
Sampler Battery Voltage	—	Changed? Y N Fresh	New voltage 12.84
Modem Battery Voltage	13.09	Changed? Y (N)	New voltage —
Sample Tubing & Strainer OK?	Yes	**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	adjusted +3 min
Transducer Cable OK?	Yes	Aliquot Vol. Cal.'ed (Y/N & vol.)	adjusted, ~~240 ml~~ 120 ml 120-Ml
Multi-meter Cable OK	~~Yes~~ NA	Program Reviewed (Yes/No), Dup ?	DUP, reviewed
Recorded Level (FT)	3.60	Lids off bottles?	Yes
Measured Level (FT)	3.48	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT)	-0.12	Backflush with DI?	Yes
Level Adjusted ?	Yes	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	INW	Last screen... Prgm Disabled	10:20 20-Feb
Cond. Sonde Cal. Info. : Recorded Val. = X	Meas. Val. = X	Diff. = X (>10% adj. offset); Offset =	New Rec Val =
Notes: (e.g. enabling values, cond cal. meter make/model/ser#, etc.) New lvl offset = 0.19'			

Section 3. Grab Sample Collection

Personnel: Johnston / Mollerstuen	Weather: Windy Clear	Arrival Date/Time: 1745	
On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	1592
Grab Parameters Collected	TPH / FC	Salinity Reading (PPT):	.8
Grab Sample ID	SW15 Grab-004 A,B	Temp. Reading (°C):	25.6
Grab Date/Time	2/22/13 1755	Turbidity Reading (NTU)	9.25
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 microturbmeter			

Cardno TEC
Shaping the Future

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

Station: 84.1 | continued from previous page | Page: 2 of 2

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

Personnel: Sahlberg Beckwith	Weather: Sunny 40's	Arrival Date/Time: 2-23-13 (0800)	
Sampler Battery Voltage	Good	Changed? (Y) N Pulled	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)	2-22-13 0825	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	2-23-13 21/22 (DUP) 8 of 8 (0609) Manual Stop via telem		
Total Composite Sample Volume Collected	100%		
Aliquots missed/NLD (date/time/bott #/aliq #)	BTL 15 2/8 → 8/8 No more liquid		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)?	OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: Manually stopped Sampler via telem., prgm ran fine, no issues during event			
Maintenance Needed: Full Re-Set			

Section 5. Compositing Scheme and QC Sampling

Personnel: Metallo, Sahlberg, Beckwith | Date/Time: 2-23-13 (0925)

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

YSI EC-300 (ser# JC02275) MicroTPI Turbidity Meter (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):

ODDS (1)		EVENS (2)			
Normal	1. 406/28/ Y	7. 371/15/ Y	BTLS 13-24		
	2. 388/29/ Y	8. 394/15/ Y	not tested,		
	3. 94/19/ Y	9. 1135/16/ Y	not used		
DUP	4. 88/21/ Y	10. 1117/14/ Y			
	5. 118/14/ Y	11. 3240/NA/ DM N			
	6. 118/12/ Y	12. 3312/NA/N			

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

Normal Sample; used btls 1, 3, 5, 7, & 9

Dup Sample; used btls 2, 4, 6, 8, & 10

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

Cond = 424 µS/cm Turb. = 19 NTU Vol. = ~5000 ml Analysis Per PWPA

Composite Sample ID & Time:	SW15-0009 (1809) 2-22-13
Field Blank Collected? (date/time)	NA previously
Blank ID:	NA
Duplicate comp sample? Yes/No	Yes
Duplicate sample ID	SW15-0010 (1809) 2-22-13

NOTES:

(1) Duplicate collected at this station; ODD# btls = Normal Sample

(2) Even # BTLs used for duplicate.

DUP Comp Readings: Cond. 445 µS/cm Turb. = 19 NTU Vol. = ~5000 ml

Cardno TEC
Shaping the Future

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

ver.113012

Station: PSNS 053	MH/CB#: 2749	Loc. Descrip. NE B449	Page: 1 of 2

pages per station

Section 1. Station Reset and Inspection

Personnel: Metallo, Sahlberg	Weather: 40's Overcast	Arrival Date/Time: 2/20/13 (1220)	
Carry-over maintenance to do prior to set-up:	Full re-set	done? N	
Sampler Battery Voltage	12.66	Changed? Y N Fresh	New voltage —
Modem Battery Voltage	12.69	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?	Yes (replied dist arm tube)
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.: Leveled (Y) Yes	Mount OK Y Wiring Y	Lid Status?	Off
Funnel/Throat Clean (Y) Y	Buckets Cleaned (Y) Y Tips During Maint. 0	Backflushed with DI?	Yes
Notes (including channel condition):		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen..	ON

Section 2. Storm Setup and Inspection

Personnel: Metallo, Sahlberg	Weather:	Arrival Date/Time: Same as above	
Sampler Battery Voltage	12.66	Changed? Y N Fresh	New voltage —
Modem Battery Voltage	12.69	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.)	not able to cal.
Multi-meter Cable OK	NA	Program Reviewed (Yes/No), Dup ?	Normal, reviewed
Recorded Level (FT)	0.008	Lids off bottles?	Off
Measured Level (FT)	0.00	Diagnostics/Distrubutor arm check?	OK
Offset Diff (FT)	0.00	Backflush with DI?	Yes
Level Adjusted ?	N	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	INW	Last screen... Prgm Disabled 12:41 20-Feb...	
Cond. Sonde Cal. Info. : Recorded Val. = NA	Meas. Val. = NA	Diff. = NA (>10% adj. offset); Offset =	New Rec Val =
Notes: (e.g. enabling values, cond cal. meter make/model/ser#, etc.)			

Section 3. Grab Sample Collection

Personnel: Johnston / Mollerstuen	Weather: Sunny No Rain	Arrival Date/Time: 1625	
On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	153
Grab Parameters Collected		Salinity Reading (PPT):	0.1
Grab Sample ID		Temp. Reading (°C):	27.3
Grab Date/Time		Turbidity Reading (NTU)	
Grab Dup ID		Equipment running correctly?	
Grab Dup Date/Time		Sampler Battery Voltage (Changed?):	
Sample Observations (notify storm controller if sample turbidity, odor, color, foam, or sheen look out of the ordinary): which?:			
Storm Contoller notified (Y or N/A)?:		Grab MS/MSD Collected ? Y / (N)	Ice OK?
Notes: (what meter was used for site readings, etc.) No Samples taken No Flow			

Cardno TEC

Shaping the Future

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

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

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

Personnel: Sahlberg Beckwith	Weather: Sunny, lo 40's	Arrival Date/Time: 2-23-13 (0740)	
Sampler Battery Voltage	Good	Changed? (Y) N Pulled	New voltage X
Telemtery Battery Voltage	Good	Changed? Y (N)	New voltage —
Additional Grabs (IDs, date/time)	NO		
Additional Dup Grab (IDs, date/time)	NO (0810)		
Composite Begin Time (date/time)	2-22-13 ~~(0747)~~	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	~~2-23-13 (0100)~~ 23 2/2 (1) see below Manual Stop via telem.		
Total Composite Sample Volume Collected	100% @ btls where water collected		
Aliquots missed/NLD (date/time/bott #/aliq #)	~~12 2/4 → 17 2/4 (0001 2-23)~~ DM BTL 8 3/4 → 20 1/4 (1901 2/22)		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)?	OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: Sampler worked well, no issues, basin is relatively flashy			
Maintenance Needed: Full Re-set			

Section 5. Compositing Scheme and QC Sampling

Personnel: Metiallo, Sahlberg, Beckwith | Date/Time: 2-23-13 (0900)

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

EC-300 (ser.# JC02275) YSI (cond.) Micro-TPI (ser. 20109025) 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. 78 / 29 / Y	7. 93 / 13 / Y		
2. 113 / 24 / Y	8. 160 / 31 / Y		
3. 27 / 12 / Y	9-19 Empty		
4. 21 / 10 / Y			
5. 20 / 8 / Y	20-23 not used		
6. 21 / 6 / Y	24 empty		

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

Used btls 1-8 for comp (btl 8 only ½ full) – used total vol from each btl. btls 9-19 were empty, 20-23 not used, 24 empty

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

Cond. = 62 µS/cm Turb. = 14 NTU Vol. = ~7000 ml Analysis per 2013 PWPA

Composite Sample ID & Time:	SWIS-0008 (1524) 2-22-13
Field Blank Collected? (date/time)	NA previously
Blank ID:	NA
Duplicate comp sample? Yes/No	NO
Duplicate sample ID	NA

NOTES:

(1) Last Aliquot collected = 23 1/1 (0609) Manual stop via telemetry

9 x 4 = 36

Cardno TEC
Shaping the Future

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

ver.113012

Station: PSNS PB01	MH/CB#: SDMH-1D	Loc. Descrip. SSE B449, Pier B Quay Wall	Page: 1 of 2

pages per station

Section 1. Station Reset and Inspection

Personnel: Metallo, Sahlberg | Weather: Overcast, 40°s | Arrival Date/Time: (1245) 2/20/13

Carry-over maintenance to do prior to set-up: Full re-Set | done? N

Sampler Battery Voltage	12.73	Changed? Y N Fresh	New voltage —
Modem Battery Voltage	12.69	Changed? Y (N)	New voltage —
Sample Tubing & Strainer OK?	Yes	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	N +5 mins
Trands. Cable OK?	OK	Internal Sampler Tubing OK?	OK
Trands. Desiccant OK (Yes/No)	OK - Next event	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.: (Leveled) Y	Mount OK Y Wiring Y	Lid Status?	Off
Funnel/Throat Clean Y	Buckets clean/ed Y Tips During Maint. 0	Backflushed with DI?	Yes
Notes (including channel condition):		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen..	ON

Section 2. Storm Setup and Inspection

Personnel: Metallo, Sahlberg | Weather: 40's Overcast | Arrival Date/Time: Same as above

Sampler Battery Voltage	12.73	Changed? Y N Fresh	New voltage —
Modem Battery Voltage	12.69	Changed? Y N	New voltage —
Sample Tubing & Strainer OK?	OK	**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	+5 min, adjusted
Transducer Cable OK?	OK	Aliquot Vol. Cal.'ed (Y/N & vol.)	N - no water
Multi-meter Cable OK	NA	Program Reviewed (Yes/No), Dup ?	Normal, reviewed
Recorded Level (FT) Sump	0.16'	Lids off bottles?	Off
Measured Level (FT) when no flow	=0.16'	Diagnostics/Distrubutor arm check?	Yes
Offset Diff (FT)	0.00	Backflush with DI?	Yes
Level Adjusted ?	N	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	INW	Last screen... Prgm Disabled 13:24 20 Feb...	

Cond. Sonde Cal. Info. : Recorded Val. = NA Meas. Val. = NA Diff. = NA (>10% adj. offset); Offset = New Rec Val =

Notes: (e.g. enabling values, cond cal. meter make/model/ser#, etc.)

Section 3. Grab Sample Collection

Personnel: Johnston / Mollestad | Weather: Clear no rain | Arrival Date/Time:

On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	60.2
Grab Parameters Collected	TPH/FC	Salinity Reading (PPT):	0
Grab Sample ID	SWISGrab-002A,B	Temp. Reading (°C):	7.8
Grab Date/Time	2/22/13 1700	Turbidity Reading (NTU)	27.76
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.)
Taken from vault YSI micro turb meter

Cardno TEC
Shaping the Future

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

Station: PB01 continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)			
Personnel: Sahlberg, Beckwith	Weather: Sunny 40°s	Arrival Date/Time: 2-23-13 (0750)	
Sampler Battery Voltage	Good - but failed	Changed? (Y) N Pulled	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)	2-22-13 (0750)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	2-22-13 (1649) BTL 10 4/4		
Total Composite Sample Volume Collected	9 @ 100% 1 @ 25%		
Aliquots missed/NLD (date/time/bott #/aliq #)	BTLs 10 2/4 → 24 4/4 power failure BTL 10 1/4		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor...)?	OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: Power (battery) failure, unknown reason, batt was @ 12.60 vdc @ start of event			
Maintenance Needed: Full re-sets + elec. system check			

Section 5. Compositing Scheme and QC Sampling			
Personnel: Metallo, Sahlberg, Beckwith		Date/Time: 2-23-13 (1130)	
Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)			
Conductivity & Turbidity Testing (List ind. smplr bottle; cond. reading in µS/cm; turb. reading in NTU; will ind. smpl be included in comp smpl Y/N):			
1. 338 / 22 / Y	7. 75 / 14 / Y		
2. 603 / 21 / Y	8. 78 / 13 / Y		
3. 281 / 16 / Y	9. 80 / 12 / Y		
4. 90 / 11 / Y	10. 81 / 10 / Y		
5. 69 / 15 / Y	11-24 empty		
6. 72 / 17 / Y			
Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample) Used btls 1-10 for comp sample. Btls 11-24 empty, no water collected			
Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis) Cond = 186 us/cm Turb. = 16 NTU Vol. ~8000 ml Analysis per PWPA			
Composite Sample ID & Time:	SW15-0014 (1649) 2-22-13		
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

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

ver.113012

Station: PSNS 015	MH/CB#: ~~5110~~ A42	Loc. Descrip. 1019 McD's	Page: 1 of 2 pages per station

Section 1. Station Reset and Inspection

Personnel: Metallo, Sehlberg | Weather: Overcast, drizzle, 40°s | Arrival Date/Time: (1330)

