

# **APPENDICES**



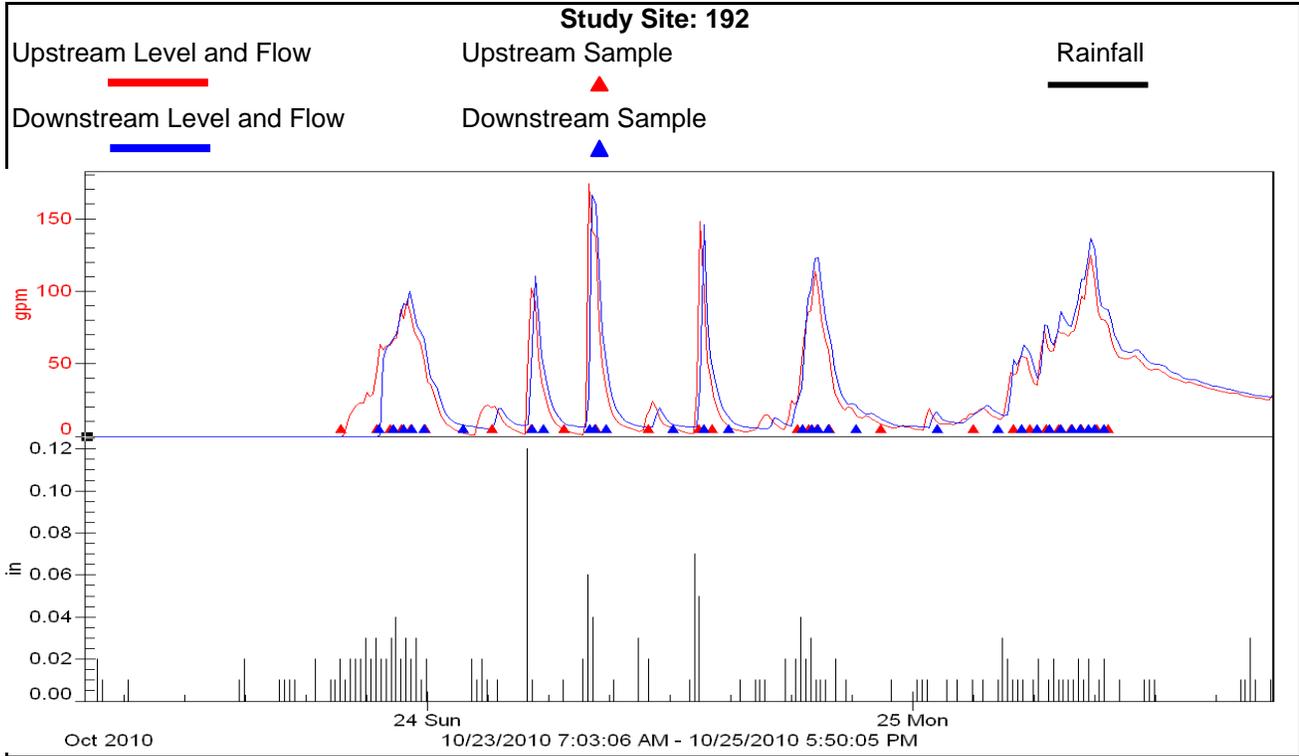
# **Appendix A.**

## **Storm Summary Figures**



**KCRMS In-Line Ditch BMP Study**

**Storm Date:** October 23 - 26 2010      **Laboratory number(s)** L51943-3 and -4  
**Site:** Petrovitsky Rd ab SE 192nd Dr      **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage

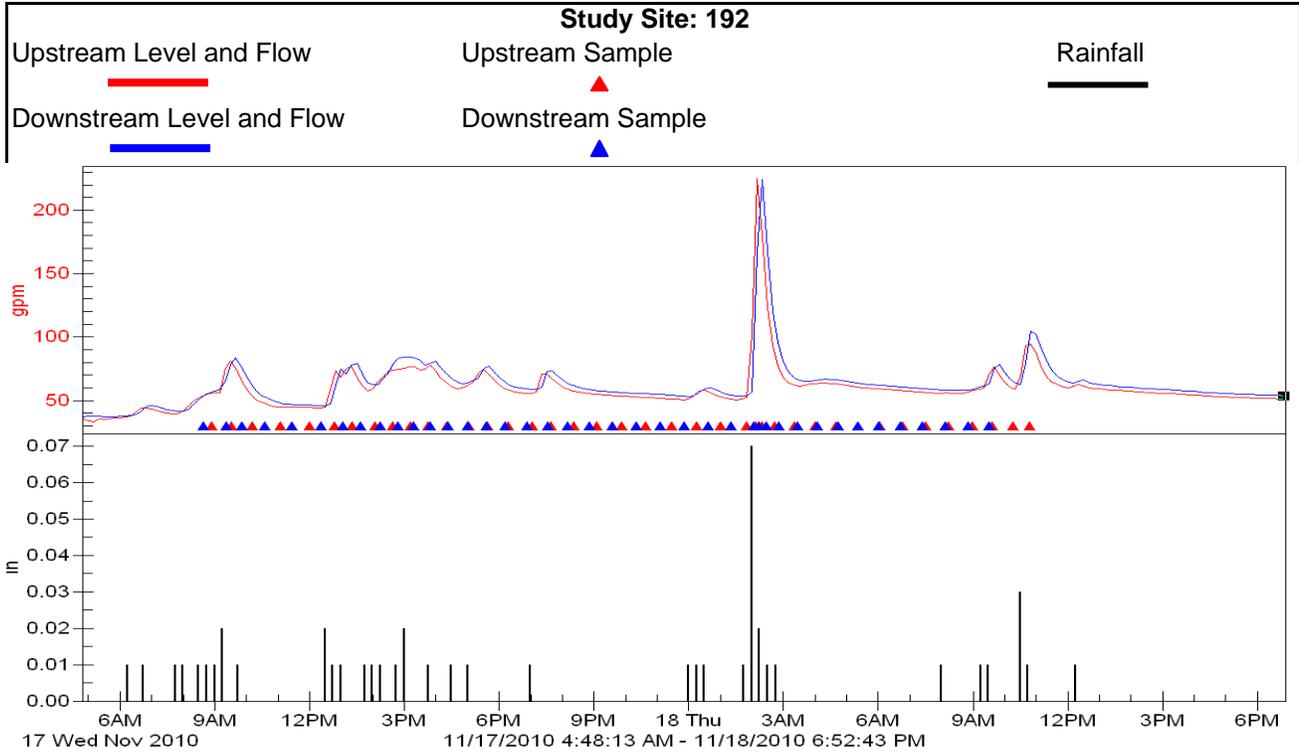


<b>Rainfall (inches):</b>	1.67	
<b>Duration (hours):</b>	49	
<b>Average Intensity (inches per hour):</b>	0.034	
<b>Antecedent Dry Period (hours):</b>	32	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	10/22/2010	
<b>Mid-Storm Visit:</b>	10/24/2010	
<b>Post Storm Visit:</b>	10/25/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	88,694	104,803
<b>Base flow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	78.9	77.5
<b>Number of Aliquots Collected:</b>	30	30

Comments: On-site rain gage = 1.55 inches

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** November 17 - 18 2010      **Laboratory number(s)** L52160-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr      **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	0.39
<b>Duration (hours):</b>	18
<b>Average Intensity (inches per hour):</b>	0.022
<b>Antecedent Dry Period (hours):</b>	35
<b>Inter-storm Dry Period (hours):</b>	<6

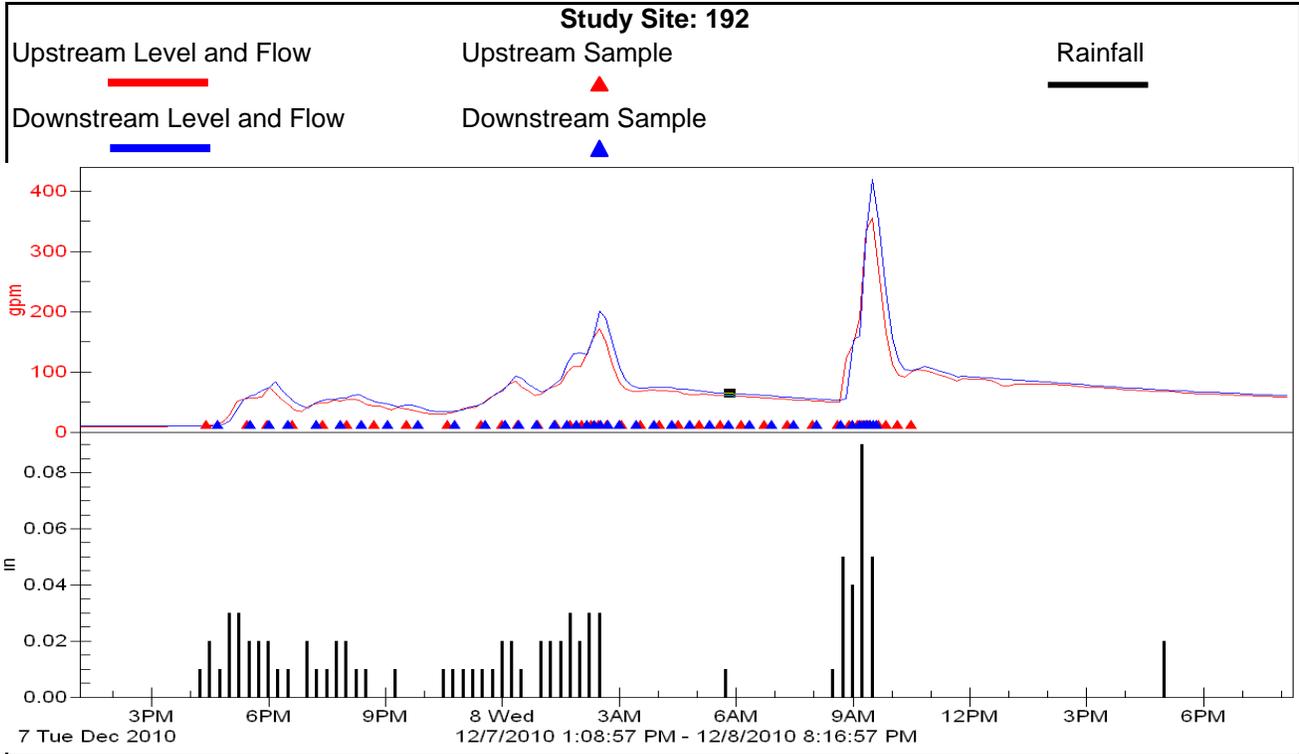
<b>Sampler Set Up:</b>	11/16/2010
<b>Mid-Storm Visit:</b>	11/17/2010
<b>Post Storm Visit:</b>	11/18/2010

<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	132,347	139,058
<b>Base flow (gpm):</b>	27/1900	39
<b>Percent of Hydrograph Sampled:</b>	73.0	67.9
<b>Number of Aliquots Collected:</b>	40	40

**Comments:**  
 On-site rain gage = 0.47 inches

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** December 7 - 8th 2010      **Laboratory number(s)** L52267-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr      **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	0.82
<b>Duration (hours):</b>	17
<b>Average Intensity (inches per hour):</b>	0.034
<b>Antecedent Dry Period (hours):</b>	110
<b>Inter-storm Dry Period (hours):</b>	<6

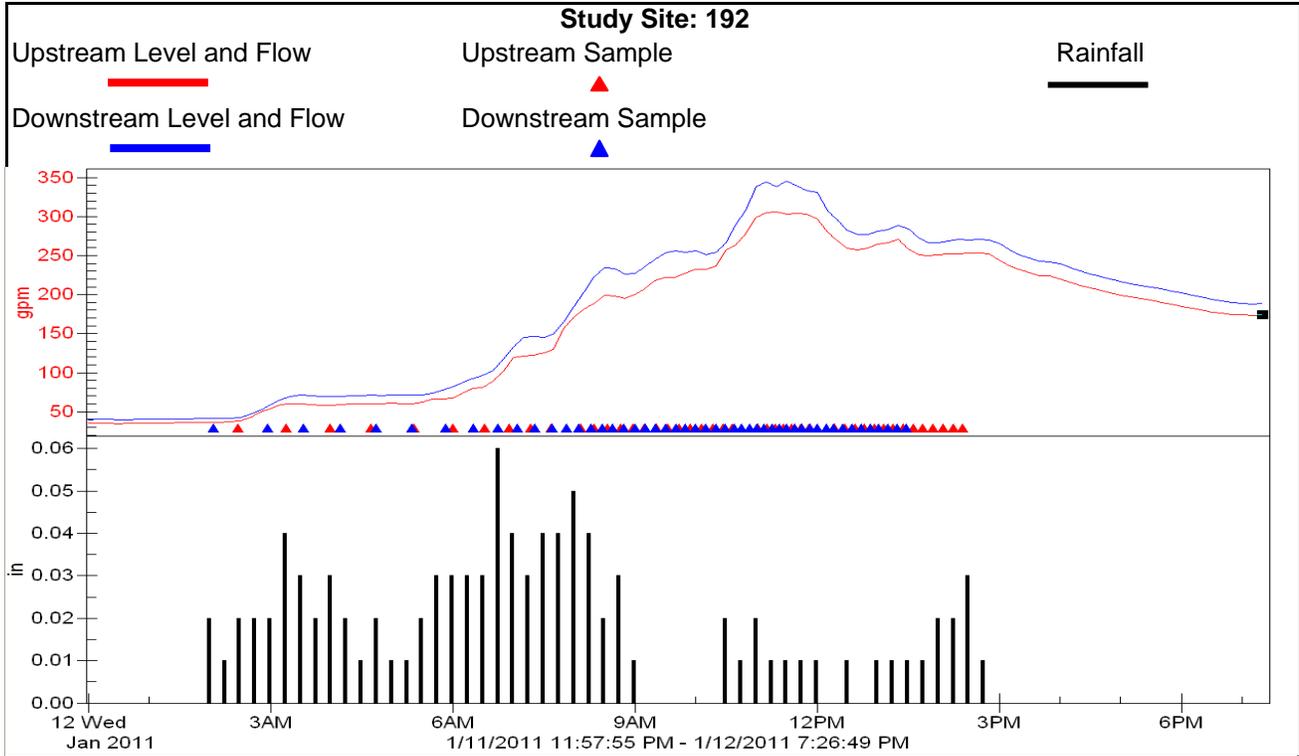
<b>Sampler Set Up:</b>	12/6/2010
<b>Mid-Storm Visit:</b>	12/6/2010 (upstream only)
<b>Post Storm Visit:</b>	12/8/2010

<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	108,457	117,952
<b>Base flow (gpm):</b>	10	10
<b>Percent of Hydrograph Sampled:</b>	71.8	65.5
<b>Number of Aliquots Collected:</b>	40	34

**Comments:** At 192M 4 aliquots #35 - 39 were listed with NM (indicates an incomplete sample aliquot) flag. Last aliquot did not have a flag. Flow is turbid. On-site rain gage = 0.79 inches

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** January 11 - 12 2011      **Laboratory number(s)** L52330-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr      **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	1.0
<b>Duration (hours):</b>	16
<b>Average Intensity (inches per hour):</b>	0.063
<b>Antecedent Dry Period (hours):</b>	63
<b>Inter-storm Dry Period (hours):</b>	<6
<b>Sampler Set Up:</b>	1/11/2011
<b>Mid-Storm Visit:</b>	1/11/2011
<b>Post Storm Visit:</b>	1/12/2011

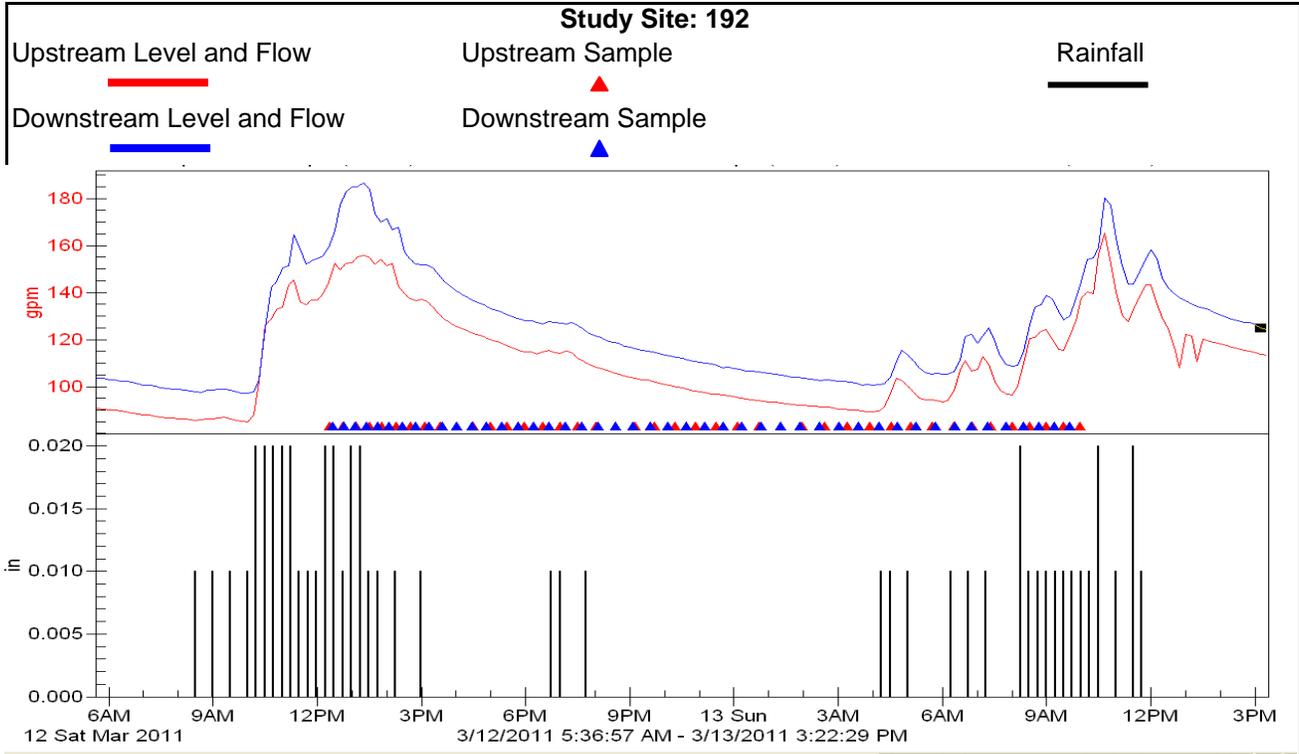
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	179,299	198,048
<b>Base flow (gpm):</b>	36	40
<b>Percent of Hydrograph Sampled:</b>	67.7	61.9
<b>Number of Aliquots Collected:</b>	50	50

**Comments:**

On-site rain gage = 0.68 inches

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** March 12 - 13 2011      **Laboratory number(s)** L52491-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr      **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage



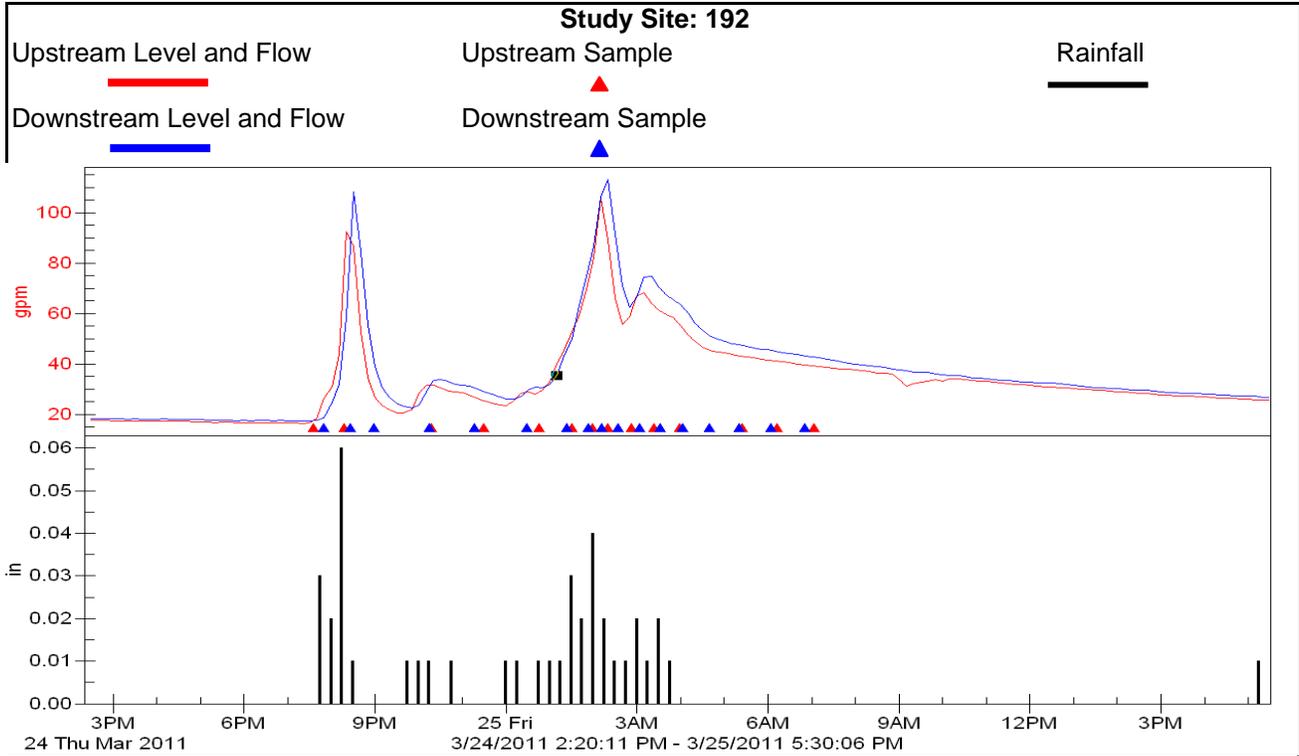
<b>Rainfall (inches):</b>	0.55	
<b>Duration (hours):</b>	15	
<b>Average Intensity (inches per hour):</b>	0.032	
<b>Antecedent Dry Period (hours):</b>	39	
<b>Inter-storm Dry Period (hours):</b>	8	
<b>Sampler Set Up:</b>	3/10/2011	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	3/13/2011	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	203,214	227,395
<b>Base flow (gpm):</b>	70.2	69.1
<b>Percent of Hydrograph Sampled:</b>	88.3	87.6
<b>Number of Aliquots Collected:</b>	42	46

**Comments:**

Storm targeted during a brief (>24 hr) dry period during an extended period of daily storm events. Base (or interflow) conditions were very high; field team set the trigger level high and the first 2 hours of the storm was missed. A dry period of 8 hours mid-sample. Sampling did capture a high percentage of the storm and the upstream and downstream sample aliquots matched closely. This sample should demonstrate downstream treatment of upstream stormflow conditions, and the sample was kept. On-site rain gage = 0.46 inches

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** March 24 - 25th 2011      **Laboratory number(s)** L52798-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr      **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage

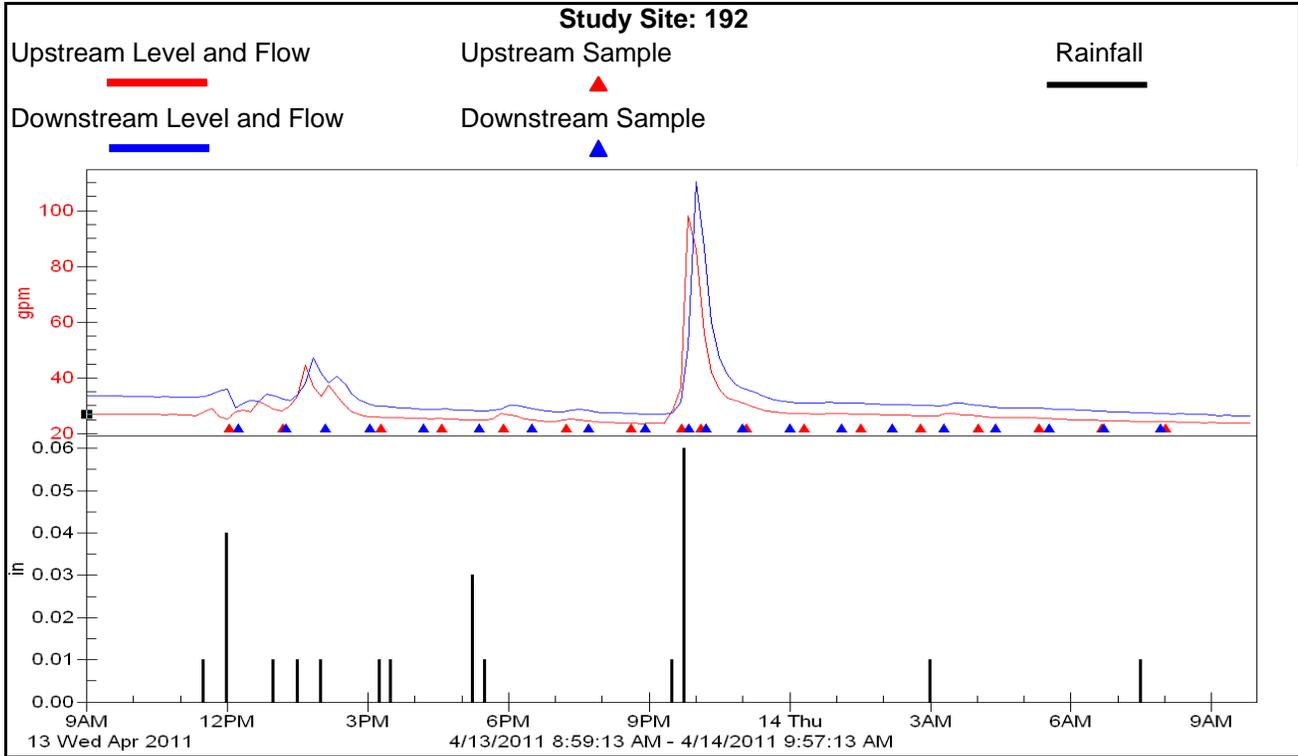


<b>Rainfall (inches):</b>	0.4	
<b>Duration (hours):</b>	9	
<b>Average Intensity (inches per hour):</b>	0.044	
<b>Antecedent Dry Period (hours):</b>	141	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	3/24/2011	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	3/24/2011	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	49,098	52,979
<b>Base flow (gpm):</b>	17	17
<b>Percent of Hydrograph Sampled:</b>	61.4	60.3
<b>Number of Aliquots Collected:</b>	16	17
<b>Comments:</b>		

On-site rain gage = 0.36 inches

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** April 13th - 14th 2011      **Laboratory number(s)** L52877-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr      **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage

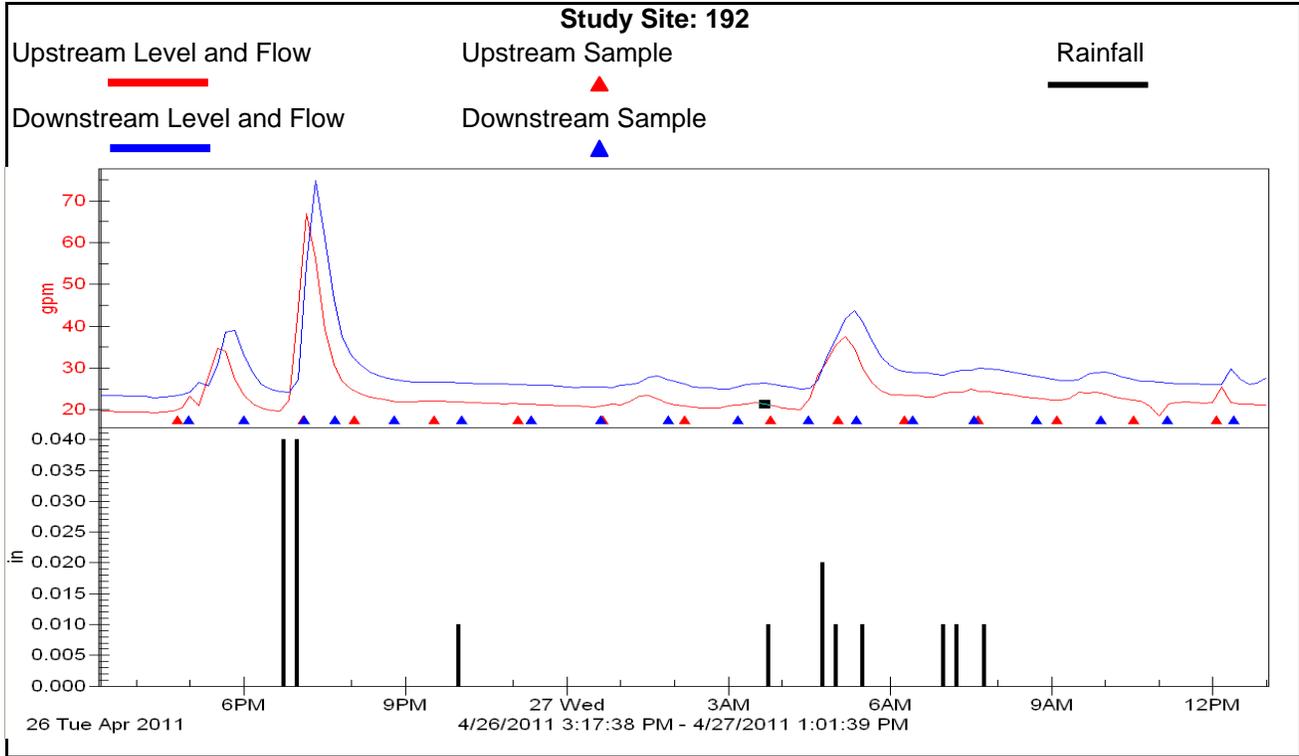


<b>Rainfall (inches):</b>	0.2	
<b>Duration (hours):</b>	20	
<b>Average Intensity (inches per hour):</b>	0.012	
<b>Antecedent Dry Period (hours):</b>	52	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	4/13/2011	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	4/14/2011	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	40,248	45,929
<b>Base flow (gpm):</b>	27	33
<b>Percent of Hydrograph Sampled:</b>	83.9	82.0
<b>Number of Aliquots Collected:</b>	18	20
<b>Comments:</b>		

On-site rain gage = 0.2 inches

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** April 26 - 27 2011      **Laboratory number(s)** L53057-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr      **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage



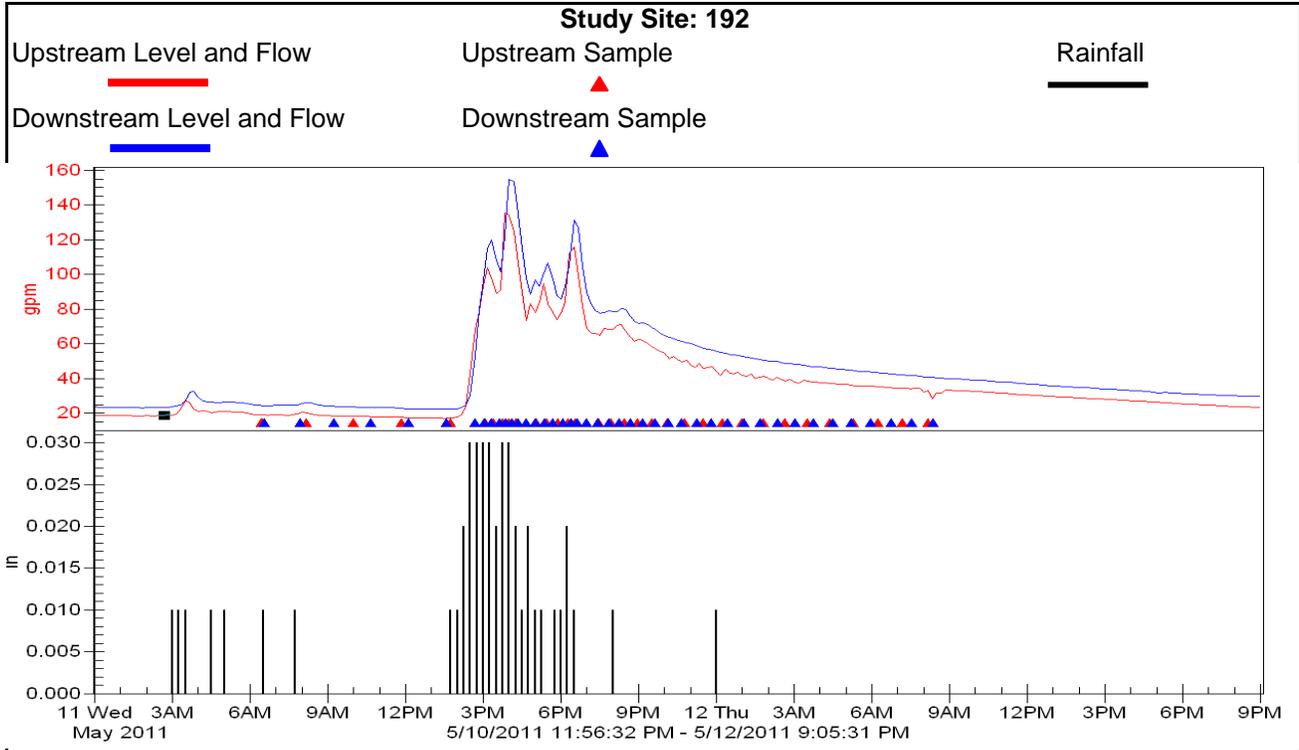
<b>Rainfall (inches):</b>	0.17
<b>Duration (hours):</b>	14
<b>Average Intensity (inches per hour):</b>	0.012
<b>Antecedent Dry Period (hours):</b>	28
<b>Inter-storm Dry Period (hours):</b>	<6
<b>Sampler Set Up:</b>	4/26/2011
<b>Mid-Storm Visit:</b>	4/27/2011
<b>Post Storm Visit:</b>	4/27/2011

<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	32,221	38,911
<b>Base flow (gpm):</b>	21	25
<b>Percent of Hydrograph Sampled:</b>	86.3	87.0
<b>Number of Aliquots Collected:</b>	15	18

**Comments:** Sample aliquots representative of stormflow, samples analyzed. On-site rain gage = 0.18 inches.

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** May 11 - 12 2011 **Laboratory number(s)** L53138-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage



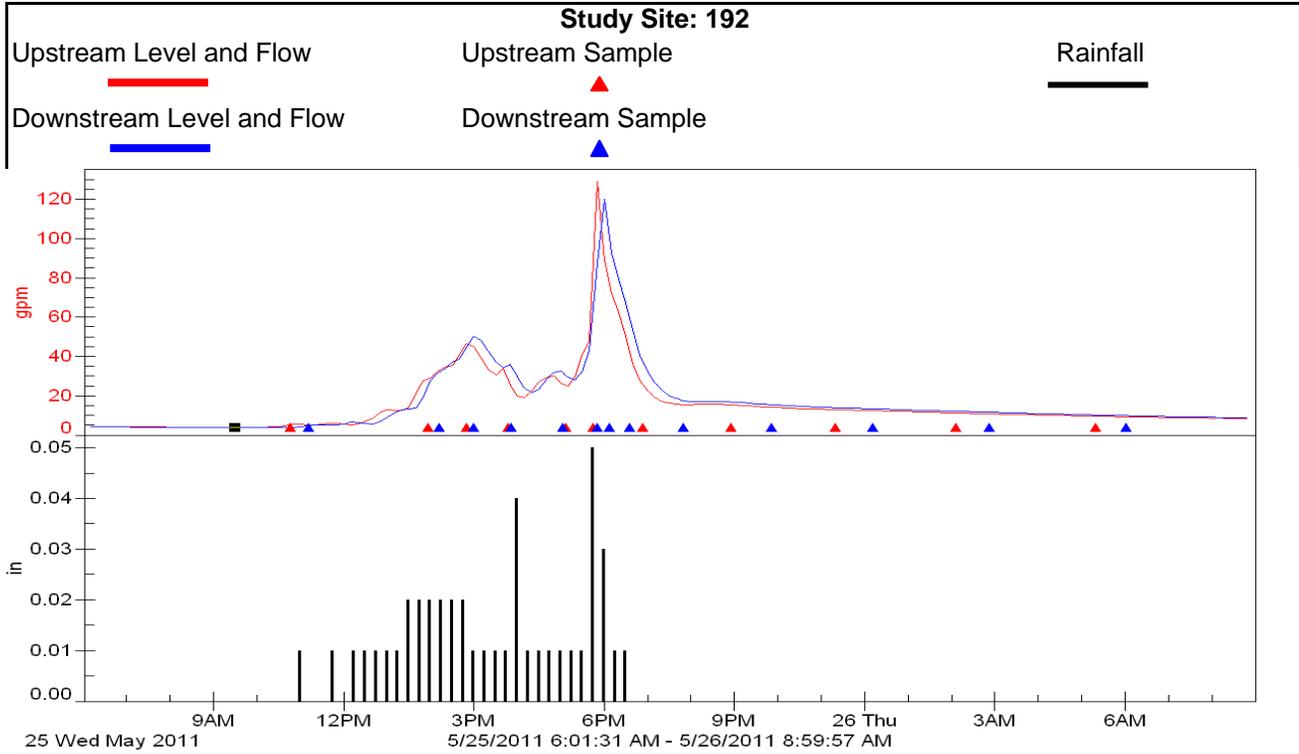
<b>Rainfall (inches):</b>	0.45
<b>Duration (hours):</b>	21
<b>Average Intensity (inches per hour):</b>	0.021
<b>Antecedent Dry Period (hours):</b>	66
<b>Inter-storm Dry Period (hours):</b>	6
<b>Sampler Set Up:</b>	5/11/2011
<b>Mid-Storm Visit:</b>	none
<b>Post Storm Visit:</b>	5/12/2011

<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	101,422	122,632
<b>Base flow (gpm):</b>	19	24
<b>Percent of Hydrograph Sampled:</b>	68.9	68.3
<b>Number of Aliquots Collected:</b>	36	43

**Comments:** Antecedent dry period of 66 hours is less than the dry season criteria of 72 hours. Stormflow well covered by sampling; samples analyzed. On-site rain gage = 0.45 inches.

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** May 25 - 26 2011 **Laboratory number(s)** L53280-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage

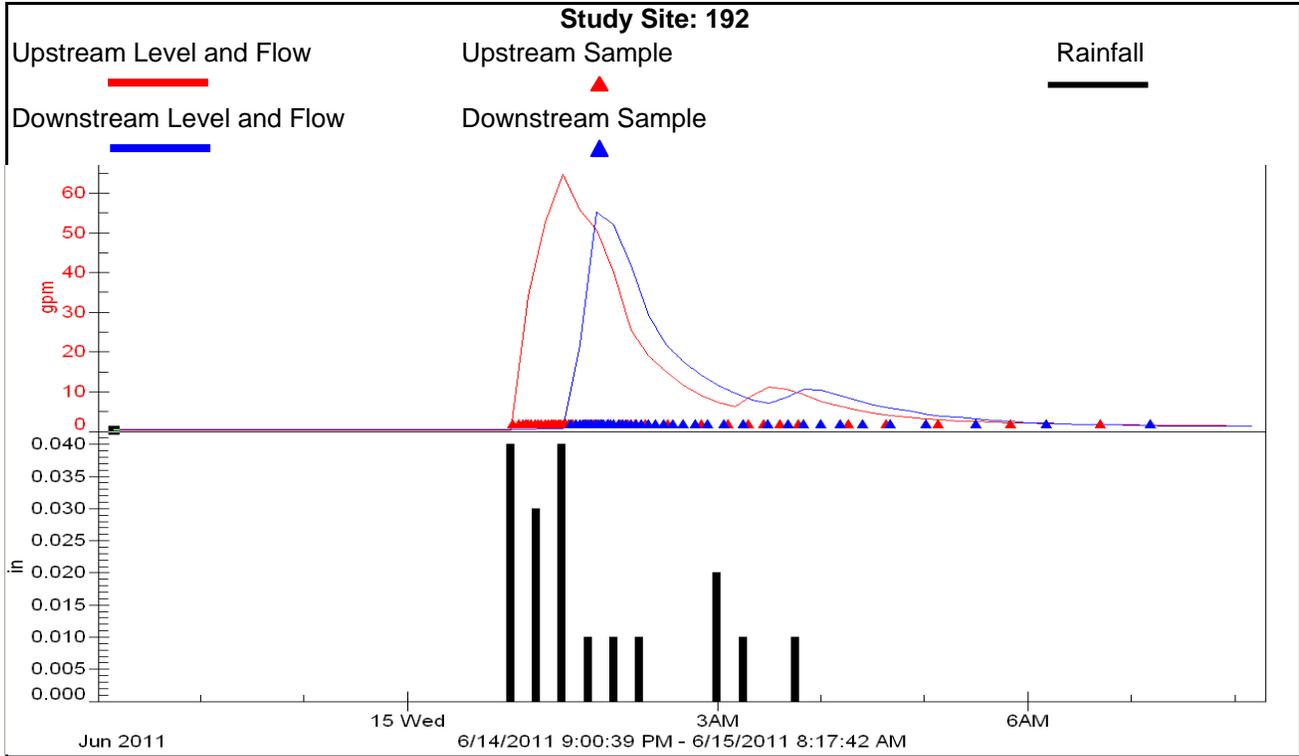


<b>Rainfall (inches):</b>	0.43	
<b>Duration (hours):</b>	8	
<b>Average Intensity (inches per hour):</b>	0.064	
<b>Antecedent Dry Period (hours):</b>	84	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	5/24/2011	
<b>Mid-Storm Visit:</b>	5/25/2011	
<b>Post Storm Visit:</b>	5/26/2011	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	21,982	23,993
<b>Base flow (gpm):</b>	4	4
<b>Percent of Hydrograph Sampled:</b>	92.6	94.0
<b>Number of Aliquots Collected:</b>	12	12

Comments: On-site rain gage = 0.37 inches.