Carry-over maintenance to do prior to set-up: Full Re-sets | done? N

Sampler Battery Voltage	12.72	Changed? Y N Fresh	New voltage —
Modem Battery Voltage	12.98	Changed? Y (N)	New voltage —
Sample Tubing & Strainer OK?	Yes	**Sampler Info.**	
Transducer & Telemetry System Info.		Time Display OK? (Yes/No)	OK
Trands. Cable OK?	Yes	Internal Sampler Tubing OK?	OK
Trands. Desiccant OK (Yes/No)	Yes	Tubing Replaced? (Yes/No)	NO
Telem. Box Desiccant OK (Yes/No)	Yes	Normal Smpler Program or Dup. ?	Normal
Modem Status	Operational	Bottles Loaded ?	Yes
Rain Gauge Maint.: (Leveled) Y	Mount OK Y Wiring Y	Lid Status?	Off
Funnel/Throat Clean (Y)	Buckets clean/ed ____ Tips During Maint. 0	Backflushed with DI?	Yes
Notes (including channel condition):		Suction line & quick connect attached?	Yes
		Smplr Status (on/off) / last screen..	ON

Section 2. Storm Setup and Inspection

Personnel: Metallo, Sehlberg | Weather: Same as above | Arrival Date/Time: Same as above

Sampler Battery Voltage	12.72	Changed? Y N Fresh	New voltage —
Modem Battery Voltage	12.78	Changed? Y (N)	New voltage —
Sample Tubing & Strainer OK?	Yes	**Sampler Setup**	
Transducer & Multi-meter Setup		Time/Date Display OK? (Yes/No)	OK NO D
Transducer Cable OK?	OK	Aliquot Vol. Cal.'ed (Y/N & vol.)	240-ml
Multi-meter Cable OK	NA	Program Reviewed (Yes/No), Dup ?	Yes - normal
Recorded Level (FT)	4.36	Lids off bottles?	Off
Measured Level (FT)	4.35	Diagnostics/Distrubutor arm check?	Yes-ok
Offset Diff (FT)	0.01	Backflush with DI?	Yes
Level Adjusted ?	NO	Storm Reset (1, enter) Completed	Yes
Cond. Sonde Type (INW-CT2X)	INW	Last screen... Smplr Disabled	13:53 20 Feb..

Cond. Sonde Cal. Info. : Recorded Val. = 4/1334 Meas. Val. = NA Diff. = NA (>10% adj. offset); Offset = New Rec Val =

Notes: (e.g. enabling values, cond cal. meter make/model/ser#, etc.) 15.25 4.36
10.89

Section 3. Grab Sample Collection

Personnel: Johnston/Mollerstuen | Weather: Windy & Cold | Arrival Date/Time: 1820

On Composite... (Bottle #/ Aliq #)		Conductivity Reading (µS/cm):	~~358~~ 259
Grab Parameters Collected	TPH / FC	Salinity Reading (PPT):	0.2
Grab Sample ID	SW05 Grab-006 A, B	Temp. Reading (°C):	11.4
Grab Date/Time	2/22/13 1820	Turbidity Reading (NTU)	6.35
Grab Dup ID	-007	Equipment running correctly?	Yes
Grab Dup Date/Time	2/22/13 1830	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 micro Turb meter

Cardno TEC
Shaping the Future

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

Station: 015 continued from previous page

Section 4. Post-Storm Sample Collection (for grab, comp or both)			
Personnel: Sahlberg, Beckwith	Weather: 40°S, Sunny	Arrival Date/Time: 2-23-13 (0730)	
Sampler Battery Voltage	Good	Changed? (Y) N Pulled	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)	2-22-13 (0747)	Sampler Report Downloaded ?	Yes
Last Aliquot Taken (date/time, bott #, aliq #)	2-23-13 (0601) BTL 23 2/4		
Total Composite Sample Volume Collected	100%		
Aliquots missed/NLD (date/time/bott #/aliq #)?	"NL" for 12 2/4 → 17 2/4		
Channel Condition / Observations (oil/sheen, floatables, turbidity, suspended solids, discoloration, odor…)?	OK		
Storm Contoller notified (Y or N/A)?: NA	Which parameter?:	NA	
Notes: Manually stopped sampler this morning (~6AM) via telemetry			
Maintenance Needed: Full Re-set, Cond. Cal.			

Section 5. Compositing Scheme and QC Sampling			
Personnel: Metallo, Sahlberg, Beckwith		Date/Time: 2-23-13 (1100)	
Conductivity & Turbidity Meter/s Info.(Manuf., Model, Serial#, Cal.info.)			
YSI EC-300 (Ser.# JC02275) MicroTPI (Ser#20110925) 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. 831 / 32 / Y	7. 38 / 13 / Y	13-24 either too	
2. 30 / 30 / Y	8. 52 / 12 / Y	long after rain	
3. 27 / 19 / Y	9. 51 / 11 / Y	end and/or too	
4. 22 / 16 / Y	10. 126 / 9 / Y	high cond.	
5. 32 / 16 / Y	11. 304 / 7 / Y		
6. 35 / 12 / Y	12. Base flow		
Brief Description of Compositing Scheme: (include what bottles, based on bench-top screening above, where used for the overall composite sample)			
Used btl's 1-11 for comp. BTLs 12-24 rep'ed base flow & tidally influenced periods - so these were not ~~utilized~~ utilized for sample submission.			
Overall Composite Info. (include conductivity and turbidity measurements, volume and requested analysis)			
Cond = 143 µs/cm Turb. 18 Vol. = ~9200 ml. Analysis per PWPA			
Composite Sample ID & Time: SW15-0013 (1831) 2-22-13			
Field Blank Collected? (date/time)	previously		
Blank ID:	NA		
Duplicate comp sample? Yes/No	NO		
Duplicate sample ID	NA		

NOTES:

SAMPLE CHAIN OF CUSTODY FORM

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

SW15 Composite Samples

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

	Sample Label	Station ID	Collection Date/Time	Matrix	Analyze parameters per QAP/FSP: Hardness	TOC	DOC	TSS	TME/DME	TPH	Turbidity (values @ right) (1)					No. containers	Sample Type (Grab vs. Comp)	Storm#	Notes / Comp. Cond. (µS/cm) and Turb. (NTU) Readings
	SW15-0008	PSNS053	2-22-13 (1524)	SW	X	X	X	X	X							1	Comp	SW15	62 µS/cm 14 NTU
	SW15-0009	PSNS084.1	2-22-13 (1809)	SW	X	X	X	X	X							1	Comp	SW15	424 19
②	SW15-0010	PSNS084.1 DUP	2-22-13 (1809)	SW	X	X	X	X	X							1	Comp DUP	SW15	445 19
	SW15-0011	PSNS 115.1	2-22-13 (1749)	SW	X	X	X	X	X							1	Comp	SW15	107 11
	SW15-0012	PSNS 126	2-22-13 (1633)	SW	X	X	X	X	X							1	Comp	SW15	239 23
	SW15-0013	PSNS015	2-22-13 (1831)	SW	X	X	X	X	X							1	Comp	SW15	143 18
	SW15-0014	PSNS PB01	2-22-13 (1649)	SW	X	X	X	X	X							1	Comp	SW15	186 16

Relinquished by: David Metallo — 2-23-13 — 1205
Signature — Date — Time
David Metallo — C-TEC
Printed Name — Company

Received by: BG Beckwith
Signature
BG Beckwith
Printed Name

Total # of Containers:
Shipment Method:
Sample Disposition:

Relinquished by: BG Beckwith — 2-23-13 — 1330
Signature — Date — Time
BG Beckwith — Pacific Tec
Printed Name — Company

Received by: 2/23/13 1340
Signature
Printed Name

Distribution:
1) PNNL
2) CAS
3) TAI

* Grab Samples on Separate C.O.C.
(1) Turbidity of comp. samples tested @ PSNS SW Lab during Comp. formulation
(2) DUP of 84.1

SAMPLE CHAIN OF CUSTODY FORM

Date: 2/22/2013

Page: 1 of 1

COC Number:

SW15 Grab Samples

~~SSC Pacific~~
Bioassay Testing Laboratory
Code 71751 Environmental Sciences Branch

Project No.:

Project Name: Johnston / Mollerstuen

Project Manager:

Phone:

EVENT: SW15 Grabs

Address:

Attention: ~~Gunther Rosen~~

Testing Parameters

Observations, Instructions

Lab. Use only: Lab ID	Sample ID	Sample Label	Collection Date/Time	Matrix	Field Temp	TPH	No. of containers	StationID	Comments
	SW15-Grab-		2/22/2013						Note: -003 mislabled as 084.1 should be 115.1
	SW15-001	PSNS126	1605	SW			2	PSNS126	A&B
	SW15-002	PSNSPB01	1700				2	PSNSPB01	A&B taken from vault
	SW15-003	PSNS 115.1	1725				2	PSNS115.1	A&B 3ft of water
	SW15-004	PSNS084.1	1755				2	PSNS084.1	A&B >1ft of water
	SW15-006	PSNS015	1820				2	PSNS085	A&B >1ft of water
	SW15-007	PSNS015 DUP	1830	↓		↓	2	PSNS015	A&B >1ft of water
	~~SW~~								

~~Relinquished~~ received by: _____ Signature 2/23/13 Date 1340 Time

Jill Brandenberger Printed Name ~~IEC~~ PNNL Company

~~Relinquished~~ Received by: _____ Signature 2/23/13 1330 Time

BG Beckwith Printed Name

Total # of Containers

Shipment Method:

Shipment Method:

Relinquished by: _____ Signature Date Time

Printed Name Company

Received by: _____ Signature

Printed Name

Sample Disposition:

Distribution:
1) 2 copies to the Laboratory
2) 1 copy to project manager
3) Return completed original to ENVVEST Technical Coordinator

PSNS NDDSW Monitoring **Stormwater Sampling Event SW15 (2/22/2013)**

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

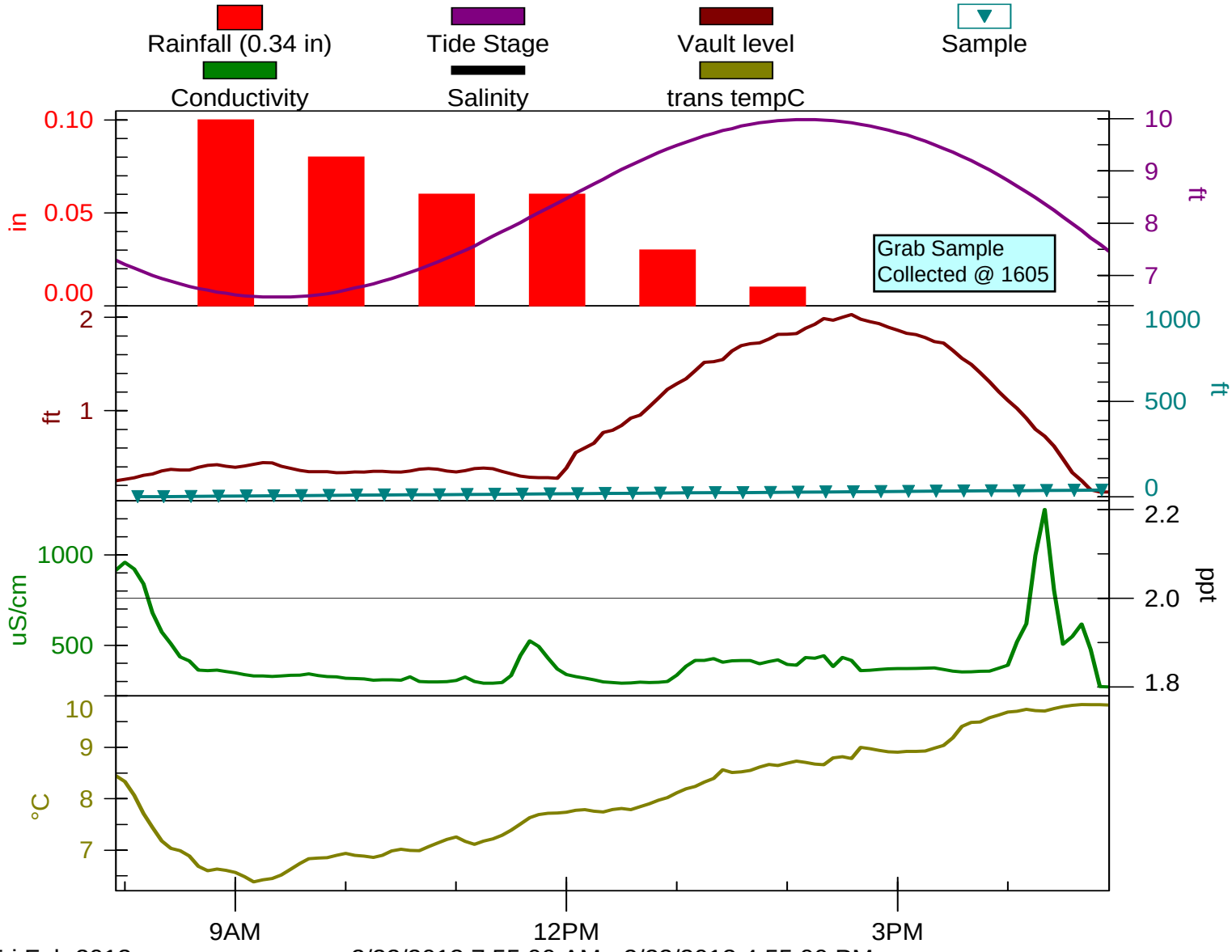
Station	Type of Surface	Area of Basin Surface Type (ft^2)	[1]Runoff Coefficient Range	Combined Drainage Area (Ft^2)	Sample Event Rain Total (In)	Sample Event Rain Total (Ft)	Sample Event Period Runoff Vol. (Gal)
126	Impervious	653,373	0.9	591,881	0.34	0.0283	125,448
	Pervious	9,613	0.4				
115.1	Impervious	449,104	0.9	409,792	0.29	0.0242	74,082
	Pervious	13,938	0.4				
84.1	Impervious	23,958	0.9	21,562	0.50	0.0417	6,721
53	Impervious	209,720	0.9	190,460	0.61	0.0508	72,424
	Pervious	4,280	0.4				
15	Impervious	2,009,431	0.8	2,411,321	0.56	0.0467	841,770
	Pervious	2,009,431	0.4				
PB01	Impervious	130,681	0.9	117,613	0.50	0.0417	36,659

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	0.34	0.0283	125,448
115.1	409,792	0.29	0.0242	74,082
84.1	21,562	0.50	0.0417	6,721
53	190,460	0.61	0.0508	72,424
15	2,411,321	0.56	0.0467	841,770
PB01	117,613	0.50	0.0417	36,659

PSNS 126

SW15 2-22-2013

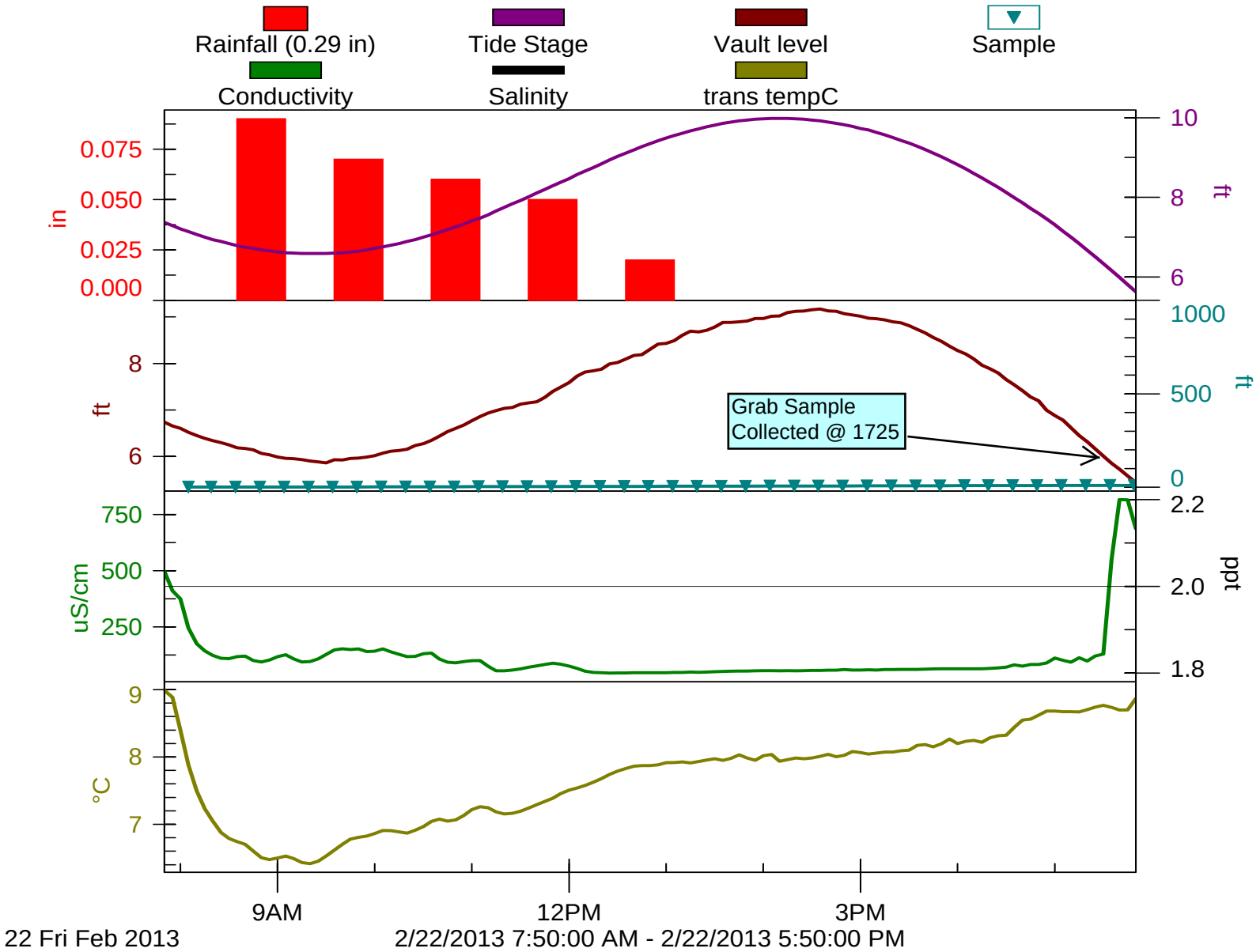


22 Fri Feb 2013

2/22/2013 7:55:00 AM - 2/22/2013 4:55:00 PM

PSNS 115.1

SW15 2-22-2013

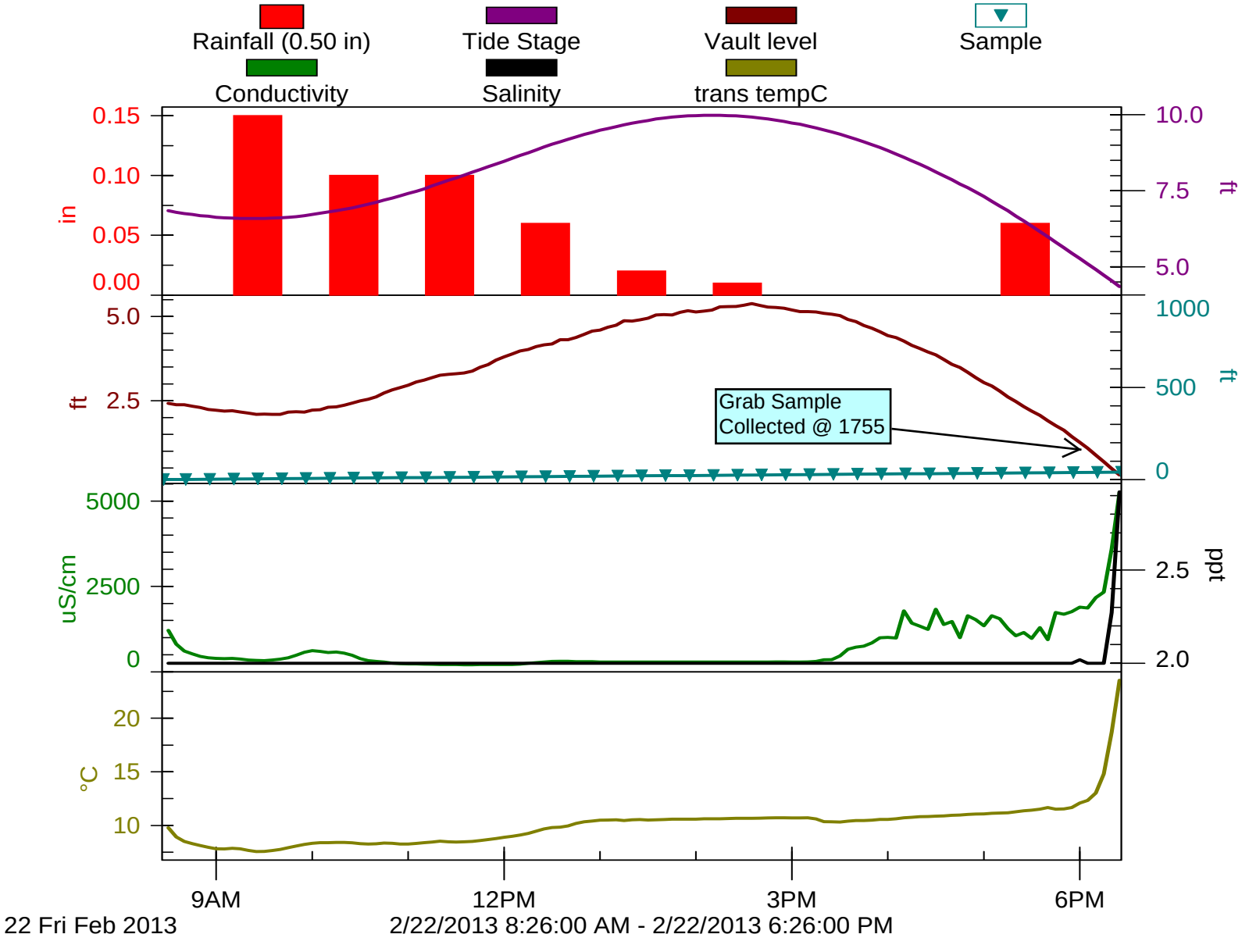


22 Fri Feb 2013

2/22/2013 7:50:00 AM - 2/22/2013 5:50:00 PM

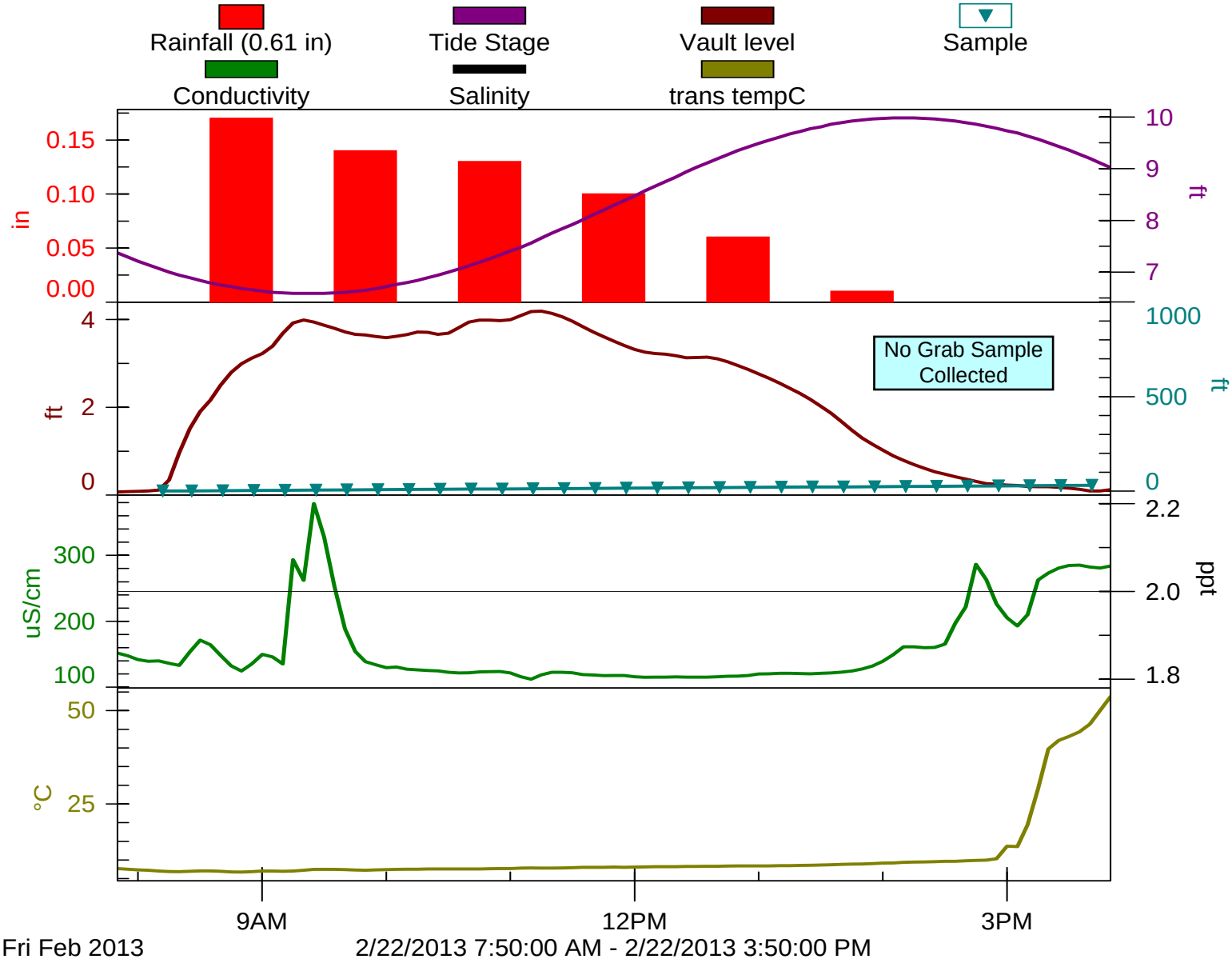
PSNS 084.1