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** June 15 - 16 2011 **Laboratory number(s)** L53348-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage



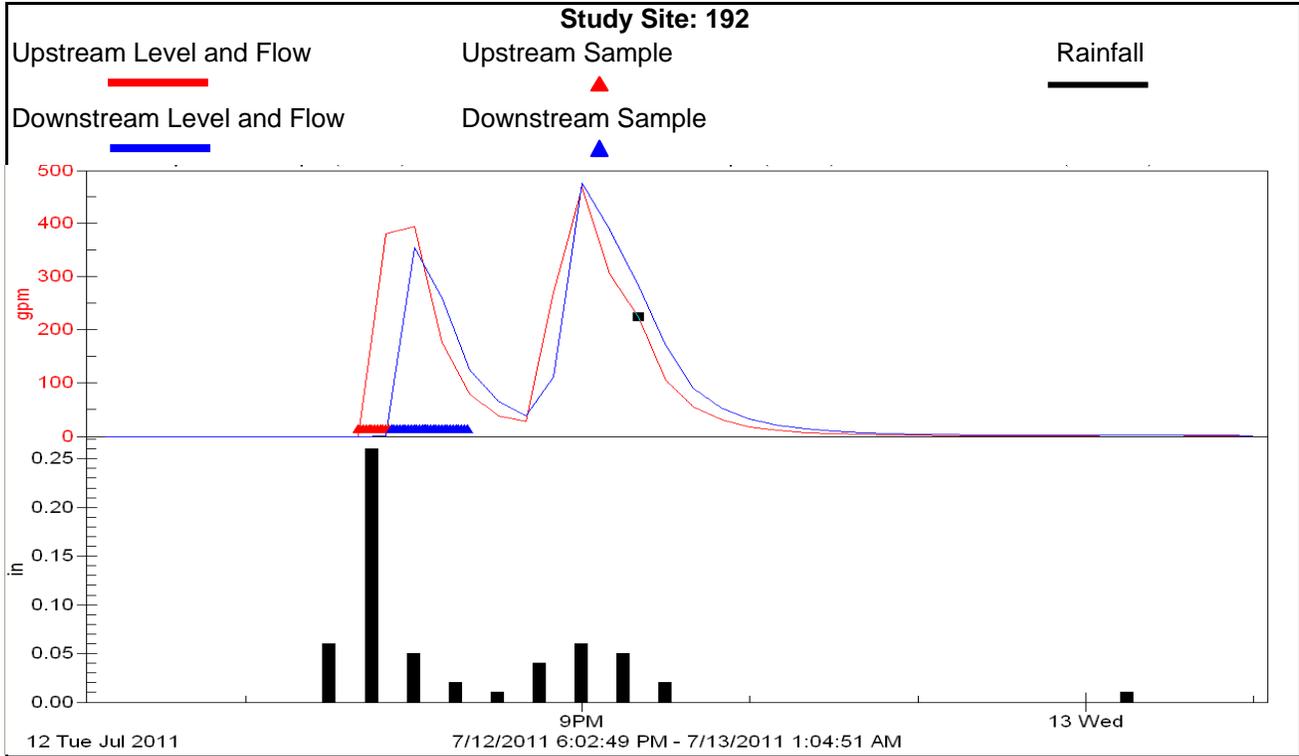
<b>Rainfall (inches):</b>	0.18
<b>Duration (hours):</b>	0.18
<b>Average Intensity (inches per hour):</b>	0.06
<b>Antecedent Dry Period (hours):</b>	41
<b>Inter-storm Dry Period (hours):</b>	<6
<b>Sampler Set Up:</b>	6/14/2011
<b>Mid-Storm Visit:</b>	none
<b>Post Storm Visit:</b>	6/15/2011

<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	4,895	3,893
<b>Base flow (gpm):</b>	0	1
<b>Percent of Hydrograph Sampled:</b>	100.0	100.0
<b>Number of Aliquots Collected:</b>	50	40

**Comments:** Antecedent dry period of 41 hrs is less than criteria of 72 hours. Total rainfall was 0.18 inches; less than the 0.2 inch rainfall criteria. The stormflow was well covered by the sampling; the sample was kept for analysis as a good representation of conditions this dry season. The entire storm fell in three hours without the typical preceding showers, and the storm started with 0.12 inches falling in just one hour. On-site rain gage = 0.16 inches

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** July 12 2011 **Laboratory number(s)** L53471-1 and -2  
**Site:** Petrovitsky Rd ab SE 192nd Dr **Site ID:** (192)  
**BMPs:** Six Water Quality BMPs with Compost Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flumes with stilling well  
**Monitoring Equipment:** Isco Bubble Meters and 6712 Autosamplers  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	0.63
<b>Duration (hours):</b>	2
<b>Average Intensity (inches per hour):</b>	0.315
<b>Antecedent Dry Period (hours):</b>	131
<b>Inter-storm Dry Period (hours):</b>	<6
<b>Sampler Set Up:</b>	7/12/2011
<b>Mid-Storm Visit:</b>	none
<b>Post Storm Visit:</b>	7/13/2011

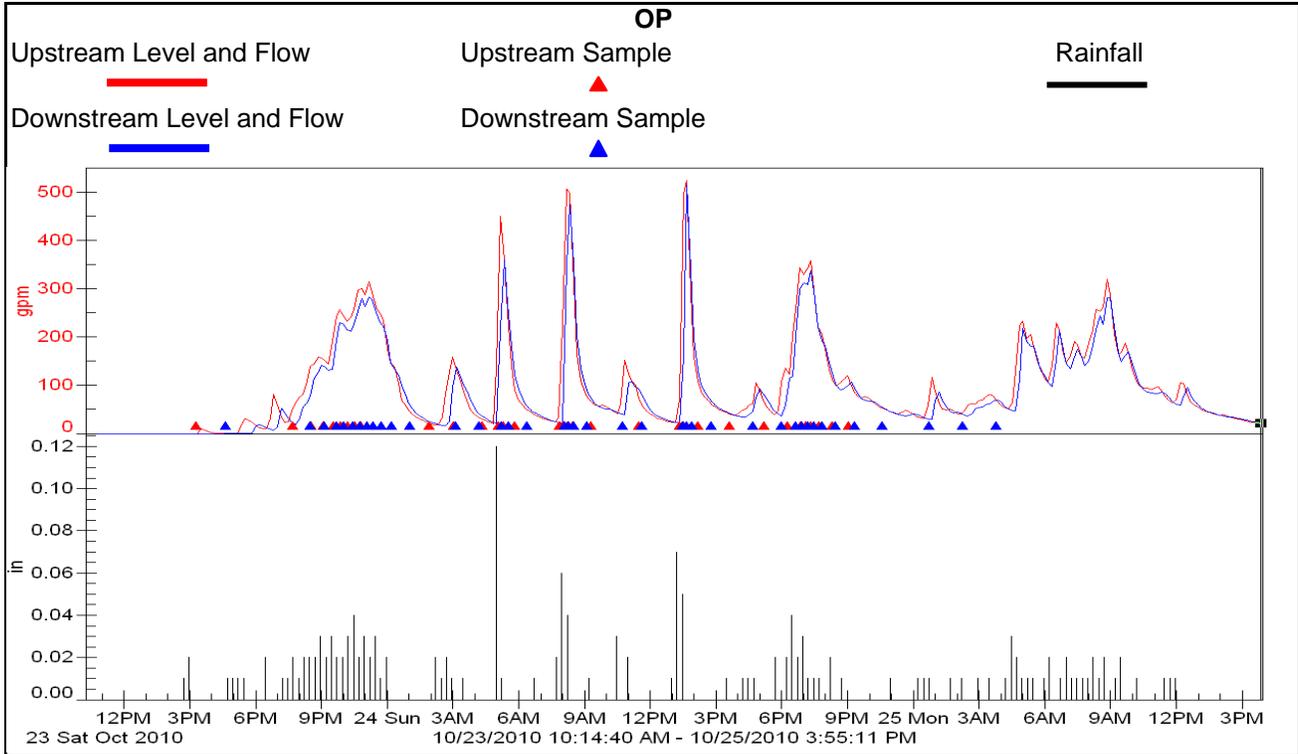
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	26,230	25,920
<b>Base flow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	36.3	32.5
<b>Number of Aliquots Collected:</b>	50	50

**Comments:** High intensity storm came in two cells that resulted two very distinct hydrograph peaks. The sampler captured 87% of the first peak upstream peak flow of 10,986 gallons from 0.4 inches of rain in one hour with matching results from downstream sampling.



**KCRMS In-Line Ditch BMP Study**

**Storm Date:** October 23 - 25 2010      **Laboratory number(s)** L51943-1 and -2  
**Site:** Petrovitsky Rd at Old Petrovitsky Rd      **(OP)** Stormsample No. 2  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	1.64
<b>Duration (hours):</b>	1.64
<b>Average Intensity (inches per hour):</b>	0.03
<b>Antecedent Dry Period (hours):</b>	32
<b>Inter-storm Dry Period (hours):</b>	<6

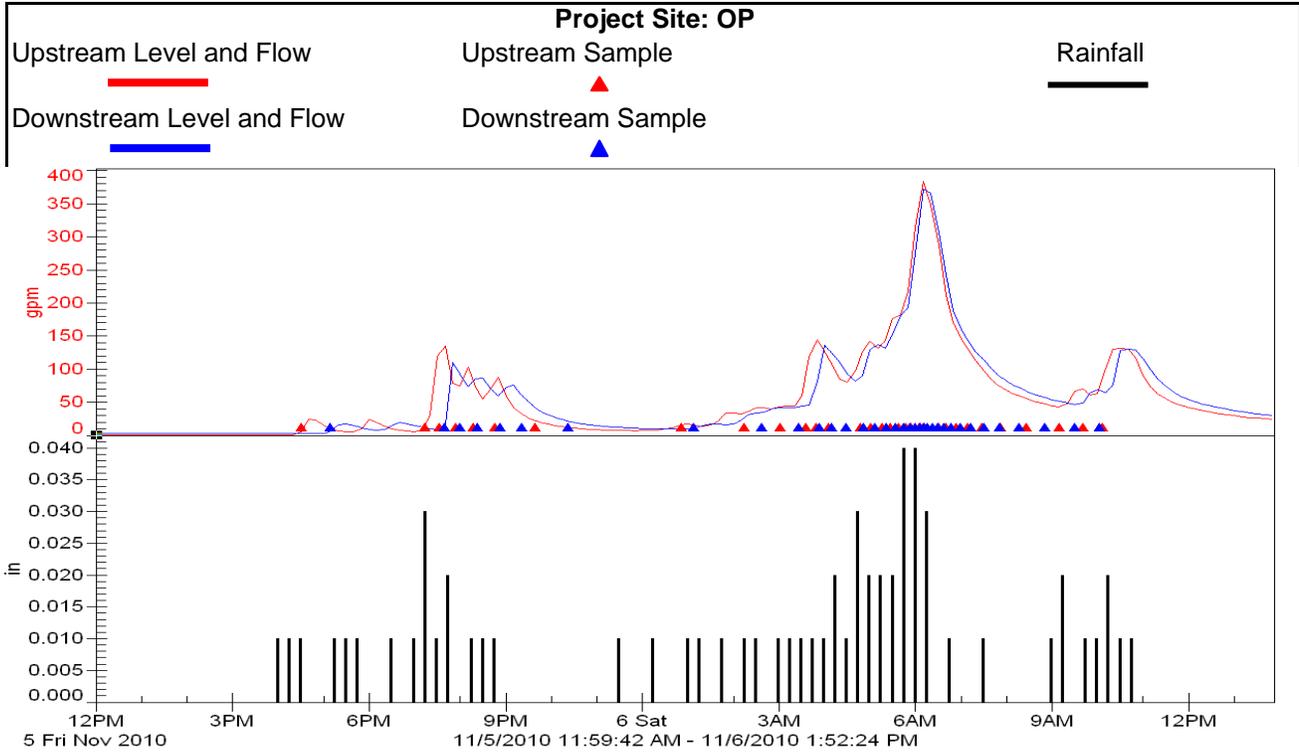
<b>Sampler Set Up:</b>	10/22/2010
<b>Mid-Storm Visit:</b>	10/24/2010
<b>Post Storm Visit:</b>	10/25/2010

<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	305,989	274,505
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	63.8%	69.1%
<b>Number of Aliquots Collected:</b>	40	40

**Comments:**  
 Storm sampling criteria met.

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** November 5 - 6 2010      **Laboratory number(s)** L52041-3 and -4  
**Site:** Petrovistky Rd at Old Petrovistky Rd      **(OP)** Stormsample No. 3  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	0.63
<b>Duration (hours):</b>	19
<b>Average Intensity (inches per hour):</b>	0.03
<b>Antecedent Dry Period (hours):</b>	84
<b>Inter-storm Dry Period (hours):</b>	<6

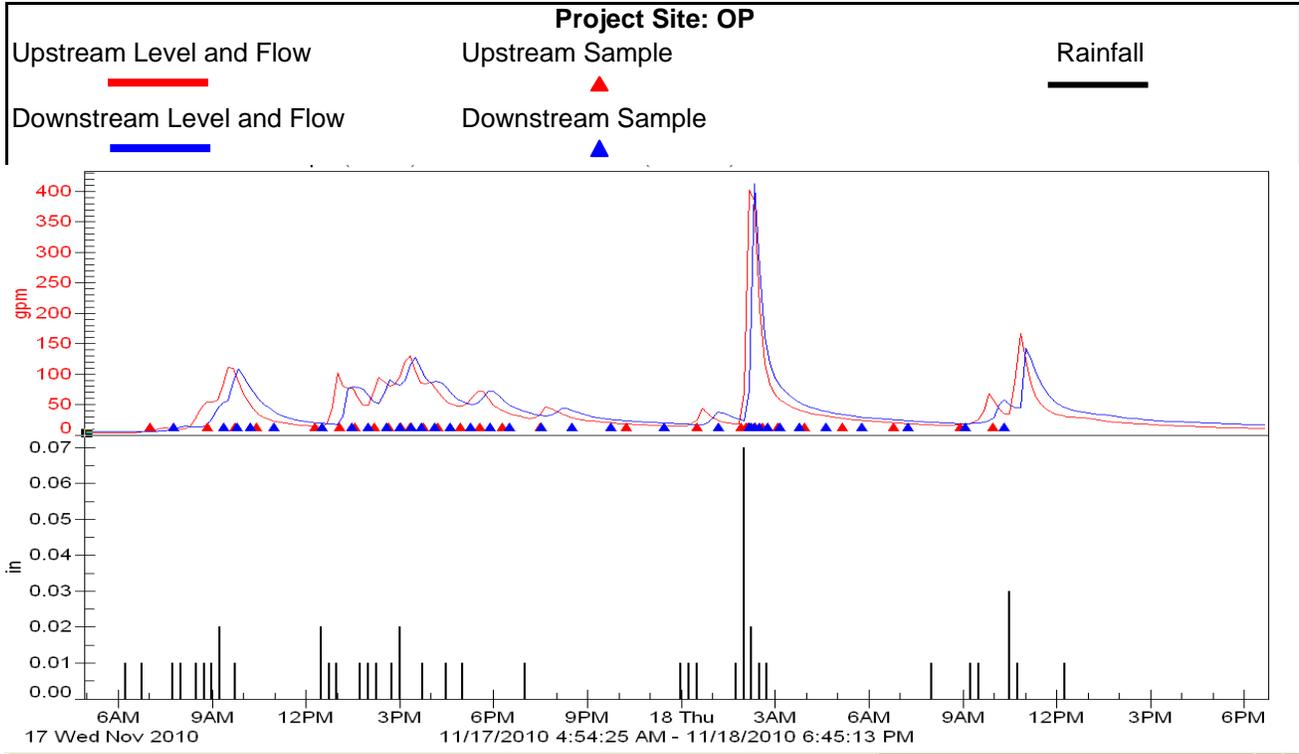
<b>Sampler Set Up:</b>	11/4/2011
<b>Mid-Storm Visit:</b>	11/6/2011
<b>Post Storm Visit:</b>	11/6/2011

<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	82,056.00	82,133.00
<b>Baseflow (gpm):</b>	1	2
<b>Percent of Hydrograph Sampled:</b>	85.2%	83.4%
<b>Number of Aliquots Collected:</b>	36	35

**Comments:**  
 Storm sampling criteria met. On-site rain gage = 0.55 inches.

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** November 17 - 18 2010      **Laboratory number(s)** L52160-3 and -4  
**Site:** Petrovistky Rd at Old Petrovitsky Rd      **(OP)** Stormsample No. 4  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage

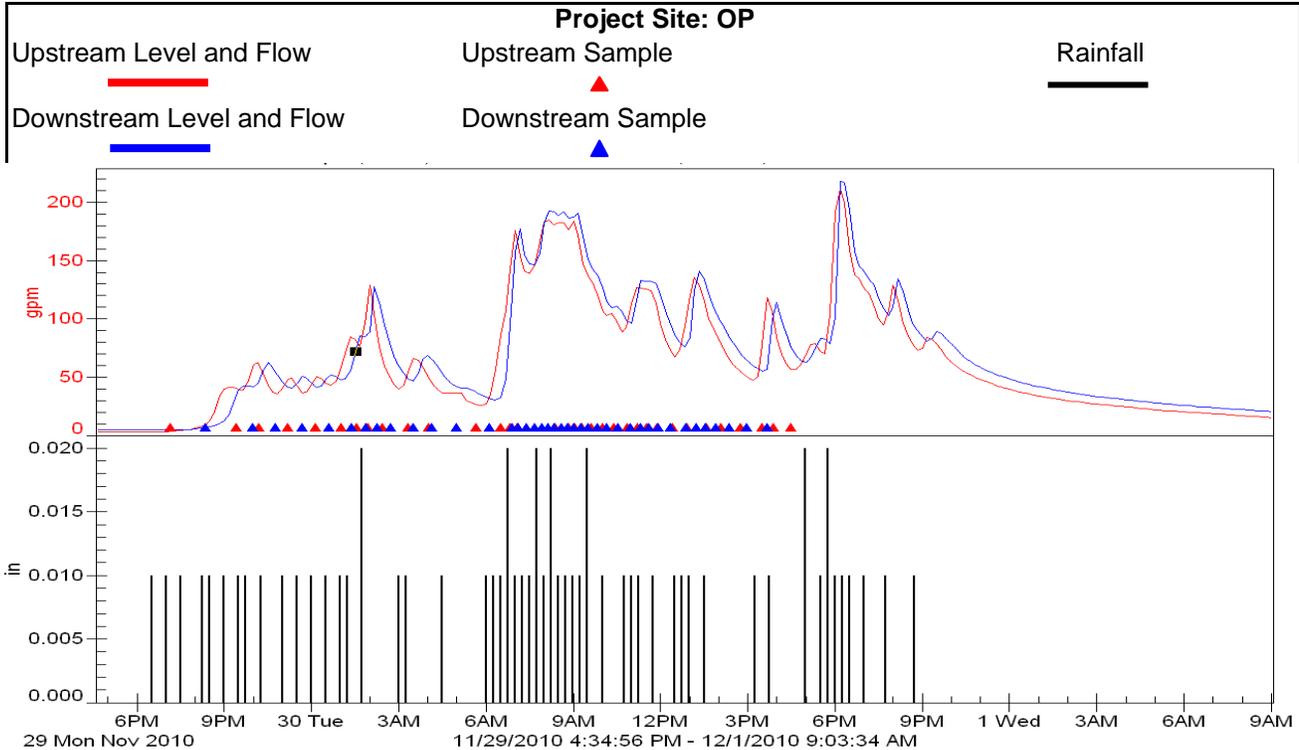


<b>Rainfall (inches):</b>	0.47	
<b>Duration (hours):</b>	30	
<b>Average Intensity (inches per hour):</b>	0.02	
<b>Antecedent Dry Period (hours):</b>	35	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	11/16/2010	
<b>Mid-Storm Visit:</b>	11/17/2010	
<b>Post Storm Visit:</b>	11/18/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	74,635	74,278
<b>Baseflow (gpm):</b>	5	9
<b>Percent of Hydrograph Sampled:</b>	80.2%	80.5%
<b>Number of Aliquots Collected:</b>	32	35

**Comments:**  
 Storm critera met. On-site rain gage = 0.4 inches

**KCRMS In-Line Ditch BMP Study**

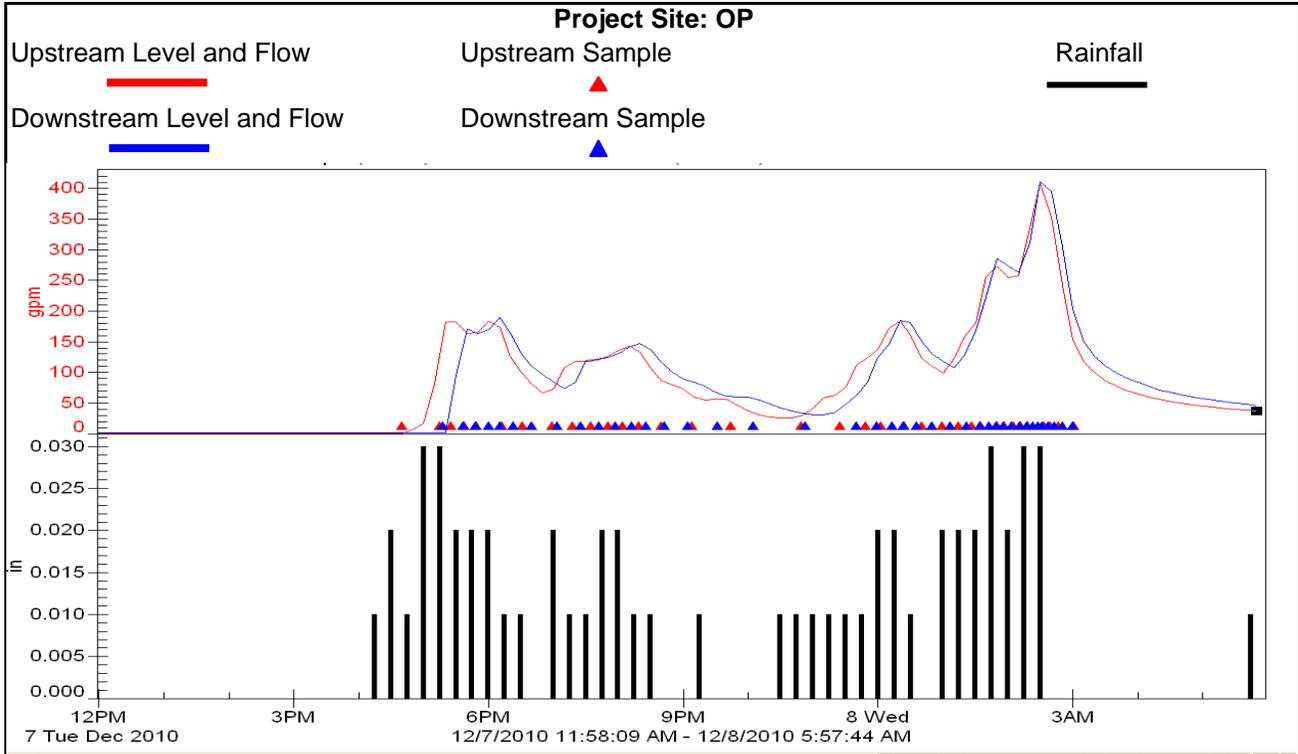
**Storm Date:** November 29 - 30 2010      **Laboratory number(s)** L52206-3 and -4  
**Site:** Petrovitsky Rd at Old Petrovitsky Rd      **(OP)** Stormsample No.5  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	0.61	
<b>Duration (hours):</b>	26	
<b>Average Intensity (inches per hour):</b>	0.02	
<b>Antecedent Dry Period (hours):</b>	39	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	11/29/2010	
<b>Mid-Storm Visit:</b>	11/30/2010	
<b>Post Storm Visit:</b>	12/1/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	147,952	156,974
<b>Baseflow (gpm):</b>	5	5
<b>Percent of Hydrograph Sampled:</b>	66.5%	62.0%
<b>Number of Aliquots Collected:</b>		
<b>Comments:</b>		

**KCRMS In-Line Ditch BMP Study**

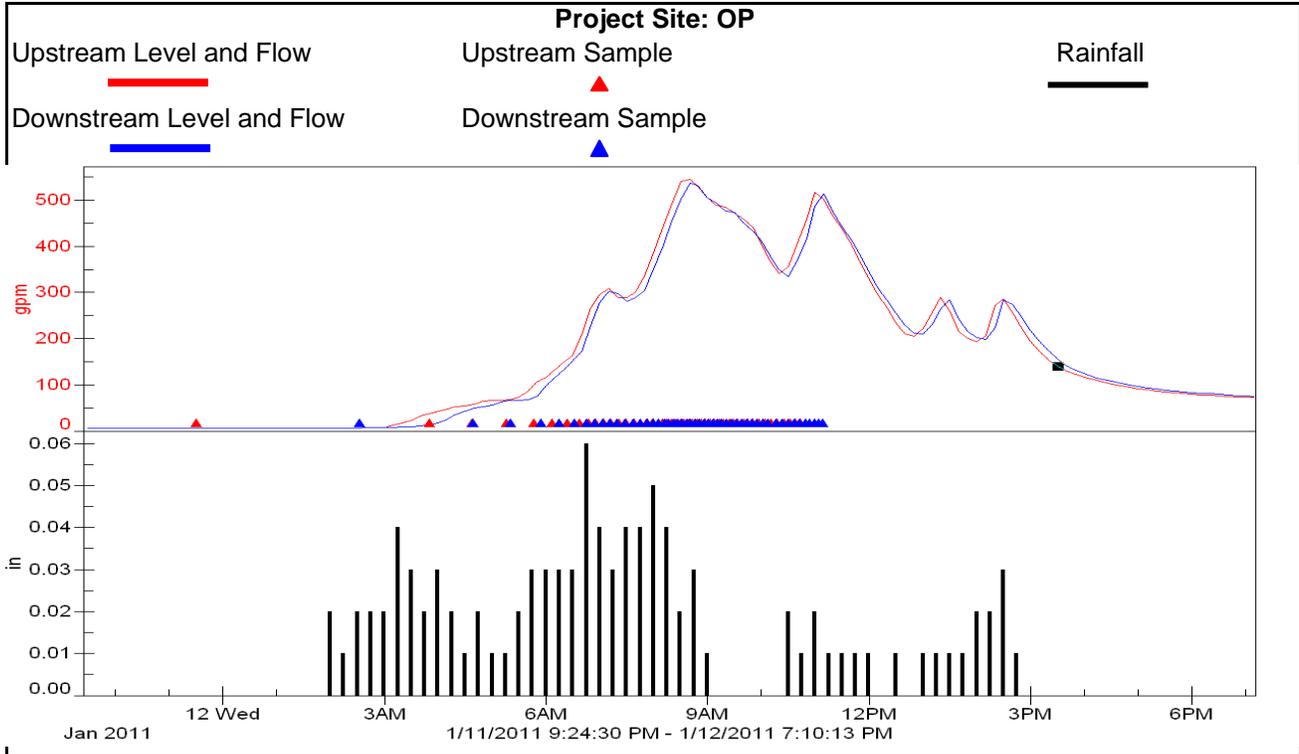
**Storm Date:** December 7 - 8 2010      **Laboratory number(s)** L52267-3 and -4  
**Site:** Petrovistky Rd at Old Petrovistky Rd      **(OP)** Stormsample No.6  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	0.57	
<b>Duration (hours):</b>	17	
<b>Average Intensity (inches per hour):</b>	0.03	
<b>Antecedent Dry Period (hours):</b>	110	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	12/6/2011	
<b>Mid-Storm Visit:</b>	none	
<b>Post Storm Visit:</b>	12/8/2011	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	93,227	96,677
<b>Baseflow (gpm):</b>	1	2
<b>Percent of Hydrograph Sampled:</b>	84.3%	80.6%
<b>Number of Aliquots Collected:</b>	40	40
<b>Comments:</b>		

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** January 11 - 12, 2011      **Laboratory number(s)** L52330-3 and -4  
**Site:** Petrovitsky Rd at Old Petrovitsky Rd      **(OP)** Stormsample No.7  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage

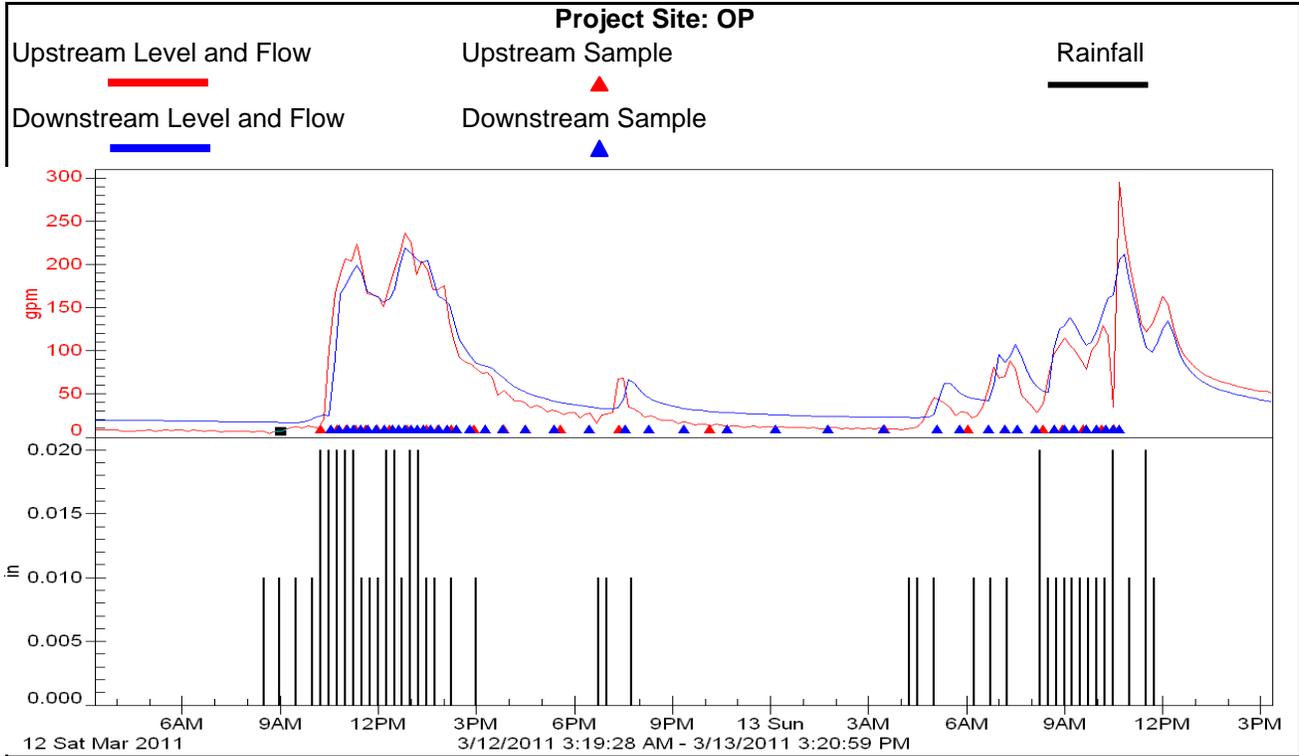


<b>Rainfall (inches):</b>	1.00	
<b>Duration (hours):</b>	12	
<b>Average Intensity (inches per hour):</b>	0.08	
<b>Antecedent Dry Period (hours):</b>	63	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	1/11/2011	
<b>Mid-Storm Visit:</b>	none	
<b>Post Storm Visit:</b>	1/12/2011	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	211,024	206,700
<b>Baseflow (gpm):</b>	6	6
<b>Percent of Hydrograph Sampled:</b>	57.0%	59.0%
<b>Number of Aliquots Collected:</b>	50	50

**Comments:**  
 Storm sampling criteria met. On-site rain gage = 0.71 inches

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** March 12 - 13 2011      **Laboratory number(s)** L52491-3 and -4  
**Site:** Petrovistky Rd at Old Petrovistky Rd      **(OP)** Stormsample No.8  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	0.55
<b>Duration (hours):</b>	28
<b>Average Intensity (inches per hour):</b>	0.02
<b>Antecedent Dry Period (hours):</b>	39
<b>Inter-storm Dry Period (hours):</b>	8

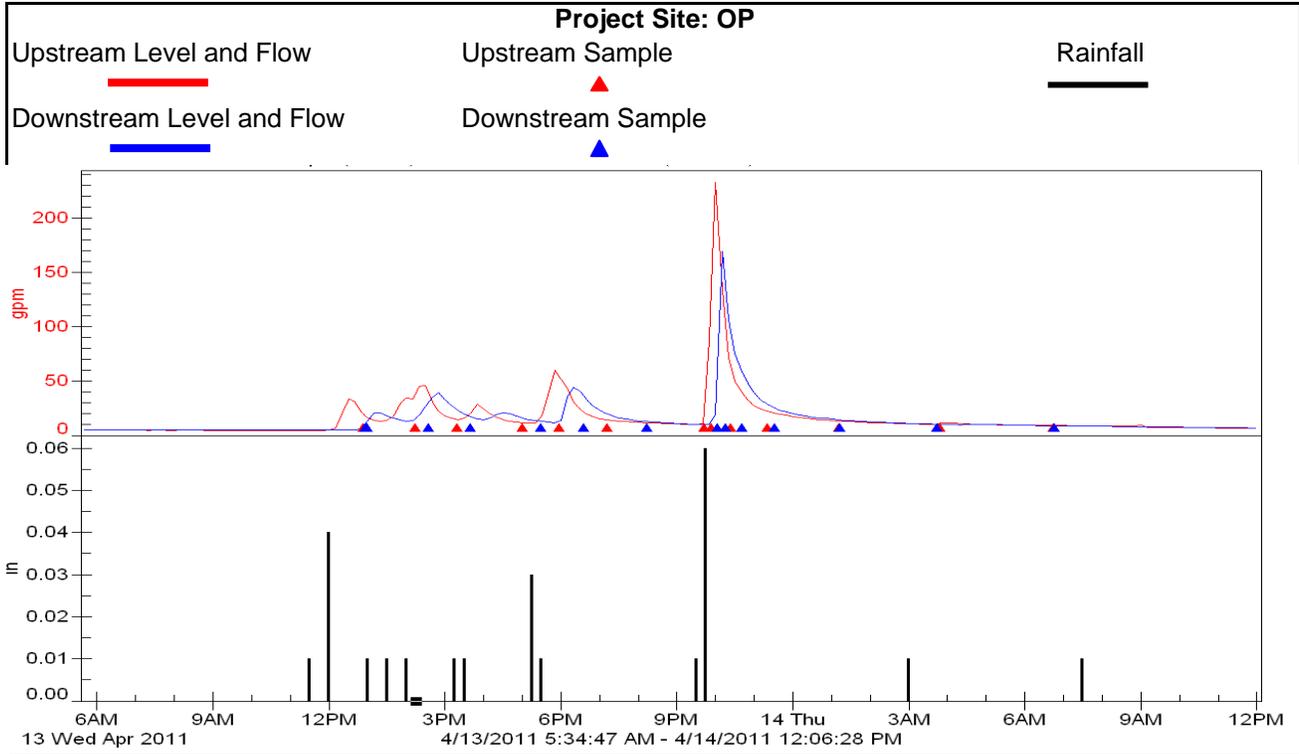
<b>Sampler Set Up:</b>	3/10/2011
<b>Mid-Storm Visit:</b>	None
<b>Post Storm Visit:</b>	3/12/2011

<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	87,819	104,035
<b>Baseflow (gpm):</b>	23	17
<b>Percent of Hydrograph Sampled:</b>	73.8%	80.0%
<b>Number of Aliquots Collected:</b>	26	44

**Comments:** Inter-storm dry period exceeded by 2 hours on the project rain gage. The on-site raingage recorded an interstorm dry period < 6 hours. The timing of Upstream and downstream sample aliquots is fairly consistant and the samples were analyzed as

**KCRMS In-Line Ditch BMP Study**

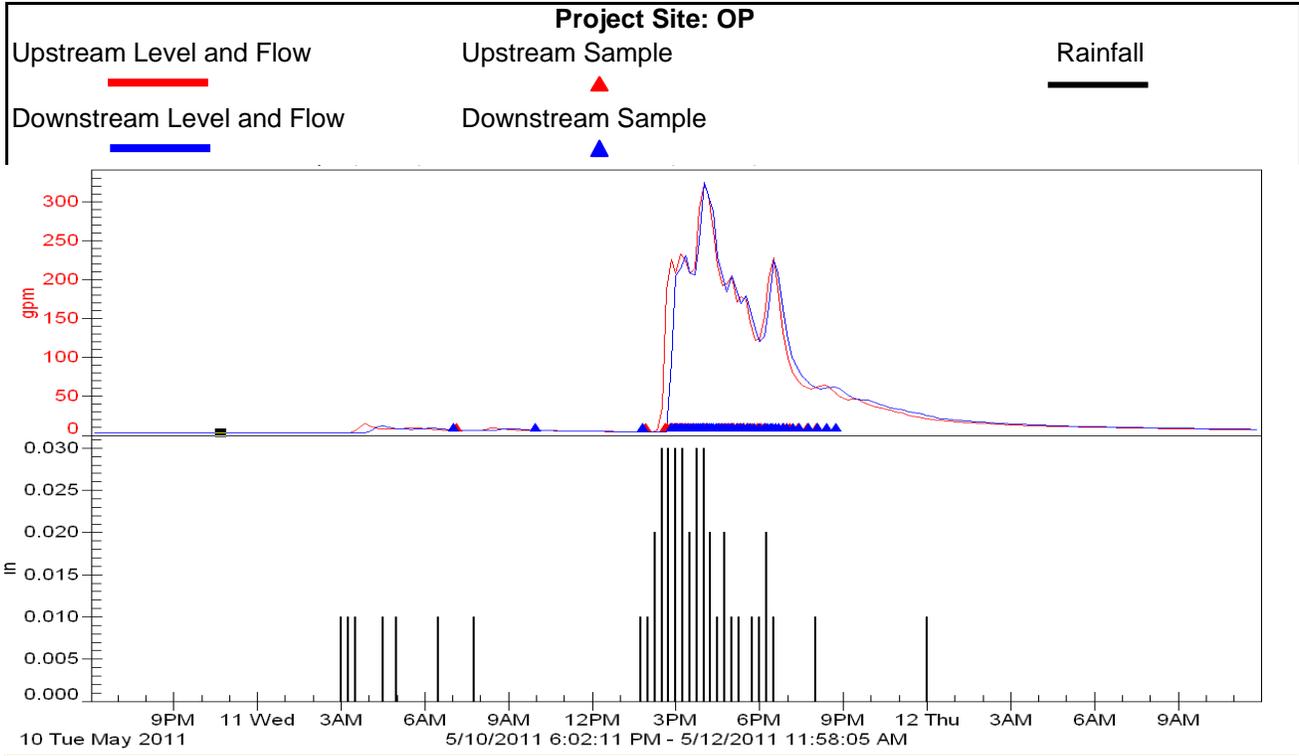
**Storm Date:** April 13 - 14 2011 **Laboratory number(s)** L52877-3 and -4  
**Site:** Petrovistky Rd at Old Petrovistky Rd (OP) Stormsample No.9  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	0.23	
<b>Duration (hours):</b>	14	
<b>Average Intensity (inches per hour):</b>	0.01	
<b>Antecedent Dry Period (hours):</b>	52	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	4/13/2011	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	4/14/2011	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	24,486	21,530
<b>Baseflow (gpm):</b>	5	5
<b>Percent of Hydrograph Sampled:</b>	95.0%	100.0%
<b>Number of Aliquots Collected:</b>		
<b>Comments:</b>		

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** May 11 - 12 2011 **Laboratory number(s)** L53138-3 and -4  
**Site:** Petrovitsky Rd at Old Petrovitsky Rd (OP) Stormsample No.10  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage

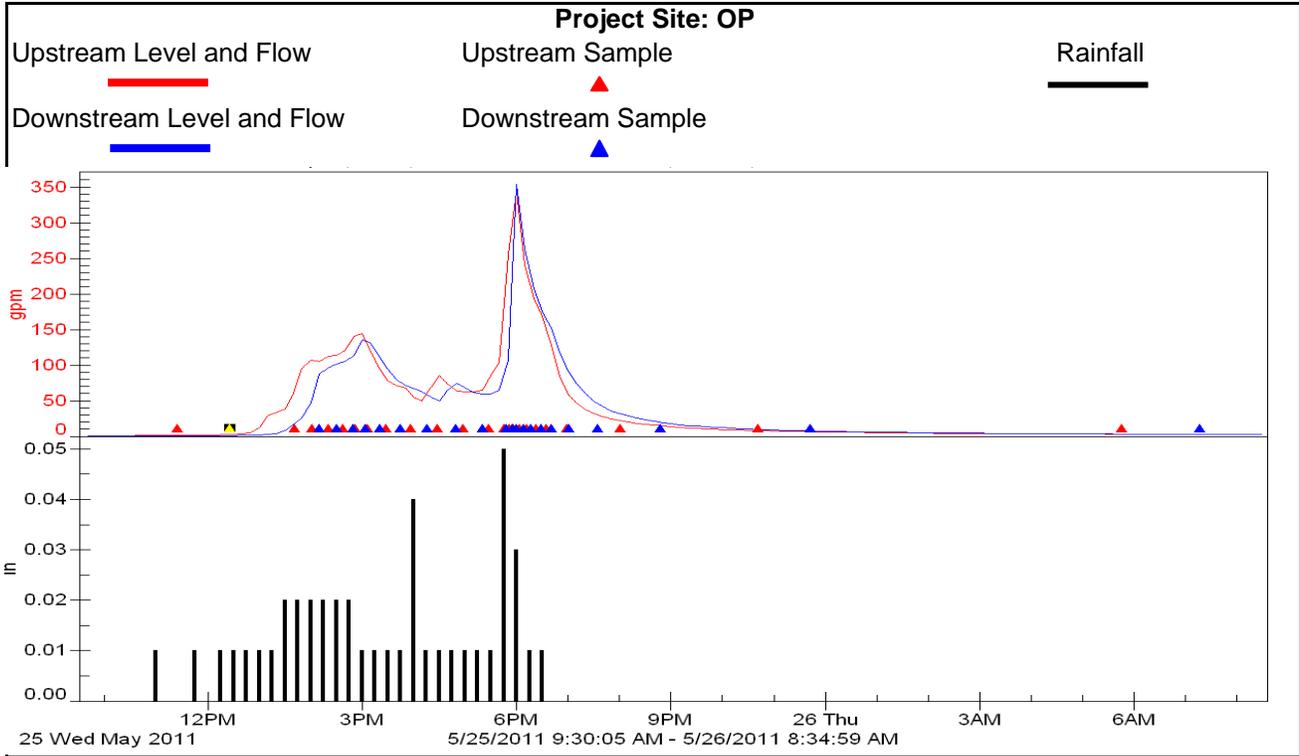


<b>Rainfall (inches):</b>	0.45	
<b>Duration (hours):</b>	21	
<b>Average Intensity (inches per hour):</b>	0.021	
<b>Antecedent Dry Period (hours):</b>	66	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	5/11/2011	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	5/12/2011	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	75,515	73,821
<b>Baseflow (gpm):</b>	3	3
<b>Percent of Hydrograph Sampled:</b>	80.9%	82.4%
<b>Number of Aliquots Collected:</b>	50	50

**Comments:**  
 Antecedent dry period of 66 hours is less than the dry season criteria of 72 hours.  
 Storm started with light showers and a dry period of six hours. Sample aliquots

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** May 25 - 26 2011 **Laboratory number(s)** L53280-3 and -4  
**Site:** Petrovistky Rd at Old Petrovitsky Rd (OP) Stormsample No.11  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage



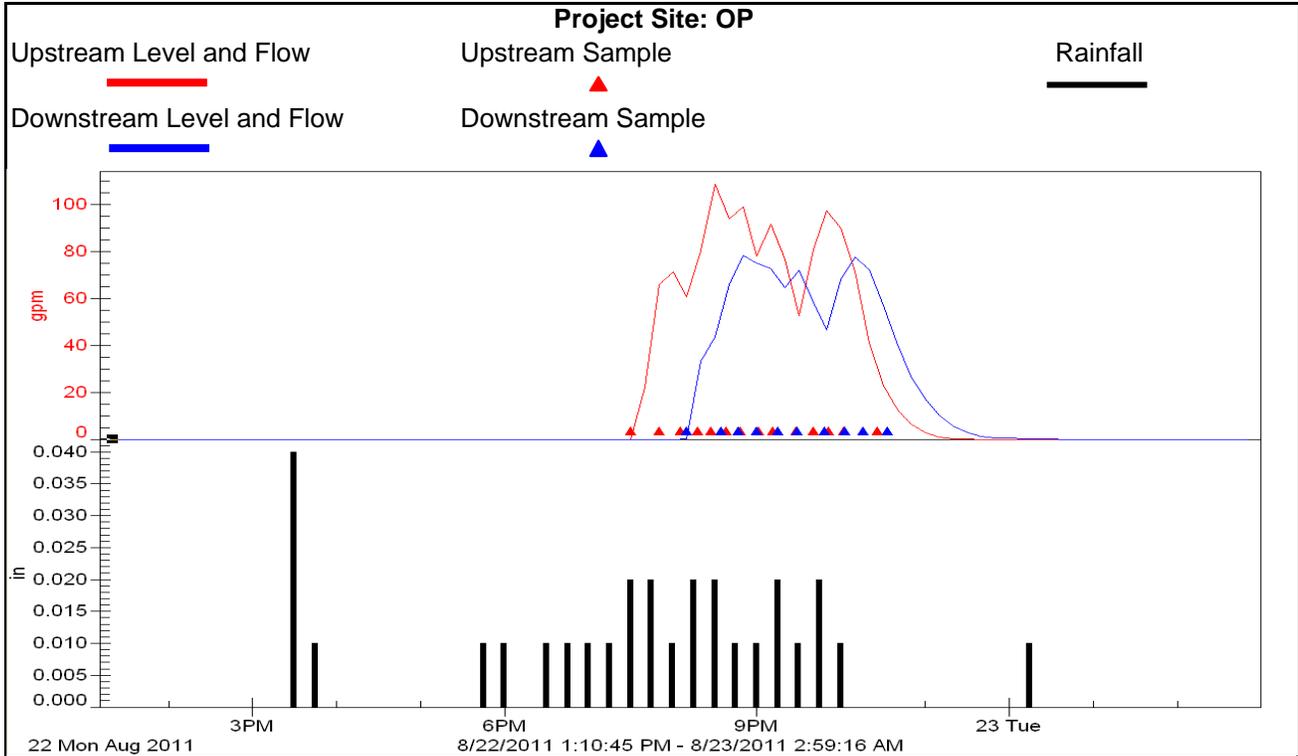
<b>Rainfall (inches):</b>	0.43
<b>Duration (hours):</b>	8
<b>Average Intensity (inches per hour):</b>	0.05
<b>Antecedent Dry Period (hours):</b>	84
<b>Inter-storm Dry Period (hours):</b>	<6

<b>Sampler Set Up:</b>	5/24/2011
<b>Mid-Storm Visit:</b>	5/25/2011
<b>Post Storm Visit:</b>	5/26/2011

<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	44,297	41,867
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	99.3%	95.5%
<b>Number of Aliquots Collected:</b>	23	22
<b>Comments:</b>		

**KCRMS In-Line Ditch BMP Study**

**Storm Date:** August 22 - 23 2011      **Laboratory number(s)** L53696-3 and -4  
**Site:** Petrovistky Rd at Old Petrovistky Rd      **(OP)** Stormsample No.12  
**BMPs:** Fourteen Water Quality BMPs with Compost Sock Treatment Cells  
**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well  
**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler  
**Raingage:** King County Fairwood gage



<b>Rainfall (inches):</b>	0.29
<b>Duration (hours):</b>	8
<b>Average Intensity (inches per hour):</b>	0.04
<b>Antecedent Dry Period (hours):</b>	670
<b>Inter-storm Dry Period (hours):</b>	<6

<b>Sampler Set Up:</b>	8/22/2011
<b>Mid-Storm Visit:</b>	None
<b>Post Storm Visit:</b>	8/23/2011

<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	13,266	9,903
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	96.6%	89.4%

**Number of Aliquots Collected:**

**Comments:** Fourteen composite sample aliquots were collected for the upstream sample, but only 9 aliquots were collected for the downstream sample (the typical aliquot minimum is twelve). Composite sampling provided good coverage of the storm and

**KCRMS In-Line Ditch BMP Study**

**Storm # 1**

**Storm Set-up Date:** October 16, 2009

**Laboratory number(s):** L49169-3 and -4

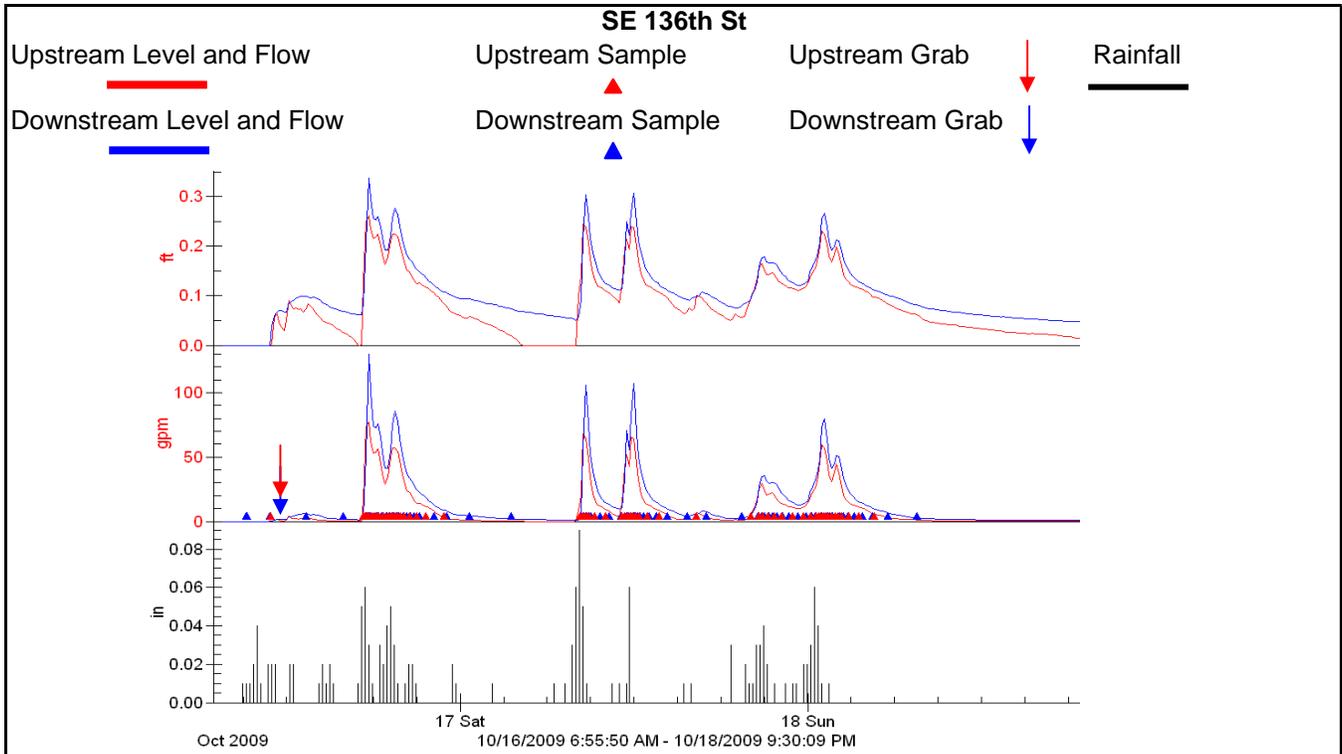
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	1.52	
<b>Duration (hours):</b>	40	
<b>Average Intensity (inches per hour):</b>	0.04	
<b>Antecedent Dry Period (hours):</b>	31	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	10/16/2009	
<b>Mid-Storm Visit:</b>	10/16/2009	
<b>Post Storm Visit:</b>	10/18/2009	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	31,569	46,401
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	94%	98%
<b>Number of Aliquots Collected:</b>	63	94
<b>Grab Samples (Fecals &amp; TPH)</b>	10/16/2009 12:45 (PDT)	12:45 (PDT)
<b>Comments:</b>	Samples submitted.	

**KCRMS In-Line Ditch BMP Study**

**Storm # 2**

**Storm Set-up Date:** October 28, 2009

**Laboratory number(s):** L49467-3 and -4

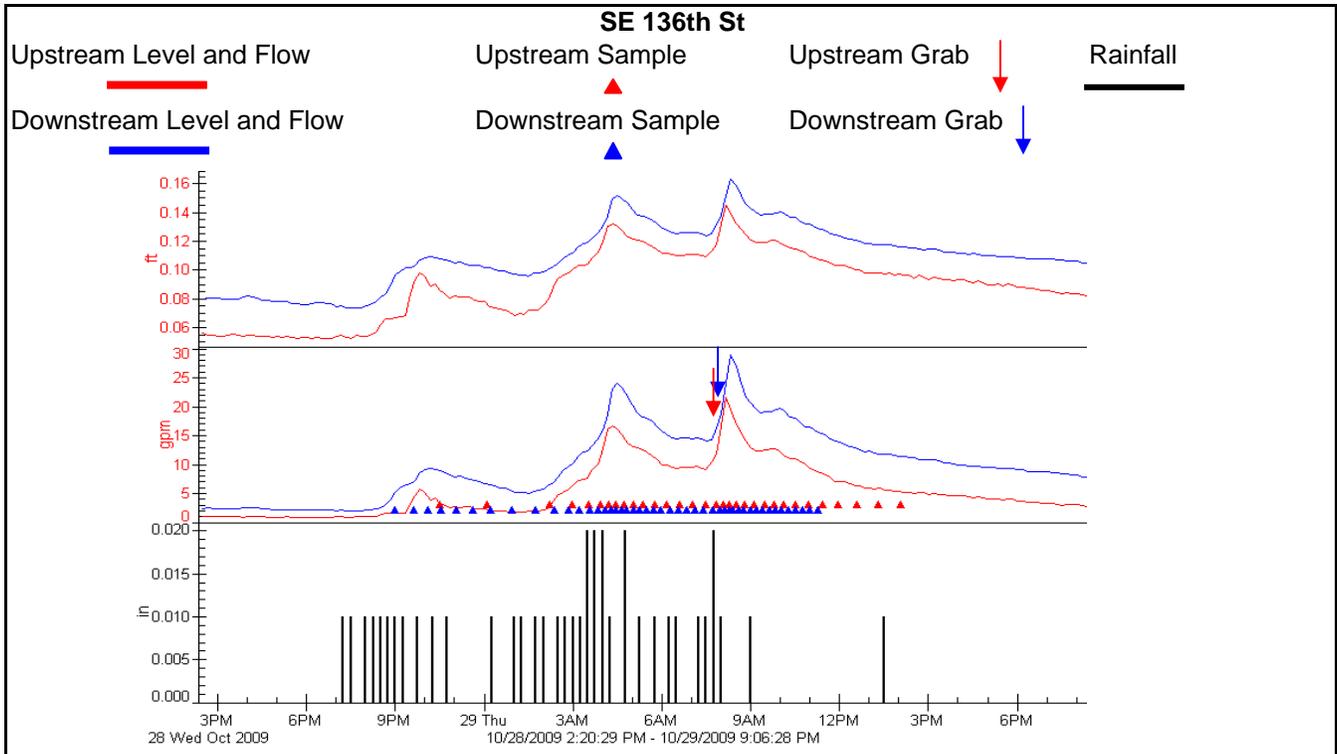
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.4	
<b>Duration (hours):</b>	18	
<b>Average Intensity (inches per hour):</b>	0.02	
<b>Antecedent Dry Period (hours):</b>	41	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	10/28/2009	
<b>Mid-Storm Visit:</b>	10/29/2009	
<b>Post Storm Visit:</b>	10/30/2009	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	10,200	18,922
<b>Baseflow (gpm):</b>	1	2
<b>Percent of Hydrograph Sampled:</b>	70%	60%
<b>Number of Aliquots Collected:</b>	30	46
<b>Grab Samples (Fecals &amp; TPH)</b>	10/29/2009 8:50 (PDT)	9:00 (PDT)
<b>Comments:</b>	Composite samples submitted.	

**KCRMS In-Line Ditch BMP Study**

**Storm # 3**

**Storm Set-up Date:** November 4, 2009

**Laboratory number(s):** L49581-3 and -4

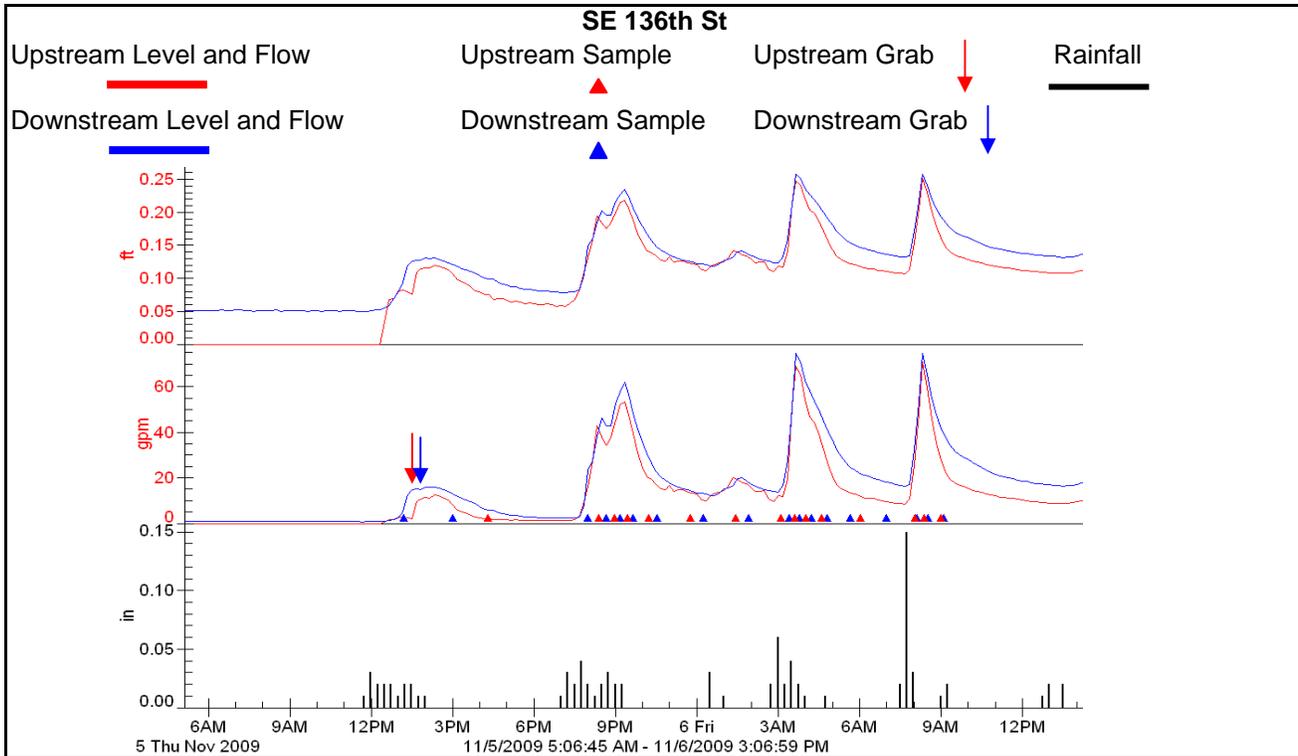
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.84	
<b>Duration (hours):</b>	21	
<b>Average Intensity (inches per hour):</b>	0.04	
<b>Antecedent Dry Period (hours):</b>	63	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	11/4/2009	
<b>Mid-Storm Visit:</b>	11/5/2009	
<b>Post Storm Visit:</b>	11/6/2009	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	23,517	31,632
<b>Baseflow (gpm):</b>	0	1
<b>Percent of Hydrograph Sampled:</b>	75%	80%
<b>Number of Aliquots Collected:</b>	15	18
<b>Grab Samples (Fecals &amp; TPH)</b>	11/5/2009 13:40	13:50
<b>Comments:</b>	Rainfall less than predicted, samplers paced for a larger stormflow event.	

**KCRMS In-Line Ditch BMP Study**

**Storm # 4**

**Storm Set-up Date:** December 14, 2009

**Laboratory number(s)** L49787-3 and -4

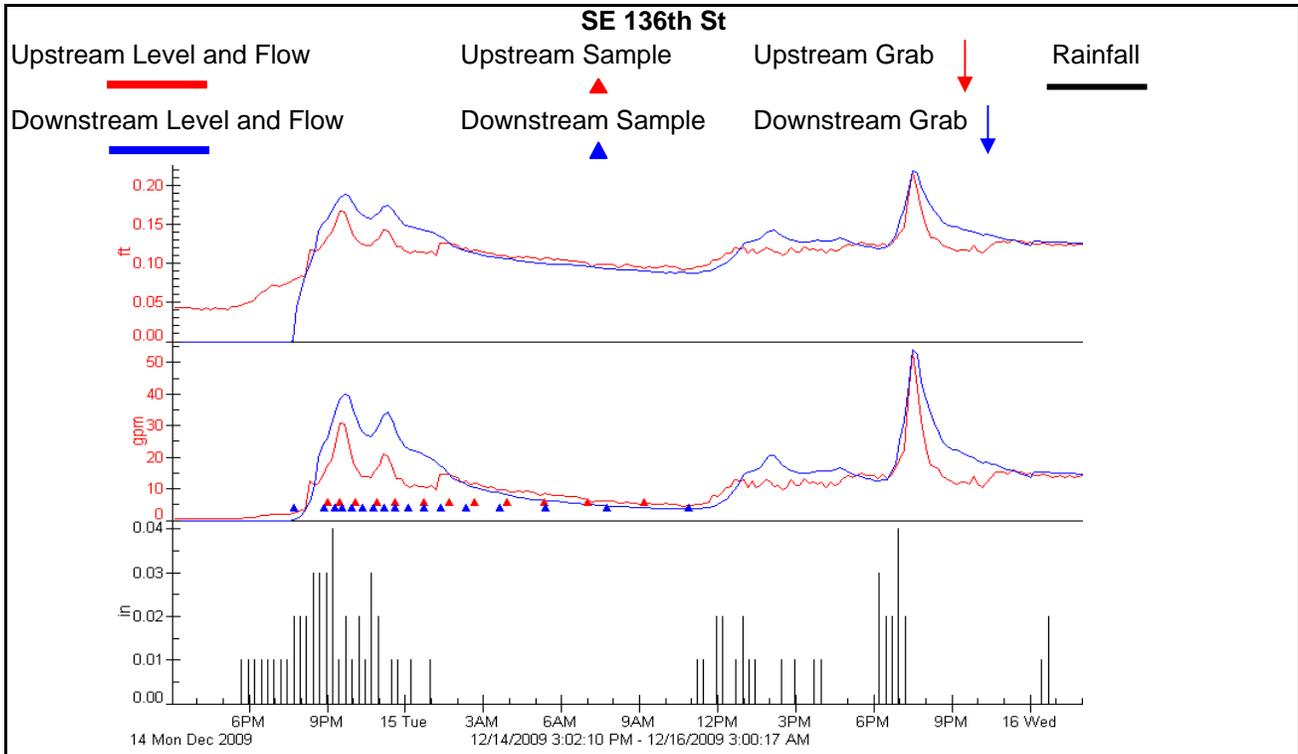
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.44	
<b>Duration (hours):</b>	26	
<b>Average Intensity (inches per hour):</b>	0.02	
<b>Antecedent Dry Period (hours):</b>	197	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	12/14/2009	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	12/15/2009	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	9,750	12,020
<b>Baseflow (gpm):</b>	11	14
<b>Percent of Hydrograph Sampled:</b>	83%	100%
<b>Number of Aliquots Collected:</b>	11	14
<b>Grab Samples (Fecals &amp; TPH)</b>	Not Collected	Not Collected
<b>Comments:</b>	Composite samples submitted.	

**KCRMS In-Line Ditch BMP Study**

**Storm # 5**

**Storm Set-up Date:** January 10, 2010

**Laboratory number(s)** L49918-3 and -4

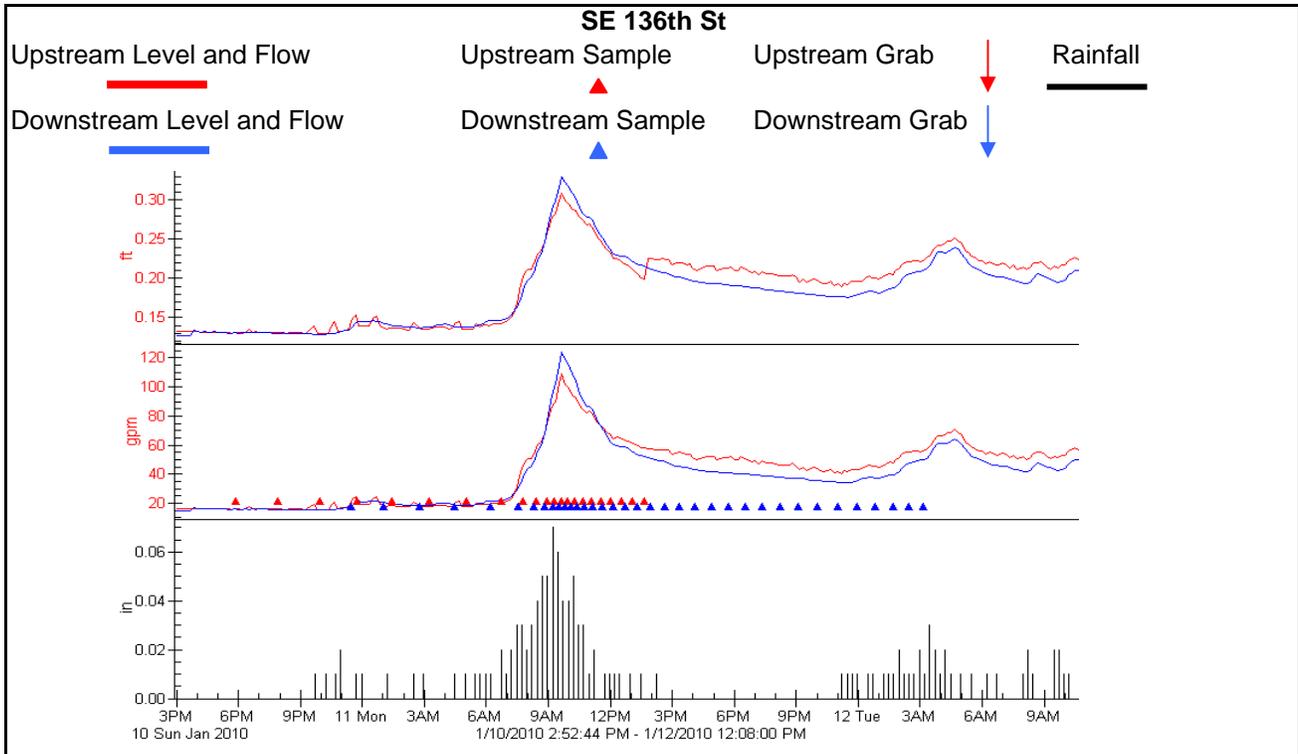
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.88	
<b>Duration (hours):</b>	16	
<b>Average Intensity (inches per hour):</b>	0.06	
<b>Antecedent Dry Period (hours):</b>	39	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	1/10/2010	
<b>Mid-Storm Visit:</b>	1/11/2010	
<b>Post Storm Visit:</b>	1/11/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	64,255	60,119
<b>Baseflow (gpm):</b>	16	15
<b>Percent of Hydrograph Sampled:</b>	65%	117%
<b>Number of Aliquots Collected:</b>	22	20
<b>Grab Samples (Fecals &amp; TPH)</b>	Not Collected	Not Collected

**Comments:** First three upstream aliquots represents 8% of total flow taken before true start of storm. Last six downstream aliquots represents 14% of total flow taken after end of storm and start of next rainfall.

**KCRMS In-Line Ditch BMP Study**

**Storm # 6**

**Storm Set-up Date:** February 23, 2010

**Laboratory number(s)** L50182-3 and -4

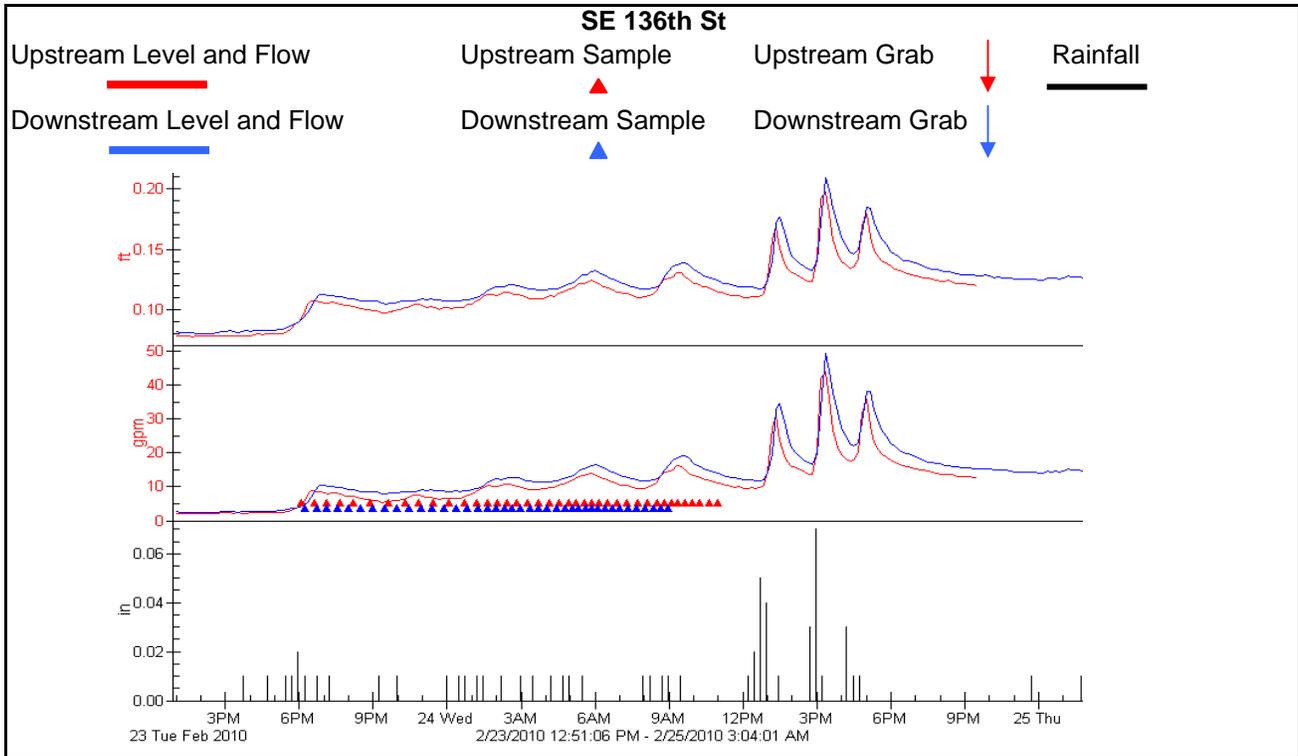
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.57	
<b>Duration (hours):</b>	20	
<b>Average Intensity (inches per hour):</b>	0.03	
<b>Antecedent Dry Period (hours):</b>	180	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	2/23/2010	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	2/24/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	20,901	25,300
<b>Baseflow (gpm):</b>	2	2
<b>Percent of Hydrograph Sampled:</b>	46%	38%
<b>Number of Aliquots Collected:</b>	40	40
<b>Grab Samples (Fecals &amp; TPH)</b>	Not Collected	Not Collected

**Comments:** Sampled light rain for 18 hours. Thought storm was over when samplers were pulled. Samples kept. Representative of base flow/first flush conditions.

**KCRMS In-Line Ditch BMP Study**

**Storm # 7**

**Storm Set-up Date:** March 19, 2010

**Laboratory number(s)** L50299-3 and -4

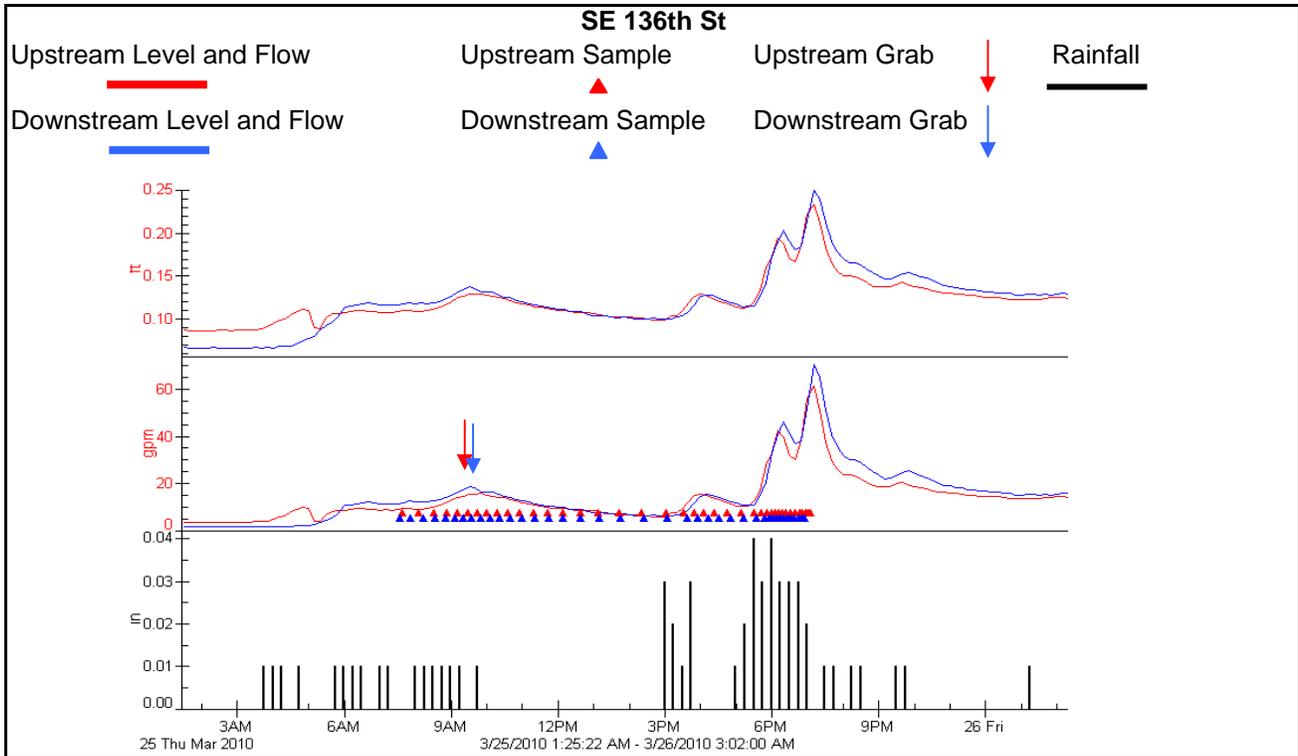
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.58	
<b>Duration (hours):</b>	23	
<b>Average Intensity (inches per hour):</b>	0.03	
<b>Antecedent Dry Period (hours):</b>	76	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	3/19/2010	
<b>Mid-Storm Visit:</b>	3/25/2010	
<b>Post Storm Visit:</b>	3/26/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	20,241	22,401
<b>Baseflow (gpm):</b>	4	2
<b>Percent of Hydrograph Sampled:</b>	46%	40%
<b>Number of Aliquots Collected:</b>	40	40
<b>Grab Samples (Fecals &amp; TPH)</b>	3/25/2010 10:30 (PDT)	10:40 (PDT)

**Comments:** Samplers set up for rain that was predicted for Sunday, 3/21/2010. Samplers and tubing were left to run until 3/25/2010 when rain began. Samplers picked up long, showery start to storm and continued into peak of hydrograph. While the percent of storm sampled was less than 50% it was decided that this sampling was representative.

**KCRMS In-Line Ditch BMP Study**

**Storm # 8**

**Storm Set-up Date:** April 19, 2010

**Laboratory number(s)** L50699-3 and -4

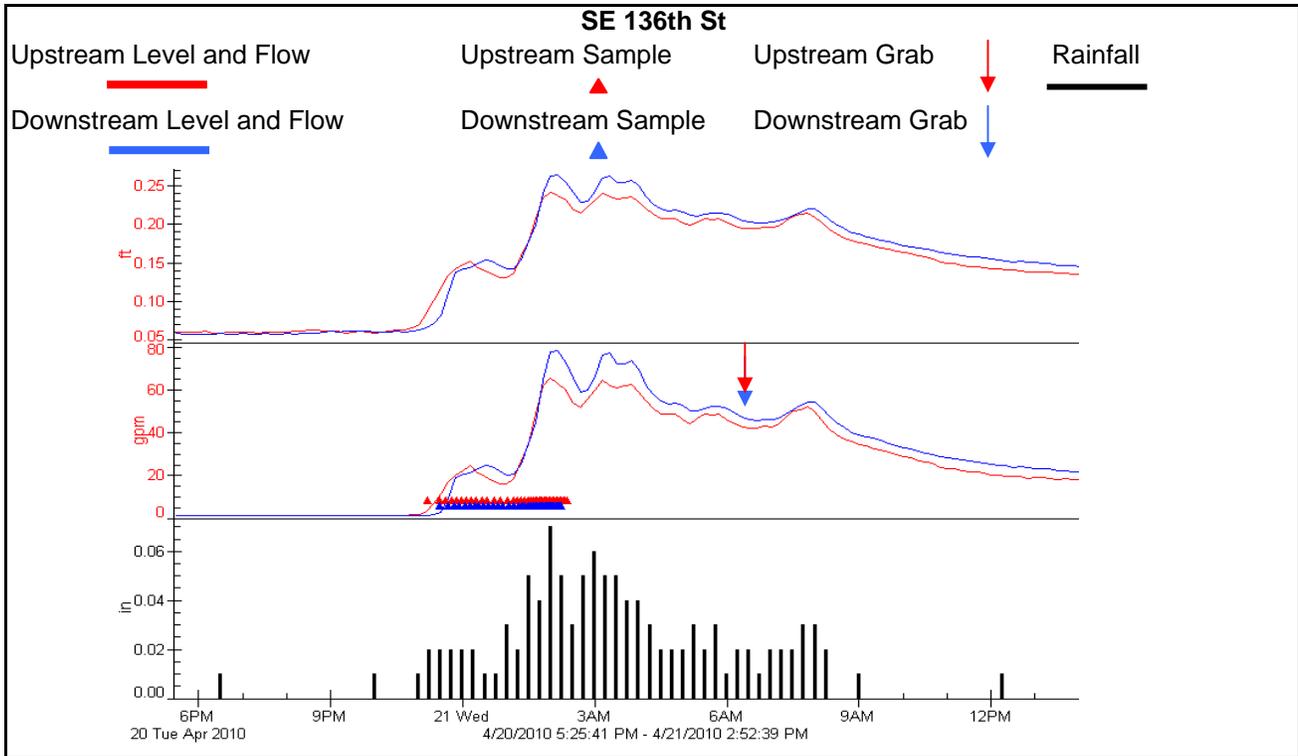
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	1.12	
<b>Duration (hours):</b>	13	
<b>Average Intensity (inches per hour):</b>	0.09	
<b>Antecedent Dry Period (hours):</b>	72	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	4/19/2010	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	4/21/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	33,366	37,419
<b>Baseflow (gpm):</b>	1	1
<b>Percent of Hydrograph Sampled:</b>	17%	14%
<b>Number of Aliquots Collected:</b>	40	40
<b>Grab Samples (Fecals &amp; TPH)</b>	4/21/2010 7:30 (PDT)	7:30 (PDT)

**Comments:** Storm successfully sampled the leading edge of the the hydrograph up to the first storm peak. This storm was significantly greater than predicted and the sample pacing was low for this storm volume. Storm was not forecasted well. Upstream sample was visibly turbid with fine sediment.