SW15 2-22-2013



PSNS 053

SW-15 2-22-2013

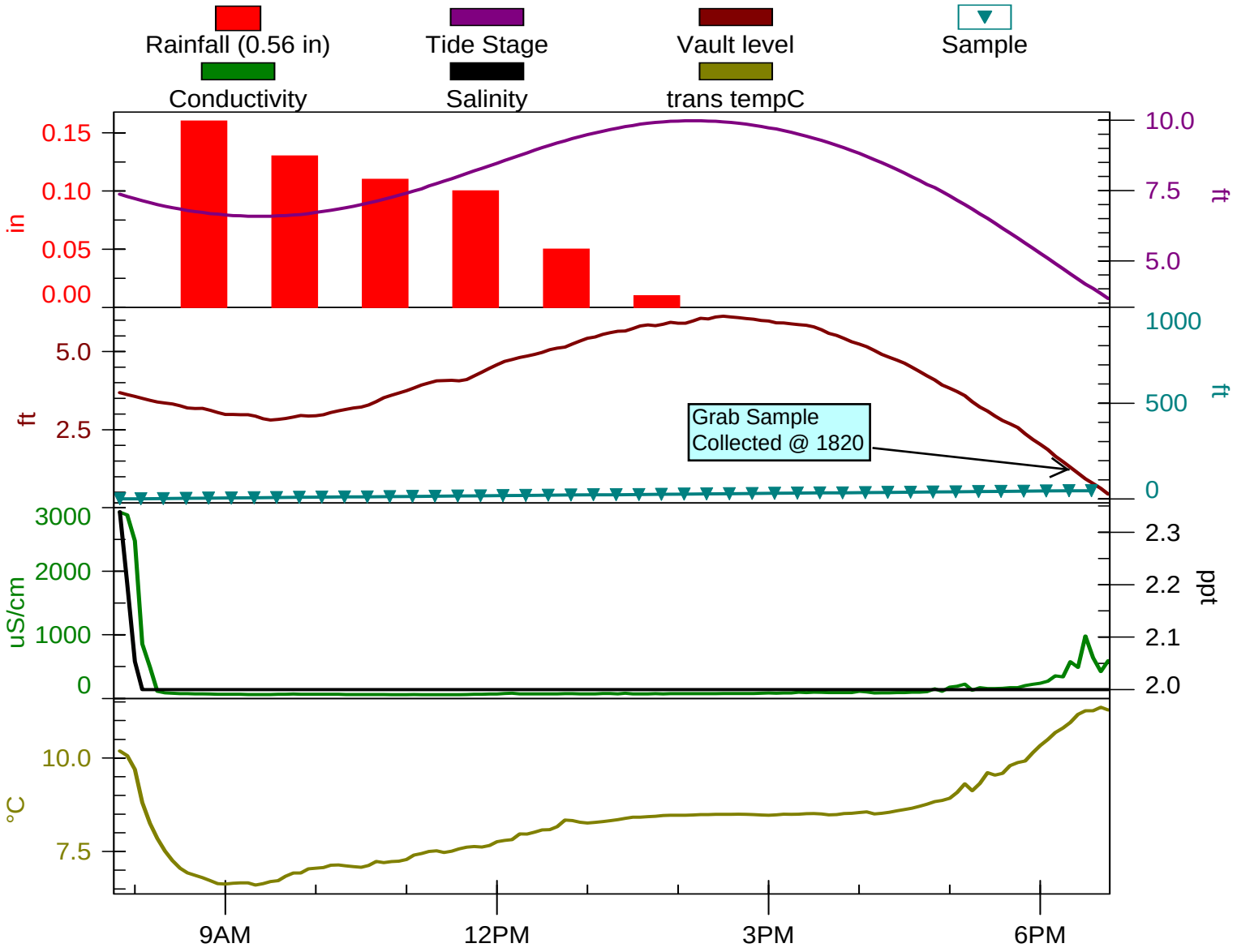


22 Fri Feb 2013

2/22/2013 7:50:00 AM - 2/22/2013 3:50:00 PM

PSNS 015

SW15 2-22-2013

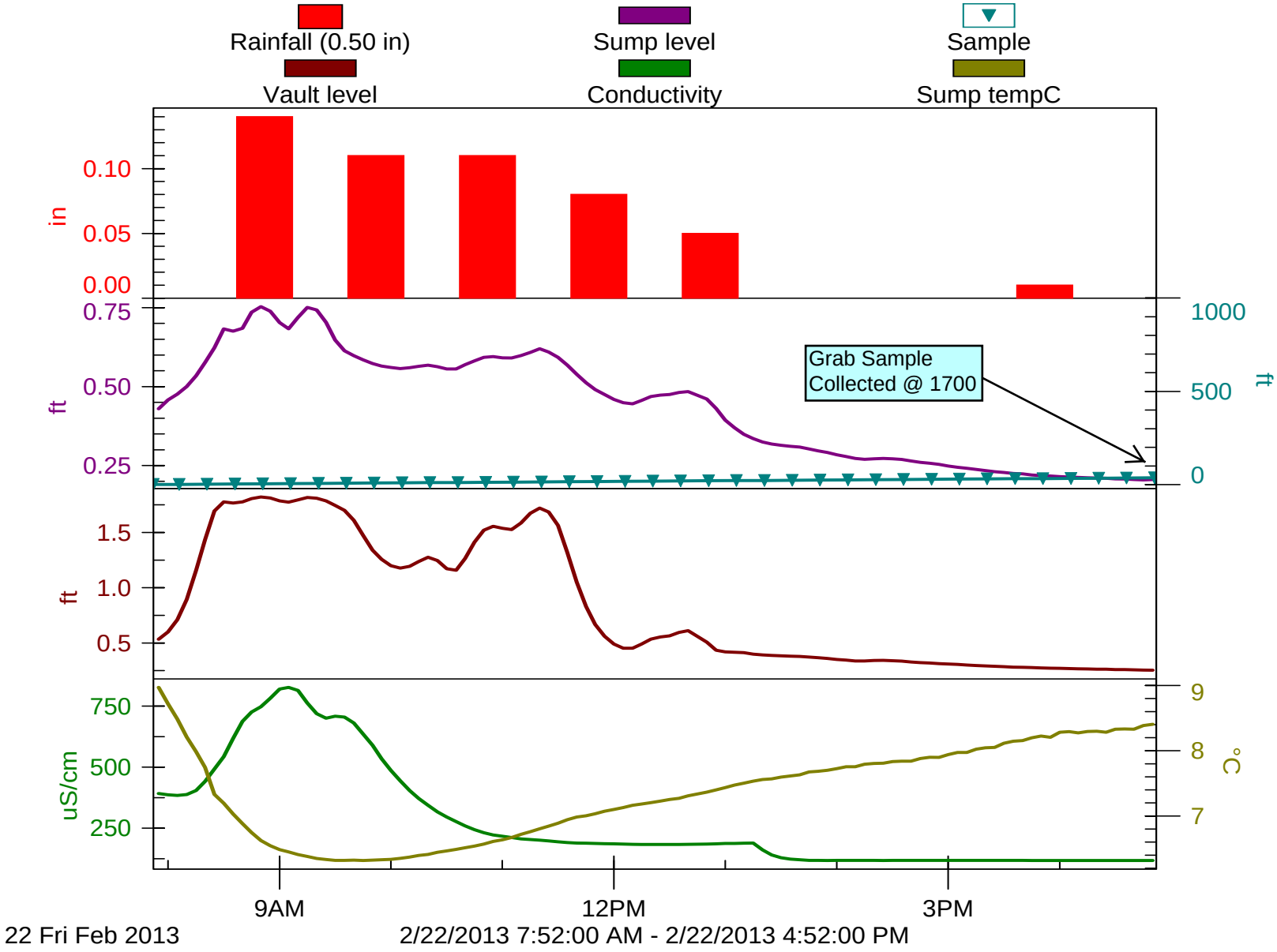


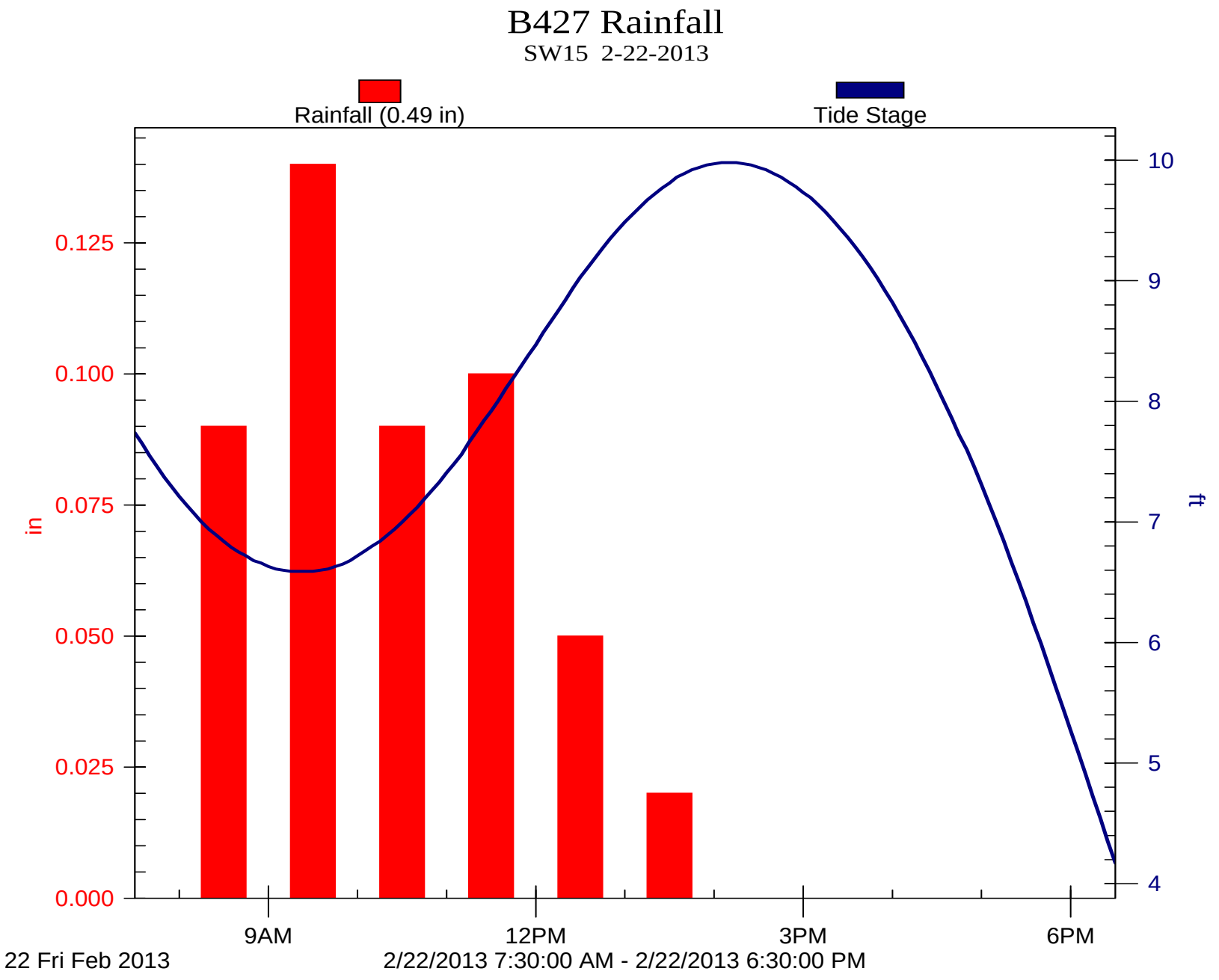
22 Fri Feb 2013

2/22/2013 7:46:00 AM - 2/22/2013 6:46:00 PM

PSNS PB01

SW15 2-22-2013




B427 Rainfall
SW15 2-22-2013
Rainfall (0.49 in)
Tide Stage
0.125
0.100
0.075
0.050
0.025
0.000
in
10
9
8
7
6
5
4
ft
9AM
12PM
3PM
6PM
22 Fri Feb 2013
2/22/2013 7:30:00 AM - 2/22/2013 6:30:00 PM

*** Model 6700 HW Rev: B2 SW Rev: 3.26.0000 ID 3293179321
> REPORT
SAMPLER ID# 3293179321 08:32 23-FEB-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  08:32 23-FEB-13
  Hardware: B2      Software: 3.26
********** SAMPLING RESULTS **********
   SITE: PSNS126
PROGRAM: PSNS126
Program Started at 11:49 WE 20-FEB-13
Nominal Sample Volume =  240 ml
                              COUNT
                                TO
SAMPLE  BOTTLE TIME  SOURCE ERROR LIQUID
------- ------ ----      -- --    ------
            11:49  PGM DISABLED
------------- FR 22-FEB-13 -------------
            08:04  PGM ENABLED
  1,4     1   08:04      E          484
  2,4     1   08:18      F          489
```

3,4	1	08:33	F		533
4,4	1	08:48	F		553
1,4	2	09:03	F		492
2,4	2	09:18	F		545
3,4	2	09:33	F		533
4,4	2	09:48	F		493
1,4	3	10:03	F		489
2,4	3	10:18	F		540
3,4	3	10:33	F		491
4,4	3	10:48	F		534
1,4	4	11:03	F		491
2,4	4	11:18	F		545
3,4	4	11:33	F		491
4,4	4	11:48	F		701
1,4	5	12:03	F		491
2,4	5	12:18	F		491
3,4	5	12:33	F		485
4,4	5	12:48	F		486
1,4	6	13:03	F		485
2,4	6	13:18	F		485
3,4	6	13:33	F		479
4,4	6	13:48	F		479
1,4	7	14:03	F		533
2,4	7	14:18	F		476
3,4	7	14:33	F		483
4,4	7	14:48	F		481
1,4	8	15:03	F		479
2,4	8	15:18	F		479
3,4	8	15:33	F		487
4,4	8	15:48	F		548
1,4	9	16:03	F		492
2,4	9	16:18	F		499
3,4	9	16:33	F		495
4,4	9	16:48	F	NL	*
1,4	10	17:03	F	NL	*
2,4	10	17:18	F	NL	*
3,4	10	17:33	F	NL	*
4,4	10	17:48	F	NL	*
1,4	11	18:03	F	NL	*
2,4	11	18:18	F	NL	*
3,4	11	18:33	F	NL	*
4,4	11	18:48	F	NL	*
1,4	12	19:03	F	NL	*
2,4	12	19:18	F	NL	*
3,4	12	19:33	F	NL	*
4,4	12	19:48	F	NL	*

1,4	13	20:03	F	NL	*
2,4	13	20:18	F	NL	*
3,4	13	20:33	F	NL	*
4,4	13	20:48	F	NL	*
1,4	14	21:03	F	NL	*
2,4	14	21:18	F	NL	*
3,4	14	21:33	F	NL	*
4,4	14	21:48	F	NL	*
1,4	15	22:03	F	NL	*
2,4	15	22:18	F	NL	*
3,4	15	22:33	F	NL	*
4,4	15	22:48	F	NL	*
1,4	16	23:03	F	NL	*
2,4	16	23:18	F	NL	*
3,4	16	23:33	F	NL	*
4,4	16	23:48	F	NL	*

---------- SA 23-FEB-13 ----------

1,4	17	00:03	F	NL	*
2,4	17	00:18	F	NL	*
3,4	17	00:33	F	NL	*
4,4	17	00:48	F	NL	*
1,4	18	01:03	F	NL	*
2,4	18	01:18	F	NL	*
3,4	18	01:33	F	NL	*
4,4	18	01:48	F		491
1,4	19	02:03	F		496
2,4	19	02:18	F		505
3,4	19	02:33	F		491
4,4	19	02:48	F		484
1,4	20	03:03	F		476
2,4	20	03:18	F		481
3,4	20	03:33	F		473
4,4	20	03:48	F		475
1,4	21	04:03	F		476
2,4	21	04:18	F		478
3,4	21	04:33	F		469
4,4	21	04:48	F		479
1,4	22	05:03	F		478
2,4	22	05:18	F		481
3,4	22	05:33	F		476
4,4	22	05:48	F		482
1,4	23	06:03	F		480
2,4	23	06:18	F		478
3,4	23	06:33	F		484
4,4	23	06:48	F		489
1,4	24	07:03	F		489

```
 2,4    24   07:18      F          488
 3,4    24   07:33      F          497
 4,4    24   07:48      F  NL        *
           07:49  PGM DONE 23-FEB
  SOURCE E  ==> ENABLE
  SOURCE F  ==> FLOW
   ERROR NL ==> NO LIQUID DETECTED!
----------------------------------------
```

*** Model 6712 HW Rev: B0 SW Rev: 2.34.0000 ID 1313656803

SAMPLER ID# 1313656803 08:25 23-FEB-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

---
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 08:25 23-FEB-13
Hardware: B0 Software: 2.34
********** SAMPLING RESULTS **********
SITE: PSNS115-1
PROGRAM: PSNS115-1

Nominal Sample Volume = 240 ml

TIMESTAMP	BTL	RCD#	ALIQUOT	ERROR CODE
2/22/2013 8:05	1	1	1:4	Successful
2/22/2013 8:19	1	2	2:4	Successful
2/22/2013 8:34	1	3	3:4	Successful
2/22/2013 8:49	1	4	4:4	Successful
2/22/2013 9:04	2	5	1:4	Successful
2/22/2013 9:19	2	6	2:4	Successful
2/22/2013 9:34	2	7	3:4	Successful
2/22/2013 9:49	2	8	4:4	Successful
2/22/2013 10:04	3	9	1:4	Successful
2/22/2013 10:19	3	10	2:4	Successful
2/22/2013 10:34	3	11	3:4	Successful
2/22/2013 10:49	3	12	4:4	Successful
2/22/2013 11:04	4	13	1:4	Successful
2/22/2013 11:19	4	14	2:4	Successful
2/22/2013 11:34	4	15	3:4	Successful
2/22/2013 11:49	4	16	4:4	Successful
2/22/2013 12:04	5	17	1:4	Successful
2/22/2013 12:19	5	18	2:4	Successful
2/22/2013 12:34	5	19	3:4	Successful
2/22/2013 12:49	5	20	4:4	Successful
2/22/2013 13:04	6	21	1:4	Successful
2/22/2013 13:19	6	22	2:4	Successful
2/22/2013 13:34	6	23	3:4	Successful
2/22/2013 13:49	6	24	4:4	Successful
2/22/2013 14:04	7	25	1:4	Successful
2/22/2013 14:19	7	26	2:4	Successful
2/22/2013 14:34	7	27	3:4	Successful
2/22/2013 14:49	7	28	4:4	Successful
2/22/2013 15:04	8	29	1:4	Successful
2/22/2013 15:19	8	30	2:4	Successful
2/22/2013 15:34	8	31	3:4	Successful
2/22/2013 15:49	8	32	4:4	Successful

PSNS 115.1

2/22/2013 16:04	9	33	1:4	Successful
2/22/2013 16:19	9	34	2:4	Successful
2/22/2013 16:34	9	35	3:4	Successful
2/22/2013 16:49	9	36	4:4	Successful
2/22/2013 17:04	10	37	1:4	Successful
2/22/2013 17:19	10	38	2:4	Successful
2/22/2013 17:34	10	39	3:4	Successful
2/22/2013 17:49	10	40	4:4	Successful
2/22/2013 18:04	11	41	1:4	Successful
2/22/2013 18:19	11	42	2:4	Successful
2/22/2013 20:50	13	43	1:4	No More Liquid
2/22/2013 21:05	14	44	1:4	No More Liquid
2/22/2013 21:20	14	45	2:4	No More Liquid
2/22/2013 21:35	14	46	3:4	No More Liquid
2/22/2013 21:50	14	47	4:4	No More Liquid
2/22/2013 22:05	15	48	1:4	No More Liquid

*** Model 6700 HW Rev: B2 SW Rev: 3.26.0000 ID 3293179316
>
*** Model 6700 HW Rev: B2 SW Rev: 3.26.0000 ID 3293179316
> REPORT
SAMPLER ID# 3293179316 06:22 23-FEB-13
  Hardware: B2   Software: 3.26
********** PROGRAM SETTINGS **********

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

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

  24, 1000 ml BTLS
 16 ft SUCTION LINE
 15 ft SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    FLOW, EVERY
       1 PULSES
  SAMPLE AT START

    DISTRIBUTION:
  2 BOTTLES/SAMPLE
   8 SAMPLES/BOTTLE
  RUN CONTINUOUSLY

      VOLUME:
   120 ml SAMPLES

      ENABLE:
  NONE PROGRAMMED

      ENABLE:
   ONCE ENABLED,
    STAY ENABLED

SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON
0.01 inch TIP
RAIN GAGE

NO YSI SONDE

MASTER/SLAVE OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR
EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

I/O1= NONE
I/O2= NONE
I/O3= NONE
---
0 ANALOG OUTPUTS
NO PERIODIC
SERIAL OUTPUT

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 3293179316 06:23 23-FEB-13
Hardware: B2 Software: 3.26
********** SAMPLING RESULTS **********
SITE: PSNS084DUP
PROGRAM: PSNS084DUP
Program Started at 10:20 WE 20-FEB-13
Nominal Sample Volume = 120 ml
COUNT

TO

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	LIQUID
		10:20	PGM DISABLED		
---------- FR 22-FEB-13 ----------					
		08:25	PGM ENABLED		
1,8	1-2	08:25	E		504
2,8	1-2	08:39	F		504
3,8	1-2	08:54	F		504
4,8	1-2	09:09	F		504
5,8	1-2	09:24	F		506
6,8	1-2	09:39	F		510
7,8	1-2	09:54	F		504
8,8	1-2	10:09	F		505
1,8	3-4	10:24	F		503
2,8	3-4	10:39	F		503
3,8	3-4	10:54	F		506
4,8	3-4	11:09	F		506
5,8	3-4	11:24	F		500
6,8	3-4	11:39	F		503
7,8	3-4	11:54	F		500
8,8	3-4	12:09	F		500
1,8	5-6	12:24	F		500
2,8	5-6	12:39	F		498
3,8	5-6	12:54	F		492
4,8	5-6	13:09	F		492
5,8	5-6	13:24	F		494
6,8	5-6	13:39	F		492
7,8	5-6	13:54	F		492
8,8	5-6	14:09	F		492
1,8	7-8	14:24	F		492
2,8	7-8	14:39	F		492
3,8	7-8	14:54	F		491
4,8	7-8	15:09	F		493
5,8	7-8	15:24	F		492
6,8	7-8	15:39	F		498
7,8	7-8	15:54	F		497
8,8	7-8	16:09	F		498
1,8	9-10	16:24	F		504
2,8	9-10	16:39	F		503
3,8	9-10	16:54	F		504
4,8	9-10	17:09	F		506
5,8	9-10	17:24	F		509
6,8	9-10	17:39	F		511
7,8	9-10	17:54	F		512
8,8	9-10	18:09	F		522

1,8	11-12	18:24	F		527
2,8	11-12	18:39	F		528
3,8	11-12	18:54	F		528
4,8	11-12	19:09	F		523
5,8	11-12	19:24	F		524
6,8	11-12	19:39	F		524
7,8	11-12	19:54	F		524
8,8	11-12	20:09	F		523
1,8	13-14	20:24	F		521
2,8	13-14	20:39	F		523
3,8	13-14	20:54	F		522
4,8	13-14	21:09	F		522
5,8	13-14	21:24	F		524
6,8	13-14	21:39	F		528
7,8	13-14	21:54	F		521
8,8	13-14	22:09	F		528
1,8	15-16	22:24	F		522
2,8	15-16	22:39	F	NM	*
3,8	15-16	22:54	F		536
4,8	15-16	23:09	F	NM	*
5,8	15-16	23:24	F	NM	*
6,8	15-16	23:39	F	NM	*
7,8	15-16	23:54	F	NM	*
---------- SA 23-FEB-13 ----------					
8,8	15-16	00:09	F	NM	*
1,8	17-18	00:24	F		528
2,8	17-18	00:39	F		530
3,8	17-18	00:54	F		517
4,8	17-18	01:09	F		510
5,8	17-18	01:24	F		503
6,8	17-18	01:39	F		504
7,8	17-18	01:54	F		498
8,8	17-18	02:09	F		493
1,8	19-20	02:24	F		492
2,8	19-20	02:39	F		488
3,8	19-20	02:54	F		487
4,8	19-20	03:09	F		485
5,8	19-20	03:24	F		486
6,8	19-20	03:39	F		486
7,8	19-20	03:54	F		480
8,8	19-20	04:09	F		486
1,8	21-22	04:24	F		481
2,8	21-22	04:39	F		486
3,8	21-22	04:54	F		486
4,8	21-22	05:09	F		486
5,8	21-22	05:24	F		485

```
  6,8   21-22 05:39      F          486
  7,8   21-22 05:54      F          487
  8,8   21-22 06:09      F          488
   SOURCE E  ==> ENABLE
   SOURCE F  ==> FLOW
    ERROR NM ==> NO MORE LIQUID!
----------------------------------------
```

*** Model 6700 HW Rev: B2 SW Rev: 3.26.0000 ID 3293179322
> REPORT
SAMPLER ID# 3293179322 06:25 23-FEB-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  06:25 23-FEB-13
  Hardware: B2      Software: 3.26
********** SAMPLING RESULTS **********
   SITE: PSNS 053
PROGRAM: PSNS 053
Program Started at 12:41 WE 20-FEB-13
Nominal Sample Volume =  240 ml
                              COUNT
                                TO
SAMPLE  BOTTLE TIME  SOURCE ERROR LIQUID
------- ------ ----      -- --    ------
            12:41  PGM DISABLED
------------- FR 22-FEB-13 -------------
            08:10  PGM ENABLED
  1,4     1   08:10      E          493
  2,4     1   08:24      F          475
```

3,4	1	08:39	F		470
4,4	1	08:54	F		469
1,4	2	09:09	F		469
2,4	2	09:24	F		464
3,4	2	09:39	F		469
4,4	2	09:54	F		469
1,4	3	10:09	F		469
2,4	3	10:24	F		469
3,4	3	10:39	F		465
4,4	3	10:54	F		462
1,4	4	11:09	F		464
2,4	4	11:24	F		469
3,4	4	11:39	F		469
4,4	4	11:54	F		470
1,4	5	12:09	F		475
2,4	5	12:24	F		469
3,4	5	12:39	F		475
4,4	5	12:54	F		475
1,4	6	13:09	F		476
2,4	6	13:24	F		476
3,4	6	13:39	F		481
4,4	6	13:54	F		487
1,4	7	14:09	F		487
2,4	7	14:24	F		491
3,4	7	14:39	F		488
4,4	7	14:54	F		493
1,4	8	15:09	F		481
2,4	8	15:24	F		476
3,4	8	15:39	F	NL	*
4,4	8	15:54	F	NL	*
1,4	9	16:09	F	NL	*
2,4	9	16:24	F	NL	*
3,4	9	16:39	F	NL	*
4,4	9	16:54	F	NL	*
1,4	10	17:09	F	NL	*
2,4	10	17:24	F	NL	*
3,4	10	17:39	F	NL	*
4,4	10	17:54	F	NL	*
1,4	11	18:09	F	NL	*
2,4	11	18:24	F	NL	*
3,4	11	18:39	F	NL	*
4,4	11	18:54	F	NL	*
1,4	12	19:09	F	NL	*
2,4	12	19:24	F	NL	*
3,4	12	19:39	F	NL	*
4,4	12	19:54	F	NL	*