**KCRMS In-Line Ditch BMP Study**

**Storm # 9**

**Storm Set-up Date:** April 26, 2010

**Laboratory number(s)** L50724-3 and -4

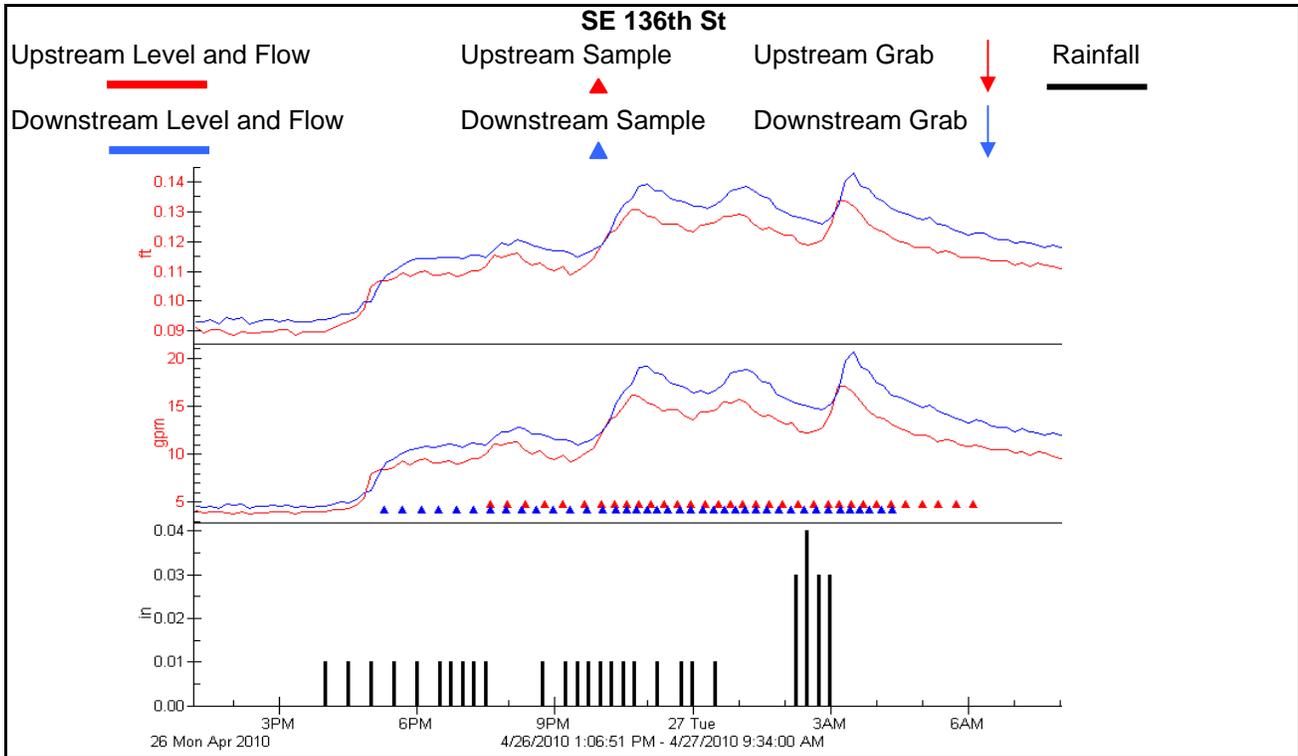
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.35	
<b>Duration (hours):</b>	12	
<b>Average Intensity (inches per hour):</b>	0.03	
<b>Antecedent Dry Period (hours):</b>	51	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	4/26/2010	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	4/27/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	12,346	14,629
<b>Baseflow (gpm):</b>	5	5
<b>Percent of Hydrograph Sampled:</b>	66%	66%
<b>Number of Aliquots Collected:</b>	34	40
<b>Grab Samples (Fecals &amp; TPH)</b>	Not Collected	Not Collected
<b>Comments:</b>	Both upstream and downstream collected.	

**KCRMS In-Line Ditch BMP Study**

**Storm # 10**

**Storm Set-up Date:** June 14, 2010

**Laboratory number(s)** L51051-3 and -4

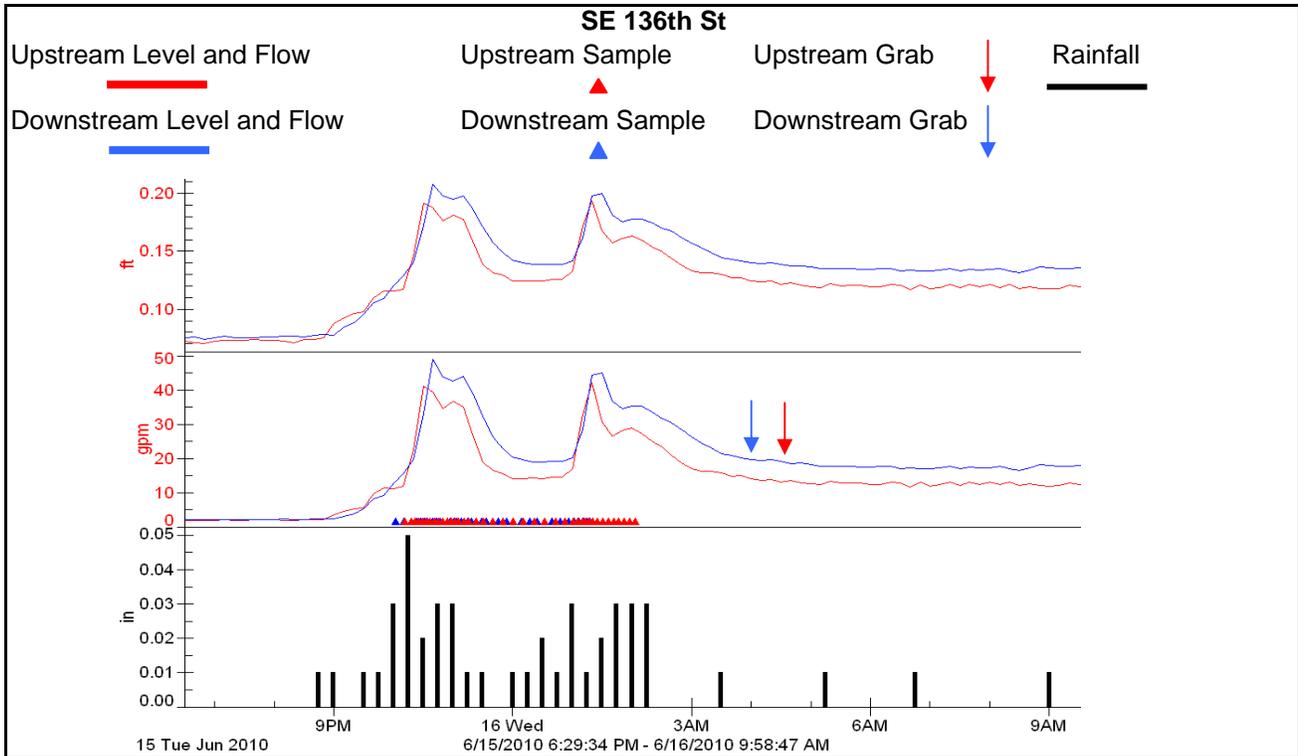
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.46	
<b>Duration (hours):</b>	12	
<b>Average Intensity (inches per hour):</b>	0.04	
<b>Antecedent Dry Period (hours):</b>	109	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	6/14/2010	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	6/16/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	16,546	22,027
<b>Baseflow (gpm):</b>	2	2
<b>Percent of Hydrograph Sampled:</b>	34%	23%
<b>Number of Aliquots Collected:</b>	40	40
<b>Grab Samples (Fecals &amp; TPH)</b>	6/16/2010 5:30 (PDT)	5:00 (PDT)

**Comments:** Percentage of stormflow sampled is low due to long slow lag time in post-storm flow. Sample is representative of main storm event, samples were kept.

**KCRMS In-Line Ditch BMP Study**

**Storm # 11**

**Storm Set-up Date:** June 24, 2010

**Laboratory number(s)** L51159-3 and -4

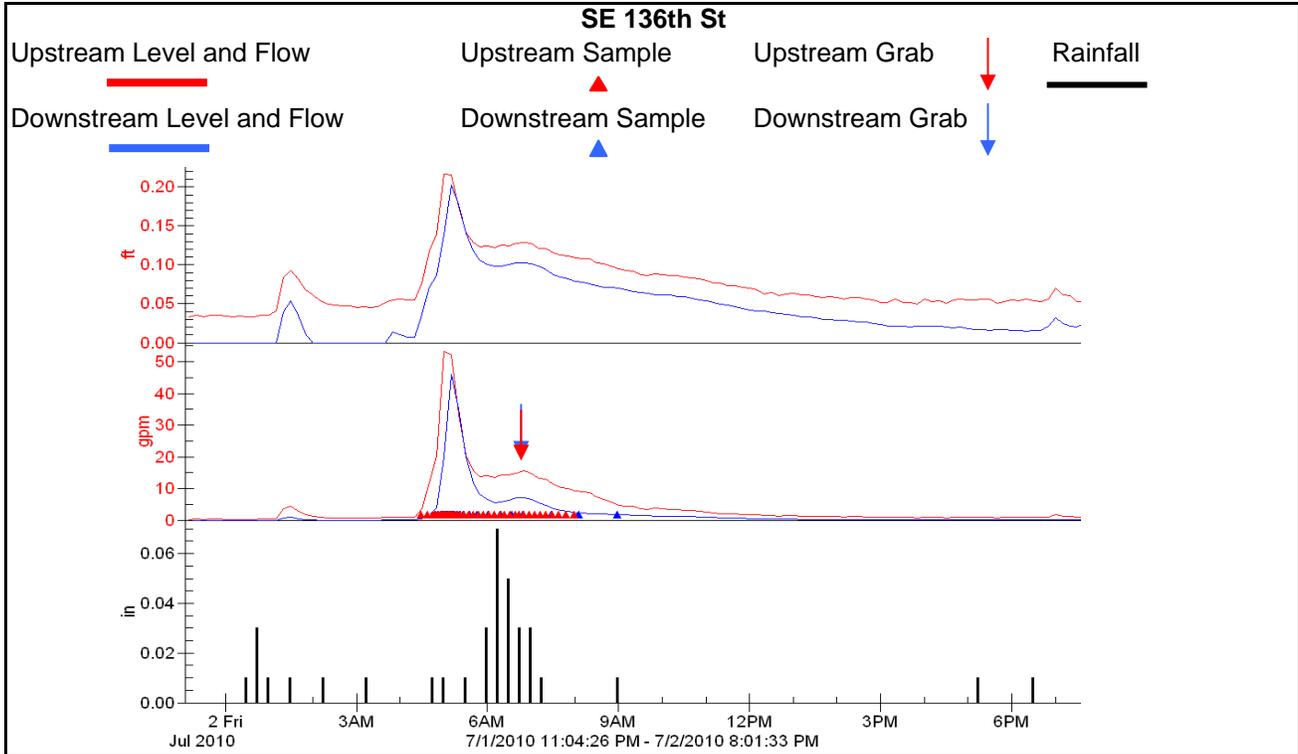
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.34	
<b>Duration (hours):</b>	8	
<b>Average Intensity (inches per hour):</b>	0.04	
<b>Antecedent Dry Period (hours):</b>	271	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	6/24/2010	
<b>Mid-Storm Visit:</b>	7/2/2010	
<b>Post Storm Visit:</b>	7/2/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	5,219	2,493
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	73%	78%
<b>Number of Aliquots Collected:</b>	40	23
<b>Grab Samples (Fecals &amp; TPH)</b>	7/2/2010 7:48 (PDT)	7:48 (PDT)
<b>Comments:</b>		

**KCRMS In-Line Ditch BMP Study**

**Storm # 12**

**Storm Set-up Date:** August 25, 2010

**Laboratory number(s)** L51252-3 and -4

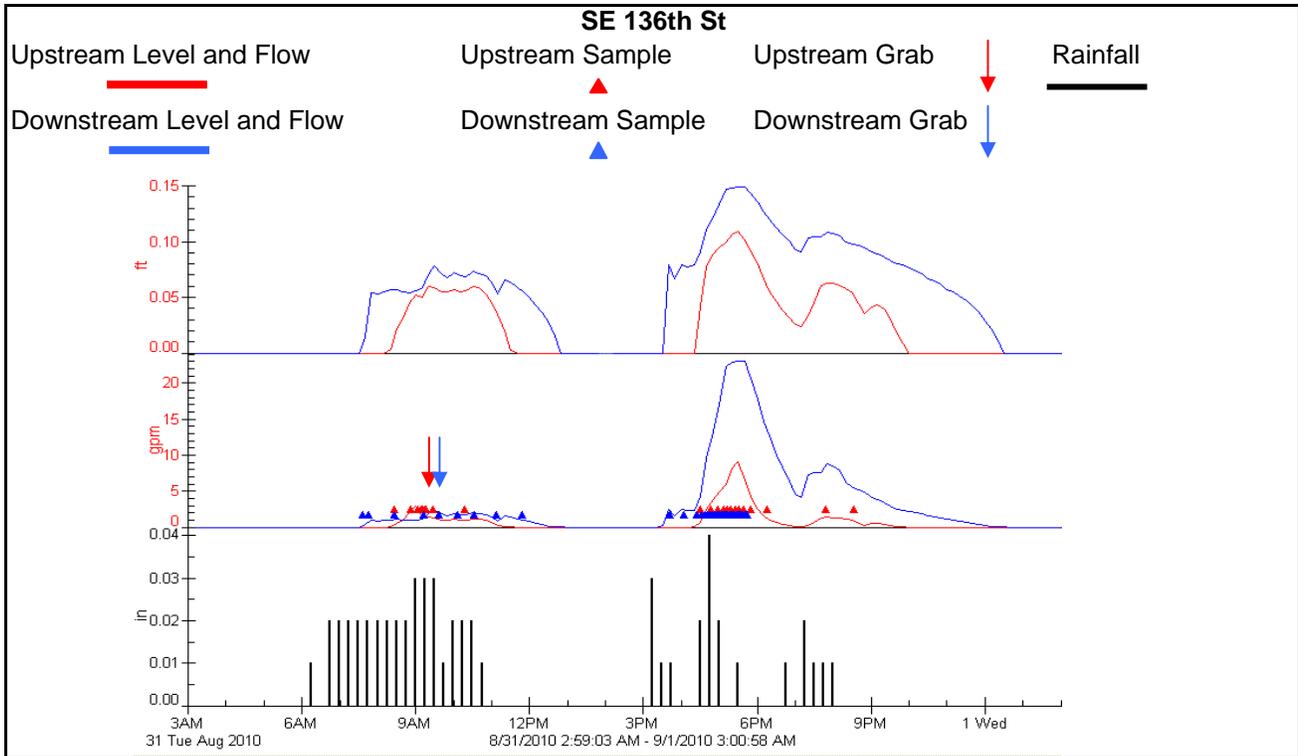
**Site:** SE 136th St

**BMPs:** Four Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Thel-Mar Weirs

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.56	
<b>Duration (hours):</b>	13	
<b>Average Intensity (inches per hour):</b>	0.04	
<b>Antecedent Dry Period (hours):</b>	552	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	8/25/2010	
<b>Mid-Storm Visit:</b>	8/31/2010	
<b>Post Storm Visit:</b>	9/1/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	787	3,862
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	101%	47%
<b>Number of Aliquots Collected:</b>	22	36
<b>Grab Samples (Fecals &amp; TPH)</b>	8/31/2010 10:25 (PDT)	10:40 (PDT)

**Comments:** Site visit on 8/31/2010 at 08:38. Raining at site, flow <1 gpm over weir, no visible flow in ditch. Sampled less than 50% of storm but sampled well into storm peak. Samples kept as representative of a dry season storm event.

**KCRMS In-Line Ditch BMP Study**

**Storm # 1**

**Storm Set-Up Date:** October 16, 2010

**Laboratory number(s):** L49169-1 and 2

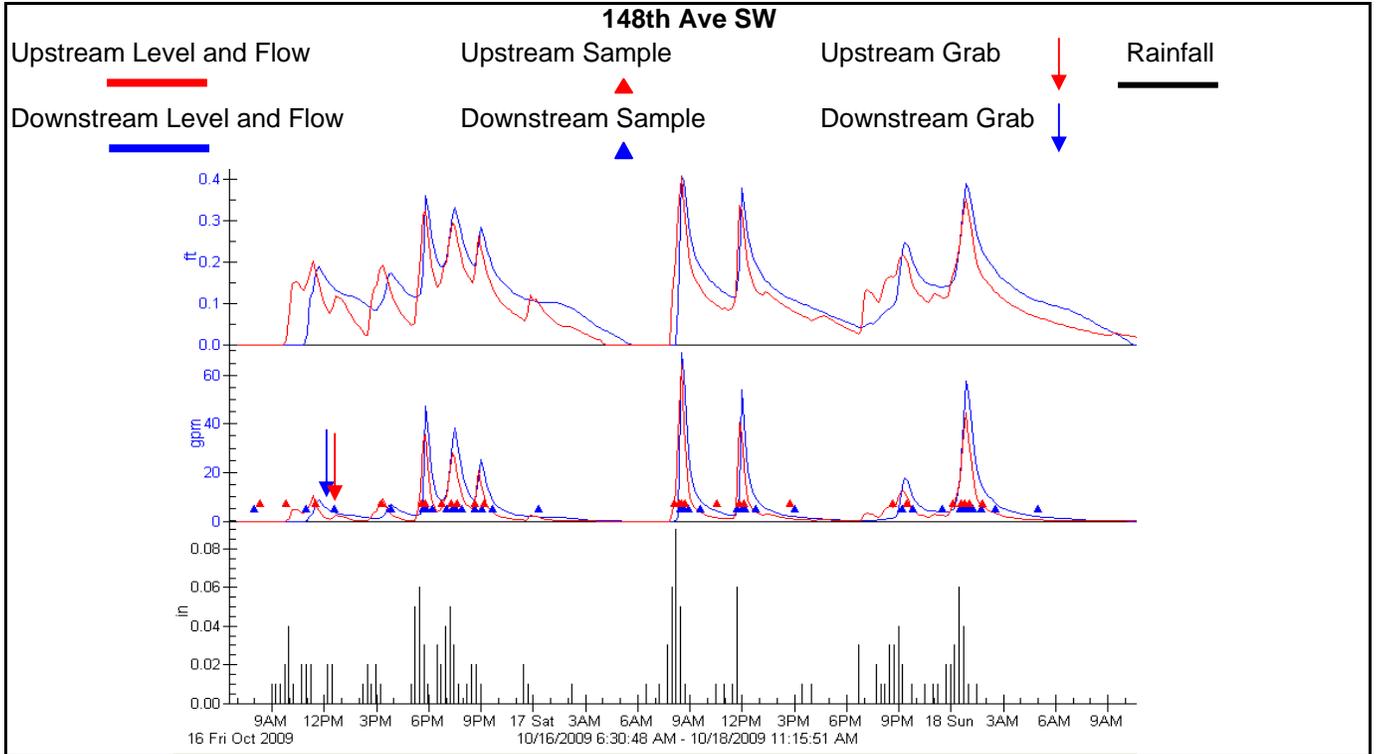
**Site:** 148th Ave SE

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	1.50	
<b>Duration (hours):</b>	47	
<b>Average Intensity (inches per hour):</b>	0.03	
<b>Antecedent Dry Period (hours):</b>	31	
<b>Inter-storm Dry Period (hours):</b>	< 6	
<b>Sampler Set Up:</b>	10/16/2009	
<b>Mid-Storm Visit:</b>	10/16/2009	
<b>Post Storm Visit:</b>	10/18/2009	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	12,400	17,203
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	97%	99%
<b>Number of Aliquots Collected:</b>	25	34
<b>Grab Samples (Fecals &amp; TPH)</b>	10/16/2009 13:20 (PDT)	10/18/2009 13:10 (PDT)
<b>Comments:</b>	Composite sample delivered to KCEL 10/18/09, splitting/filtering done at lab.	

**KCRMS In-Line Ditch BMP Study**

**Storm # 2**

**Storm Set-Up Date:** October 28, 2010

**Laboratory number(s)** L49467-1 and 2

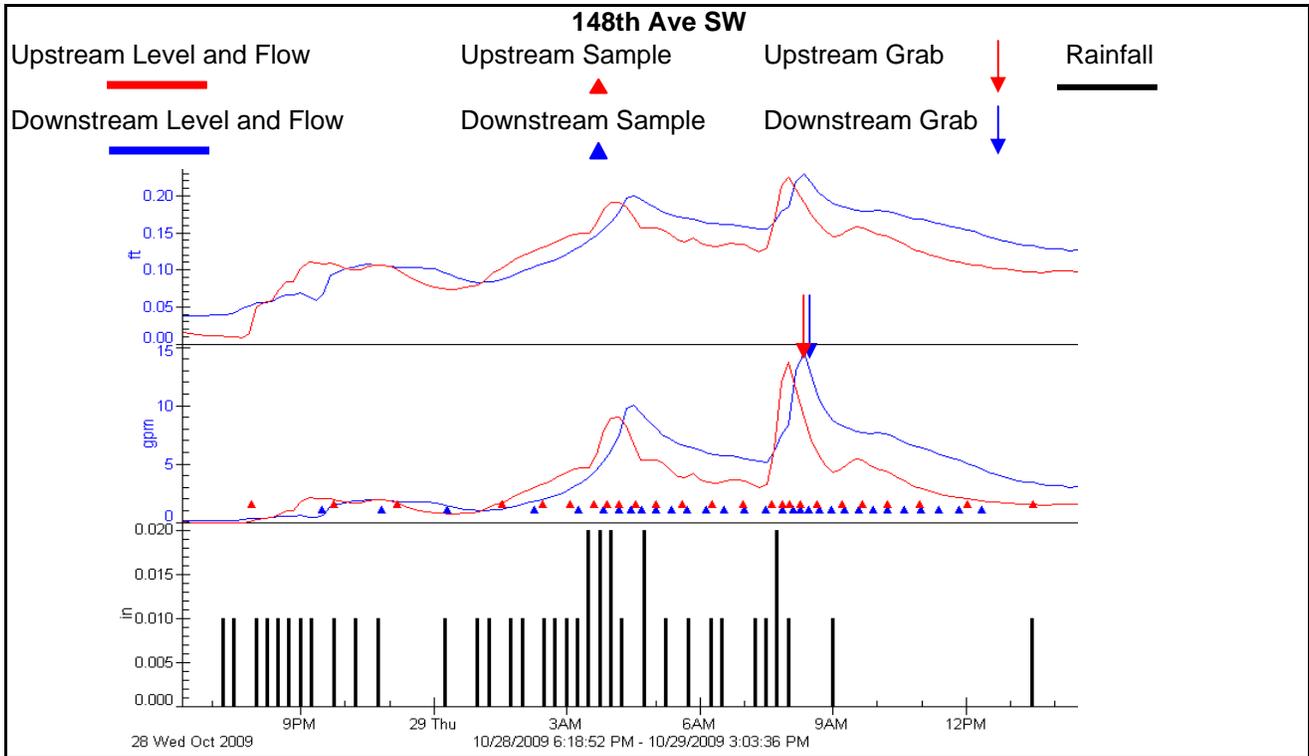
**Site:** 148th Ave SE

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.40	
<b>Duration (hours):</b>	18	
<b>Average Intensity (inches per hour):</b>	0.02	
<b>Antecedent Dry Period (hours):</b>	41	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	10/28/2009	
<b>Mid-Storm Visit:</b>	10/29/2009	
<b>Post Storm Visit:</b>	10/30/2009	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	5,490	5,475
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	65%	82%
<b>Number of Aliquots Collected:</b>	23	27
<b>Grab Samples (Fecals &amp; TPH)</b>	10/29/2009 9:25 (PDT)	9:39 (PDT)
<b>Comments:</b>	Composite samples successful. Grab samples collected.	

**KCRMS In-Line Ditch BMP Study**

**Storm # 3**

**Storm Set-Up Date:** November 4, 2009

**Laboratory number(s)** L49581-1 and 2

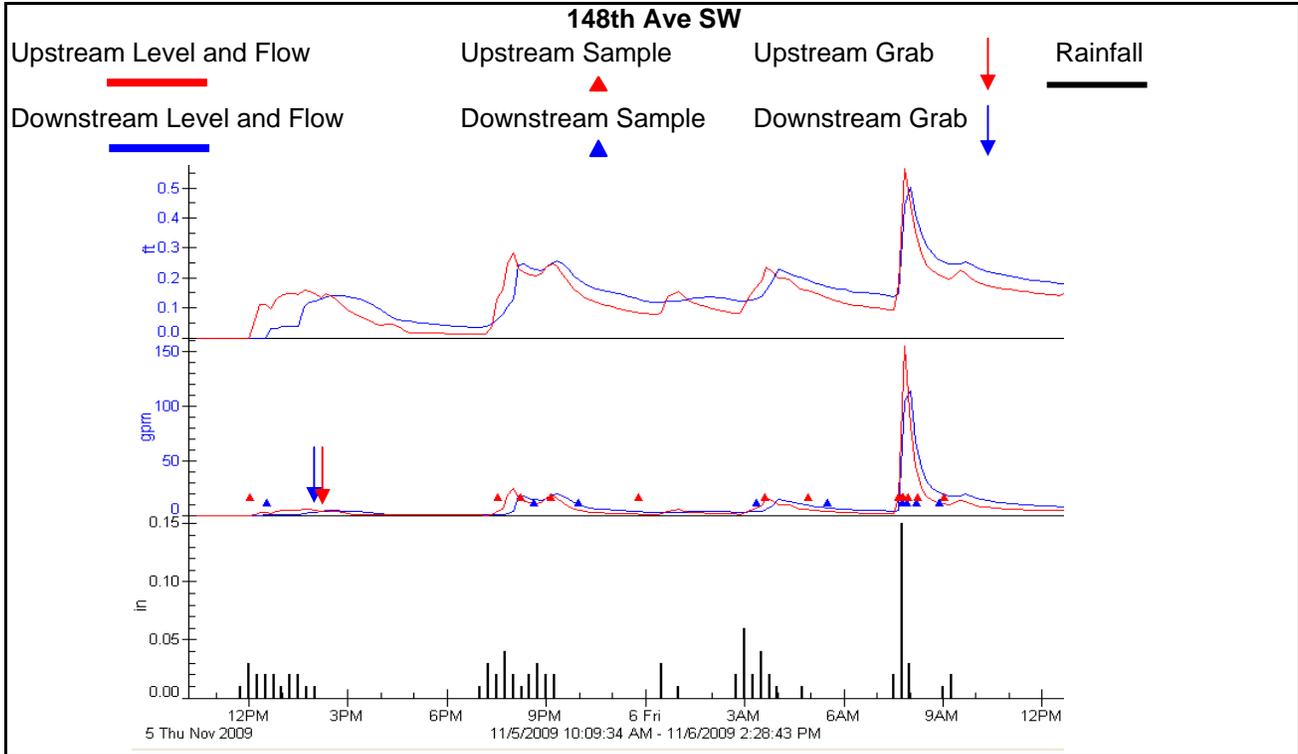
**Site:** 148th Ave SE

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.84	
<b>Duration (hours):</b>	21	
<b>Average Intensity (inches per hour):</b>	0.04	
<b>Antecedent Dry Period (hours):</b>	63	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	11/4/2009	
<b>Mid-Storm Visit:</b>	11/5/2009	
<b>Post Storm Visit:</b>	11/6/2009	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	9,655	11,962
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	79%	79%
<b>Number of Aliquots Collected:</b>	13	8
<b>Grab Samples (Fecals &amp; TPH):</b>	11/5/2009 14:10	14:00

**Comments:** Rainfall less than predicted, samplers paced for a larger stormflow event. Less than 10 aliquots collected at the downstream sample site, sample was submitted for analysis. Limited sample volume. Grab samples collected.

**KCRMS In-Line Ditch BMP Study**

**Storm # 4**

**Storm Set-Up Date:** January 10, 2010

**Laboratory number(s)** L49923-1

**Site:** 148th Ave SE

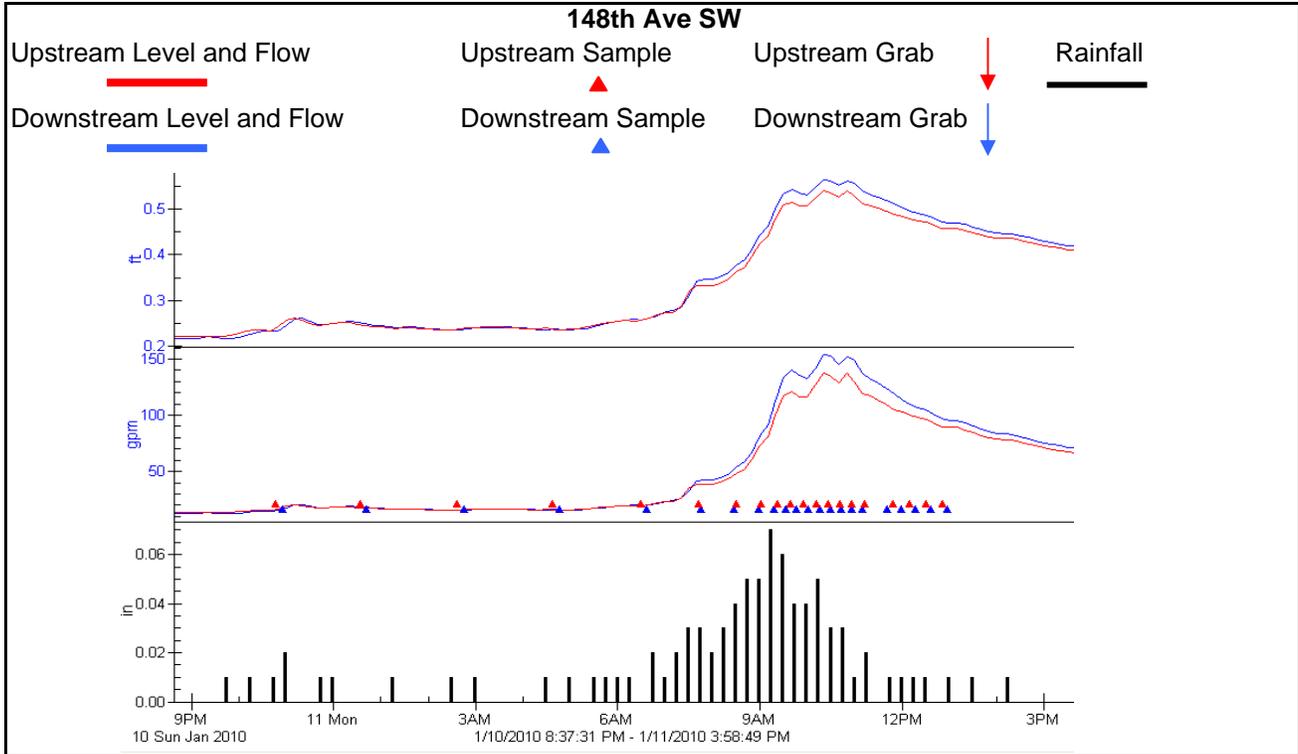
L49918-2

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.88	
<b>Duration (hours):</b>	16	
<b>Average Intensity (inches per hour):</b>	0.05	
<b>Antecedent Dry Period (hours):</b>	39	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	1/10/2010	
<b>Mid-Storm Visit:</b>	1/11/2010	
<b>Post Storm Visit:</b>	1/11/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	76,960	82,141
<b>Baseflow (gpm):</b>	14	17
<b>Percent of Hydrograph Sampled:</b>	52%	54%
<b>Number of Aliquots Collected:</b>	20	16
<b>Grab Samples (Fecals &amp; TPH):</b>	Not Collected	Not Collected

**Comments:** Grab samples were not collected. Mid-storm visit occurred at the peak of the storm.

**KCRMS In-Line Ditch BMP Study**

**Storm # 5**

**Storm Set-Up Date:** January 28, 2010

**Laboratory number(s)** L50043-1

**Site:** 148th Ave SE

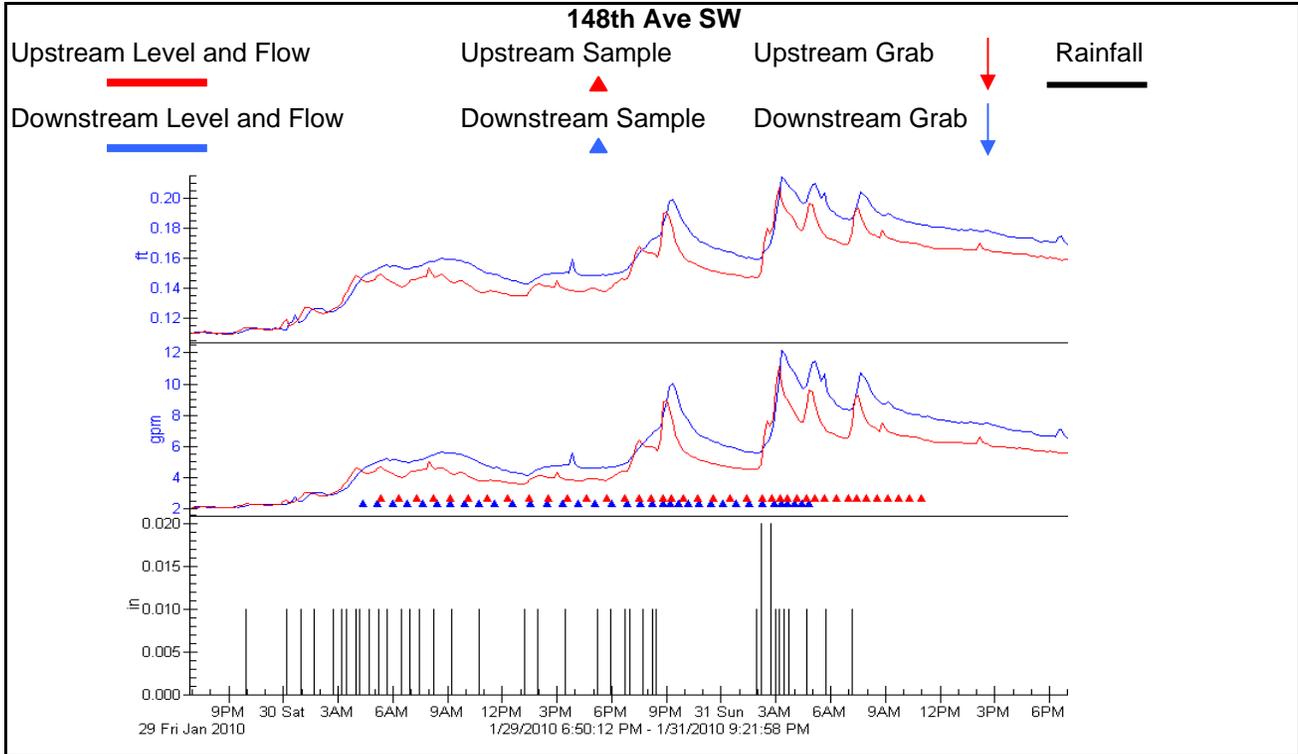
L50044-2

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.4	
<b>Duration (hours):</b>	11	
<b>Average Intensity (inches per hour):</b>	0.04	
<b>Antecedent Dry Period (hours):</b>	110	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	1/28/2010	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	2/1/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	16,483	19,610
<b>Baseflow (gpm):</b>	2	2
<b>Percent of Hydrograph Sampled:</b>	59%	45%
<b>Number of Aliquots Collected:</b>	40	35
<b>Grab Samples (Fecals &amp; TPH):</b>	Not Collected	Not Collected

**Comments:** Downstream sample volume was lower than expected due to sampler intake placed partially out of water only collecting a partial aliquot.

**KCRMS In-Line Ditch BMP Study**

**Storm # 6**

**Storm Set-Up Date:** February 4, 2010

**Laboratory number(s)** L50156-1

**Site:** 148th Ave SE

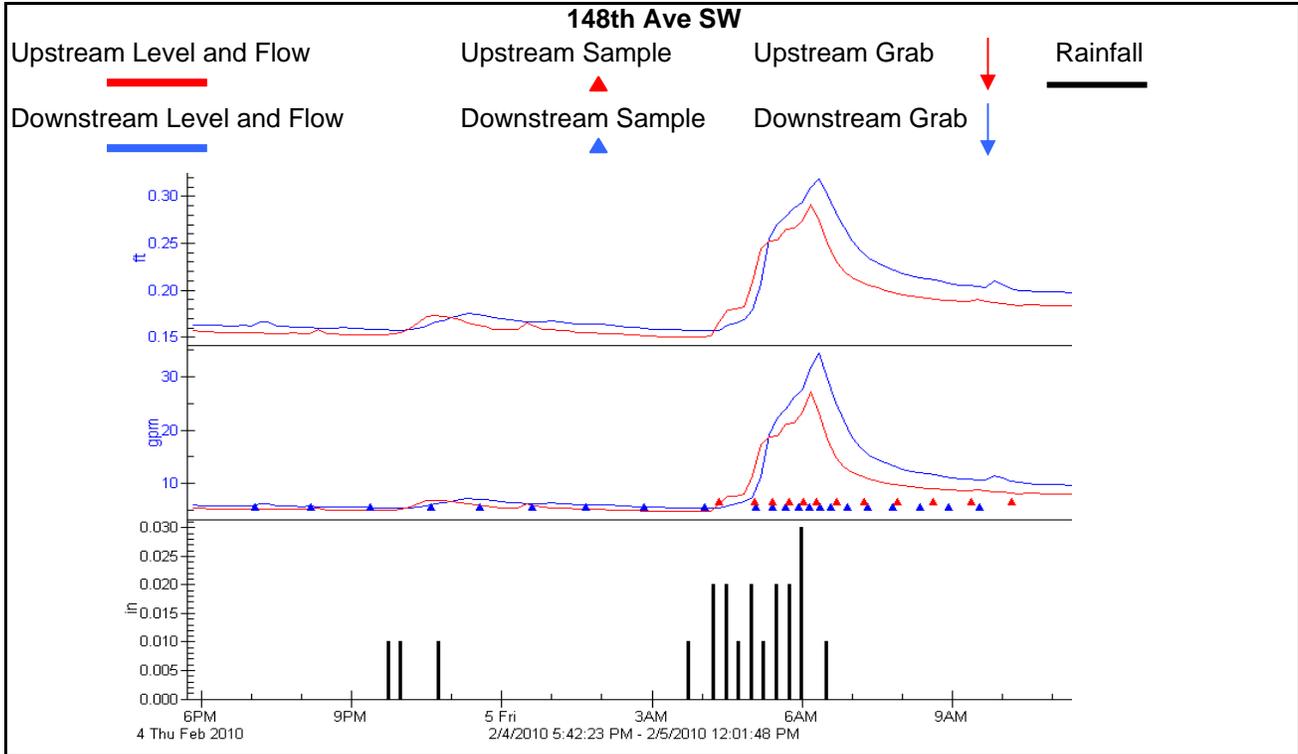
L50157-2

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.2	
<b>Duration (hours):</b>	9	
<b>Average Intensity (inches per hour):</b>	0.02	
<b>Antecedent Dry Period (hours):</b>	25	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	2/4/2010	
<b>Mid-Storm Visit:</b>	None	
<b>Post Storm Visit:</b>	2/5/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	6,830	8,122
<b>Baseflow (gpm):</b>	5	5
<b>Percent of Hydrograph Sampled:</b>	63%	88%
<b>Number of Aliquots Collected:</b>	12	22
<b>Grab Samples (Fecals &amp; TPH):</b>	Not Collected	Not Collected

**Comments:** Downstream sampler triggered early. Downstream sample includes three aliquots collected before true start of storm.