1,4	13	20:09	F	NL	*
2,4	13	20:24	F	NL	*
3,4	13	20:39	F	NL	*
4,4	13	20:54	F	NL	*
1,4	14	21:09	F	NL	*
2,4	14	21:24	F	NL	*
3,4	14	21:39	F	NL	*
4,4	14	21:54	F	NL	*
1,4	15	22:09	F	NL	*
2,4	15	22:24	F	NL	*
3,4	15	22:39	F	NL	*
4,4	15	22:54	F	NL	*
1,4	16	23:09	F	NL	*
2,4	16	23:24	F	NL	*
3,4	16	23:39	F	NL	*
4,4	16	23:54	F	NL	*

---------- SA 23-FEB-13 ----------

1,4	17	00:09	F	NL	*
2,4	17	00:24	F	NL	*
3,4	17	00:39	F	NL	*
4,4	17	00:54	F	NL	*
1,4	18	01:09	F	NL	*
2,4	18	01:24	F	NL	*
3,4	18	01:39	F	NL	*
4,4	18	01:54	F	NL	*
1,4	19	02:09	F	NL	*
2,4	19	02:24	F	NL	*
3,4	19	02:39	F	NL	*
4,4	19	02:54	F	NL	*
1,4	20	03:09	F	NL	*
2,4	20	03:24	F		491
3,4	20	03:39	F		481
4,4	20	03:54	F		482
1,4	21	04:09	F		481
2,4	21	04:24	F		481
3,4	21	04:39	F		481
4,4	21	04:54	F		481
1,4	22	05:09	F		485
2,4	22	05:24	F		484
3,4	22	05:39	F		487
4,4	22	05:54	F		487
1,1	23	06:09	F		487

SOURCE E ==> ENABLE
SOURCE F ==> FLOW
ERROR NL ==> NO LIQUID DETECTED!

*** Model 6700 HW Rev: B2 SW Rev: 3.26.0000 ID 2425546782
> REPORT
SAMPLER ID# 2425546782 06:39 23-FEB-13
  Hardware: B2   Software: 3.26
********** PROGRAM SETTINGS **********

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

   UNITS SELECTED:
     LENGTH: ft

  24, 1000 ml BTLS
 30 ft SUCTION LINE
  9 ft SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    FLOW, EVERY
       1 PULSES
  SAMPLE AT START

    DISTRIBUTION:
   4 SAMPLES/BOTTLE

      VOLUME:
   240 ml SAMPLES

      ENABLE:
  NONE PROGRAMMED

      ENABLE:
   ONCE ENABLED,
    STAY ENABLED
  SAMPLE AT ENABLE

      ENABLE:
 0 PAUSE & RESUMES

 NO DELAY TO START

```
    ----------
    ----------
  LIQUID DETECT ON
    NO RAIN GAGE
    ----------
    NO YSI SONDE
    ----------
  MASTER/SLAVE OFF
BTL FULL DETECT OFF
  TIMED BACKLIGHT
    ----------
  EVENT MARK SENT
 DURING PUMP CYCLE
    ----------
  PUMP COUNTS FOR
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
    ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE
    ----------
  0 ANALOG OUTPUTS
    NO PERIODIC
   SERIAL OUTPUT
    ----------
    NO DIALOUT
   CONDITIONS SET
----------------------------------------
SAMPLER ID# 2425546782  06:39 23-FEB-13
  Hardware: B2      Software: 3.26
********** SAMPLING RESULTS **********
   SITE: PSNS PB01
PROGRAM: PSNS PB01
Program Started at 13:24 WE 20-FEB-13
Nominal Sample Volume =  240 ml
                              COUNT
                                TO
SAMPLE  BOTTLE TIME  SOURCE ERROR LIQUID
------- ------ ----      -- --    ------
            13:24  PGM DISABLED
------------- FR 22-FEB-13 -------------
            07:50  PGM ENABLED
  1,4     1   07:50      E          777
  2,4     1   08:04      F          783
```

3,4	1	08:19	F	783
4,4	1	08:34	F	777
1,4	2	08:49	F	785
2,4	2	09:04	F	795
3,4	2	09:19	F	779
4,4	2	09:34	F	785
1,4	3	09:49	F	785
2,4	3	10:04	F	785
3,4	3	10:19	F	794
4,4	3	10:34	F	797
1,4	4	10:49	F	797
2,4	4	11:04	F	797
3,4	4	11:19	F	796
4,4	4	11:34	F	797
1,4	5	11:49	F	797
2,4	5	12:04	F	797
3,4	5	12:19	F	798
4,4	5	12:34	F	788
1,4	6	12:49	F	797
2,4	6	13:04	F	791
3,4	6	13:19	F	797
4,4	6	13:34	F	789
1,4	7	13:49	F	797
2,4	7	14:04	F	803
3,4	7	14:19	F	791
4,4	7	14:34	F	797
1,4	8	14:49	F	790
2,4	8	15:04	F	791
3,4	8	15:19	F	797
4,4	8	15:34	F	797
1,4	9	15:49	F	803
2,4	9	16:04	F	803
3,4	9	16:19	F	797
4,4	9	16:34	F	791
1,4	10	16:49	F	803
2,4	10	17:04	F P	*
		17:04 POWER FAILED!		
		17:04 POWER RESTORED		
3,4	10	17:19	F P	*
		17:20 POWER FAILED!		
		17:20 POWER RESTORED		
4,4	10	17:34	F P	*
		17:35 POWER FAILED!		
		17:35 POWER RESTORED		
1,2	11	17:49	F P	*
		17:50 POWER FAILED!		

```
          17:50  POWER RESTORED
 2,2    11   18:04      F  P         *
          18:05  POWER FAILED!
          18:05  POWER RESTORED
          18:05  PGM STOPPED 22-FEB
  SOURCE E  ==> ENABLE
  SOURCE F  ==> FLOW
   ERROR P  ==> POWER FAILED!
----------------------------------------
```

*** Model 6700 HW Rev: B2 SW Rev: 3.26.0000 ID 2483481595
> REPORT
SAMPLER ID# 2483481595 06:30 23-FEB-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  06:30 23-FEB-13
  Hardware: B2      Software: 3.26
********** SAMPLING RESULTS **********
   SITE: PSNS015
PROGRAM: PSNS015
Program Started at 13:53 WE 20-FEB-13
Nominal Sample Volume =  240 ml
                              COUNT
                                TO
SAMPLE  BOTTLE TIME  SOURCE ERROR LIQUID
------- ------ ----      -- --    ------
            13:53  PGM DISABLED
------------- FR 22-FEB-13 -------------
            07:47  PGM ENABLED
  1,4     1   07:47      E          773
  2,4     1   08:01      F          785
```

3,4	1	08:16	F		785
4,4	1	08:31	F		785
1,4	2	08:46	F		792
2,4	2	09:01	F		795
3,4	2	09:16	F		797
4,4	2	09:31	F		797
1,4	3	09:46	F		797
2,4	3	10:01	F		791
3,4	3	10:16	F		789
4,4	3	10:31	F		795
1,4	4	10:46	F		786
2,4	4	11:01	F		785
3,4	4	11:16	F		779
4,4	4	11:31	F		783
1,4	5	11:46	F		779
2,4	5	12:01	F		771
3,4	5	12:16	F		768
4,4	5	12:31	F		771
1,4	6	12:46	F		767
2,4	6	13:01	F		765
3,4	6	13:16	F		759
4,4	6	13:31	F		761
1,4	7	13:46	F		761
2,4	7	14:01	F		762
3,4	7	14:16	F		751
4,4	7	14:31	F		761
1,4	8	14:46	F		756
2,4	8	15:01	F		760
3,4	8	15:16	F		764
4,4	8	15:31	F		761
1,4	9	15:46	F		773
2,4	9	16:01	F		775
3,4	9	16:16	F		781
4,4	9	16:31	F		783
1,4	10	16:46	F		788
2,4	10	17:01	F		788
3,4	10	17:16	F		799
4,4	10	17:31	F		805
1,4	11	17:46	F		813
2,4	11	18:01	F		819
3,4	11	18:16	F		824
4,4	11	18:31	F		841
1,4	12	18:46	F		849
2,4	12	19:01	F	NL	*
3,4	12	19:16	F	NL	*
4,4	12	19:31	F	NL	*

1,4	13	19:46	F	NL	*
2,4	13	20:01	F	NL	*
3,4	13	20:16	F	NL	*
4,4	13	20:31	F	NL	*
1,4	14	20:46	F	NL	*
2,4	14	21:01	F	NL	*
3,4	14	21:16	F	NL	*
4,4	14	21:31	F	NL	*
1,4	15	21:46	F	NL	*
2,4	15	22:01	F	NL	*
3,4	15	22:16	F	NL	*
4,4	15	22:31	F	NL	*
1,4	16	22:46	F	NL	*
2,4	16	23:01	F	NL	*
3,4	16	23:16	F	NL	*
4,4	16	23:31	F	NL	*
1,4	17	23:46	F	NL	*

---------- SA 23-FEB-13 ----------

2,4	17	00:01	F	NL	*
3,4	17	00:16	F		839
4,4	17	00:31	F		821
1,4	18	00:46	F		809
2,4	18	01:01	F		803
3,4	18	01:16	F		796
4,4	18	01:31	F		791
1,4	19	01:46	F		783
2,4	19	02:01	F		773
3,4	19	02:16	F		762
4,4	19	02:31	F		761
1,4	20	02:46	F		750
2,4	20	03:01	F		749
3,4	20	03:16	F		744
4,4	20	03:31	F		745
1,4	21	03:46	F		743
2,4	21	04:01	F		742
3,4	21	04:16	F		739
4,4	21	04:31	F		740
1,4	22	04:46	F		747
2,4	22	05:01	F		744
3,4	22	05:16	F		745
4,4	22	05:31	F		749
1,2	23	05:46	F		749
2,2	23	06:01	F		749

SOURCE E ==> ENABLE
SOURCE F ==> FLOW
ERROR NL ==> NO LIQUID DETECTED!

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:
1234567891011121314151617181920212223242526272829303132333435363738394041424344454647484950

000
FXUS66 KSEW 220513
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
913 PM PST THU FEB 21 2013

.SYNOPSIS...WINDY CONDITIONS AND HEAVY MOUNTAIN SNOW ARE EXPECTED FRIDAY AND FRIDAY NIGHT AS A STRONG COLD FRONT IMPACTS THE AREA. SHOWERS WILL DECREASE SATURDAY IN A BREAK BETWEEN SYSTEMS. ANOTHER WARM FRONT WILL REACH THE REGION SUNDAY FOLLOWED BY A COLD FRONT ON MONDAY.

&&

.SHORT TERM...A VIGOROUS FRONTAL SYSTEM WILL MOVE THROUGH THE AREA FRIDAY. EXPECT BLUSTERY WINDS AS THE PDX-BLI GRADIENT GETS UP TO AROUND +11MB AND OLM-BLI PEAKS AT 6MB FRIDAY AFTERNOON. SNOW WILL BECOME HEAVY IN THE MOUNTAINS AND SNOW SHOWERS BEHIND THE FRONT WILL CONTINUE IN THE CASCADES AND OLYMPICS THROUGH FRIDAY NIGHT IN STRONG ONSHORE FLOW AND GOOD OROGRAPHICS. THE PSCZ WIND PATTERN WILL SET UP FRIDAY EVENING WITH A BAND OF HEAVY SHOWERS POSSIBLE IN THE CASCADES NEAR HIGHWAY 2. SOUTHERLY WINDS WITH THE FRONT AND POSTFRONTAL WESTERLIES WILL BE FLIRTING WITH SPEEDS THAT ARE IN THE WIND ADVISORY CATEGORY.

DRIER NORTHWEST FLOW ALOFT AND SOME RIDGING WILL DEVELOP SATURDAY AND SATURDAY NIGHT...BREEZY ONSHORE FLOW WILL EASE AND SCATTERED SHOWERS WILL DECREASE. A WARM FRONT WILL BRUSH THE AREA SUNDAY AND THE COLD FRONT WITH THAT NEXT WEAKER FRONTAL SYS WILL ARRIVE MON. 19

.LONG TERM...MONDAY THROUGH THURSDAY WILL REMAIN RELATIVELY ACTIVE WITH FRONTS MOVING THROUGH THE AREA EVERY OTHER DAY OR SO. THE MODELS ARE STILL STRUGGLING WITH THE EXACT DETAILS. IN GENERAL...IT LOOKS LIKE A FRONT WILL MOVE ONSHORE SUNDAY NIGHT OR MONDAY...WITH A BREAK IN BETWEEN SYSTEMS TUESDAY...FOLLOWED BY ANOTHER FRONT TUESDAY NIGHT OR WEDNESDAY. BOTH THE GFS AND ECMWF ARE BEGINNING TO HINT AT A BIT OF A PINEAPPLE EXPRESS STARTING THURSDAY. SCHNEIDER

&&

.HYDROLOGY...RIVER FLOODING IS NOT EXPECTED THE NEXT 7 DAYS.

&&

.AVIATION...A DEEP UPPER TROUGH WILL DIVE IN FROM THE NW ON FRI...PUSHING A STRONG COLD FRONT ACROSS WRN WA FROM 18Z-21Z FRI. HEAVY RAIN AND MOUNTAIN SNOW DEVELOPING 09Z-12Z IN ADVANCE OF THE FRONT...BOTH BRINGING REDUCED VSBYS. STRONG LOW-LEVEL WINDS AND LOCALIZED WIND SHEAR IN ADVANCE OF AND ALONG THE FRONT. A MOIST AND UNSTABLE AIR MASS WITH STRONG LOW-LEVEL ONSHORE FLOW WILL FOLLOW THE FRONT...LEADING TO SHOWERY WEATHER.

KSEA...STRONG COLD FROPA ARND 20Z FRI. CIGS WILL MAINLY BE IN THE 015-030 RANGE FOR THE NEXT 30 HOURS...THOUGH CIGS WILL BECOME MORE VARIABLE IN THE POST-FRONTAL SHOWERY REGIME. HEAVIER RAIN AHEAD OF AND ALONG THE FRONT WILL OCCASIONALLY LOWER VSBY TO 3-5SM RA BR. STRONG LOW-LEVEL WINDS WILL PEAK ARND 18Z-21Z...WITH 2000-4000 FT WINDS PEAKING AT 50-70 KT. PEAK SFC WIND GUSTS NEAR 35 KTS EXPECTED. HANER

&&

.MARINE...SMALL CRAFT WINDS WITH THE FRONT FROM EARLIER TODAY ARE DONE...SO ENDED THE SMALL CRAFT ADVISORY FOR THE REST OF TONIGHT OVER THE INTERIOR WATERS.

A VIGOROUS FRONTAL SYSTEM WILL CROSS THE WRN WA WATERS FROM 18Z-21Z FRI. STRONG SE PRESSURE GRADIENTS WILL PRECEDE THE FRONT...THEN STRONG SOUTHWEST GRADIENTS AND ONSHORE FLOW WILL FOLLOW THE FRONT. ARND THE TIME OF FROPA...OLM-BLI GRADIENT EXPECTED TO PEAK NEAR +6 MB...WHICH WOULD BE STRONG ENOUGH FOR SOUTHERLY GALES IN PUGET SOUND AS WELL ARND MIDDAY FRI.

STRONG ONSHORE FLOW WILL CONTINUE TO SUPPORT WESTERLY GALES IN THE STRAIT ON FRI NIGHT AND WELL INTO SAT. GRADIENTS AND WINDS WILL FINALLY EASE ON SAT AFTN.

IN ADDITION...WESTERLY SWELLS WILL BUILD TO 22 TO 24 FT ON SATURDAY IN THE COASTAL WATERS AND UP TO 18 FEET AT THE WEST ENTRANCE TO THE STRAIT OF JUAN DE FUCA.

ANOTHER WEAKER FRONTAL SYSTEM WILL AFFECT WESTERN WASHINGTON SUNDAY THROUGH MONDAY...AND ANOTHER FRONT WILL APPROACH FROM OFFSHORE ON TUESDAY. HANER

&&

.AVALANCHE...A STRONG PACIFIC FRONTAL SYSTEM TAKING AIM AT THE PACIFIC NORTHWEST FRIDAY SHOULD DELIVER 1-2 FEET OR MORE OF SNOWFALL FRIDAY AND FRIDAY NIGHT. WHILE THE DEEP SNOWPACK OF MID-WINTER HAS BEEN RELATIVELY STABLE DURING THE MONTH OF FEBRUARY...HEAVY SNOWFALL...STRONG WESTERLY WINDS...RAPID LOADING AND A GRADUAL WARMING TREND BEGINNING FRIDAY SHOULD CAUSE AVALANCHES TO OCCUR MOSTLY IN THE NEW STORM SNOW.