**KCRMS In-Line Ditch BMP Study**

**Storm # 7**

**Storm Set-Up Date:** February 23, 2010

**Laboratory number(s)** L50181-1

**Site:** 148th Ave SE

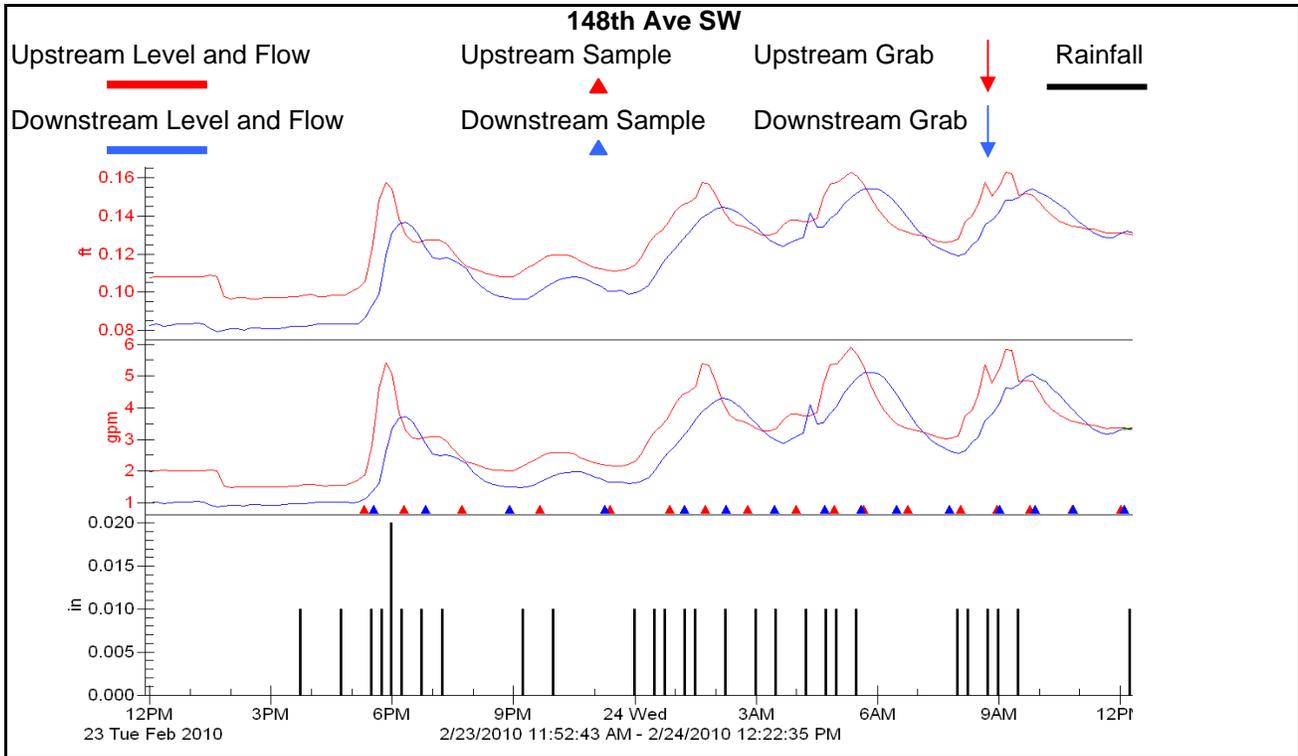
L50182-2

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.57	
<b>Duration (hours):</b>	25	
<b>Average Intensity (inches per hour):</b>	0.02	
<b>Antecedent Dry Period (hours):</b>	180	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	2/23/2010	
<b>Mid-Storm Visit:</b>	2/23/2010	
<b>Post Storm Visit:</b>	2/24/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	9,839	10,613
<b>Baseflow (gpm):</b>	2	2
<b>Percent of Hydrograph Sampled:</b>	40%	33%
<b>Number of Aliquots Collected:</b>	17	15
<b>Grab Samples (Fecals &amp; TPH):</b>	Not Collected	Not Collected

**Comments:** Sampled light rain for almost 18 hours, field crew thought that storm was complete at a few hour break in rain and pulled samples, took to lab. Samples represents first flush portion of storm and was kept.

**KCRMS In-Line Ditch BMP Study**

**Storm # 8**

**Storm Set-Up Date:** March 19, 2010

**Laboratory number(s)** L50300-1

**Site:** 148th Ave SE

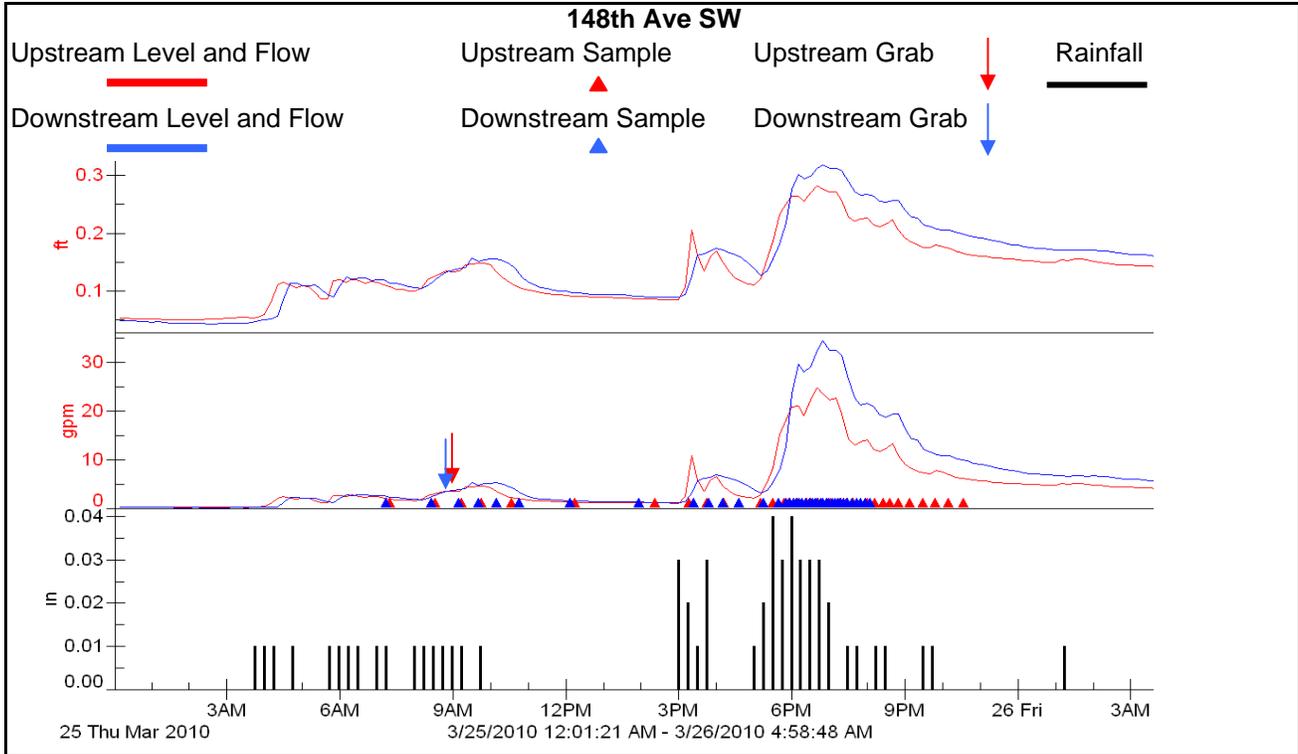
L50299-2

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.58	
<b>Duration (hours):</b>	22	
<b>Average Intensity (inches per hour):</b>	0.03	
<b>Antecedent Dry Period (hours):</b>	76	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	3/19/2010	
<b>Mid-Storm Visit:</b>	3/25/2010	
<b>Post Storm Visit:</b>	3/26/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	7,584	10,278
<b>Baseflow (gpm):</b>	0.2	0.2
<b>Percent of Hydrograph Sampled:</b>	77%	56%
<b>Number of Aliquots Collected:</b>	40	40
<b>Grab Samples (Fecals &amp; TPH):</b>	3/25/2010 10:00 (PDT)	9:50 (PDT)

**Comments:** Samplers set up for rain that was predicted for Sunday, 3/21/2010. Samplers and tubing were left to run until 3/25/2010 when rain began.

**KCRMS In-Line Ditch BMP Study**

**Storm # 9**

**Storm Set-Up Date:** April 12, 2010

**Laboratory number(s)** L50574-1

**Site:** 148th Ave SE

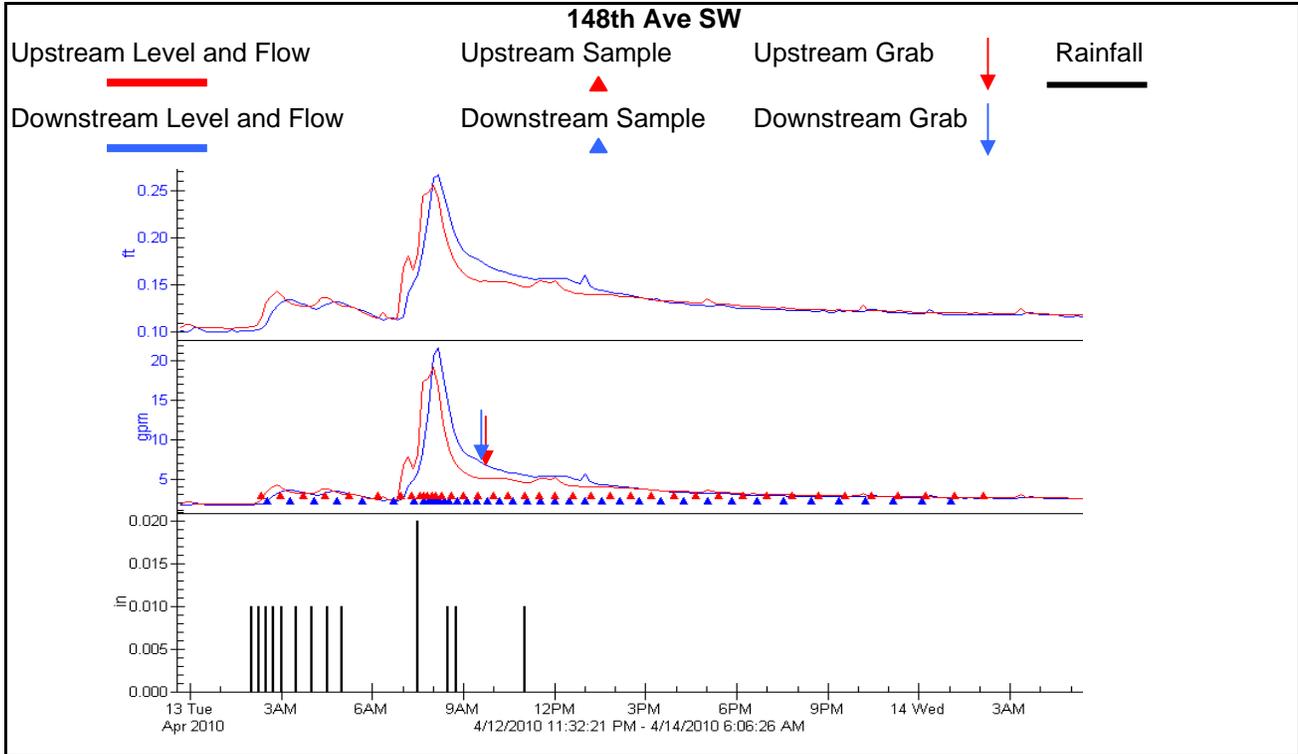
L50575-2

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.14	(0.27 on-site rain gage)
<b>Duration (hours):</b>	9	
<b>Average Intensity (inches per hour):</b>	0.16	
<b>Antecedent Dry Period (hours):</b>	120	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	4/12/2010	
<b>Mid-Storm Visit:</b>	4/13/2010	
<b>Post Storm Visit:</b>	4/14/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	5,877	6,019
<b>Baseflow (gpm):</b>	2	2
<b>Percent of Hydrograph Sampled:</b>	99%	82%
<b>Number of Aliquots Collected:</b>	40	40
<b>Grab Samples (Fecals &amp; TPH):</b>	4/13/2010 10:50 (PDT)	10:35 (PDT)

**Comments:** Rain cell sat over site and produced 0.27" of rainfall. Rainfall at Renton gage was 0.14" between 4/13/2010 03:00 - 12:00.

**KCRMS In-Line Ditch BMP Study**

**Storm # 10**

**Storm Set-Up Date:** April 19, 2010

**Laboratory number(s)** L50698-1

**Site:** 148th Ave SE

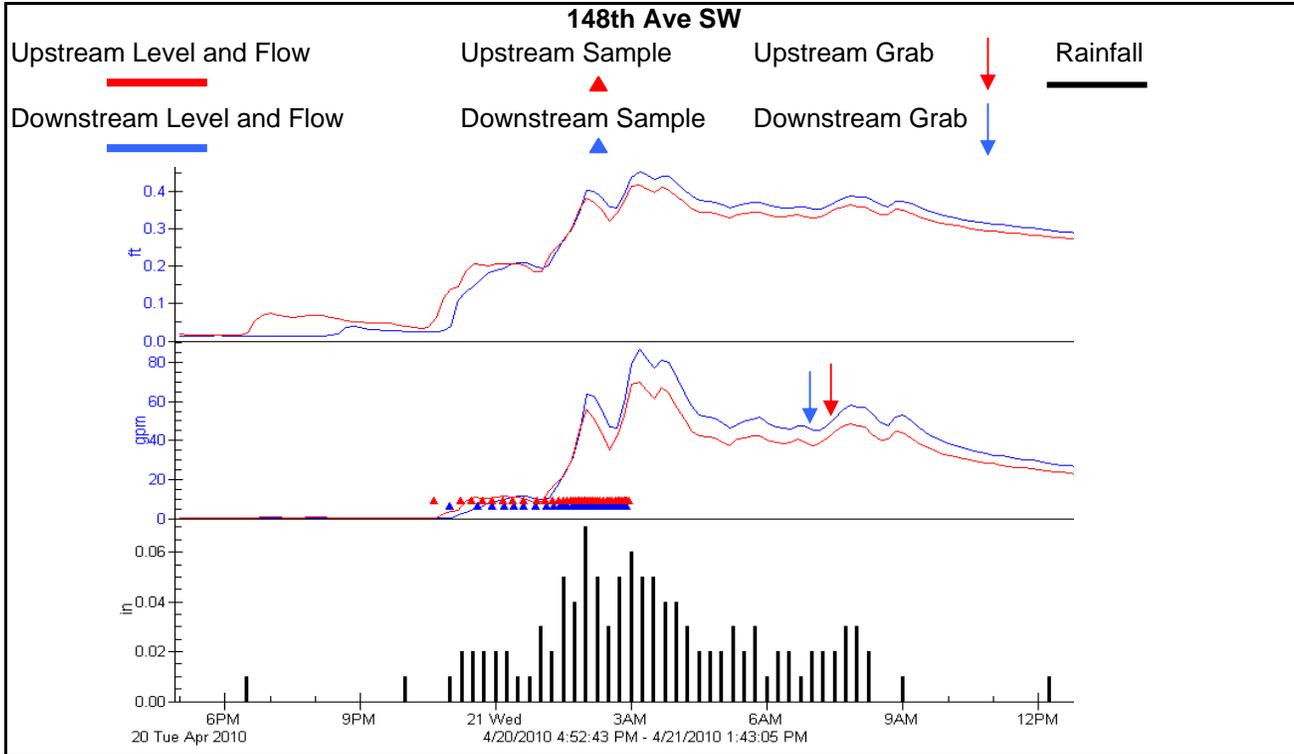
L50699-2

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	1.12	
<b>Duration (hours):</b>	10	
<b>Average Intensity (inches per hour):</b>	0.11	
<b>Antecedent Dry Period (hours):</b>	72	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	4/19/2010	
<b>Mid-Storm Visit:</b>	4/21/2010	
<b>Post Storm Visit:</b>	4/21/2010	
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	32,002	37,507
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	17%	15%
<b>Number of Aliquots Collected:</b>	40	40
<b>Grab Samples (Fecals &amp; TPH):</b>	4/21/2010 8:30 (PDT)	8:00 (PDT)

**Comments:** Storm successfully sampled the leading edge of the the hydrograph up to the first storm peak. This storm was significantly greater than predicted and the sample pacing was low for this storm volume. These samples represent the theoretical worst-case portion of this storm and it was decided that these samples should be included as representative. Storm was not forecasted well. Rainfall significantly more than predicted. Upstream sample was visibly turbid with fine sediment.

**KCRMS In-Line Ditch BMP Study**

**Storm # 11**

**Storm Set-Up Date:** August 25, 2010

**Laboratory number(s)** L51252-1

**Site:** 148th Ave SE

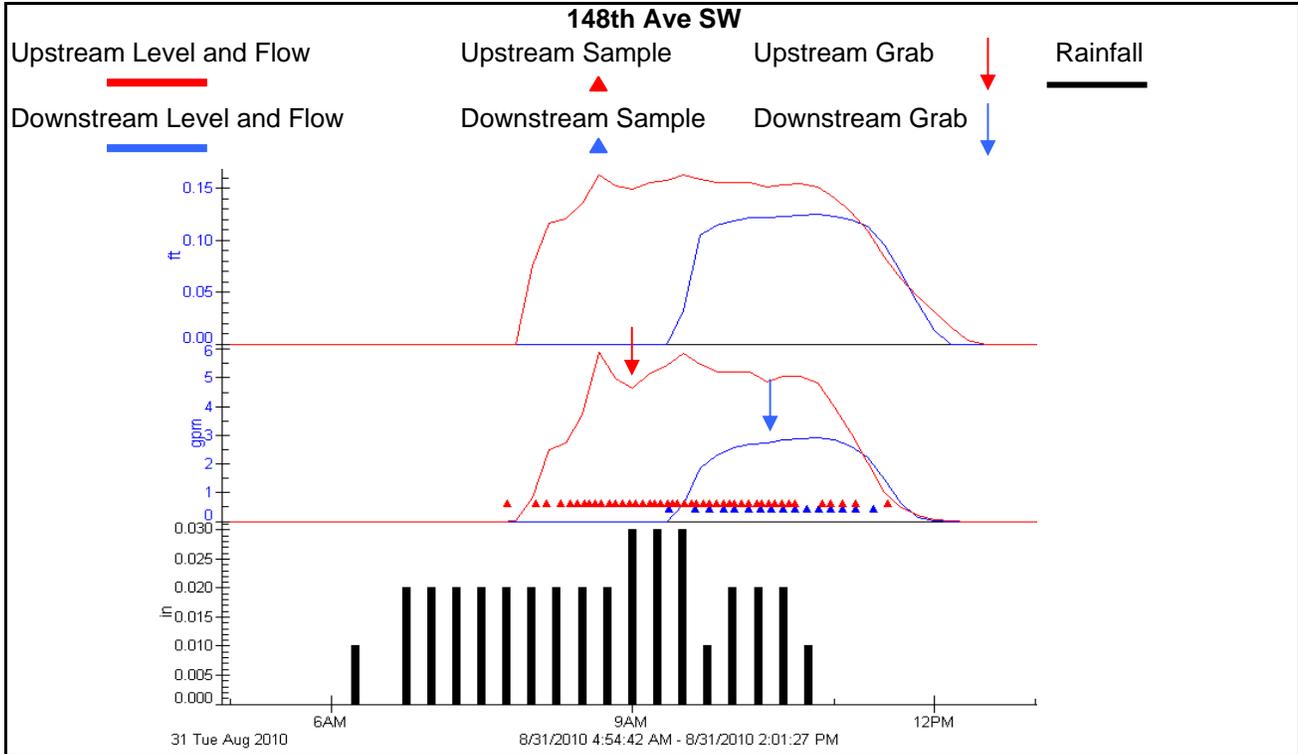
L51252-2

**BMPs:** Three Water Quality BMPs with Compost Treatment Cells

**Flow Measurement:** Extra-Large 60° Trapezoidal flume with stilling well

**Monitoring Equipment:** Isco Bubble Meter and 6712 Autosampler

**Raingage:** King County Renton gage



<b>Rainfall (inches):</b>	0.56	
<b>Duration (hours):</b>	13	
<b>Average Intensity (inches per hour):</b>	0.04	
<b>Antecedent Dry Period (hours):</b>	552	
<b>Inter-storm Dry Period (hours):</b>	<6	
<b>Sampler Set Up:</b>	8/25/2010	
<b>Mid-Storm Visit:</b>	8/31/2010	
<b>Post Storm Visit:</b>	8/31/2010	9/1/2010
<b>Sample Parameters:</b>	<b>Upstream</b>	<b>Downstream</b>
<b>Flow (gallons):</b>	1,989	307
<b>Baseflow (gpm):</b>	0	0
<b>Percent of Hydrograph Sampled:</b>	82%	93%
<b>Number of Aliquots Collected:</b>	40	16
<b>Grab Samples (Fecals &amp; TPH):</b>	8/31/2010 10:00 (PDT)	11:20 (PDT)

**Comments:** Storm resulted in two flow peaks separated by four hours with no flow. Second peak was not sampled. Samples kept as representative of first flush of a dry season event.



# **Appendix B.**

## **Quality Assurance/Quality Control**



# 1. DATA QUALITY ASSESSMENT, QUALIFICATION, AND REPORTING

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Quality assurance/Quality Control (QA/QC) protocol for this project was established in the *Quality Assurance Project Plan for [the] In-Line Ditch Stormwater Treatment BMP Program* King County Department of Transportation Road Services Division, Revised 2010. Efforts to implement the data quality objectives and data review described in the QAPP are provided in this section.

## 1.1. Water Quality BMP Studies

Water quality BMPs were evaluated by comparing monitoring results (laboratory analytical results, field water quality parameters and flow monitoring results) at influent and effluent monitoring stations. A monitoring program was developed for field monitoring procedures, quality control checks on flow data collection, and review and verification of data.

Flow monitoring was accomplished through installation of identical primary flow measurement devices at the upstream and downstream monitoring stations. A primary flow measurement device is a hydraulic structure with a standardized geometry that restricts the rate of flow so that flow is related to water level at the measurement point in the device. Flow meters collected measurements of water level at the measurement points and converted the level readings to flow based on standard rating tables for the primary device.

Water levels recorded by the datalogger were verified through direct (manual) measurements of water level in the primary device during field visits. Field forms were created to standardize monitoring procedures. Additional audit checks were made to test the response of the level measuring equipment at multiple stages during a single visit. Field forms and data sets downloaded from flow meters were reviewed by in-house staff. Raw logger files were backed up and reviewed in comparison with field notes before processing for import into the software package. Additional detail on these data verification and validation steps is provided below.

Rainfall data collected by the designated project rain gage was also imported into the software for flow/rainfall comparisons.

### 1.1.1 Equipment

**Primary Flow Measurement devices, Water Level Measurement and Dataloggers** at Water Quality BMP Project sites:

**Projects 148, 192 and OP.** Extra large 60°V trapezoidal flumes, originally developed for use in irrigation channels and used extensively by the Agricultural Research Service, U.S. Department

of Agriculture<sup>1</sup>, were selected and installed at the upstream and downstream monitoring stations due to the wide range of flows (0 to 694.7 gallons per minute [gmp]) for which they are rated. They have a shape that conforms to a typical ditch cross-section and a tendency to be self cleaning – they typically pass debris that is often caught in other types of flumes or weirs. Flumes were installed by hand in a uniform manner. They were installed level in all directions with the entrance and monitoring port upstream. The inlet to the flume was placed 2 to 3 inches above the floor of the ditch. A plywood wing wall plate cut to fit the upstream entrance to the flume was attached so that both ends extended into the walls of the ditch

**Project 136.** Thel-Mar weirs were installed directly into existing culverts. The Thel-Mar weir is a compound weir configured specifically to be installed easily into a culvert and connected to a bubble meter. They are rated at 251.3 gpm. Project 136 was located in a ditch directly adjacent to a front yard in a residential neighborhood setting. An elementary school is located one block to the north and a high school is located one block west of the project site. Use of the Thel-Mar weir was thought to provide some extra security against potential vandalism or tampering; the upstream weir was installed at the head of a culvert inside a locked catch basin and the downstream weir was placed inside the downstream culvert where it was not visible from the road. The weirs are supplied with mounting hardware and were installed level and vertical within the culverts.

#### **Water Level Measurement and Dataloggers:**

Isco 4230 bubble meters (flow meters) were used to measure water level in the primary devices and to communicate with Isco 6712 autosamplers for collection of flow-weighted composite samples at all water quality BMP sites. At Projects 148, 192 and OP, the bubble tube was installed in a stilling well attached to the monitoring port of the flume. At Project 136, weirs were monitored by attaching the bubble tube directly to a bubble tube port on the weir. Flow meters were programmed to collect water levels every ten minutes. Water levels recorded by the flow meter were calibrated to direct measurements of water level in the primary device.

#### **Autosampler**

Isco 4230 auto-samplers were used to collect flow-weighted composite samples. The samplers communicated with the flow meter to receive a water level-based trigger from the flow meter and flow pulses for timing of the aliquot samples. The same basic sampler program was used for all four sampling sites but modified for the expected flow conditions expected at each monitoring station for each targeted storm.

## 1.2. Field Monitoring

The field monitoring program focused on verifying water level in the primary device during site visits at every project site. Direct measurements of water level were made by hand at the device's monitoring point using a dedicated steel tape marked in hundredths of a foot. Direct measurements at the Thel-Mar weir were made from the base of the weir below the V-notch. A

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<sup>1</sup> Grant, D.M. and Dawson, B. D. Isco Open Channel Flow Measurement Handbook

-0.17 foot correction factor was applied to direct water level measurements at weir sites to account for the distance below the v-notch of the weir to the point where the measurement was made. Flow meters were adjusted (calibrated) to directly correspond with the water level in the device. The goal of water level monitoring was to maintain less than 0.02 feet of difference between direct measurements and level values recorded by the flow meter.

Protocol for each field visit was to start with a comparison of direct measurement of water level to flow meter level. These readings were made before any other maintenance work was done to the device or the flow meter. If the readings did not agree, the stilling well was flushed with water to ensure communication at the monitoring port and any debris were cleared from the device. Direct measurements of water level in the Thel-Mar weirs required subtracting the correction factor (noted above); this measurement and calculation was also looked at as a possible source of error. Any debris in the device were removed and the readings re-taken. If there was still a difference, the flow meter was adjusted so that the device level and meter level agreed.

The flow meter does not report flow or level values less than zero and no correction is required for dry periods.

### 1.2.1. Site Visits

**Storm visits** were initiated to set up the stations for targeted storm sampling. A storm sampling field form was prepared to standardize these activities and includes:

Pre-storm setup: documentation of flow meter operation with a comparison to direct measurements of water level, sample trigger setup and flow pulse rate, autosampler setup (including tubing setup, grab sample verification, sample volumes and pacing).

Mid-storm check: if the site was visited after the start of the storm the flow meter level measurement was verified and status of the autosample was checked. Grab samples, water quality readings were collected.

Post-storm visit: final documentation of flow meter compared to direct level measurement and autosampler information (storm start time/end time, number of aliquots, errors).

Qualifying storm criteria: Sampling review – percent of storm sampled, antecedent dry period, intra-storm break.

**Routine Site Visits.** A separate field form was prepared to document non-storm site visits intended to check condition of the monitoring stations between storm sampling visits and perform any needed maintenance. Operation of the flow meter was documented during these visits with a comparison between flow meter readings and direct measurements of water level.

### 1.2.2. Equipment Decontamination

Field equipment that came into contact with stormwater samples included the sample container, silicone pump head tubing, Teflon®-lined inlet tubing and a stainless steel strainer that was placed directly into the ditch. Prior to each sampling effort, sample containers were brought to the King County Environmental Laboratory (KCEL) for a complete cleaning including scrubbing

with hot tap water and laboratory grade detergent, an acid soak and thorough rinse with water certified to be free of metals and organics (this laboratory-grade water is maintained by KCEL).

Early during 2010 water year monitoring the sample tubing was installed in conduit and left in place at each monitoring location. Pre-storm setup protocol required purging the tubing with a minimum of two gallons of laboratory grade water. This process was cumbersome and a decision was made to pull all tubing after each storm event to give it a full cleaning at the KCRMS facility. This cleaning process included setting up a pumping station where hot tap water with laboratory grade detergent could be cycled through the tubing and strainer, followed by a tap water rinse and then laboratory grade rinse water. Tubing was re-installed during pre-storm setup.

### 1.3. Data Review/Verification

Observations documented on field forms and downloaded data files were reviewed, stored, and processed by KCRMS personnel. Spreadsheets (Table B-1 through B-4) were prepared to summarize, review and verify information collected during field visits and documents on the field forms. The field summary spreadsheets include:

Date of visit

Type of visit (storm monitoring or routine site visit)

Pre- and post-maintenance water levels compared to datalogger readings

Differences between direct and meter levels

Primary device condition and maintenance activities

Meter time verification

Comments on field activities and documentation

Storm start and stop times

Total stormflow

Sampling start and stop times

Total sampled flow

Baseflow (or interflow drainage before the start of sampling)

Rainfall start and stop times

Total rainfall

Corrective actions and revisions to the downloaded dataset

Individual audit Reports were prepared during 2010 water year projects to summarize the information from the field summary tables. During 2011 water year monitoring the spreadsheets were used as the primary field audit document.

The Storm Summary Figures (Appendix A) present the results of each storm sampling event including the storm hydrograph, rainfall hyetograph, timing of aliquot and grab samples, total rainfall, antecedent dry period, mid-storm breaks, total storm flow and rainfall, a comparison of upstream and downstream flow conditions and comments about the success or failure of the aspects of the sampling.

## 1.4. Electronic Data Files

**Flow Meter Data.** The flow meters were downloaded directly into a Teledyne Isco, Inc. *Flowlink 5*® database program on the project laptop. The laptop was backed up in the office by archiving downloaded data on a KCRMS server. The *Flowlink 5*® software is used to create running graphical summaries of water level, flow and imported rainfall data.

**Rainfall Data.** One rain gage was stationed at each water quality BMP project site and downloaded directly into the flow meter. Since ditch sites were not always ideal locations for collecting rainfall data a rain gage maintained from by the King County Hydrologic Information Group (KCHIC) was designated for each project site. The purpose of the on-site rain gage was to have an on-site reading of rainfall as well as a backup to the gage maintained by KCHIC.

The Renton rain gage; 31UN was designated for 2010 Projects 148 and 136. The Fairwood rain gage; 31Y2 was designated for 2011 Projects 192 and OP. The KCHIC website describes rain gage maintenance and calibrations as:

“Recording rain gauges use tipping bucket gauges to measure rainfall and dataloggers to store the information. The gauges are uploaded, maintained and the calibration checked about ten times a year. The dataloggers total record the rainfall every 15 minutes in 0.01 inch increments. Data accuracy is checked by comparing nearby gauge records for anomalies. Where equipment failure produces a gap in the record, rainfall is estimated from nearby recording gauges and volunteer observations.”<sup>2</sup>

Data from these rain gages were downloaded from the KCHIC website:

<http://green.kingcounty.gov/WLR/Waterres/hydrology/Default.aspx> at routine intervals. The dataset was re-imported after the end of each water year to account for any changes due to end of year data reviews made by KCHIC.

**Autosampler Data.** The autosampler was downloaded separately from the flow meter, but its dataset is imported directly into the same database file. A separate storm sampling “History” report is generated by the autosampler. This report lists the programming used and the timing and success of each sampled aliquot.

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<sup>2</sup> King County Hydrologic Information Center: About the Hydrologic Monitoring Program at: <http://green.kingcounty.gov/WLR/Waterres/hydrology/About.aspx>

(last visited 2/8/2011).

**Data Files.** Electronic data files are have been saved and stored by KCRMS.

## 1.5. Water Quality Audit Review/Data Validation

### 1.1.2 Laboratory Data

All samples were delivered to and analyzed by KCEL in Seattle, Washington. KCEL reviewed and assisted with preparation of the program QAPP. Sample handling, analysis and reporting done by KCEL followed criteria specified in this QAPP. Data packages prepared by KCEL included electronic data submittals and a hard-copy (or .pdf file) report that summarized the analytical work and anomalies. If performance objectives were not achieved or if sample handling guidelines were not followed, KCEL flagged the data result with a qualifier, and submitted a Data Anomaly Form to document the potential effect on the data results. The reports include the QA/QC work done by the laboratory, data flags and anomaly forms if needed. Each data report submitted by KCEL was reviewed in detail by KCRMS staff for completeness and accuracy. Reports were checked to ensure proper analyses were performed within the required sample hold time, as outlined in the QAPP. All associated QA/QC was checked to ensure that data results were not compromised, including verifying method blanks, reporting detection limits, duplicates, matrix spikes and matrix spike duplicates, lab control samples, and surrogate recoveries all were within acceptable ranges in accordance with the QAPP. Field QA/QC was also verified including filter blanks, equipment blanks, and Chain of Custody protocols were followed and within acceptable limits. Data review worksheets prepared by KCRMS and the analytical reports have been saved as part of the project records. Throughout the study, no anomalies were found that invalidated a sample result.

### 1.1.3 Field Quality Control Samples

Collection of quality control samples is specified in the project QAPP.

**Equipment Blanks.** A total of seven field equipment blank samples were collected over the course of the four water quality studies. Each blank was collected by pumping laboratory grade water provided by KCEL through decontaminated sample tubing (strainer, Teflon tubing and silicone pump head tubing) and into a decontaminated composite sample bottle at each site. The blank sample was transferred to KCEL where it went through the standard composite sample mixing and splitting process as a regular stormwater sample.

**Field Filtration Blanks.** Filtration blanks were collected during the sample splitting process for nitrate-nitrite nitrogen, ortho-phosphorus and dissolved metals when using commercially prepared filters. Analysis of filter blanks for dissolved metals was discontinued during 2011 sampling when the laboratory switch from cone filters to pre-tested in-line filter cartridges.

**Temperature Blanks.** The temperature of the composite sample was documented with delivery of the composite sample to the KCEL and prior to sample splitting activities. Temperature was reviewed as part of the laboratory audit summary.

### 1.1.4 Data Verification

KCRMS efforts in verifying data packages received from KCEL included reviewing laboratory reports for completeness against the chain of custody (COC) completed by KCRMS at the time

of sampling, and reviewing data sets as they were transferred from electronic data files submitted by KCEL into spreadsheets.

### 1.1.5 Data Validation

KCRMS prepared a spreadsheet review form to check the quality control parameters run by KCEL against criteria specified in the project QAPP. An audit report was then prepared for each storm sampling event summarizing the data review process, any anomalies found by KCEL and corrective actions. Corrective actions included contacting the KCEL for verification or correction to the reports. These audit reports are saved as part of the project record. No anomalies were found that invalidated a reported analytical result.

### 1.1.6 Corrective Actions

Three parameters have a 15 minute hold time from completion of sampling; dissolved metals and ortho-phosphorous have a 15 minute requirement for filtering, and TKN has a 15 minute requirement for preservation. These parameters are collected as composite samples; the sample end time is noted as the time of the last aliquot collected by the autosampler. This time is typically not known in advance, and the composite sample must be mixed using a sample splitting system before aliquots are removed. These holding time requirements created an unavoidable situation for this monitoring program in that hold times for these parameters could not be met. This raises concerns over the validity or usefulness of applying such short holding time criteria to samples that need to be evaluated as flow-weighted composites. Corrective action included removing composite samples from each site soon after collection was completed and delivering them to KCEL for sample splitting. These analytes were filtered during the splitting process and the TKN was preserved as soon as the splitting was completed. However, all exceeded the 15 minute hold time and, thus, received an H qualifier. Laboratory reports were reviewed for application of the H qualifier.

**Laboratory Analytical Data.** Laboratory analytical data audits prepared by KCRMS summarize any issues found with the laboratory reports prepared by KCEL. Issues identified were addressed through email communication with the laboratory. No anomalies were found that invalidated a reported analytical result.

**Field Monitoring** Corrective actions focused on training and reviewing procedures with field staff for documentation procedures. These corrective actions are noted in Tables B1 through B4.

Project 136 several periods of suspect or missing record between storm sampling events were identified during data validation. These periods have been documented in the Field Summary spreadsheet. Some of these appear to be due to debris clogging the weir; and in one case the upstream weir was found to be pushed out of alignment in the culvert in which it was mounted.

## 1.1.7 Exceptions to the QAPP

### **Laboratory Analytical Data**

Holding times for filtering of dissolved metals and ortho-phosphorous and preservation of TKN samples was reviewed under Section 6.3 Corrective Actions. Composite samples were removed from each site soon after collection and delivered to KCEL for sample splitting. These analytes were filtered during the splitting process but all exceeded the 15 minute hold time, and received an H qualifier.

Field documentation Forms. As indicated in the QAPP, field forms were prepared for this project using standard office software. These forms were printed on Rite in the Rain® paper for use during storm events at multiple sites and were revised as documentation needs developed. Pencil has been used on some forms due to the need to document on wet paper during storm conditions. Due to these conditions, these forms were not pre-bound. They are identified in review documents by station ID and monitoring date. These forms have been saved as Portable Document Files (PDFs) and are saved as part of the project files.

### **Qualifying Storms**

Samples were analyzed from storms that did not meet strict storm acceptance criteria specified in the QAPP but were felt to be representative of stormflow conditions at both influent and effluent monitoring sites in order to assess BMP performance. These conditions are noted in the field summary spreadsheets.

### **Field Quality Control Samples**

A total of seven field equipment blanks were analyzed during the study period. Four samples were analyzed in 2010 and three were analyzed in 2011. The QAPP called for a total eight field blanks with two collected from each study site.

## 1.6. Flow Control BMP Studies

The goal of the flow control monitoring program was to collect complete flow records at influent and effluent monitoring stations at each project site through a water year to document seasonal variation in flow control attributes.

## 1.1.8 Equipment

### **Primary Flow Measurement devices and Dataloggers at Flow Control BMP Project sites:**

Extra-large 60°V trapezoidal flumes were installed as primary flow measurement devices at all flow-control project sites (Projects PET, 276, 276DN and 192DN).

## **Water Level Measurement and Dataloggers:**

Water level was measured at each flow control project using vented pressure transducers (Instrumentation Northwest Inc. 5 psi SDI-12 pressure transducers) mounted inside stilling wells attached to the monitoring port of flumes. Water level data was collected by dataloggers (Campbell Scientific, Inc. 800CR dataloggers) in five minute increments. Water levels recorded by the pressure transducers were calibrated to direct measurements of water level in the primary device using an offset value to convert the level measured in the stilling well to the water level in the flume. Level measurements were verified through direct measurements during site visits.

## **Monitoring:**

The field monitoring program focused on verifying water level in the flume during site visits at every project site. Direct measurements of water level were made by hand at the flume's monitoring port using a dedicated steel tape marked in hundredths of a foot. Water level measured by the pressure transducer was corrected at the datalogger using a correction factor (based on actual depth of the transducer probe in the attached stilling well) verified through these hand measurements. The goal of water level monitoring was to maintain less than 0.02 feet of difference between direct measurements and level values recorded by the flow meter.

Protocol for each field visit was to start with a comparison of direct measurement of water level to flow meter level. These readings were made before any other maintenance work was done to the device or the flow meter. If the readings did not agree, the stilling well was flushed with water to ensure communication at the monitoring port and any debris were cleared from the device. When the flume was dry water level in the stilling wells would drop below zero and were reported as negative level by the datalogger. Negative levels were reviewed and corrected to zero before importing into the project database.

### 1.1.9 Data Review/Verification

Observations documented on field forms and downloaded data files were reviewed, stored, and processed by KCRMS personnel. Spreadsheets (Table B-5 through B-8) were prepared to summarize, review and verify information collected during field visits and documents on the field forms. The field summary spreadsheets include:

Date of visit

Type of visit (storm monitoring or routine site visit)

Pre- and post-maintenance water levels compared to datalogger readings

Differences between direct and meter levels

Primary device condition and maintenance activities

Meter time verification

Comments on field activities and documentation

Corrective actions and revisions to the downloaded dataset

Individual audit Reports were prepared during 2010 water year projects to summarize the information from the field summary tables. During 2011 water year monitoring the spreadsheets were used as the primary field audit document.