MORE MODEST AMOUNTS OF SNOW AND WINDS ARE EXPECTED FIRST ON THURSDAY WITH SNOW LEVELS BELOW PASS ELEVATIONS. STORM AND WIND SLAB AVALANCHES THAT RELEASE FRIDAY MAY STEP DOWN AND ENTRAIN SNOWFALL FROM THURSDAY SNOWFALL AS WELL. INCREASINGLY THICK NEW WIND SLABS ARE LIKELY TO FORM ON LEE SLOPES AT HIGHER ELEVATIONS.

BACKCOUNTRY TRAVEL IN AVALANCHE TERRAIN IS NOT RECOMMENDED FRIDAY AND FRIDAY NIGHT.

ALTHOUGH WARNING CONDITIONS ARE NOT CURRENTLY FORECASTED ALONG THE CASCADE EAST SLOPES DUE TO A LITTLE LESS EXPECTED SNOWFALL...A SIGNIFICANT INCREASE IN THE DANGER IS LIKELY IN THAT AREA AS WELL.

PLEASE VISIT NWAC.US FOR DETAILS. FERBER

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...WINTER WEATHER ADVISORY FOR THE NORTH AND CENTRAL CASCADES THROUGH FRIDAY MORNING.
WINTER STORM WARNING FOR THE NORTH AND CENTRAL CASCADES FRIDAY MORNING THROUGH SATURDAY MORNING.
WINTER WEATHER ADVISORY FOR THE OLYMPICS FRIDAY MORNING THROUGH FRIDAY EVENING.
WIND ADVISORY FOR THE COAST AND NORTH INTERIOR FRIDAY.
PZ...SMALL CRAFT ADVISORY COAST AND WEST ENTRANCE TONIGHT.
GALE WARNING ALL WATERS.
SMALL CRAFT ADVISORY FOR ROUGH GRAYS HARBOR BAR.

&&

$$

WEATHER.GOV/SEATTLE

National Weather Service
National Weather Service National Headquarters
1325 East West Highway
Silver Spring, MD 20910
Incorrect Region Format!
Web Master's E-mail: NWS Internet Services Team
Page last modified: Jul 16th, 2012 21:28 UTC

NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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

Several Weather Hazards Expected on Friday Across the United States

Snow, heavy at times, will impact the Upper Great Lakes, Washington and Oregon Cascades, and northern Rockies on Friday. Meanwhile, significant ice accumulations are possible for the central Appalachians. Further south, severe thunderstorms may develop along the central Gulf Coast, with heavy rainfall capable of river and/or flash flooding from southern Mississippi to the eastern Carolinas.
Read More...

BREMERTON WA

En Español

A Few Clouds
39°F
4°C

Humidity	81%
Wind Speed	S 3 MPH
Barometer	30.08 in
Dewpoint	34°F (1°C)
Visibility	10.00 mi

Last Update on 21 Feb 10:15 pm PST

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

OVERNIGHT	FRIDAY	FRIDAY NIGHT	SATURDAY	SATURDAY NIGHT	SUNDAY	SUNDAY NIGHT	MONDAY	MONDAY NIGHT
 80%	 100%	 70%	 30%	 30%	 40%	 60%		
Rain	Rain	Showers Likely	Chance Showers	Chance Rain	Chance Rain	Rain Likely	Chance Rain	Chance Showers
Low: 42 °F	High: 47 °F	Low: 39 °F	High: 47 °F	Low: 39 °F	High: 47 °F	Low: 41 °F	High: 47 °F	Low: 38 °F

7-DAY FORECAST

Overnight	Rain. Low around 42. South southwest wind around 14 mph. Chance of precipitation is 80%.
Friday	Rain. High near 47. South wind around 18 mph. Chance of precipitation is 100%.
Friday Night	Showers likely, mainly before 10pm. Cloudy, with a low around 39. Southwest wind 13 to 16 mph. Chance of precipitation is 70%.
Saturday	A 30 percent chance of showers. Mostly cloudy, with a high near 47. West southwest wind 5 to 10 mph becoming light west in the morning.
Saturday Night	A 30 percent chance of rain. Mostly cloudy, with a low around 39. Calm wind becoming south around 5 mph in the evening.
Sunday	A 40 percent chance of rain. Cloudy, with a high near 47.
Sunday Night	Rain likely. Cloudy, with a low around 41. Chance of precipitation is 60%.
Monday	A chance of rain. Cloudy, with a high near 47.
Monday Night	A chance of showers. Mostly cloudy, with a low around 38.
Tuesday	A chance of rain. Mostly cloudy, with a high near 46.
Tuesday Night	Rain likely. Cloudy, with a low around 41.
Wednesday	Rain likely. Mostly cloudy, with a high near 48.
Wednesday Night	Rain likely. Cloudy, with a low around 43.
Thursday	Rain likely. Cloudy, with a high near 47.

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 122.65°W (Elev. 0 ft)
Last Update:	6:58 pm PST Feb 21, 2013
Forecast Valid:	12am PST Feb 22, 2013-6pm PST Feb 28, 2013

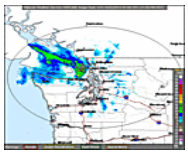
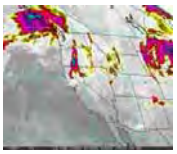
Forecast Discussion

KML XML

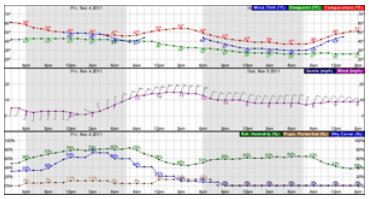
Click Map for Forecast Disclaimer

Requested Location Forecast Area
Lat/Lon: 47.56°N 122.65°W **Elevation:** 0 ft

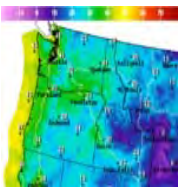
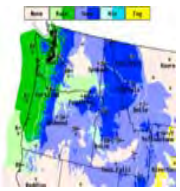
RADAR & SATELLITE IMAGES

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
47.58N 122.66W (Elev. 26 ft)

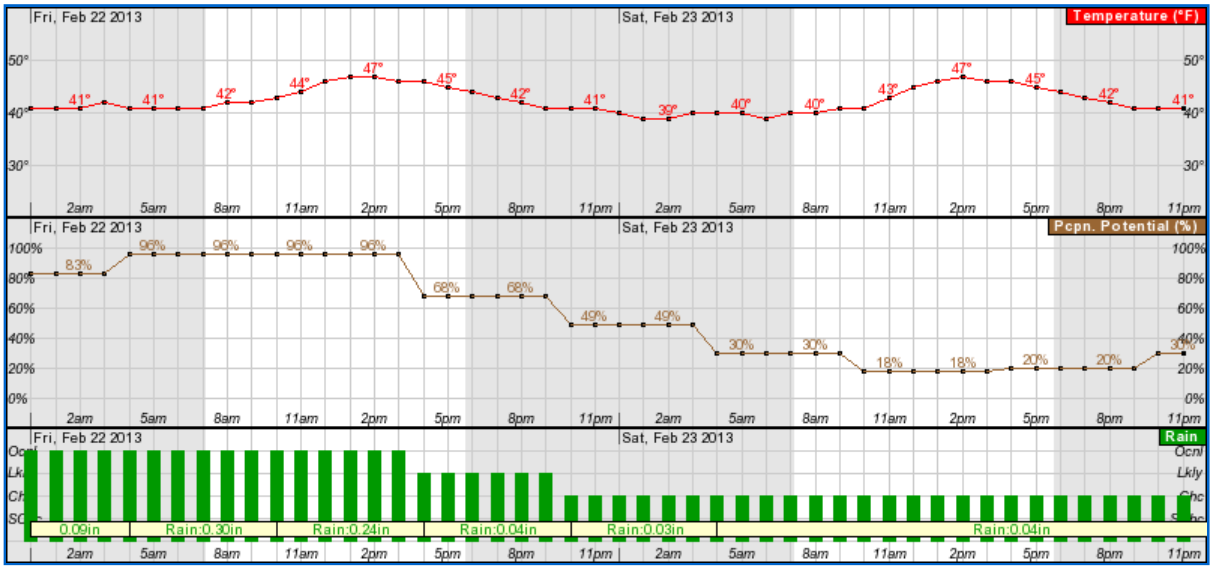
Last Update: 6:58 pm PST Feb 21, 2013

Hourly Weather Forecast Graph

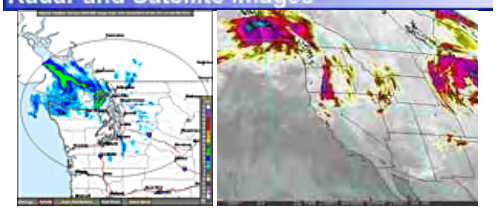
[dashes/dots] | [b/w] | [hide menu]

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: 12am Fri, Feb 22 2013 Submit Back 2 Days Forward 2 Days



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

Disclaimer
Credits
Glossary

Privacy Policy
About Us
Career Opportunities

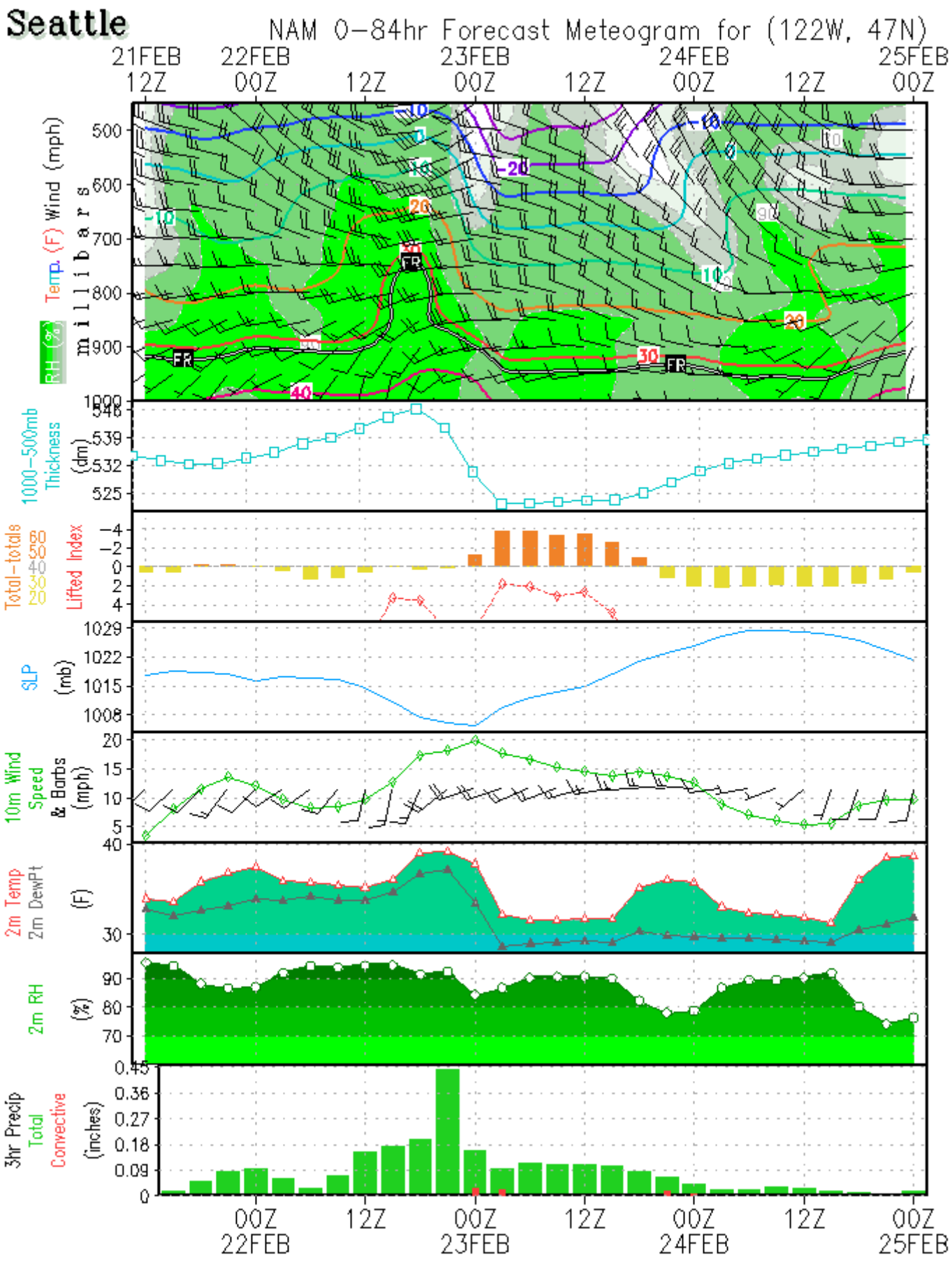
Forecast For Lat/Lon: 47.5620/-122.6230 (Elev. 0 ft)
Bremerton WA

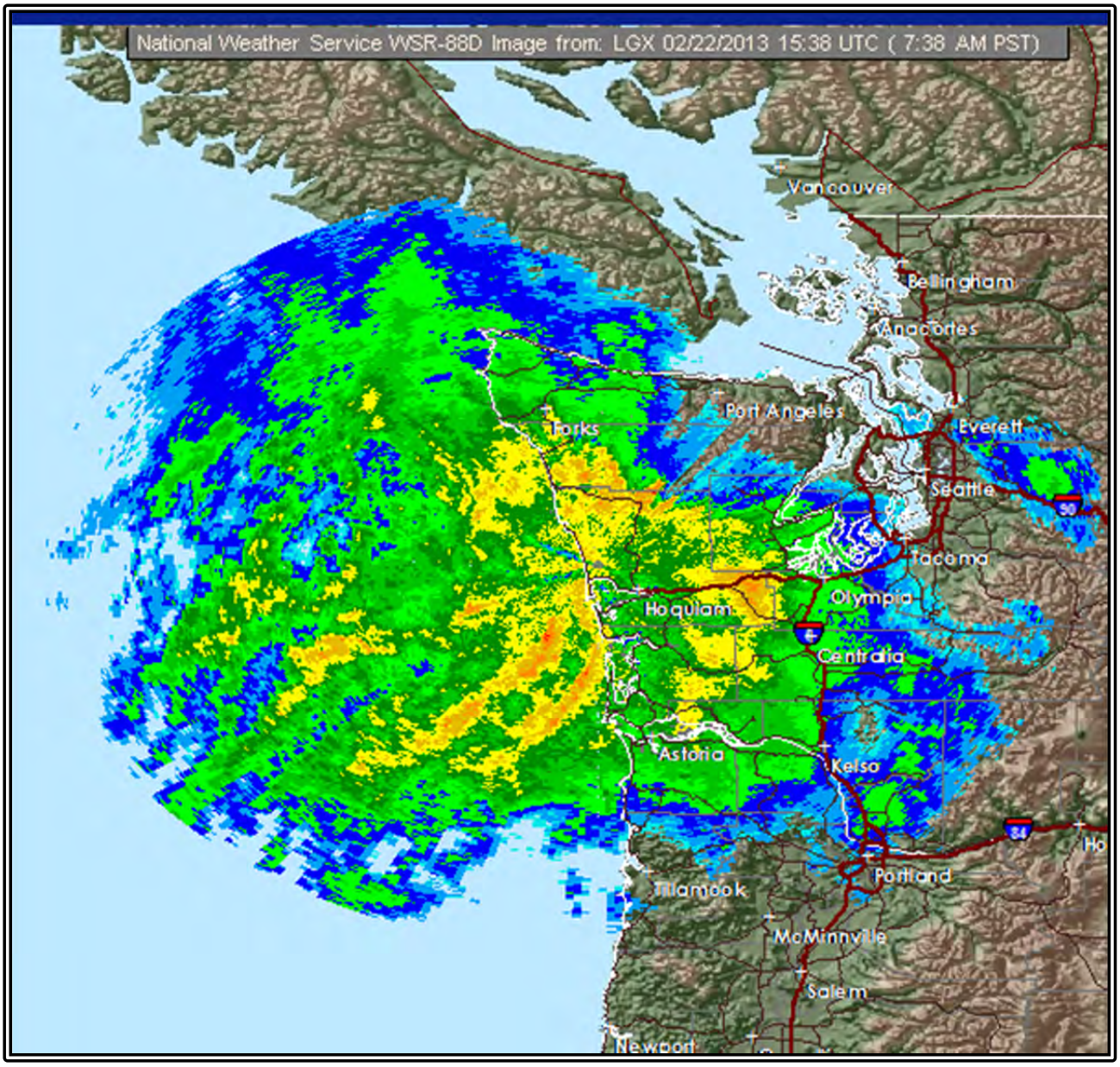
Forecast Created at: 11pm PST Feb 21, 2013

Custom Weather Forecast Table

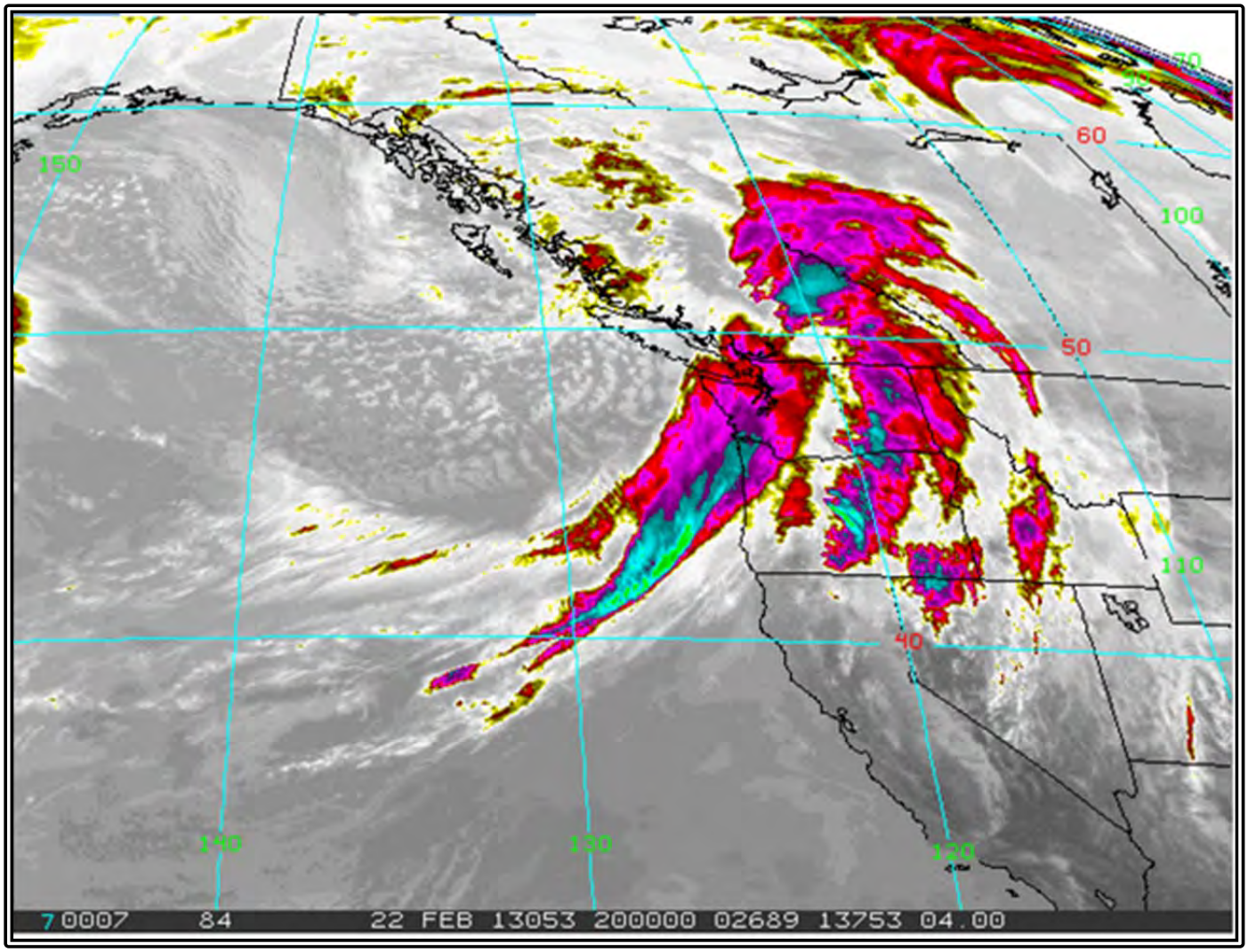
	Thu Feb 21								Fri Feb 22								Sat Feb 23								Sun Feb 24
Weather	Rain		Likely Rain						Rain				Likely Rain				Chance Rain Showers				Chance Rain				
Daily-Temp		High **46** Low **40**								High **48** Low **42**									High **48** Low **39**						Low **40**
Chance of Precip	85%	80%	60%	85%	95%	95%	70%	50%	30%	20%	20%	30%													
Precip	0.04"	0.06"	0.01"	0.16"	0.30"	0.26"	0.04"	0.04"	0.01"	0.01"	0.01"	0.01"													
12-hr Snow Total	0"			0"			0"				0"														

3-Hour	4am	7am	10am	1pm	4pm	7pm	10pm	1am	4am	7am	10am	1pm	4pm	7pm	10pm	1am	4am	7am	10am	1pm	4pm	7pm	10pm	1am
Temp	40	41	42	46	46	44	43	42	42	43	44	48	47	44	41	39	40	40	42	47	47	44	42	40
Cloudiness	100%	100%	100%	100%	99%	99%	100%	100%	100%	100%	100%	100%	98%	98%	94%	94%	85%	85%	67%	67%	69%	69%	69%	69%
Dewpoint	32	32	35	36	36	35	35	35	35	36	39	40	37	34	34	33	31	31	32	33	32	32	32	31
Relative Humdity	72%	72%	76%	68%	68%	71%	74%	77%	75%	75%	81%	74%	67%	69%	75%	79%	71%	70%	69%	57%	56%	62%	67%	71%
Wind	S 7	W 14	SW 17	SW 14	SW 16	SW 15	SW 14	S 12	S 12	S 18	S 18	SW 21	SW 14	SW 17	SW 16	SW 15	SW 10	SW 10	W 0	W 0	N 2	N 2	S 5	S 5
Snow Level (ft)	2050	2050	1973	1973	2584	2584	2372	2372	2557	2557	3738	3738	2492	2492	1394	1394	1417	1417	1603	1603	1870	1870	1457	1457


Seattle
NAM 0-84hr Forecast Meteogram for (122W, 47N)
21FEB 12Z
22FEB 00Z
12Z
23FEB 00Z
12Z
24FEB 00Z
12Z
25FEB 00Z
millibars
Temp. (F) Wind (mph)
RH (%)
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
3hr Precip
Total
Convective
(inches)
00Z 22FEB
12Z
00Z 23FEB
12Z
00Z 24FEB
12Z
00Z 25FEB



Radar image from Langley Hill station, 2/22/13 ~0738, showing full strength of SW15 event



4KM Infrared Sat image, 2/22/13 ~1238, showing heart of SW15 storm event