## 1.2 Electronic Data Files

**Datalogger Data.** The dataloggers were downloaded directly into a project laptop and saved as comma-separated (.csv) files. In the office, field data collected during the site visit was reviewed and entered into a spreadsheet that was used to review the pre – and post monitoring water levels and the accuracy of the meter readings recorded by the datalogger. Any revisions to the field data set were noted in the spreadsheet. The original or raw data file downloaded from the logger was saved and the reviewed data set was prepared for import into Teledyne Isco, Inc. *Flowlink 5*® software along with rainfall data. The raw and revised files from the laptop were backed up in the office by saving on a KCRMS server. *Flowlink 5*® database program The *Flowlink 5*® software is used to create running graphical summaries of water level, flow and imported rainfall data.

**Rainfall Data.** A rain gage maintained from by the King County Hydrologic Information Group (KCHIC) was designated for each project site.

The Fairwood rain gage; 31Y2 was designated for the 2010 Project PET and 2011 Project 192. The The KCHIC website describes rain gage maintenance and calibrations as:

Data from these rain gages were downloaded from the KCHIC website:

<http://green.kingcounty.gov/WLR/Waterres/hydrology/Default.aspx> at routine intervals. The dataset was re-imported after the end of each water year to account for any changes due to end of year data reviews made by KCHIC.

**Autosampler Data.** The autosampler was downloaded separately from the flow meter, but its dataset is imported directly into the same database file. A separate storm sampling “History” report is generated by the autosampler. This report lists the programming used and the timing and success of each sampled aliquot.

Table B-1. Project 148 Monitoring Summary for 2010 Water Year

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Storm Sample Targeted?	Composite Sample Analyzed?	Composite Sample ID	Antecedent Dry Period (hrs)	Pacing (gal)	Flume Level	Meter Level	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Grab Sample ID	Mid Storm Check Date	Flume Level	Meter Level	Off By	Grab Date/Time (PDT/PST)	Post Storm Date	Flume Level	Meter Level	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break? (hrs)	Stormflow Start (date/time)	Stormflow End (date/time)
--	--	148	06/04/09	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	06/17/09	No	--	--	--	--	Dry	-0.013	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	06/17/09	No	--	--	--	--	Dry	-0.029	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	06/22/09	No	--	--	--	--	Dry	NA	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	06/22/09	No	--	--	--	--	Dry	NA	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	07/22/09	No	--	--	--	--	Dry	-0.01	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	07/22/09	No	--	--	--	--	Dry	-0.31	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	08/31/09	No	--	--	--	--	Dry	-0.12	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	08/31/09	No	--	--	--	--	Dry	-0.14	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	09/03/09	Yes	No	--	7	--	Dry	-0.12	--	No	No	--	--	--	--	--	--	9/8/09	Dry	-0.12	--	--	--	--	--	--
--	--	148DN	09/03/09	Yes	No	--	7	--	Dry	-0.12	--	No	No	--	--	--	--	--	--	9/8/09	Dry	-0.12	--	--	--	--	--	--
--	--	148UP	09/08/09	No	--	--	--	--	Dry	-0.12	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	09/08/09	No	--	--	--	--	Dry	-0.12	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	09/17/09	Yes	Yes	--	45	150	Dry	-0.013	--	No	No	--	None	--	--	--	Not Collected	9/19/09	Dry	-0.013	NA	No	No	<6	9/19/09 3:00	9/19/09 8:00
--	--	148DN	09/17/09	Yes	No	--	45	50	Dry	-0.013	--	No	No	--	None	--	--	--	Not Collected	9/19/09	Dry	-0.012	NA	No	No	<6	9/19/09 6:40	9/19/09 8:40
--	--	148UP	09/28/09	Yes	No	--	24	40	Dry	-0.013	--	No	No	--	None	--	--	--	Not Collected	9/30/09	Dry	-0.011	NA	No	No	<6	9/29/09 19:50	9/29/09 22:00
--	--	148DN	09/28/09	Yes	No	--	24	20	Dry	-0.012	--	No	No	--	None	--	--	--	Not Collected	9/30/09	NA	NA	NA	No	No	<6	9/29/09 21:30	9/29/09 21:40
--	--	--	10/1/2010	--	--	--	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	10/08/09	Yes	No	--	260	NA	0.000	-0.004	0.004	No	No	--	None	--	--	--	Not Collected	10/14/09	0.000	-0.008	0.008	No	No	<6	10/14/09 5:20	10/14/09 6:50
--	--	148DN	10/08/09	Yes	No	--	260	NA	0.000	0	0.000	No	No	--	None	--	--	--	Not Collected	10/14/10	0.000	0.000	0.000	No	No	<6	No Flow	No Flow
1	1	148UP	10/16/09	Yes	Yes	L49169-1	31	500	0.000	0.003	-0.003	No	No	L49169-5	10/16/09	0.090	0.074	0.016	10/16/09 13:20	10/18/09	0.030	0.022	0.008	No	No	<6	10/16/09 9:00	10/18/09 14:20
1	1	148DN	10/16/09	Yes	Yes	L49169-2	31	500	Dry	0.004	--	No	No	L49169-6	10/16/10	0.150	0.152	-0.002	10/16/09 13:05	10/18/09	0.040	0.040	0.000	No	No	<6	10/16/09 10:45	10/18/09 8:10
--	--	148UP	10/20/09	Yes	Yes	--	28	30	dry	-0.075	--	No	No	--	10/21/09	No Flow	--	--	Not Collected	10/22/09	dry	-0.005	--	No	No	9*	10/21/09 6:00	10/22/09 6:00
--	--	148UP	10/22/09	Yes	No	--	36	100	Dry	0	--	No	No	--	10/23/09	0.115	0.104	0.011	--	None	--	--	--	--	--	--	--	--
--	--	148DN	10/22/09	Yes	No	--	36	150	Dry	-0.011	--	No	No	--	--	--	--	--	None	--	--	--	--	--	--	--	--	--
--	--	148UP	10/26/09	No	No	--	--	--	0.270	0.257	0.013	-0.007	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	10/26/09	No	No	--	--	--	0.370	0.357	0.013	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2	2	148UP	10/28/09	Yes	Yes	L49467-1	41	150	0.010	0.022	-0.012	No	No	L49467-5	10/29/09	0.190	0.185	0.005	10/29/09 9:25	10/30/09	0.000	0.001	-0.001	No	No	<6	10/28/09 19:50	10/29/09 18:00
2	2	148DN	10/28/09	Yes	Yes	L49467-2	41	150	0.050	0.053	-0.003	No	No	L49467-6	10/29/09	0.210	0.210	0.000	10/29/09 9:39	10/30/09	0.060	0.066	-0.006	No	No	<6	10/28/09 19:30	10/29/09 18:00
3	3	148UP	11/04/09	Yes	Yes	L49581-1	63	700	Dry	0.001	--	No	No	L49581-5	11/5/09	0.150	0.135	0.015	11/5/09 14:12	11/6/09	NA	0.105	NA	No	No	<6	11/5/09 12:10	11/6/09 12:00
3	3	148DN	11/04/09	Yes	Yes	L49581-2	63	1200	Dry	0.011	--	-0.011	No	L49581-6	11/5/09	0.130	0.130	0.000	11/5/09 14:00	11/6/09	NA	0.115	NA	No	No	<6	11/5/09 12:20	11/6/09 12:00
--	--	148UP	11/19/09	No	No	--	--	--	0.350	0.351	-0.001	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	11/19/09	No	No	--	--	--	0.375	0.364	0.011	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	12/03/09	No	No	--	--	--	0.140	0.141	-0.001	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	12/03/09	No	No	--	--	--	0.125	0.123	0.002	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	12/14/09	Yes	Yes	--	197	600	0.025	0.029	-0.004	No	No	--	None	--	--	--	Not Collected	12/15/09	0.105	0.104	0.001	No	No	<6	12/14/09 17:50	12/15/09 4:56
--	--	148DN	12/14/09	Yes	No	--	197	700	0.000	-0.001	0.001	No	No	--	None	--	--	--	Not Collected	12/15/09	0.070	0.100	-0.030	Yes	No	<6	12/14/09 13:00	12/15/09 4:56
--	--	148UP	12/17/09	No	No	--	--	--	0.215	0.212	0.003	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	12/17/09	No	No	--	--	--	0.230	0.222	0.008	0.008	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	12/26/09	Yes	No	--	--	--	0.125	0.128	-0.003	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	12/26/09	Yes	No	--	--	--	0.110	0.113	-0.003	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	--	148UP	01/10/10	Yes	Yes	L49923-1	39	2000	0.232	0.232	0.000	No	No	--	1/11/10	0.500	0.500	0.000	Not Collected	1/11/10	0.460	0.458	0.002	No	No	<6	1/10/10 22:40	1/11/10 14:20
4	--	148DN	01/10/10	Yes	Yes	L49918-2	39	2000	0.228	0.229	-0.001	No	No	--	1/11/10	0.530	0.530	0.000	Not Collected	1/11/10	0.470	0.469	0.001	No	No	<6	1/10/10 22:40	1/11/10 22:50
--	--	148UP	01/22/10	Yes	No	--	22	1500	0.136	0.132	0.004	-0.004	No	--	None	--	--	--	Not Collected	1/25/10	0.185	0.182	0.003	No	No	<6	1/24/10 13:10	1/27/10 0:20
--	--	148DN	01/22/10	Yes	No	--	22	1500	0.135	0.134	0.001	No	No	--	None	--	--	--	Not Collected	1/25/10	0.195	0.195	0.000	No	No	<6	1/24/10 13:20	1/27/10 0:20



Table B-1. Project 148 Monitoring Summary for 2010 Water Year

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Total Stormflow (gal)	Stormflow duration (hrs)	First Sample (date/time)	Last Sample (date/time)	No. of Aliquots Collected	Sampled Stormflow (gals)	% of Storm Sampled	Duration of Sampling (min)	Baseflow <sup>1</sup> at start of storm (gpm)	Total Base flow (gal)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hrs)	Rainfall Intensity (in/hrs)	On-site Rain gage	Comment
--	--	148	06/04/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Project 148 Installed: 3 BMPs
--	--	148UP	06/17/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1st - post BMP site visit-start of monitoring
--	--	148DN	06/17/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1st - post BMP site visit-start of monitoring
--	--	148UP	06/22/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Downloaded meters
--	--	148DN	06/22/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Downloaded meters
--	--	148UP	07/22/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
--	--	148DN	07/22/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
--	--	148UP	08/31/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	No upstream/downstream storm combinations collected
--	--	148DN	08/31/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Audited Rain gage 10-tips ok, will show as 0.1 rain in record
--	--	148UP	09/03/09	--	--	--	--	--	--	--	--	--	--	--	--	1.35	--	--	--	Site visit after Labor Day storm that failed inter-storm dry period criteria. Samplers were set up, pacing was wrong-bottles overtopped. No samples kept.
--	--	148DN	09/03/09	--	--	--	--	--	--	--	--	--	--	--	--	1.35	--	--	--	Site visit after Labor Day storm that failed inter-storm dry period criteria. Samplers were set up, pacing was wrong-bottles overtopped. No samples kept.
--	--	148UP	09/08/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
--	--	148DN	09/08/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
--	--	148UP	09/17/09	598	5.0	9/19/09 4:36	9/19/09 6:59	14	523	87.5%	143	0.0	0	--	--	0.33	5	0.07	--	0.03 inches 45 hrs prior to storm that didn't result in flow in ditch. Sample kept for Site Characterization analysis.
--	--	148DN	09/17/09	174	2.0	--	--	0	0	0.0%	--	0.0	--	--	--	0.33	5	0.07	--	10 sample aliquots attempted, none successful. No sample collected.
--	--	148UP	09/28/09	588	2.2	--	--	0	1	0.0%	--	0.0	--	--	--	0.28	4	0.07	--	Insufficient sample for analysis upstream (about 250 milliliters total) - not analyzed
--	--	148DN	09/28/09	94	0.2	9/29/09 21:43	9/29/09 22:01	3	0	0.0%	18	0.0	0	--	--	0.28	4	0.07	--	No sample collected
--	--	--	10/1/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Start of 2010 Water Year (wet season)
--	--	148UP	10/08/09	60	1.5	--	--	2	16	26.7%	--	0.0	--	--	--	0.88	10	0.09	--	10/13/09 still dry, added ice. 10/14/09 Only 2 of 3 aliquots collected. Sample not analyzed.
--	--	148DN	10/08/09	0	--	None	None	0	0	0.0%	--	0.0	--	--	--	0.88	10	0.03	--	No flow, no sample collected.
1	1	148UP	10/16/09	12,400	53.3	10/16/09 11:28	10/18/09 1:49	25	11,997	96.8%	2301	0.0	0	10/16/09 9:00	10/18/09 1:30	1.50	47	0.03	0.56	Sample analyzed through Ditch Grant protocol
1	1	148DN	10/16/09	17,203	45.4	10/16/09 15:51	10/18/09 2:35	34	17,011	98.9%	2084	0.0	0	10/16/09 9:00	10/18/09 1:30	1.50	47	0.03	0.56	Sample analyzed through Ditch Grant protocol
--	--	148UP	10/20/09	575	24.0	10/21/09 11:22	10/21/09 21:31	18	563	97.9%	609	0.0	0	--	--	0.13*	17	--	--	Sample for Site Characterization only. No downstream setup or field form. *Inter-storm break in Renton RG record. On-site 148DN rain gage = 0.2", with <6 hour inter-storm break.
--	--	148UP	10/22/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Could not complete sample due to weekend staffing issues.
--	--	148DN	10/22/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Could not complete sample due to weekend staffing issues.
--	--	148UP	10/26/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148DN	10/26/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
2	2	148UP	10/28/09	5,490	22.2	10/28/09 21:45	10/29/09 12:02	24	3,592	65.4%	857	0.0	0	10/28/09 19:10	10/30/09 13:30	0.40	18	0.02	0.42	Composites successful. Grab samples collected
2	2	148DN	10/28/09	5,475	22.5	10/28/09 2:16	10/29/09 12:22	28	4,478	81.8%	2046	0.0	0	10/28/09 19:10	10/30/09 13:30	0.40	18	0.02	0.42	Composites successful. Grab samples collected
3	3	148UP	11/04/09	9,655	23.8	11/5/09 19:32	11/6/09 9:03	13	7,618	78.9%	811	0.0	0	11/5/09 11:45	11/6/09 9:15	0.84	21	0.04	0.78	Composites successful. Grab samples collected
3	3	148DN	11/04/09	11,962	23.7	11/5/09 20:38	11/6/09 8:53	8	9,497	79.4%	735	0.0	0	11/5/09 11:45	11/6/09 9:15	0.84	21	0.04	0.78	Composites successful. Grab samples collected
--	--	148UP	11/19/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148DN	11/19/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148UP	12/03/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148DN	12/03/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148UP	12/14/09	3,584	11.1	12/14/09 18:01	12/15/09 4:56	7	3,584	100.0%	655	0.0	0	--	--	0.44	6	0.07	--	Collected the minimum number of aliquots
--	--	148DN	12/14/09	2,190	15.9	12/14/09 19:29	12/15/09 3:12	4	2,096	95.7%	463	0.0	0	--	--	0.44	6	0.07	--	Only 4 aliquots collected. Sample volume too small; sample not analyzed.
--	--	148UP	12/17/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148DN	12/17/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148UP	12/26/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Storm did not materialize; only 0.03 inches recorded. No sample.
--	--	148DN	12/26/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Storm did not materialize; only 0.03 inches recorded. No sample.
4	--	148UP	01/10/10	76,960	15.7	1/10/10 22:47	1/11/10 12:52	20	39,699	51.6%	845	13.8	11661	1/10/10 21:45	1/11/10 14:15	0.8	16	0.05	0.81	
4	--	148DN	01/10/10	82,141	24.2	1/10/10 22:56	1/11/10 12:57	16	44,133	53.7%	841	17.2	14465	1/10/10 21:45	1/11/10 14:15	0.8	16	0.05	0.81	
--	--	148UP	01/22/10	25,854	59.2	1/24/10 18:36	1/25/10 11:29	8	8,861	34.3%	1013	3.5	3546	--	--	0.42	14	0.03	--	Samples missed a significant portion of the leading or first flush flow as well as low % of total storm. Not analyzed
--	--	148DN	01/22/10	32,222	59.0	1/24/10 18:33	1/25/10 10:54	10	10,273	31.9%	981	3.5	3434	--	--	0.42	14	0.03	--	Samples missed a significant portion of the leading or first flush flow as well as low % of total storm. Not analyzed



Table B-1. Project 148 Monitoring Summary for 2010 Water Year

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Storm Sample Targeted?	Composite Sample Analyzed?	Composite Sample ID	Antecedent Dry Period (hrs)	Pacing (gal)	Flume Level	Meter Level	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Grab Sample ID	Mid Storm Check Date	Flume Level	Meter Level	Off By	Grab Date/Time (PDT/PST)	Post Storm Date	Flume Level	Meter Level	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break? (hrs)	Stormflow Start (date/time)	Stormflow End (date/time)	
5	--	148UP	01/28/10	Yes	Yes	L50043-1	110	250	0.125	0.123	0.002	No	No	--	None	--	--	--	Not Collected	2/1/10	0.150	0.145	0.005	no	no	<6	1/29/10 23:50	1/31/10 4:00	
5	--	148DN	01/28/10	Yes	Yes	L50044-2	110	250	0.128	0.13	-0.002	No	No	--	None	--	--	--	Not Collected	2/1/10	0.150	0.152	-0.002	No	No	<6	1/30/10 0:10	1/31/10 4:00	
6	--	148UP	02/04/10	Yes	Yes	L50156-1	25	400	0.160	0.154	0.006	0.006	No	--	None	--	--	--	Not Collected	2/5/10	0.180	0.186	-0.006	no	No	<6	2/4/10 22:10	2/5/10 11:00	
6	--	148DN	02/04/10	Yes	Yes	L50157-2	25	400	0.165	0.167	-0.002	No	No	--	None	--	--	--	Not Collected	2/5/10	0.206	0.206	0.000	No	No	<6	2/4/10 22:10	2/5/10 11:00	
7	--	148UP	02/23/10	Yes	Yes	L50181-1	180	250	0.125	0.123	0.002	No	No	--	2/23/10	--	--	--	Not Collected	2/24/10	0.140	0.130	0.010	No	No	<6	2/23/10 17:15	2/24/10 18:00	
7	--	148DN	02/23/10	Yes	Yes	L50182-2	180	250	0.095	0.089	0.006	No	No	--	2/23/10	--	--	--	Not Collected	2/24/10	0.150	0.150	0.000	No	No	<6	2/23/10 17:40	2/24/10 18:00	
--	--	148UP	03/05/10	Yes	No	--	114	150	0.120	0.121	-0.001	No	No	--	None	--	--	--	Not Collected	3/8/10	0.102	0.102	0.000	No	No	<6	3/7/10 19:20	3/8/10 10:00	
--	--	148DN	03/05/10	Yes	No	--	114	150	0.115	0.114	0.001	No	No	--	None	--	--	--	Not Collected	3/8/10	0.095	0.094	0.001	No	No	<6	3/7/10 19:20	3/8/10 10:00	
--	--	148UP	03/16/10	No	No	--	--	--	0.160	0.161	-0.001	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	03/16/10	No	No	--	--	--	0.161	0.157	0.004	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	4	148UP	03/19/10	Yes	Yes	L50300-1	76	150	0.120	0.13	-0.010	No	No	L50300-2	3/25/10	0.140	0.133	0.007	3/25/10 10:00	3/26/10	0.139	0.132	0.007	No	No	<6	3/25/10 3:50	3/26/10 3:00	
8	4	148DN	03/19/10	Yes	Yes	L50299-2	76	150	0.117	0.118	-0.001	No	No	L50299-6	3/25/10	0.130	0.133	-0.003	3/25/10 9:50	3/26/10	0.150	0.150	0.000	No	No	<6	3/25/10 4:00	3/26/10 3:00	
--	--	148UP	04/02/10	No	No	--	--	--	0.270	0.269	0.001	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	04/02/10	No	No	--	--	--	0.300	0.306	-0.006	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9	5	148UP	04/12/10	Yes	Yes	L50574-1	120	150	0.118	0.115	0.003	No	No	L50574-2	4/13/10	0.155	0.156	-0.001	4/13/10 10:50	4/14/10	0.120	0.121	-0.001	No	No	<6	4/13/10 2:10	4/14/10 2:20	
9	5	148DN	04/12/10	Yes	Yes	L50575-2	120	150	0.110	0.115	-0.005	No	No	L50575-6	4/13/10	0.175	0.177	-0.002	4/13/10 10:30	4/14/10	0.110	0.118	-0.008	No	No	<6	4/13/10 2:20	4/14/10 2:20	
10	6	148UP	04/19/10	Yes	Yes	L50698-1	72	150	0.035	0.041	-0.006	No	No	L50698-2	4/21/10	Not Recorded	Not Recorded	--	4/21/10 8:30	4/21/10	0.370	0.354	0.016	No	No	<6	4/20/10 22:37	4/21/2010 15:00	
10	6	148DN	04/19/10	Yes	Yes	L50699-2	72	450	0.030	0.037	-0.007	No	No	L50699-6	4/21/10	Not Recorded	Not Recorded	--	4/21/10 8:00	4/21/10	0.360	0.356	0.004	No	No	<6	4/20/10 23:00	4/21/2010 15:00	
--	--	148UP	04/26/10	Yes	Yes	--	51	250	0.110	0.109	0.001	No	No	--	None	--	--	--	Not Collected	4/27/10	0.165	0.157	0.008	No	No	<6	4/26/10 16:00	4/27/2010 7:20	
--	--	148DN	04/26/10	Yes	No	--	51	--	0.125	0.094	0.031	-0.031	No	--	None	--	--	--	Not Collected	4/27/10	0.165	0.162	0.003	No	No	<6	4/26/10 16:00	4/27/2010 7:20	
--	--	--	05/01/10	--	--	--	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	05/10/10	No	No	--	--	--	0.060	0.065	-0.005	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	05/10/10	No	No	--	--	--	0.055	0.053	0.002	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	05/14/10	No	No	--	--	--	Dry	-0.001	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	05/14/10	No	No	--	--	--	Dry	0	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148UP	06/08/10	No	No	--	--	--	0.190	0.192	-0.002	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	06/08/10	No	No	--	--	--	0.180	0.177	0.003	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	7	148UP	06/14/10	Yes	Yes	--	109	150	0.142	0.142	0.000	No	Yes	L51050-2	6/16/10	0.210	0.203	0.007	6/16/10 4:10	6/16/10	0.170	0.172	-0.002	No	No	<6	6/15/10 20:45	6/16/2010 9:00	
--	7	148DN	06/14/10	Yes	No	--	109	150	0.110	0.096	0.014	0.014	Yes	L51051-6	6/16/10	Not Checked	Not Checked	--	6/16/10 4:35	6/16/10	0.170	0.174	-0.004	No	No	<6	6/15/10 21:00	6/16/2010 9:00	
--	8	148UP	06/24/10	Yes	No	--	271	100	Dry	0.009	--	No	No	L51159-5	--	--	--	--	7/2/10 7:48	7/2/10 11:13	Dry	0.006	-0.006	No	No	<6	7/2/10 5:10	7/2/10 10:30	
--	8	148DN	06/24/10	Yes	No	--	271	100	Dry	0.003	--	No	No	L51159-6	--	--	--	--	7/2/10 11:14	7/2/10 11:13	Dry	-0.008	-0.008	No	No	<6	No Flow	No Flow	
--	--	148UP	08/06/10	No	No	--	--	--	0.000	0.002	-0.002	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	148DN	08/06/10	No	No	--	--	--	0.000	0.01	-0.010	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	9	148UP	08/25/10	Yes	Yes	L51252-1	552	20	0.000	-0.01	0.010	No	No	L51252-5	8/31/10	0.160	0.154	0.006	8/31/10 10:00	8/31/10	0.170	0.149	0.021	No	No	<6	8/31/10 8:00	8/31/2010 21:30	



Table B-1. Project 148 Monitoring Summary for 2010 Water Year

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Total Stormflow (gal)	Stormflow duration (hrs)	First Sample (date/time)	Last Sample (date/time)	No. of Aliquots Collected	Sampled Stormflow (gals)	% of Storm Sampled	Duration of Sampling (min)	Baseflow <sup>1</sup> at start of storm (gpm)	Total Base flow (gal)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hrs)	Rainfall Intensity (in/hrs)	On-site Rain gage	Comment
5	--	148UP	01/28/10	16,483	28.2	1/30/10 5:23	1/31/10 11:00	40	9,761	59.2%	1777	2.0	3554	1/29/10 22:00	1/31/10 7:15	0.4	11	0.04	0.40	Sample volume was lower than expected due to sampler intake placed partially out of water only collecting a partial aliquot. Sampled stormflow represents bulk of storm.
5	--	148DN	01/28/10	19,610	27.8	1/30/10 4:21	1/31/10 4:52	35	8,730	44.5%	1471	2.0	2942	1/29/10 22:00	1/31/10 7:15	0.4	11	0.04	0.40	Sample volume was lower than expected due to sampler intake placed partially out of water only collecting a partial aliquot. Sampled stormflow represents bulk of storm.
6	--	148UP	02/04/10	6,830	12.8	2/5/10 4:20	2/5/10 10:11	12	4,320	63.3%	351	5.0	1755	2/4/10 21:45	2/5/10 6:30	0.2	9	0.02	0.22	
6	--	148DN	02/04/10	8,122	12.8	2/4/10 19:05	2/5/10 9:33	22	7,126	87.7%	868	5.0	4340	2/4/10 21:45	2/5/10 6:30	0.2	9	0.02	0.22	Sample includes three aliquots collected before true start of stormflow.
7	--	148UP	02/23/10	9,839	24.8	2/23/10 17:19	2/24/10 12:02	17	3,957	40.2%	1123	1.6	1797	2/23/10 15:40	2/24/10 16:40	0.57	25	0.02	0.36	Sampled light rain for almost 18 hours, field crew thought that storm was complete at a few hour break in rain and pulled sample, took to lab. Sample represents first flush portion of storm and was kept.
7	--	148DN	02/23/10	10,613	24.3	2/23/10 17:33	2/24/10 12:06	15	3,491	32.9%	1113	1.6	1781	2/23/10 15:40	2/24/10 16:40	0.57	25	0.02	0.36	Sampled light rain for almost 18 hours, field crew thought that storm was complete at a few hour break in rain and pulled sample, took to lab. Sample represents first flush portion of storm and was kept.
--	--	148UP	03/05/10	1,979	14.7	3/5/10 14:19	3/7/10 15:45	40	0	0.0%	2966	1.5	4449	--	--	0.1	8	0.01	--	False start - all aliquots collected before start of stormflow. Only 0.1 inch rain. Sample not analyzed.
--	--	148DN	03/05/10	1,688	14.7	3/7/10 22:31	3/8/10 2:45	9	1,237	73.3%	254	1.0	254	--	--	0.1	8	0.01	--	Upstream sample failed, DN sample missed first flush of storm. Only 9 aliquots, only 0.1 inches rain. Sample not analyzed
--	--	148UP	03/16/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148DN	03/16/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
8	4	148UP	03/19/10	7,584	23.2	3/25/10 7:20	3/25/10 22:34	40	5,820	76.7%	914	0.2	183	3/25/10 3:45	3/26/10 1:15	0.58	22	0.03	NA	On-site rain gage malfunction
8	4	148DN	03/19/10	10,278	23.0	3/25/10 7:13	3/25/10 20:04	40	5,747	55.9%	771	0.2	154	3/25/10 3:45	3/26/10 1:15	0.58	22	0.03	NA	On-site rain gage malfunction
--	--	148UP	04/02/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148DN	04/02/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
9	5	148UP	04/12/10	5,877	24.2	4/13/10 2:20	4/14/10 2:07	40	5,827	99.1%	1427	2.0	2854	4/13/10 2:00	4/13/10 11:00	0.14	9	0.02	0.27	Renton Raingage recorded 0.14 inches, onsite gage recorded 0.27 inches. Flow consistent with higher rainfall amounts
9	5	148DN	04/12/10	6,019	24.0	4/13/10 2:33	4/14/10 2:27	40	4,917	81.7%	1434	2.0	2868	4/13/10 2:00	4/13/10 11:00	0.14	9	0.02	0.27	Renton Raingage recorded 0.14 inches, onsite gage recorded 0.27 inches. Flow consistent with higher rainfall amounts
10	6	148UP	04/19/10	32,002	16.4	4/20/10 22:37	4/21/10 2:56	40	5,336	16.7%	259	0.0	0	4/20/10 18:30	4/21/10 12:15	1.12	10	0.11	1.13	Rain significantly more than predicted, paced for smaller storm. Composite captured the first flush well into the main storm peak, sample was kept.
10	6	148DN	04/19/10	37,507	16.0	4/20/10 23:35	4/21/10 2:53	40	5,524	14.7%	198	0.0	0	4/20/10 18:30	4/21/10 12:15	1.12	10	0.11	1.13	Rain significantly more than predicted, paced for smaller storm. Composite captured the first flush well into the main storm peak, sample was kept.
--	--	148UP	04/26/10	5,755	15.3	4/26/10 16:13	4/27/10 7:09	24	5,721	99.4%	896	2.0	1792	--	--	0.35	12	0.03	--	
--	--	148DN	04/26/10	5,779	15.3	4/26/10 17:30	4/27/10 6:30	7	5,740	99.3%	780	2.0	1560	--	--	0.35	12	0.03	--	Equipment failure - no sample collected
--	--	--	05/01/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<b>Start of Dry Season</b>
--	--	148UP	05/10/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only; missed setting up for storm
--	--	148DN	05/10/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only; missed setting up for storm
--	--	148UP	05/14/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148DN	05/14/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	148UP	06/08/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit-installed sondes
--	--	148DN	06/08/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit-installed sondes
--	7	148UP	06/14/10	7,842	12.2	6/15/10 21:49	6/16/10 4:46	40	5,721	73.0%	417	1.2	500	6/15/10 20:45	6/16/10 9:00	0.46	13	0.04	0.50	
--	7	148DN	06/14/10	8,864	12.0	6/15/10 21:58	6/16/10 3:09	0	5,831	65.8%	311	1.0	311	6/15/10 20:45	6/16/10 9:00	0.46	13	0.04	0.50	Sampler not set up correctly. Sampler triggered but no sample collected.
--	8	148UP	06/24/10	58	5.3	7/2/2010 5:09	7/2/2010 5:09	1	1	0%	0	0	0	7/2/10/0:30	7/2/10 9:00	0.34	10	0.03	0.19	*Grab samples only. Storm did not produced only 58 gallons of flow. No composites collected.
--	8	148DN	06/24/10	0	0.0	--	--	--	--	--	--	--	--	7/2/10/0:30	7/2/10 9:00	0.34	10	--	0.19	Storm resulted in less than 1 gallon of downstream flow. Water pooled just above flume, did not flow through flume. Grab collected in pool
--	--	148UP	08/06/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only.
--	--	148DN	08/06/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only.
11	9	148UP	08/25/10	1,989	13.5	8/31/10 7:45	8/31/10 10:37	40	1,631	82.0%	172	0.0	0	8/31/10 6:15	8/31/10 20:00	0.56	13	0.04	0.67	Four hour break in rain resulted in 2 flow peaks with no base flow in between. Sampler picked up all of 1st peak and over 1/2 of second peak. Sample kept.



**Table B-1. Project 148 Monitoring Summary for 2010 Water Year**

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Storm Sample Targeted?	Composite Sample Analyzed?	Composite Sample ID	Antecedent Dry Period (hrs)	Pacing (gal)	Flume Level	Meter Level	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Grab Sample ID	Mid Storm Check Date	Flume Level	Meter Level	Off By	Grab Date/Time (PDT/PST)	Post Storm Date	Flume Level	Meter Level	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break? (hrs)	Stormflow Start (date/time)	Stormflow End (date/time)
11	9	148DN	08/25/10	Yes	Yes	L51252-2	552	20	0.000	0.003	-0.003	No	No	L51252-6	8/31/10	0.124	0.130	-0.006	8/31/10 11:20	9/1/10	dry	-0.021	NA	No	No	<6	8/31/10 9:20	8/31/2010 21:30
--	--	148UP	09/14/10	Yes	No	--	192	20	0.000	0	0.000	No	Yes	--	None	Not Checked	Not Checked	--	Not Collected	9/17/10	Dry	-0.009	NA	No	No	<6	9/15/10 18:00	9/16/2010 18:40
--	--	148DN	09/14/10	Yes	No	--	192	20	0.000	0.015	-0.015	-0.015	Yes	--	None	Not Checked	Not Checked	--	Not Collected	9/17/10	Dry	-0.009	NA	No	No	<6	9/16/10 16:20	9/16/2010 17:10
--	10	148UP	09/23/10	Yes	No	--	24	30	0.200	0.197	0.003	No	Yes	L51656-3	9/23/10	0.010	0.023	-0.013	9/23/10 12:50	9/23/10	0.010	0.023	-0.013	No	No	<6	9/23/10 10:10	9/24/2010 13:10
--	10	148DN	09/23/10	Yes	No	--	24	20	0.100	0.11	-0.010	No	Yes	L51656-4	9/23/10	0.010	0.013	-0.003	9/23/10 12:50	9/23/10	0.010	0.013	-0.003	No	No	<6	No Flow	No Flow

**Notes:**

<sup>1</sup>Baseflow is gallons per minute flow at start of storm  
 hrs - hours  
 gal - gallons  
 min - minutes  
 in - inches  
 PDT - Pacific Daylight Time  
 PST - Pacific Standard Time



**Table B-1. Project 148 Monitoring Summary for 2010 Water Year**

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Total Stormflow (gal)	Stormflow duration (hrs)	First Sample (date/time)	Last Sample (date/time)	No. of Aliquots Collected	Sampled Stormflow (gals)	% of Storm Sampled	Duration of Sampling (min)	Baseflow <sup>1</sup> at start of storm (gpm)	Total Base flow (gal)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hrs)	Rainfall Intensity (in/hrs)	On-site Rain gage	Comment
11	9	148DN	08/25/10	307	12.2	8/31/10 9:22	8/31/10 11:24	16	285	92.8%	122	0.0	0	8/31/10 6:15	8/31/10 20:00	0.56	13	0.04	0.67	Four hour break in rain resulted in 2 flow peaks with no base flow in between. Sampler picked up all of 1st peak but none of second peak. Sample kept as representative of first flush and due to difficulty in collecting a matching downstream sample during dry-season conditions.
--	--	148UP	09/14/10	217	24.7	9/15/10 17:55	9/16/10 17:03	8	206	94.9%	1388	0.0	0	--	--	0.37	31	0.01	--	Sample successful with minimum number of aliquots but downstream sample failed. Sample not analyzed.
--	--	148DN	09/14/10	2	0.8	9/16/10 16:20	9/16/10 16:20	1	0	0.0%	0	0.0	0	--	--	0.37	31	0.01	--	Only 1 aliquot collected from 2 gallons of stormflow-no analyzed.
--	10	148UP	09/23/10	238	27.0	9/23/10 11:35	9/23/2010 12:16	5	95	39.9%	41	0.0	0	9/23/10 9:10	9/23/10 11:45	0.25	14	0.02	0.15	Grab samples collected and submitted from small amount of stormflow. Only 5 aliquots sampled. No downstream flow. Sample not analyzed.
--	10	148DN	09/23/10	--	--	None	None	0	0	None	0	0.0	0	9/23/10 9:10	9/23/10 11:45	0.25	14	0.02	0.15	Grab samples collected. Stormflow pooling above flume. Insufficient flow for composite samples. no aliquots collected

**Notes:**

- <sup>1</sup>Baseflow is gallons per minute
- hrs - hours
- gal - gallons
- min - minutes
- in - inches
- PDT - Pacific Daylight Time
- PST - Pacific Standard Time



Table B-2. Project 136 Monitoring Summary for 2010 Water Year

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Storm Sample Targeted?	Composite Sample Analyzed?	Composite Sample ID	Antecedent Dry Period (hrs)	Pacing (gal)	Weir Level (ft)	Meter Level (ft)	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Grab Sample ID	Mid Storm Check Date	Weir Level (ft)	Meter Level	Off By	Grab Date/Time	Post Storm Date	Weir Level (ft)	Meter Level (ft)	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break (hrs)	Stormflow Start (date/time)	Stormflow End (date/time)	Total Stormflow (gal)
--	--	--	06/11/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	06/17/09	No	No	--	--	--	Dry	-0.218	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	06/17/09	No	No	--	--	--	Dry	-0.008	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	07/22/09	No	No	--	--	--	Dry	-0.218	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	07/22/09	No	No	--	--	--	Dry	-0.232	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	08/10/09	Yes	No	--	648	10	Dry	-0.158	--	No	No	--	None	Not Checked	--	--	None	8/11/09	Not Recorded	Not Recorded	--	No	No	<6	8/11/09 4:30	8/11/09 7:30	126
--	--	136DN	08/10/09	Yes	No	--	648	10	Dry	-0.232	--	No	No	--	None	Not Checked	--	--	None	8/11/09	Not Recorded	Not Recorded	--	No	No	<6	8/11/09 8:50	8/11/09 10:10	8,320
--	--	136UP	08/31/09	No	No	--	--	--	Dry	-0.218	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	08/31/09	No	No	--	--	--	See Comment	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	09/03/09	Yes	No	--	7	250	Dry	-0.218	--	No	No	--	None	Not Checked	--	--	None	9/8/09	-0.190	-0.19	--	No	No	<6	9/6/09 3:30	9/6/09 19:00	18,203
--	--	136DN	09/03/09	Yes	No	--	7	250	Dry	-0.218	--	0.208	No	--	None	Not Checked	--	--	None	9/8/09	Not Recorded	0.177	--	No	No	<6	9/6/09 4:10	9/6/09 19:50	16,532
--	--	136UP	09/08/09	No	No	--	--	--	Dry	-0.19	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	09/08/09	No	No	--	--	--	Dry	-0.181	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	09/17/09	Yes	No	--	45	30	Dry	-0.214	--	No	No	--	None	Not Checked	--	--	None	9/19/09	Dry	-0.219	--	No	No	<6	--	--	58
--	--	136DN	09/17/09	Yes	No	--	45	10	Dry	-0.219	--	No	No	--	None	Not Checked	--	--	None	9/19/09	Dry	-0.218	--	No	No	<6	--	--	0
--	--	136UP	09/28/09	Yes	No	--	24	Not Recorded	Dry	-0.218	--	No	No	--	None	Not Checked	--	--	None	9/30/09	Dry	-0.180	--	No	No	<6	--	--	55
--	--	136DN	09/28/09	Yes	No	--	24	Not Recorded	Dry	-0.219	--	No	No	--	None	Not Checked	--	--	None	9/30/09	0.010	-0.144	--	No	No	<6	--	--	0
--	--	--	10/01/10	--	--	--	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	10/08/09	Yes	No	--	260	40	Dry	-0.218	--	No	No	--	None	Not Checked	--	--	None	10/14/09	-0.065	-0.071	-0.006	No	No	<6	10/14/09 5:30	10/14/09 22:30	8,643
--	--	136DN	10/08/09	Yes	No	--	260	20	Dry	-0.181	--	No	No	--	None	Not Checked	--	--	None	10/14/09	0.200	0.025	-0.175	No	No	<6	10/14/09 2:50	10/15/09 15:50	12,532
1	1	136UP	10/16/09	Yes	Yes	L49169-3	31	500	Dry	-0.228	--	No	No	L49169-7	10/16/09	0.060	0.063	-0.003	10/16/09 12:40	10/18/09	0.050	0.067	0.017	No	No	<6	10/16/09 11:00	10/18/09 12:00	31,569
1	1	136DN	10/16/09	Yes	Yes	L49169-4	31	500	-0.105	-0.104	-0.001	No	No	L49169-8	10/16/09	0.080	0.069	0.011	10/16/09 12:40	10/18/09	0.080	0.075	-0.005	No	No	<6	10/16/09 11:00	10/18/09 12:00	46,401
--	--	136UP	10/22/09	Yes	No	--	36	300	Dry	-0.254	--	--	No	--	10/23/09	0.300	0.128	0.172	None	None	--	--	--	--	--	<6	10/23/09 1:50	10/24/09 4:20	9,595
--	--	136DN	10/22/09	Yes	No	--	36	300	Dry	-0.85	--	--	No	--	10/23/09	0.320	0.131	0.189	None	None	--	--	--	--	--	<6	10/23/09 2:00	10/24/09 7:20	10,151
2	2	136UP	10/28/09	Yes	Yes	L49467-3	41	250	0.060	0.06	0.000	No	No	L49467-7	10/29/09	0.110	0.107	0.003	10/29/09 8:50	10/30/09	0.115	0.068	-0.047	No	No	<6	10/28/09 20:40	10/30/09 0:00	10,200
2	2	136DN	10/28/09	Yes	Yes	L49467-4	41	250	0.070	0.071	-0.001	No	No	L49467-8	10/29/09	0.140	0.141	-0.001	10/29/09 9:00	10/30/209	0.080	0.087	0.007	No	No	<6	10/28/09 20:30	10/30/09 0:00	18,922
3	3	136UP	11/04/09	Yes	Yes	L49581-3	63	1400	0.005	0.006	-0.001	No	No	L49581-7	11/5/09	0.110	0.015	0.095	11/5/09 13:38	11/6/09	See Comment	0.121	--	No	No	<6	11/5/09 12:30	11/6/09 12:00	23,517
3	3	136DN	11/04/09	Yes	Yes	L49581-4	63	1600	0.060	0.06	0.000	0	No	L49581-8	11/5/09	0.140	0.133	0.007	11/5/09 13:53	11/6/09	See Comment	0.139	--	No	No	<6	11/5/09 12:30	11/6/09 12:00	31,632
--	--	--	--	--	--	--	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	11/12/09	No	No	--	--	--	0.095	0.012	0.083	-0.18	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	11/12/09	No	No	--	--	--	0.140	0.321	-0.181	-0.181	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	11/19/09	No	No	--	--	--	0.210	0.215	-0.005	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	11/19/09	No	No	--	--	--	*	*	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	11/24/09	No	No	--	--	--	0.185	0.181	0.004	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	12/03/09	No	No	--	--	--	0.090	0.097	-0.007	-0.07	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	12/03/09	No	No	--	--	--	0.090	0.09	0.000	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	12/11/09	No	No	--	--	--	0.020	0.029	-0.009	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	12/13/09	No	No	--	--	--	0.130	0.11	0.020	0.02	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



Table B-2. Project 136 Monitoring Summary for 2010 Water Year

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Stormflow duration (hrs)	First Sample (date/time)	Last Sample (date/time)	No. of Aliquots	Sampled Stormflow (gals)	% of Storm Sampled	Sampling Duration (min)	Baseflow <sup>1</sup> at start of storm (gpm)	Total Base flow (gals)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hrs)	Rainfall Intensity (in/hrs)	On-Site Rain gage	Supect Data	Comment
--	--	--	06/11/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Project 136 installed: 4 BMPs
--	--	136UP	06/17/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Post BMP monitoring start up.
--	--	136DN	06/17/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Post BMP monitoring start up.
--	--	136UP	07/22/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	136DN	07/22/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	136UP	08/10/09	3	--	--	2	--	--	--	--	--	--	--	0.50	--	--	--	--	--
--	--	136DN	08/10/09	--	--	--	--	--	--	--	--	--	--	--	0.50	--	--	--	--	Equipment malfunction; bubble tube disconnected. No sample
--	--	136UP	08/31/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	08/31/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	See Comment	Weir replaced after cleaning. On-site rain gage wiring issues addressed.
--	--	136UP	09/03/09	--	--	--	--	--	--	--	--	--	--	--	1.35	--	--	--	--	Antecedent Dry period blown by 0.08 inch shower 8 hours before storm on Sept 5th. Samplers allowed to run over weekend to as test.
--	--	136DN	09/03/09	--	--	--	--	--	--	--	--	--	--	--	1.35	--	--	--	--	Antecedent Dry period blown by 0.08 inch shower 8 hours before storm on Sept 5th. Samplers allowed to run over weekend to as test.
--	--	136UP	09/08/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	09/08/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	09/17/09	--	--	--	--	--	--	--	--	--	--	--	0.33	--	--	--	--	Measured flow of 50 gallons with No aliquots collected
--	--	136DN	09/17/09	--	--	--	--	--	--	--	--	--	--	--	0.33	--	--	--	--	No flow recorded. No sample collected. Rain gage at 136_DN not functioning.
--	--	136UP	09/28/09	--	--	--	--	--	--	--	--	--	--	--	0.28	--	--	--	--	No liquid detected. Note: Flow of 6000 gallons recorded with no rain - on 9/21/09. Discharge from nearby water main work?
--	--	136DN	09/28/09	--	--	--	--	--	--	--	--	--	--	--	0.28	--	--	--	--	Sampler did not enable.
--	--	--	10/01/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<b>2010 Water Year (Wet Season)</b>
--	--	136UP	10/08/09	17	None	None	0	0	0.0%	0	0	0	--	--	0.88	22	0.04	--	--	No aliquots collected
--	--	136DN	10/08/09	37	10/14/09 2:49	10/14/09 8:03	12	0	0.0%	314	0	0	--	--	0.88	22	0.04	--	--	Good sample with volume of 5 liters but No upstream sample. Sample not kept.
1	1	136UP	10/16/09	49	10/16/09 17:18	10/18/09 2:52	63	29,721	94.1%	2014	0	0	10/16/09 9:00	10/18/09 1:30	1.50	40	0.04	NA	--	--
1	1	136DN	10/16/09	49	10/16/09 13:20	10/18/09 7:33	94	45,482	98.0%	2533	0	0	10/16/09 9:00	10/18/09 1:30	1.50	40	0.04	NA	--	--
--	--	136UP	10/22/09	26	--	--	--	--	--	0	0	0	--	--	0.50	16	0.03	--	--	Sampler set up but not maintained through the weekend storm due to staffing issues. Grab and composite samples not submitted for analysis.
--	--	136DN	10/22/09	29	--	--	--	--	--	0	0	0	--	--	0.50	16	0.03	--	--	Sampler set up but not maintained through the weekend storm due to staffing issues. Grab and composite samples not submitted for analysis.
2	2	136UP	10/28/09	27	10/28/09 2:12	10/29/09 14:04	30	7,211	70.7%	2152	1	2152	10/28/09 19:10	10/30/09 13:30	0.40	19	0.02	NA	--	Level readings ok mid storm, but 0.047 low at end of storm. No obvious change in record, no corrections. Sample container filled but many errors listed for aliquot collection. Strainer may need deeper placement in water to sample.
2	2	136DN	10/28/09	28	10/28/09 21:37	10/29/09 11:16	46	11,396	60.2%	819	2	1638	10/28/09 19:10	10/30/09 13:30	0.40	19	0.02	NA	--	Need to review sample strainer placement.
3	3	136UP	11/04/09	23	11/5/09 20:23	11/6/09 9:00	15	17,590	74.8%	757	0	0	11/5/09 11:45	11/6/09 9:15	0.84	21	0.04	NA	--	Rainfall less than predicted, samplers paced for a larger stormflow event. Sample volume limited. Composite sample submitted. White foam noted at culvert outlet. No direct weir reading at end of storm. Reading on 11/9/09: weir= 0.12, meter= 0.108. Diff=0.011. Reset meter to 0.125.
3	3	136DN	11/04/09	23	11/5/09 15:00	11/6/09 9:06	18	25,358	80.2%	1086	1	1086	11/5/09 11:45	11/6/09 9:15	0.84	21	0.04	NA	--	Rainfall less than predicted, samplers paced for a larger stormflow event. Sample volume limited. Composite sample submitted. No direct weir reading at end of storm. Reading on 11/9/09: weir= 0.125, meter= 0.136. Diff=0.011. Reset Meter to 0.125
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	11/12/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	136DN	11/12/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	136UP	11/19/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	136DN	11/19/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11/10/09 13:40 11/12/09 14:00, 11/18/09 11:50 12:00, 11/19/09 8:20 - 13:30 Field visit only. Weir out of placement, and jammed with leafy debris. Reset.Missing/suspect data during dates/times noted.
--	--	136DN	11/24/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only. Upstream station not checked. Checked weir placement-ok. Heavy leaf litter in ditch.
--	--	136UP	12/03/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	136DN	12/03/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only. Flows not recording. Missing data. Reset Thel Mar.
--	--	136UP	12/11/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	136UP	12/13/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Adjusted level and removed leaves.



Table B-2. Project 136 Monitoring Summary for 2010 Water Year

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Storm Sample Targeted?	Composite Sample Analyzed?	Composite Sample ID	Antecedent Dry Period (hrs)	Pacing (gal)	Weir Level (ft)	Meter Level (ft)	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Grab Sample ID	Mid Storm Check Date	Weir Level (ft)	Meter Level	Off By	Grab Date/Time	Post Storm Date	Weir Level (ft)	Meter Level (ft)	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break (hrs)	Stormflow Start (date/time)	Stormflow End (date/time)	Total Stormflow (gal)
--	--	136DN	12/13/09	No	No	--	--	--	0.120	0.156	-0.036	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	--	136UP	12/14/09	Yes	Yes	L49787-3	197	750	0.050	0.05	0.000	No	No	--	None	Not Checked	Not Checked	--	None	12/15/09	0.080	0.098	0.018	No	No	<6	12/14/09 18:00	12/15/09 11:00	9,750
4	--	136DN	12/14/09	Yes	Yes	L49787-4	197	750	-0.130	-0.118	-0.012	No	No	--	None	Not Checked	Not Checked	--	None	12/15/09	0.100	0.090	-0.010	No	No	<6	12/14/09 19:45	12/15/09 11:00	12,020
--	--	136UP	12/28/09	Yes	No	--	179	120	0.090	0.092	-0.002	No	No	--	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	12/28/09	Yes	No	--	179	120	0.100	0.102	-0.002	No	No	--	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	--	136UP	01/10/10	Yes	Yes	L49918-3	39	2000	0.130	0.132	-0.002	No	No	--	1/11/10	0.260	0.267	-0.007	None	1/11/10	0.210	0.229	0.019	No	No	<6	1/10/10 23:00	1/11/10 23:00	64,255
5	--	136DN	01/10/10	Yes	Yes	L49918-4	39	2000	0.126	0.132	-0.006	0.006	No	--	1/11/10	0.280	0.277	0.003	None	1/11/10	0.225	0.213	-0.012	No	No	<6	1/10/10 23:00	1/11/10 23:00	60,119
--	--	136UP	01/14/10	No	No	--	--	--	0.170	0.198	-0.028	-0.280	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	01/14/10	No	No	--	--	--	0.175	0.176	-0.001	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	01/22/10	Yes	No	--	21	150	0.090	0.107	-0.017	-0.017	No	--	None	None	None	--	None	1/25/10	0.113	0.111	-0.002	No	No	<6	1/24/10 13:20	1/27/10 10:20	40,414
--	--	136DN	01/22/10	Yes	No	--	21	150	0.090	0.092	-0.002	No	No	--	None	None	None	--	None	1/25/10	0.118	0.119	0.001	No	No	<6	1/24/10 13:20	1/27/10 10:20	50,132
--	--	136UP	01/28/10	Yes	No	--	110	250	0.091	0.09	0.001	No	No	--	None	None	None	--	None	2/1/10	0.100	0.101	0.001	No	No	<6	1/30/10 0:15	2/1/10 0:00	26,170
--	--	136DN	01/28/10	Yes	No	--	110	250	0.093	0.096	-0.003	No	No	--	None	None	None	--	None	2/1/10	0.110	0.108	-0.002	No	No	<6	1/30/10 0:15	2/1/10 0:00	33,617
--	--	136UP	02/03/10	Yes	No	--	31	500	0.100	0.096	0.004	No	No	--	None	None	None	--	None	None	--	--	--	--	--	<6	--	--	--
--	--	136DN	02/03/10	Yes	No	--	31	500	0.100	0.103	-0.003	No	No	--	None	None	None	--	None	None	--	--	--	--	--	<6	--	--	--
--	--	136UP	02/04/10	Yes	No	--	25	500	0.100	0.107	-0.007	-0.007	No	--	None	None	None	--	None	2/5/10	0.110	0.116	0.006	No	No	<6	2/5/10 5:00	2/5/10 15:00	8,749
--	--	136DN	02/04/10	Yes	No	--	25	500	0.110	0.103	0.007	0.007	No	--	None	None	None	--	None	2/5/10	0.118	0.121	0.003	No	No	<6	2/5/10 5:00	2/5/10 15:00	10,755
6	--	136UP	02/23/10	Yes	Yes	L50182-3	180	250	0.070	0.079	-0.009	-0.009	No	--	None	None	None	--	None	2/24/10	0.180	0.176	-0.004	No	No	<6	2/23/10 18:06	2/24/10 21:30	20,901
6	--	136DN	02/23/10	Yes	Yes	L50182-4	180	250	0.070	0.081	-0.011	-0.011	No	--	None	None	None	--	None	2/24/10	0.200	0.176	-0.024	No	No	<6	2/23/10 18:14	2/24/10 21:30	25,300
--	--	136UP	03/05/10	Yes	No	--	114	300	0.085	0.088	-0.003	-0.003	No	--	None	None	None	--	None	3/8/10	0.080	0.088	0.008	No	No	<6	3/7/10 18:50	3/8/10 21:00	7,537
--	--	136DN	03/05/10	Yes	No	--	114	300	0.100	0.098	0.002	0.002	No	--	None	None	None	--	None	3/8/10	0.090	0.093	0.003	No	No	<6	3/7/10 18:50	3/8/10 21:00	8,957
7	4	136UP	03/19/10	Yes	Yes	L50299-3	76	250	0.090	0.097	-0.007	-0.007	No	L50299-7	3/25/10	0.120	0.128	-0.008	3/25/10 10:30	3/26/10	0.095	0.113	0.018	No	No	<6	3/25/10 4:00	3/26/10 3:00	20,241
7	4	136DN	03/19/10	Yes	Yes	L50299-4	76	250	0.090	0.095	-0.005	No	No	L50299-8	3/25/10	0.130	0.141	-0.011	3/25/10 10:40	3/26/10	0.100	0.115	0.015	No	No	<6	3/25/10 5:00	3/26/10 3:00	22,401
--	--	136UP	04/12/10	Yes	No	--	120	1500	0.070	0.069	0.001	No	No	--	4/13/10	0.114	0.114	0.000	None	None	--	--	--	--	--	<6	--	--	--
--	--	136DN	04/12/10	Yes	No	--	120	1500	0.090	0.086	0.004	No	No	--	4/13/10	0.092	0.094	-0.002	None	None	--	--	--	--	--	<6	--	--	--
8	5	136UP	04/19/10	Yes	Yes	L50699-3	72	150	0.070	0.062	0.008	0.008	No	L50699-7	--	Not read	Not read	--	4/21/10 7:35	4/21/10	0.200	0.193	-0.007	No	No	<6	4/20/10 23:12	4/21/10 15:00	33,366
8	5	136DN	04/19/10	Yes	Yes	L50699-4	72	150	0.080	0.074	0.006	No	No	L50699-8	--	Not read	Not read	--	4/21/10 7:30	4/21/10	0.230	0.200	-0.030	No	No	<6	4/20/10 23:19	4/21/10 15:00	37,419
9	--	136UP	04/26/10	Yes	Yes	L50724-3	51	250	0.080	0.091	-0.011	No	No	--	None	None	None	--	None	4/27/10 7:54	0.105	0.115	0.010	No	No	<6	4/26/10 16:40	4/27/10 10:30	12,346
9	--	136DN	04/26/10	Yes	Yes	L50724-4	51	250	0.090	0.092	-0.002	No	No	--	None	None	None	--	None	4/27/10 8:15	0.100	0.119	0.019	No	No	<6	4/26/10 16:40	4/27/10 10:30	14,629
--	--	--	05/01/10	--	--	--	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	05/10/10	No	No	--	--	--	--	0.112	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	05/10/10	No	No	--	--	--	--	0.119	--	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	05/10/10	No	No	--	--	--	0.080	0.084	-0.004	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	05/10/10	No	No	--	--	--	0.090	0.090	0.000	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136UP	05/14/10	Yes	No	--	38	150	0.040	0.042	-0.002	No	No	--	5/18/10	None	None	--	None	5/18/10 11:22	Not Recorded	Not Recorded	--	--	--	<6	--	--	393
--	--	136DN	05/14/10	Yes	No	--	38	150	Dry	-0.227	--	No	No	--	5/18/10	None	None	--	None	5/18/10 11:22	Not Recorded	Not Recorded	--	--	--	<6	--	--	<1
--	--	136UP	05/28/10	No	No	--	--	--	0.150	0.151	-0.001	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	05/28/10	No	No	--	--	--	0.150	0.142	0.008	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



Table B-2. Project 136 Monitoring Summary for 2010 Water Year

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Stormflow duration (hrs)	First Sample (date/time)	Last Sample (date/time)	No. of Aliquots	Sampled Stormflow (gals)	% of Storm Sampled	Sampling Duration (min)	Baseflow <sup>1</sup> at start of storm (gpm)	Total Base flow (gals)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hrs)	Rainfall Intensity (in/hrs)	On-Site Rain gage	Supect Data	Comment
--	--	136DN	12/13/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Reading off due to leaves on weir - removed leaves readings = 0.136 level 0.135 meter
4	--	136UP	12/14/09	17	12/14/09 20:23	12/15/09 9:12	11	8,080	82.9%	769	1	384	12/14/09 17:40	12/15/09 1:00	0.44	26	0.02	0.42	--	--
4	--	136DN	12/14/09	15	12/14/09 19:45	12/15/09 10:53	14	11,978	99.7%	908	0	0	12/14/09 17:40	12/15/09 1:00	0.44	26	0.02	0.42	--	--
--	--	136UP	12/28/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Storm did not materialize.
--	--	136DN	12/28/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Storm did not materialize.
5	--	136UP	01/10/10	24	1/10/10 17:52	1/11/10 13:33	22	41,919	65.2%	1181	20	23620	1/10/10 21:45	1/11/10 14:15	0.88	16	0.06	0.69	--	First 3 aliquots representing 8% of total flow taken before true start of storm.
5	--	136DN	01/10/10	24	1/10/10 23:27	1/11/10 13:37	20	70,216	116.8%	850	16	13600	1/10/10 21:45	1/11/10 14:15	0.88	16	0.06	0.69	--	Last six aliquots representing 13% of the total flow taken after end of storm and start of next rainfall.
--	--	136UP	01/14/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	136DN	01/14/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	136UP	01/22/10	69	1/24/10 18:22	1/27/10 10:20	25	36,103	89.3%	3838	4	15352	--	--	0.42	17	0.02	--	--	Antecedent Dry period not met. Sampler trigger set too high, samples started near peak of hydrograph.
--	--	136DN	01/22/10	69	1/24/10 18:54	1/25/10 11:04	14	19,217	38.3%	970	4	3880	--	--	0.42	17	0.02	--	--	Antecedent Dry period not met. Sampler trigger set too high, samples started near peak of hydrograph.
--	--	136UP	01/28/10	48	1/31/10 3:28	1/31/10 17:12	36	8,671	33.1%	824	4	3297	--	--	0.40	36	0.01	--	--	Trigger set too high, sampling started after storm peak -Samples not analyzed.
--	--	136DN	01/28/10	48	1/31/10 3:09	1/31/10 12:18	36	8,759	26.1%	549	5	2745	--	--	0.40	36	0.01	--	--	Trigger set too high, sampling started after storm peak -Samples not analyzed.
--	--	136UP	02/03/10	--	--	--	--	--	--	--	--	--	--	--	0.26	--	--	--	--	Cleaned out bubble tube line with high pressure air. Missed storm event due to forecast.
--	--	136DN	02/03/10	--	--	--	--	--	--	--	--	--	--	--	0.26	--	--	--	--	Missed storm event due to forecast
--	--	136UP	02/04/10	10	None	None	0	0	0.0%	--	6	--	--	--	0.20	13	0.02	--	--	Sampler did not trigger. No sample collected.
--	--	136DN	02/04/10	10	2/5/10 5:05	2/5/10 10:38	16	7,324	68.1%	333	6	1998	--	--	0.20	13	0.02	--	--	Upstream sample failed; downstream sample not kept.
6	--	136UP	02/23/10	27	2/23/10 18:06	2/24/10 10:59	40	9,621	46.0%	1013	2	2026	2/23/10 15:40	2/24/10 16:40	0.57	20	0.03	0.48	--	Sampled for 17 hours during front end of showery rain event, samples kept although totals <50% of storm.
6	--	136DN	02/23/10	27	2/23/10 18:14	2/24/10 8:57	40	9,576	37.8%	883	2	1766	2/23/10 15:40	2/24/10 16:40	0.57	20	0.03	0.48	2/19/10 2:30 - 2/22/10 14:00	Sampled for 15 hours during front end of showery rain event, samples kept although totals <50% of storm. Suspect data as noted. No rain during period of suspect data.
--	--	136UP	03/05/10	26	3/6/10 14:44	3/8/10 8:25	36	See Comment	See Comment	2501	3	7503	--	--	0.10	9	0.01	--	--	False start; 18 aliquots collected before start of storm flow. Sample not kept.
--	--	136DN	03/05/10	26	3/7/10 20:17	3/8/10 8:42	21	5,571	62.2%	745	6	4470	--	--	0.10	9	0.01	--	--	Sample not kept due to false start of upstream sample.
7	4	136UP	03/19/10	23	3/25/10 7:38	3/25/10 19:05	40	9,394	46.4%	687	6	4122	3/25/10 3:45	3/26/10 1:15	0.57	23	0.02	0.55	--	Missed the first 2 hours (about 6%) of storm flow and sampled 46% of total storm. Sampled significant proportion of storm into main storm peak and samples were kept.
7	4	136DN	03/19/10	22	3/25/10 7:33	3/25/10 18:55	40	9,057	40.4%	682	5	3410	3/25/10 3:45	3/26/10 1:15	0.57	23	0.02	0.55	--	Missed the first 2 hours (about 6%) of storm flow and sampled 46% of total storm. Sampled significant proportion of storm into main storm peak and samples were kept. Adjusted level down during storm on 3/25/10 @ 10:31 by 0.011 ft.
--	--	136UP	04/12/10	--	--	--	--	--	--	--	--	--	--	--	0.14	0	--	--	3/21/10 16:20 - 3/24/10 19:40	Trigger level set at 0.15, storm peak just below level of trigger; sampler did not enable. No sample collected. Suspect data 3/21 - 3/24 prior to storm sampling attempt. No rain during period of suspect data. Missing record due to weir knocked out of place.
--	--	136DN	04/12/10	--	--	--	--	--	--	--	--	--	--	--	0.14	0	--	--	--	Trigger level set at 0.15, storm peak just below level of trigger; sampler did not enable. No sample collected.
8	5	136UP	04/19/10	16	4/20/10 23:12	4/21/10 2:22	40	5,648	16.9%	190	2	380	4/20/10 18:30	4/21/10 12:15	1.12	13	0.09	0.88	--	Rainfall total significantly more than predicted. Sample kept as representative of front or first flush portion of storm.
8	5	136DN	04/19/10	16	4/20/10 23:19	4/21/10 2:15	40	5,314	14.2%	176	2	352	4/20/10 18:30	4/21/10 12:15	1.12	13	0.09	0.88	--	Rainfall total significantly more than predicted. Sample kept as representative of front or first flush portion of storm.
9	--	136UP	04/26/10	18	4/26/10 19:36	4/27/10 6:06	34	8,128	65.8%	630	4	2520	4/26/10 16:00	4/27/10 15:00	0.35	12	0.03	0.26	--	Sampled more than 50% of storm flow, but missed first 2 hours (12%) of storm flow due to trigger level above this early flow. Samples were kept for analysis.
9	--	136DN	04/26/10	18	4/26/10 17:17	4/27/10 4:21	40	9,680	66.2%	664	5	3320	4/26/10 16:00	4/27/10 15:00	0.35	12	0.03	0.26	--	--
--	--	--	05/01/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Start of Dry Season
--	--	136UP	05/10/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only. Meter level recorded but not weir level.
--	--	136DN	05/10/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only. Meter level recorded but not weir level.
--	--	136UP	05/10/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Afternoon site visit. Received 0.21 inches of rain, missed storm event. No samples collected.
--	--	136DN	05/10/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Afternoon site visit. Received 0.21 inches of rain, missed storm event. No samples collected.
--	--	136UP	05/14/10	--	None	None	0	0	0%	0	0	0	--	--	0.21	12	0.02	--	--	Sampler did not trigger
--	--	136DN	05/14/10	--	None	None	0	0	0%	0	0	0	--	--	0.21	12	0.02	--	--	Sampler did not trigger
--	--	136UP	05/28/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only
--	--	136DN	05/28/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only



Table B-2. Project 136 Monitoring Summary for 2010 Water Year

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Storm Sample Targeted?	Composite Sample Analyzed?	Composite Sample ID	Antecedent Dry Period (hrs)	Pacing (gal)	Weir Level (ft)	Meter Level (ft)	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Grab Sample ID	Mid Storm Check Date	Weir Level (ft)	Meter Level	Off By	Grab Date/Time	Post Storm Date	Weir Level (ft)	Meter Level (ft)	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break (hrs)	Stormflow Start (date/time)	Stormflow End (date/time)	Total Stormflow (gal)	
10	6	136UP	06/14/10	Yes	Yes	L51051-3	109	150	0.090	0.092	-0.002	No	No	L51051-7	--	--	--	--	6/16/10 5:30	6/16/10	0.120	0.120	0.000	No	No	<6	6/15/10 20:15	6/16/10 15:00	16,546	
10	6	136DN	06/14/10	Yes	Yes	L51051-4	109	150	0.095	0.088	0.007	0.008	No	L51051-8	--	--	--	--	6/16/10 5:00	6/16/10	0.120	0.127	0.007	No	No	<6	6/15/10 21:00	6/16/10 15:00	22,027	
--	--	--	--	--	--	--	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	7	136UP	06/24/10	Yes	Yes	L51159-3	271	100	Dry	-0.036	--	No	No	L51159-7	7/2/10	Not read	Not read	--	7/2/10 6:48	7/2/10	Not Checked	Not Checked	--	No	No	<6	7/2/10 1:00	7/2/10 13:00	5,219	
11	7	136DN	06/24/10	Yes	Yes	L51159-4	271	100	0.060	0.042	0.018	No	No	L51159-8	7/2/10	Not read	Not read	--	7/2/10 6:48	7/2/10	Not Checked	Not Checked	--	No	No	<6	7/2/10 1:00	7/2/10 13:00	2,493	
--	--	136UP	08/06/10	No	No	--	--	--	Dry	-0.123	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	136DN	08/06/10	No	No	--	--	--	Dry	-0.247	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12	8	136UP	08/25/10	Yes	Yes	L51252-3	552	30	Dry	-0.128	--	No	No	L51252-7	8/31/10	0.123	0.050	0.073	8/31/10 10:25	9/1/10	Dry	-0.231	--	No	Yes*	<6	8/31/10 8:26	8/31/10 21:40	792	
12	8	136DN	08/25/10	Yes	Yes	L51252-4	552	40	Dry	-0.248	--	No	No	L51252-8	8/31/10	0.100	0.078	0.022	8/31/10 10:40	9/1/10	Not Recorded	Not Recorded	--	--	No	<6	8/31/10 7:45	9/1/10 0:10	3,862	

Notes:  
<sup>1</sup>Baseflow is gallons per minute flow at start of storm  
 hrs - hours  
 gal - gallons  
 min - minutes  
 in - inches  
 PDT - Pacific Daylight Time  
 PST - Pacific Standard Time



Table B-2. Project 136 Monitoring Summary for 2010 Water Year

Composite Sample	Grab Sample	Project Site ID	Site Visit Date	Stormflow duration (hrs)	First Sample (date/time)	Last Sample (date/time)	No. of Aliquots	Sampled Stormflow (gals)	% of Storm Sampled	Sampling Duration (min)	Baseflow <sup>1</sup> at start of storm (gpm)	Total Base flow (gals)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hrs)	Rainfall Intensity (in/hrs)	On-Site Rain gage	Supect Data	Comment	
10	6	136UP	06/14/10	19	6/15/10 22:12	6/16/10 2:03	40	5,560	33.6%	231	2	462	6/15/10 20:30	6/16/10 9:00	0.46	12	0.04	0.45	--	Sampled percentage low due to long slow lag time in post-storm flow. Sample is representative of main storm event, samples were kept.	
10	6	136DN	06/14/10	18	6/15/10 22:02	6/16/10 1:20	40	4,977	22.6%	198	2	396	6/15/10 20:30	6/16/10 9:00	0.46	12	0.04	0.45	--	Percentage of storm flow sampled is low due to long slow lag time in post-storm flow. Sample is representative of main storm event, samples were kept.	
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	7	136UP	06/24/10	12	7/2/10 4:29	7/2/10 7:59	40	3,794	72.7%	210	1	210	7/2/10 3:00	7/2/10 9:00	0.34	8	0.04	0.41	--	Weir and meter levels not documented at end of storm.	
11	7	136DN	06/24/10	12	7/2/10 4:48	7/2/10 8:58	23	1,955	78.4%	250	1	250	7/2/10 3:00	7/2/10 9:00	0.34	8	0.04	0.41	--	Weir and meter levels not documented at end of storm. Equipment Blank Collected on 7/6/10	
--	--	136UP	08/06/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7/1/10 12:10 - 7/2 10 2:40	Field visit only. Suspect data 7/1/10 - 7/2/10 as noted.	
--	--	136DN	08/06/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Field visit only	
12	8	136UP	08/25/10	13	8/31/10 8:26	8/31/10 20:32	22	703	88.8%	726	0	0	8/31/10 6:15	8/31/10 20:00	0.56	13	0.04	0.66	--	*Visited site at 8/31/10 at 08:39 - no flow yet, water in CB is still below culvert. At 10:25 meter reading 0.073 high flow is only 1 gpm. Adjusted meter to 0.05 and adjusted record in Flowlink. Took grabs.	
12	8	136DN	08/25/10	16	8/31/10 7:45	8/31/10 17:14	36*	1,831	47.4%	569	0	0	8/31/10 6:15	8/31/10 20:00	0.56	13	0.04	0.66	--	8/31/10 at 08:38 Is raining. Weir level is 0.04, Meter Level is -0.07, reset to 0.04. Flow over weir is <1 gpm, no visible flow in ditch. Reset pacing to 50 gallons. Sampler trigger is 0.05 - not triggered yet. *Level and meter readings not documented at end of storm.	

Notes:

- <sup>1</sup>Baseflow is gallons per minut
- hrs - hours
- gal - gallons
- min - minutes
- in - inches
- PDT - Pacific Daylight Time
- PST - Pacific Standard Time



Table B-3. Project 192 Monitoring Summary for 2011 Water Year

Storm Sample	Project Site ID	Site Visit Date	Composite Sample ID	Storm Sample Targeted?	Composite Sample Analyzed?	Antecedent Dry Period (hrs)	Pacing (gal)	Flume Level	Meter Level	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Mid-Storm Check Date	Flume Level	Meter Level	Off By	Sonde Reading? Date/Time	Post-Storm Date	Flume Level	Meter Level	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break (hrs)	Stormflow Start (date/time)	Stormflow End (date/time)	Total Stormflow (gal)	1st Sample (date/time)
--	192UP	10/7/10	--	Yes	No	--	--	--	--	--	--	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192M	10/7/10	--	Yes	No	--	--	--	--	--	--	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1	192UP	10/22/10	L51943-3	Yes	Yes	32	2750	0	0.003	-0.003	No	Yes	10/24/10	0.140	0.145	-0.005	10/24/10 7:30	10/25/10	0.43	0.412	0.018	No	No	<6	10/23/10 19:43	10/25/10 17:40	88,694	10/23/10 19:43
1	192M	10/22/10	L51943-4	Yes	Yes	32	2750	0.02	0.025	-0.005	No	Yes	10/24/10	0.220	0.219	0.001	10/24/10 7:46	10/25/10	0.44	0.433	0.007	No	No	<6	10/23/10 21:37	10/25/10 17:40	93,694	10/23/10 21:37
--	192UP	11/5/2010	--	Yes	No	85	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192M	11/5/2010	--	Yes	No	85	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2	192UP	11/16/10	L52160-1	Yes	Yes	35	2500	0.36	0.364	-0.004	No	Yes	11/17/10	0.355	0.361	-0.006	11/17/10 10:30	11/18/10	0.459	0.449	0.01	No	No	<6	11/17/10 6:20	11/18/10 18:50	132,347	11/17/10 8:55
2	192M	11/16/10	L52160-2	Yes	Yes	35	2500	0.36	0.353	0.007	No	Yes	11/17/10	0.370	0.371	-0.001	11/17/10 10:30	11/18/10	0.445	0.442	0.003	No	No	<6	11/17/10 6:20	11/18/10 18:50	139,058	11/17/10 8:39
--	192UP	11/29/10	--	Yes	No	39	2500	0.27	0.275	-0.005	No	No	11/30/10	0.509	0.520	-0.011	--	--	--	--	--	--	--	--	--	--	--	--
--	192M	11/29/10	--	Yes	No	39	2500	0.27	0.275	-0.005	No	No	11/30/10	0.517	0.520	-0.003	--	--	--	--	--	--	--	--	--	--	--	--
3	192UP	12/6/10	L52267-1	Yes	Yes	110	2000	0.2	0.205	-0.005	No	Yes	12/08/10	0.460	0.459	0.001	--	12/8/2010	0.49	0.487	0.003	No	No	<6	12/7/10 16:23	12/8/10 16:50	108,457	12/7/10 16:23
3	192M	12/6/10	L52267-2	Yes	Yes	110	2000	0.22	0.22	--	No	Yes	--	--	--	--	--	12/8/2010	0.49	0.481	0.009	No	No	<6	12/7/10 16:41	12/8/10 16:50	117,952	12/7/10 16:41
--	192UP	12/13/10	--	No	No	--	--	--	--	--	--	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192M	12/13/10	--	No	No	--	--	--	--	--	--	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192UP	1/4/11	--	Yes	No	150	1000	0.2	0.217	-0.017	-0.015	No	--	--	--	--	--	--	--	--	--	--	--	6	--	--	--	--
--	192M	1/4/11	--	Yes	No	150	1000	0.345	0.347	-0.002	No	No	--	--	--	--	--	--	--	--	--	--	--	6	--	--	--	--
4	192UP	1/11/11	L52330-1	Yes	Yes	63	2500	0.32	0.321	-0.001	No	Yes	--	--	--	--	--	--	--	--	--	--	--	<6	1/12/2011 2:28	1/12/2011 19:00	179,299	1/12/2011 2:28
4	192M	1/11/11	L52330-2	Yes	Yes	63	2500	0.32	0.323	-0.003	No	Yes	01/11/11	0.760	0.745	0.015	--	1/12/2011	0.81	0.807	0.003	No	No	<6	1/12/2011 2:00	1/12/2011 19:00	198,048	1/12/2011 2:04
--	192UP	1/19/11	--	Yes	No	49	3500	0.42	0.415	0.005	No	No	01/21/11	--	--	--	1/21/11 10:27	1/21/2011	1.0 +/- 0.1	1.02	+/- 0.1	No	No	--	--	--	--	--
--	192M	1/19/11	--	Yes	No	49	3500	0.45	0.443	0.007	0.007	No	01/21/11	1.08 +/- 0.1	1.1	+/- 0.2	1/21/11 10:00	1/21/2011	1.0 +/- 0.1	1.1	+/- 0.1	No	No	--	--	--	--	--
--	192UP	2/3/11	--	Yes	No	117	3000	0.25	0.249	0.001	No	Yes	02/04/11	0.285	0.286	-0.001	--	--	--	--	--	--	--	--	--	--	--	--
--	192M	2/3/11	--	Yes	No	117	3000	0.265	0.266	-0.001	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192UP	2/11/11	--	Yes	No	108	--	--	--	--	--	Yes	--	--	--	--	--	--	--	--	--	--	--	<6	--	--	--	--
--	192M	2/11/11	--	Yes	No	108	--	--	--	--	--	Yes	--	--	--	--	--	--	--	--	--	--	--	<6	--	--	--	--
--	192UP	3/7/10	--	No	No	76	--	0.305	0.307	-0.002	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192M	3/7/10	--	No	No	76	--	0.32	0.326	-0.006	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	192UP	3/10/11	L52491-1	Yes	Yes	39	3500	0.52	0.537	-0.017	No	Yes	--	--	--	--	--	3/13/2011	0.55	0.544	0.006	No	No	8*	3/12/11 10:00	3/13/11 15:30	203,214	3/12/2011 12:24
5	192M	3/10/11	L52491-2	Yes	Yes	39	3500	0.54	0.565	-0.025	No	Yes	--	--	--	--	--	3/13/2011	0.54	0.548	-0.008	No	No	8*	3/12/11 10:10	3/13/11 15:30	227,395	3/12/2011 12:27
6	192UP	3/24/11	L52798-1	Yes	Yes	141	2000	--	--	--	no	No	--	--	--	--	--	3/24/2011	0.325	0.333	-0.008	No	No	<6	3/24/11 19:36	3/25/11 17:50	49,078	3/24/2011 19:36
6	192M	3/24/11	L52798-2	Yes	Yes	141	2000	--	--	--	No	No	--	--	--	--	--	3/24/2011	0.34	0.341	-0.001	No	No	<6	3/24/11 19:49	3/25/11 17:50	52,979	3/24/2011 19:49
--	192UP	4/8/11	--	Yes	No	--	--	--	--	--	--	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192M	4/8/11	--	Yes	No	--	--	--	--	--	--	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7	192UP	4/13/11	L52877-1	Yes	Yes	52	2000	0.29	0.294	-0.004	No	Yes	--	--	--	--	--	4/14/2011	0.28	0.279	0.001	No	No	<6	4/13/11 11:20	4/14/11 12:00	40,248	4/13/2011 12:02
7	192M	4/13/11	L52877-2	Yes	Yes	52	2000	0.315	0.317	-0.002	No	Yes	--	--	--	--	--	4/14/2011	0.29	0.29	0	No	No	<6	4/13/11 12:14	4/14/11 12:00	45,929	4/13/2011 12:14



Table B-3. Project 192 Monitoring Summary for 2011 Water Year

Storm Sample	Project Site ID	Site Visit Date	Last Sample (date/time)	No. of Aliquots	Sampled Stormflow (gals)	% of Storm Sampled	Base flow at start of storm (gpm)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hrs)	Average Intensity (in/hr)	On-Site Rain gage	Comment
--	192UP	10/7/10	--	--	--	--	--	--	--	--	--	--	--	No downstream sample; sample not kept.
--	192M	10/7/10	--	--	--	--	--	--	--	--	--	--	--	Auto sampler not set up correctly; no sample
1	192UP	10/22/10	10/25/10 9:39	30	70,008	78.9%	0	10/23/10 8:00	10/25/10 19:00	1.67	49	0.034	1.55	Storm criteria met, samples analyzed
1	192M	10/22/10	10/25/10 9:27	30	72,640	77.5%	0	10/23/10 8:00	10/25/10 19:00	1.67	49	0.034	1.55	Storm criteria met, samples analyzed
--	192UP	11/5/2010	--	--	--	--	--	--	--	--	--	--	--	
--	192M	11/5/2010	--	--	--	--	--	--	--	--	--	--	--	
2	192UP	11/16/10	11/18/10 10:47	40	96,618	73.0%	38	11/17/10 6:00	11/18/10 12:00	0.39	18	0.022	0.47	Storm criteria met, samples analyzed
2	192M	11/16/10	11/18/10 9:31	40	94,403	67.9%	39	11/17/10 6:00	11/18/10 12:00	0.39	18	0.022	0.47	Storm criteria met, samples analyzed
--	192UP	11/29/10	--	--	--	--		11/29/10 18:00	11/30/10 20:00	--	--	--	--	Downstream sampler (192M) failed during the first half of storm event. Samples not kept
--	192M	11/29/10	--	--	--	--		11/29/10 18:00	11/30/10 20:00	--	--	--	--	Downstream sampler (192M) failed during the first half of storm event. Samples not kept
3	192UP	12/6/10	12/8/10 10:30	40	77,911	71.8%	10	12/7/10 16:00	12/8/10 9:00	0.82	17	0.048	0.79	Flow is turbid.
3	192M	12/6/10	12/8/10 9:38	34*	78,402	66.5%	10	12/7/10 16:00	12/8/10 9:00	0.82	17	0.048	0.79	4 Aliquots (#35 - 39) listed with NM flag. Last aliquot did not have a flag. Flow is turbid.
--	192UP	12/13/10	--	--	--	--	--	--	--	--	--	--	--	
--	192M	12/13/10	--	--	--	--	--	--	--	--	--	--	--	
--	192UP	1/4/11	--	--	--	--	--	--	--	0.16	--	--	--	Storm failed criteria. Total rain 0.14" then dry >6 hours before additional rain while still sampling
--	192M	1/4/11	--	--	--	--	--	--	--	0.16	--	--	--	Storm failed criteria. Total rain 0.14" then dry >6 hours before additional rain while still sampling
4	192UP	1/11/11	1/12/2011 14:24	50	121,354	67.7%	36	1/12/11 2:00	1/13/11 19:00	1.00	16	0.063	0.68	Post storm level measurements not recorded. Reviewed with field staff; meter was working accurately.
4	192M	1/11/11	1/12/11 13:28	50	122,517	61.9%	40	1/12/11 2:00	1/13/11 19:00	1.00	16	0.063	0.68	
--	192UP	1/19/11	--	--	--	--	--	--	--	--	1.28	--	--	Sampled less than 50% of hydrograph.
--	192M	1/19/11	--	--	--	--	--	--	--	--	1.28	--	--	Sampled less than 50% of hydrograph. Sampler did not pull last 20 aliquots. Samples not comparable.
--	192UP	2/3/11	--	--	--	--	--	--	--	0.16	--	--	--	Storm failed criteria. Total rain 0.13" then dry >6 hours before additional rain (0.03" at 6 hours, 3 hour gap then 0.02", then >12 hour gap) while still sampling
--	192M	2/3/11	--	--	--	--	--	--	--	0.16	--	--	--	Storm failed criteria. Total rain 0.13" then dry >6 hours before additional rain (0.01" at 6 hours, 3 hour gap then 0.02", then >12 hour gap) while still sampling. Also found and repaired a blockage to the tubing that prevented collection of several sample aliquots.
--	192UP	2/11/11	--	--	--	--	--	--	--	0.46	--	--	--	Sampler paced high; only 7 aliquots with almost half collected well past the storm hydrograph.
--	192M	2/11/11	--	--	--	--	--	--	--	0.46	--	--	--	Sampler paced high; only 8 aliquots with half collected well past the storm hydrograph.
--	192UP	3/7/10	--	--	--	--	--	--	--	0.14	4	0.035	--	Forecast for light showers followed less than a day later by heavy rain. Set samplers up but left off while watching storm. Forecast did not call for a criteria event, samplers left off.
--	192M	3/7/10	--	--	--	--	--	--	--	0.14	4	0.035	--	Forecast for light showers followed less than a day later by heavy rain. Set samplers up but left off while watching storm. Forecast did not call for a criteria event, samplers left off.
5	192UP	3/10/11	3/13/11 09:57	42	142,639	70.2%	85	3/12/11 8:00	3/14/11 11:00	0.55	15	0.037	0.46	Storm targeted during a brief (>24 hr) dry period during an extended period of daily storm events. Base (or interflow) conditions were very high; field team set the trigger level high and the first 2 hours of the storm was missed. A dry period of 8 hours occurred mid-sample. Influent/effluent samples were comparable and the sample was kept
5	192M	3/10/11	3/13/11 9:40	46	157,216	69.1%	97	3/12/11 8:00	3/14/11 11:00	0.55	15	0.037	0.46	Storm targeted during a brief (>24 hr) dry period during an extended period of daily storm events. Base (or interflow) conditions were very high; field team set the trigger level high and the first 2 hours of the storm was missed. A dry period of 8 hours occurred mid-sample. Influent/effluent samples were comparable and the sample was kept
6	192UP	3/24/11	3/25/11 7:03	16	30,136	61.4%	17	3/24/11 19:45	3/25/11 3:45	0.40	9	0.044	0.36	
6	192M	3/24/11	3/25/11 6:50	17	31,950	60.3%	17	3/24/11 19:45	3/25/11 3:45	0.40	9	0.044	0.36	
--	192UP	4/8/11												
--	192M	4/8/11												
7	192UP	4/13/11	4/14/11 8:01	18	33,766	83.9%	27	4/13/11 6:00	4/15/11 3:00	0.23	20	0.012	0.20	Storm criteria met, samples analyzed
7	192M	4/13/11	4/14/11 7:55	20	37,674	82.0%	33	4/13/11 6:00	4/15/11 3:00	0.23	20	0.012	0.20	Storm criteria met, samples analyzed



Table B-3. Project 192 Monitoring Summary for 2011 Water Year

Storm Sample	Project Site ID	Site Visit Date	Composite Sample ID	Storm Sample Targeted?	Composite Sample Analyzed?	Antecedent Dry Period (hrs)	Pacing (gal)	Flume Level	Meter Level	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Mid-Storm Check Date	Flume Level	Meter Level	Off By	Sonde Reading? Date/Time	Post-Storm Date	Flume Level	Meter Level	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break (hrs)	Stormflow Start (date/time)	Stormflow End (date/time)	Total Stormflow (gal)	1st Sample (date/time)
8	192UP	4/26/11	L53057-1	Yes	Yes	28	2000	0.26	0.265	-0.005	No	No	04/27/11	0.265	0.266	-0.001	--	4/27/2011	0.265	0.264	0.001	No	No	<6	4/26/11 16:46	4/27/11 15:30	32,221	4/26/2011 16:46
8	192M	4/26/11	L53057-2	Yes	Yes	28	2000	0.28	0.279	0.001	no	No	04/27/11	0.280	0.285	-0.005	--	4/27/2011	0.28	0.282	-0.002	No	No	<6	4/26/11 16:58	4/27/11 15:30	38,911	4/26/2011 16:58
9	192UP	5/11/11	L53138-1	Yes	Yes	66	2000	0.25	0.256	-0.006	No	No	--	--	--	--	--	5/12/2011	0.31	0.303	0.007	No	No	6	5/11/11 3:10	5/13/11 0:00	101,422	5/11/2011 6:29
9	192M	5/11/11	L53138-2	Yes	Yes	66	2000	0.28	0.279	0.001	No	No	--	--	--	--	--	5/12/2011	0.34	0.34	0	No	No	6	5/11/11 3:10	5/13/11 0:00	122,632	5/11/2011 06:34
--	192UP	5/13/11	--	Yes	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192M	5/13/11	--	Yes	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10	192UP	5/24/11	L53280-1	Yes	Yes	84	2000	0.29	0.295	-0.005	No	Yes	05/25/11	0.135	0.143	-0.008	--	5/26/2011	0.18	0.188	-0.008	No	No	<6	5/25/11 10:20	5/26/11 8:30	23,741	5/25/2011 10:47
10	192M	5/24/11	L53280-2	Yes	Yes	84	2000	0.16	0.162	-0.002	No	Yes	05/25/11	0.135	0.138	-0.003	--	5/26/2011	0.185	0.19	-0.005	No	No	<6	5/25/11 10:20	5/26/11 8:30	25,512	5/25/2011 11:11
--	192UP	5/31/11	--	Yes	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192M	5/31/11	--	Yes	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192UP	6/7/11	--	Yes	No	130	1000	--	--	--	No	No	--	--	--	--	--	--	--	--	--	--	--	>6	--	--	--	--
--	192M	6/7/11	--	Yes	No	130	1000	0.095	0.097	-0.002	No	No	--	--	--	--	--	6/8/2011	0.22	0.215	0.005	No	No	>6	--	--	--	--
11	192UP	6/14/11	L53348-1	Yes	Yes	41	100	0.055	0.059	-0.004	No	No	--	--	--	--	--	6/15/2011	0.09	0.096	-0.006	No	No	<6	6/15/11 1:00	6/15/11 6:42	4,895	6/15/2011 1:01
11	192M	6/14/11	L53348-2	Yes	Yes	41	100	0.075	0.075	0	No	No	--	--	--	--	--	6/15/2011	0.09	0.092	-0.002	No	No	<6	6/15/11 1:30	6/15/11 7:11	3,893	6/15/2011 1:35
--	192UP	6/22/11	--	Yes	No	118	200	0.045	0.053	-0.008	No	No	--	--	--	--	--	6/24/2011	--	0.07	--	No	No	>6	6/23/11 6:56	6/25/11 5:30	6,441	6/23/11 6:56
--	192M	6/22/11	--	Yes	No	118	200	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192UP	6/27/11	--	Yes	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	192M	6/27/11	--	Yes	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12	192UP	7/12/11	L53471-1	Yes	Yes	131	50	0	-0.012	0.012	Yes	Yes	--	--	--	--	--	7/13/2011	dry	-0.003	--	no	No	<6	7/12/11 19:40	7/12/10 23:00	26,230	7/12/2011 19:40
12	192M	7/12/11	L53471-2	Yes	Yes	131	50	0	-0.192	0.192	0.192	Yes	--	--	--	--	--	7/13/2011	0.07	0.073	-0.003	No	No	<6	7/12/11 19:52	7/13/10 9:19	25,920	7/12/2011 19:52

Notes:  
<sup>1</sup>Baseflow is gallons per minute flow at start of storm  
 hrs - hours  
 gal - gallons  
 min - minutes  
 in - inches  
 PDT - Pacific Daylight Time  
 PST - Pacific Standard Time



**Table B-3. Project 192 Monitoring Summary for 2011 Water Year**

Storm Sample	Project Site ID	Site Visit Date	Last Sample (date/time)	No. of Aliquots	Sampled Stormflow (gals)	% of Storm Sampled	Base flow at start of storm (gpm)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hrs)	Average Intensity (in/hr)	On-Site Rain gage	Comment
8	192UP	4/26/11	4/27/11 12:04	15	27,796	86.3%	21	4/26/11 18:45	4/27/11 7:45	0.17	14	0.012	0.18	Rainfall less than 0.2 inches. Sample aliquots representative of stormflow, samples analyzed.
8	192M	4/26/11	4/27/11 12:24	18	33,835	87.0%	25	4/26/11 18:45	4/27/11 7:45	0.17	14	0.012	0.18	Rainfall less than 0.2 inches. Sample aliquots representative of stormflow, samples analyzed.
9	192UP	5/11/11	5/12/11 8:11	36	69,927	68.9%	19	5/11/11 4:00	5/12/11 1:00	0.45	21	0.021	0.45	Antecedent dry period of 66 hrs is less than criteria of 72 hours. Sampling provided good representation of the storm and matched well with the downstream sample. This along with a concern over the ability to collect criteria storms lead to the decision to submit this sample for analysis.
9	192M	5/11/11	5/12/11 8:21	43	83,793	68.3%	24	5/11/11 4:00	5/12/11 1:00	0.45	21	0.021	0.45	Antecedent dry period of 66 hrs is less than criteria of 72 hours. Sampling provided good representation of the storm and matched well with the downstream sample. This along with a concern over the ability to collect criteria storms lead to the decision to submit this sample for analysis.
--	192UP	5/13/11	--	--	--	--	--	--	--	--	--	--	--	
--	192M	5/13/11	--	--	--	--	--	--	--	--	--	--	--	
10	192UP	5/24/11	5/26/11 5:20	12	21,982	92.6%	4	5/25/11 12:00	5/25/11 19:00	0.43	8	0.054	0.37	Storm criteria met, samples analyzed.
10	192M	5/24/11	5/26/11 6:01	13	23,993	94.0%	4	5/25/11 12:00	5/25/11 19:00	0.43	8	0.054	0.37	Storm criteria met, samples analyzed.
--	192UP	5/31/11	--	--	--	--	--	--	--	--	--	--	--	
--	192M	5/31/11	--	--	--	--	--	--	--	--	--	--	--	
--	192UP	6/7/11	--	--	--	--	--	--	--	--	--	--	--	
--	192M	6/7/11	--	--	--	--	--	--	--	--	--	--	--	
11	192UP	6/14/11	6/15/11 6:42	50	4,895	100.0%	0	6/15/11 1:00	6/15/11 3:45	0.18	3	0.060	0.16	Antecedent dry period of 41 hrs is less than criteria of 72 hours, total rainfall was 0.18 inches; less than the 0.2 inch rainfall criteria. The stormflow was well covered by the sampling and was kept for analysis as a good representation of upstream/downstream water quality conditions.
11	192M	6/14/11	6/15/11 7:11	40	3,893	100.0%	1	6/15/11 1:00	6/15/11 3:45	0.18	3	0.060	0.16	Antecedent dry period of 41 hrs is less than criteria of 72 hours, total rainfall was 0.18 inches; less than the 0.2 inch rainfall criteria. The stormflow was well covered by the sampling and was kept for analysis as a good representation of upstream/downstream water quality conditions.
--	192UP	6/22/11	6/25/11 5:12	7	5,004	77.7%	0	--	--	0.26	21	0.012	--	Storm did not meet criteria; >6 hour inter-storm break. Shower of 0.08 inches was followed by a six hour dry period, 0.01 inches of rain then a 3 hour dry period before 0.17 inches of rain. Sampler captured stormflow across breaks. Samples not analyzed
--	192M	6/22/11	--	--	--	--	--	--	--	--	--	--	--	Storm did not meet criteria; >6 hour inter-storm break. Shower of 0.08 inches was followed by a six hour dry period, 0.01 inches of rain then a 3 hour dry period before 0.17 inches of rain. Sampler captured stormflow across breaks. Samples not analyzed
--	192UP	6/27/11	--	--	--	--	--	--	--	0.00	--	--	0.04	Storm did not materialize.
--	192M	6/27/11	--	--	--	--	--	--	--	0.00	--	--	0.04	Storm did not materialize.
12	192UP	7/12/11	7/12/11 20:14	50	9,523	36.3%	0	7/12/11 19:30	7/12/11 12:30	0.58	2	0.290	0.56	High intensity storm came in two cells that resulted two very distinct hydrograph peaks. The sampler captured 87% of the first peak 10,986 gallons from 0.4 inches of rain in one hour. Matched sampling at downstream station - sample was analyzed.
12	192M	7/12/11	7/12/11 20:19	50	8,434	32.5%	0	7/12/11 19:30	7/12/11 12:30	0.58	2	0.290	0.56	High intensity storm came in two cells that resulted two very distinct hydrograph peaks. The sampler captured 87% of the first peak 10,986 gallons from 0.4 inches of rain in one hour. Matched sampling at downstream station - sample was analyzed.

**Notes:**

- <sup>1</sup>Baseflow is gallons per
- hrs - hours
- gal - gallons
- min - minutes
- in - inches
- PDT - Pacific Daylight
- PST - Pacific Standard



Table B-4. Project OP Monitoring Summary for 2011 Water Year

Storm Sample	Project Site ID	Site Visit Date	Composite Sample ID	Storm Sample Targeted ?	Composite Sample Analyzed?	Antecedent Dry Period (hrs)	Pacing (gal)	Flume Level	Meter Level	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Mid-Storm Check Date	Flume Level	Meter Level	Off By	Sonde Reading? Date/Time	Post-Storm Date	Flume Level	Meter Level	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break (hr)	Stormflow Start (date/time)	Stormflow End (date/time)	Total Stormflow (gal)	1st Sample (date/time)	Last Sample (date/time)	No. of Aliquots
--	OPUP	9/3/10	--	No	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPDN	9/3/10	--	No	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPUP	9/15/10	--	Yes	No	155	--	Dry	-0.039	0.000	Yes	No	None	--	--	--	--	09/16/10	0.32	0.326	-0.006	No	No	<6	--	--	--	9/15/10 14:39	9/15/10 18:06	38
--	OPDN	9/15/10	--	Yes	No	155	--	Dry	-0.010	0.000	No	No	None	--	--	--	--	09/16/10	0.300	0.256	0.044	Yes	No	<6	--	--	--	9/15/10 18:19	9/16/10 5:06	40
--	OPUP	9/21/10	--	No	No	--	--	0.02	0.000	0.020	Yes	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPDN	9/21/10	--	No	No	--	--	0.05	0.052	-0.002	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPUP	9/23/10	--	Yes	No	71	--	0.035	0.035	0.000	No	No	None	--	--	--	--	09/23/10	--	--	--	--	--	<6	--	--	--	--	--	--
--	OPDN	9/23/10	--	Yes	No	71	--	Dry	0.000	0.000	No	No	None	--	--	--	--	09/23/10	--	--	--	--	--	<6	--	--	--	--	--	--
1	OPUP	10/7/10	L51658-1	Yes	Yes	251	2,750	Dry	0	--	No	Yes	None	--	--	--	--	10/10/10	0.81	0.791	0.019	No	No	6	10/8/10 23:20	10/10/10 18:00	266,703	10/8/10 23:20	10/10/10 1:34	40
1	OPDN	10/7/10	L51658-2	Yes	Yes	251	2,750	Dry	0	--	No	Yes	None	--	--	--	--	10/10/10	0.73	0.708	0.022	No	No	6	10/9/10 0:20	10/10/10 18:00	249,543	10/9/10 0:16	10/10/10 2:27	40
2	OPUP	10/22/10	L51943-1	Yes	Yes	32	5,000	0.02	0.028	-0.008	-0.008	Yes	10/24/10	0.31	0.312	-0.002	--	10/25/10	0.595	0.586	0.009	No	No	<6	10/23/10 15:18	10/25/10 16:20	305,989	10/23/10 15:18	10/24/10 21:03	40
2	OPDN	10/22/10	L51943-2	Yes	Yes	32	5,000	Dry	0.03	--	-0.02	Yes	10/24/10	0.32	0.303	0.017	--	10/25/10	0.72	0.712	0.008	0.008	No	<6	10/23/10 17:50	10/25/10 16:20	274,505	10/23/10 16:38	10/25/10 3:47	40
3	OPUP	11/4/10	L52041-3	Yes	Yes	84	200	0.08	0.072	0.008	No	No	11/06/10	0.58	0.579	0.001	11/6/10	11/06/10	0.54	0.53	0.010	No	No	<6	11/5/10 16:30	11/6/10 13:30	82,056	11/5/10 16:31	11/6/10 10:09	40
3	OPDN	11/4/10	L52041-4	Yes	Yes	84	200	0.13	0.132	-0.002	No	No	11/06/10	0.65	0.651	-0.001	11/6/10	11/06/10	0.41	0.4	0.010	No	No	<6	11/5/10 17:10	11/6/10 13:30	82,133	11/5/10 17:08	11/6/10 10:03	40
4	OPUP	11/16/10	L52160-3	Yes	Yes	35	2,250	0.155	0.157	-0.002	No	Yes	11/17/10	0.355	0.355	0.000	11/17/10	11/18/10	0.56	0.562	-0.002	No	No	<6	11/17/10 6:15	11/18/10 18:00	87,104	11/17/10 8:51	11/18/10 9:57	32
4	OPDN	11/16/10	L52160-4	Yes	Yes	35	2,250	0.19	0.188	0.002	No	Yes	11/17/10	0.46	0.447	0.013	11/17/10	11/18/10	0.385	0.374	0.011	No	No	<6	11/17/10 6:15	11/18/10 18:00	92,308	11/17/10 7:46	11/18/10 10:19	35
5	OPUP	11/29/10	L52206-3	Yes	Yes	39	2,500	0.135	0.133	0.002	no	No	11/30/10	0.54	0.535	0.005	11/30/10	12/01/10	0.26	0.26	0.000	No	No	<6	11/29/10 19:09	12/1/10 6:00	147,952	11/29/10 19:09	11/30/10 16:30	40
5	OPDN	11/29/10	L52206-4	Yes	Yes	39	2,500	0.155	0.158	-0.003	No	No	11/30/10	0.57	0.566	0.004	11/30/10	12/01/10	0.29	0.28	0.010	No	No	<6	11/29/10 20:21	12/1/10 6:00	156,974	11/29/10 20:21	11/30/10 15:41	40
6	OPUP	12/6/10	L52267-3	Yes	Yes	110	2,000	0.08	0.077	--	No	Yes	None	--	--	--	--	12/08/10	0.45	0.442	0.008	No	No	<6	12/7/10 16:40	12/8/10 8:20	93,227	12/7/10 16:40	12/8/10 3:01	40
6	OPDN	12/6/10	L52267-4	Yes	Yes	110	2,000	0.1	0.107	--	No	Yes	None	--	--	--	--	12/08/10	0.5	0.495	0.005	No	No	<6	12/7/10 17:18	12/8/10 8:20	96,677	12/7/10 17:15	12/8/10 3:00	40
--	OPUP	12/13/10	--	No	No	--	--	0.48	0.474	0.006	Yes	No	--	--	--	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--
--	OPDN	12/13/10	--	No	No	--	--	0.465	0.461	0.004	No	No	--	--	--	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--
--	OPUP	1/4/11	--	Yes	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	6	11/5/10 16:00	11/7/10 2:00	84,699	11/5/10 16:31	11/6/10 10:07	--	
--	OPDN	1/4/11	--	Yes	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	6	11/5/10 16:00	11/7/10 2:00	84,765	11/5/10 17:08	11/6/10 10:03	--	
7	OPUP	1/11/11	L52330-3	Yes	Yes	63	2,500	0.15	0.152	-0.002	No	Yes	None	--	--	--	--	01/12/11	0.88	0.9	-0.020	No	No	<6	1/12/11 2:00	1/12/11 17:50	211,024	1/11/11 23:30	1/12/11 10:54	50
7	OPDN	1/11/11	L52330-4	Yes	Yes	63	2,500	0.16	0.166	-0.006	No	Yes	None	--	--	--	--	01/12/11	0.84	0.841	-0.001	No	No	<6	1/12/11 2:00	1/12/11 17:50	206,700	1/12/11 2:32	1/12/11 11:09	50
--	OPUP	2/3/11	--	Yes	No	117	1,500	0.13	0.298	-0.168	0.168	Yes	02/04/11	0.22	0.199	0.02	--	--	--	--	--	0.21	No	<6	2/3/11 23:00	2/4/11 7:30	14,648	--	--	--
--	OPDN	2/3/11	--	Yes	No	117	1,500	0.135	0.135	0.000	No	Yes	02/04/11	0.24	0.246	-0.01	--	--	--	--	--	No	No	<6	2/3/11 23:30	2/4/11 7:30	16,019	--	--	--
--	OPUP	2/11/11	--	Yes	No	108	4,000	0.12	0.125	-0.005	No	Yes	None	--	--	--	--	--	--	--	--	No	<6	2/12/11 16:20	2/13/11 7:21	85,563	2/11/11 21:46	2/13/11 7:21	21	
--	OPDN	2/11/11	--	Yes	No	108	4,000	0.115	0.116	-0.001	No	Yes	None	--	--	--	--	--	--	--	--	No	<6	2/12/11 16:40	2/13/11 8:12	80,049	2/12/11 16:37	2/13/11 8:12	21	
--	OPUP	3/7/11	--	No	No	59	--	0.17	0.165	0.165	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPDN	3/7/11	--	No	No	59	--	0.17	0.171	-0.001	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	OPUP	3/10/11	L52491-3	Yes	Yes	39	2,400	0.28	0.59	-0.310	-0.31	Yes	None	--	--	--	--	03/13/11	0.57	0.501	0.069	Yes	Yes	<6	3/12/11 10:16	3/13/11 15:20	119,064	3/12/11 10:16	3/13/11 10:08	25



Table B-4. Project OP Monitoring Summary for 2011 Water Year

Storm Sample	Project Site ID	Site Visit Date	Sampled Stormflow (gal)	% of Storm Sampled	Baseflow <sup>1</sup> at start of storm (gpm)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hr)	Average Rainfall Intensity (in/hr)	On-Site Rain gage	Comment
--	OPUP	9/3/10	--	--	--	--	--	--	--	--	--	Set up loggers. No flow in ditches.
--	OPDN	9/3/10	--	--	--	--	--	--	--	--	--	Set up loggers. No flow in ditches.
--	OPUP	9/15/10	--	--	0	--	--	0.46	32	0.01	0.37	Problem with inlet tubing placement. Missed early samples. Pacing low for storm. Samples not analyzed.
--	OPDN	9/15/10	--	--	0	--	--	0.46	32	0.01	0.37	Pacing low for storm. Samples not analyzed
--	OPUP	9/21/10	--	--	--	--	--	--	--	--	--	Field Visit Only
--	OPDN	9/21/10	--	--	--	--	--	--	--	--	--	Field Visit Only
--	OPUP	9/23/10	--	--	0	--	--	0.15	3	0.05	0.18	Storm failed rainfall criteria.
--	OPDN	9/23/10	--	--	0	--	--	0.15	3	0.05	0.18	Storm failed rainfall criteria. Equipment failure, no samples collected
1	OPUP	10/7/10	107,920	40.5%	0	10/8/10 23:00	10/10/10 11:00	1.87	51	0.04	1.61	Sampled stormflow = 266,703 gallons. On-site rain gage recorded 1.61 in. Inter-storm break > 6 hrs on project rain gage, on-site rain gage showed < 6 hr inter-storm break. Sampled <50 percent of storm, but captured storm first flush portion of storm, sampling was comparable at both influent and effluent stations.
1	OPDN	10/7/10	101,610	40.7%	0	10/8/10 23:00	10/10/10 11:00	1.87	51	0.04	1.61	Sampled stormflow = 249,543 gallons. On-site rain gage recorded 1.61 in. Inter-storm break > 6 hrs on project rain gage, on-site rain gage showed < 6 hr inter-storm break. Sampled <50 percent of storm, but captured storm first flush portion of storm, sampling was comparable at both influent and effluent stations.
2	OPUP	10/22/10	195,069	63.8%	0	10/23/10 8:00	10/25/10 19:00	1.64	60	0.03	1.53	Sampled for 37 hrs with no break in rain. Rain continued 10 hrs after sampling stopped.
2	OPDN	10/22/10	195,418	71.2%	0	10/23/10 8:00	10/25/10 19:00	1.64	60	0.03	1.53	
3	OPUP	11/4/10	69,873	85.2%	1	11/5/10 17:00	11/6/10 2:00	0.63	19	0.03	0.55	
3	OPDN	11/4/10	67,760	82.5%	2	11/5/10 17:00	11/6/10 2:00	0.63	19	0.03	0.55	
4	OPUP	11/16/10	71,635	82.2%	5	11/17/10 6:00	11/18/10 12:00	0.47	30	0.02	0.4	
4	OPDN	11/16/10	74,278	80.5%	9	11/17/10 6:00	11/18/10 12:00	0.47	30	0.02	0.4	
5	OPUP	11/29/10	98,320	66.5%	5	11/29/10 18:00	11/30/10 20:00	0.61	26	0.02	0.53	
5	OPDN	11/29/10	97,375	62.0%	5	11/29/10 18:00	11/30/10 20:00	0.61	26	0.02	0.53	
6	OPUP	12/6/10	78,568	84.3%	1	12/7/10 16:00	12/8/10 9:00	0.57	17	0.03	0.48	Sampling completed before 5 hour break in rainfall. High intensity storm spike after dry period not included in sample.
6	OPDN	12/6/10	77,922	80.6%	2	12/7/10 16:00	12/8/10 9:00	0.57	17	0.03	0.48	Sampling completed before 5 hour break in rainfall. High intensity storm spike after dry period not included in sample.
--	OPUP	12/13/10	--	--	--	--	--	--	--	--	--	Field Visit Only
--	OPDN	12/13/10	--	--	--	--	--	--	--	--	--	Field Visit Only. Lots of gravel deposition upstream of flume
--	OPUP	1/4/11	--	--	--	--	--	0.16			--	Storm criteria failed. Samples not analyzed.
--	OPDN	1/4/11	--	--	--	--	--	0.16			--	Storm criteria failed. Samples not analyzed.
7	OPUP	1/11/11	117,681	55.8%	6	1/12/11 2:00	1/13/11 19:00	1.00	12	0.08	0.71	Snow melt runoff triggered sampler before start of recorded rainfall
7	OPDN	1/11/11	121,980	59.0%	6	1/12/11 2:00	1/13/11 19:00	1.00	12	0.08	0.71	Snow melt runoff triggered sampler before start of recorded rainfall
--	OPUP	2/3/11	--	--	--	--	--	0.16	12	0.01	--	Very low intensity storm less than forecast, (0.13 inches followed by 5 hour dry period) paced for larger storm event Storm not sampled. Issues with flow meter level measurement-under review.
--	OPDN	2/3/11	--	--	--	--	--	0.16	12	0.01	--	Very low intensity storm less than forecast, (0.13 inches followed by 5 hour dry period) paced for larger storm event Storm not sampled. Issues with flow meter level measurement-under review.
--	OPUP	2/11/11	87,801	102.6%	3	--	--	0.46	13	0.04	--	False start - sampler started 18 hours prior to storm event. Sample not kept
--	OPDN	2/11/11	83,893	104.8%	4	--	--	0.46	13	0.04	--	False start - sampler started 18 hours prior to storm event. Sample not kept
--	OPUP	3/7/11	--	--	--	--	--	0.13	--	--	--	Samplers set up on standby (off) due to showery weather and uncertain forecasts
--	OPDN	3/7/11	--	--	--	--	--	0.13	--	--	--	Samplers set up on standby (off) due to showery weather and uncertain forecasts
8	OPUP	3/10/11	87,819	73.8%	23	3/12/11 8:00	3/14/11 11:00	0.55	28	0.02	0.49	Inter-storm dry period exceeded by 2 hours; on-site Raingage shows intra-storm dry period <6 hours and sample was kept. Level at upstream station off by 0.07 - possible blockage in bubble line. Flows are recorded low but vary consistently with downstream record. Sampling is consistent with downstream samples and almost all of storm was sampled at both stations. Pacing was low for actual flow. Flow record at upstream station was corrected based on comparison with downstream flow and previous storm response. Samples were kept as representative of upstream/downstream water quality conditions.



Table B-4. Project OP Monitoring Summary for 2011 Water Year

Storm Sample	Project Site ID	Site Visit Date	Composite Sample ID	Storm Sample Targeted ?	Composite Sample Analyzed?	Antecedent Dry Period (hrs)	Pacing (gal)	Flume Level	Meter Level	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Mid-Storm Check Date	Flume Level	Meter Level	Off By	Sonde Reading? Date/Time	Post-Storm Date	Flume Level	Meter Level	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break (hr)	Stormflow Start (date/time)	Stormflow End (date/time)	Total Stormflow (gal)	1st Sample (date/time)	Last Sample (date/time)	No. of Aliquots
8	OPDN	3/10/11	L52491-4	Yes	Yes	39	2,400	0.3	0.301	-0.001	No	Yes	None	--	--	--	--	03/13/11	0.66	0.645	0.015	No	no	<6	3/12/11 9:50	3/13/11 15:20	130,124	3/12/11 10:34	3/13/11 10:30	44
--	OPUP	3/15/11	--	No	No	--	--	0.32	0.354	-0.034	No*	No	--	--	--	--	--	--	0.32	0.317	0.003	No	Yes	--	--	--	--	--	--	--
--	OPUP	3/24/11	--	No	No	--	--	0.155	0.166	-0.011	Yes	No	--	--	--	--	--	--	0.16	0.16	0.000	-0.007	No	--	--	--	--	--	--	--
--	OPUP	4/8/11	--	No	No	--	--	--	--	--	--	Yes	--	--	--	--	--	--	--	--	--	--	--	7	4/10/11 4:00	4/11/11 18:00	46,055	--	--	--
--	OPDN	4/8/11	--	No	No	--	--	--	--	--	--	Yes	--	--	--	--	--	--	--	--	--	--	--	7	4/10/11 4:00	4/11/11 18:00	47,938	--	--	--
--	OPUP	4/11/11	--	No	No	--	--	0.2	0.254	-0.054	Yes	Yes	--	--	--	--	--	--	0.2	0.201	-0.001	-0.054	Yes	--	--	--	--	--	--	--
--	OPDN	4/11/11	--	No	No	--	--	0.215	0.217	-0.002	No	Yes	--	--	--	--	--	--	0.215	0.214	0.001	No	No	<6	--	--	--	--	--	--
9	OPUP	4/13/11	L52877-3	Yes	Yes	52	1,800	0.285	0.291	-0.006	No	Yes	None	--	--	--	--	04/14/11	0.175	0.19	-0.015	No	No	<6	4/13/11 12:10	4/14/11 7:00	24,486	4/13/11 12:53	4/14/11 6:44	14
9	OPDN	4/13/11	L52877-4	Yes	Yes	52	1,800	0.155	0.155	0.000	No	Yes	None	--	--	--	--	04/14/11	0.18	0.183	-0.003	No	No	<6	4/14/11 0:59	4/14/11 7:00	21,530	4/13/11 12:59	4/14/11 6:46	13
--	OPUP	4/29/11	--	--	--	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPDN	4/29/11	--	--	--	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10	OPUP	5/11/11	L53138-3	Yes	Yes	66	1,250	0.168	0.172	-0.004	No	No	None	--	--	--	--	05/12/11	0.185	0.187	-0.002	No	No	6	5/11/11 3:20	5/12/11 3:00	75,515	5/11/2011 7:08	5/11/11 20:04	50
10	OPDN	5/11/11	L53138-4	Yes	Yes	66	1,250	0.175	0.171	0.004	--	No	--	--	--	--	--	05/12/11	0.19	0.192	-0.002	No	No	6	5/11/11 4:00	5/12/11 3:00	73,821	5/11/11 7:02	5/11/11 20:45	50
--	OPUP	5/13/11	--	Yes	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPDN	5/13/11	--	Yes	No	--	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPUP	5/19/11	--	Yes	No	131	1,250	0.13	0.132	-0.002	No	No	None	--	--	--	--	None	--	--	--	--	--	>6	5/21/11 6:15	5/22/11 11:30	5,889	--	--	--
--	OPDN	5/19/11	--	Yes	No	131	1,250	0.14	0.141	-0.001	No	No	None	--	--	--	--	None	--	--	--	--	--	>6	--	5/22/11 11:30	5,426	--	--	--
11	OPUP	5/24/11	L53280-3	Yes	Yes	84	2,000	0.08	0.025	0.055	0.055	No	05/25/11	0.085	0.086	-0.001	--	05/26/11	0.12	0.122	-0.002	No	No	<6	5/25/11 11:25	5/26/11 7:17	44,297	5/25/11 11:25	5/26/11 5:46	23
11	OPDN	5/24/11	L53280-4	Yes	Yes	84	2,000	0.08	0.075	0.005	No	No	05/25/11	0.08	0.075	0.005	--	05/26/11	0.12	0.123	-0.003	No	no	<6	5/25/11 11:25	5/26/11 7:17	41,867	5/25/11 12:25	5/26/11 7:17	22
--	OPUP	5/31/11	--	Yes	No	72	1,400	0.085	0.092	-0.007	No	No	None	--	--	--	--	None	--	--	--	--	--	>6	5/31/11 15:40	6/1/11 18:00	91,856	5/31/11 9:01	6/1/11 8:33	36
--	OPDN	5/31/11	--	Yes	No	72	1,400	0.077	0.08	-0.003	No	No	None	--	--	--	--	None	--	--	--	--	--	>6	5/31/11 15:50	6/1/11 18:00	86,897	5/31/11 10:20	6/1/11 7:51	29
--	OPUP	6/7/11	--	Yes	No	131	800	0.09	0.097	-0.007	No	No	None	--	--	--	--	06/08/11	0.335	0.338	-0.003	No	no	>6	--	--	--	--	--	--
--	OPDN	6/7/11	--	Yes	No	131	800	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blank	OPDN	6/13/11	--	No	No	110	--	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPDN	6/14/11	--	Yes	No	41	100	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPDN	6/14/11	--	Yes	No	41	1,000*	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	OPDN	7/12/11	--	Yes	No	131	50	0	-0.064	0.064	no	No	None	--	--	--	--	07/13/11	0.11	0.084	0.026	No	no	<6	--	--	--	--	--	--



Table B-4. Project OP Monitoring Summary for 2011 Water Year

Storm Sample	Project Site ID	Site Visit Date	Sampled Stormflow (gal)	% of Storm Sampled	Baseflow <sup>1</sup> at start of storm (gpm)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hr)	Average Rainfall Intensity (in/hr)	On-Site Rain gage	Comment
8	OPDN	3/10/11	104,035	80.0%	17	3/12/11 8:00	3/14/11 11:00	0.55	28	0.02	0.49	Inter-storm dry period exceeded by 2 hours; on-site Raingage shows intra-storm dry period just <6 hours and sample was kept. Level off at upstream station by 0.07 - possible blockage in bubble line. Flows are recorded low but vary consistently with downstream record. Sampling is consistent with downstream samples and almost all of storm was sampled at both stations. Pacing was low for actual flow and sampling includes a >6 hr dry period and continues in to the following storm event. Flow record at upstream station was corrected based on comparison with downstream flow and previous storm response. Samples were kept as representative of upstream/downstream water quality conditions.
--	OPUP	3/15/11	--	--	--	--	--	--	--	--	--	Site visit OPUP only. Flushed stilling well at 14:28, level changed to 0.317- did not adjust meter.
--	OPUP	3/24/11	--	--	--	--	--	--	--	--	--	Site visit only. Flushed silt out of stilling well at 14:49. Reset meter by -0.007 ft. Correct <0.02 ft - no correction to record.
--	OPUP	4/8/11	--	--	--	--	--	0.18	27	0.007	--	Intra-storm break < 6 hrs - storm not sampled. Sondes deployec
--	OPDN	4/8/11	--	--	--	--	--	0.18	27	0.007	--	Intra-storm break < 6 hrs - storm not sampled. Sondes deployec
--	OPUP	4/11/11	--	--	--	--	--	--	--	--	--	Site visit only. Flushed stilling well and reset meter by -0.054 ft. at 12:02. Corrected flow record by 0.65% from 4/8/11 @ 12:50 to 4/11/11 at 12:00. Level record should be corrected by -0.054 for same time period.
--	OPDN	4/11/11	--	--	--	--	--	--	--	--	--	Site visit only. Flushed stilling well. Station ok, no corrections
9	OPUP	4/13/11	23,267	95.0%	5	4/13/11 6:00	4/15/11 3:00	0.23	20	0.01	0.180	Storm criteria met, samples analyzed
9	OPDN	4/13/11	21,530	100.0%	5	4/13/11 6:00	4/15/11 3:00	0.23	20	0.01	0.180	Storm criteria met, samples analyzed
--	OPUP	4/29/11	--	--	--	--	--	--	--	--	--	Storm not forecasted. Stations were set up for a Sunday/Monday event (see weather diary & forecast for 4/29/11) but a unexpected, localized storm cell moved in early Saturday morning. This situation was not realized until Monday morning - samples were not kept iced and were not submitted.
--	OPDN	4/29/11	--	--	--	--	--	--	--	--	--	Storm not forecasted. Stations were set up for a Sunday/Monday event (see weather diary & forecast for 4/29/11) but a unexpected, localized storm cell moved in early Saturday morning. This situation was not realized until Monday morning - samples were not kept iced and were not submitted.
10	OPUP	5/11/11	61,093	80.9%	3	5/11/11 4:00	5/12/11 1:00	0.45	21	0.021	0.390	Antecedent dry period of 66 hrs is less than criteria of 72 hours. Sampling provided good representation of the storm and matched well with the downstream sample. This along with a concern over the ability to collect criteria storms lead to the decision to submit this sample for analysis.
10	OPDN	5/11/11	60,838	82.4%	3	5/11/11 4:00	5/12/11 1:00	0.45	21	0.021	0.39	Antecedent dry period of 66 hrs is less than criteria of 72 hours. Sampling provided good representation of the storm and matched well with the downstream sample. This along with a concern over the ability to collect criteria storms lead to the decision to submit this sample for analysis.
--	OPUP	5/13/11	--	--	--	--	--	--	--	--	--	
--	OPDN	5/13/11	--	--	--	--	--	--	--	--	--	
--	OPUP	5/19/11	--	--	2	--	--	0.06	17	0.021	--	Storm degraded to light showers: rain totaled only 0.06 inches with >6 hour break. Samplers were set up on standby but did not target this storm.
--	OPDN	5/19/11	--	--	2	--	--	--	--	0.021	--	Storm degraded to light showers: rain totaled only 0.06 inches with >6 hour break. Samplers were set up on standby but did not target this storm.
11	OPUP	5/24/11	43,999	99.3%	0	5/25/11 12:00	5/25/11 19:00	0.43	8	0.05	0.34	Storm criteria met, samples analyzed. Level adjusted prior to storm by 0.055 ft - bubble tube appears to have been moved; noted fresh mowing in area. Mid-storm check is just prior to start of storm.
11	OPDN	5/24/11	41,969	100.2%	0	5/25/11 12:00	5/25/11 19:00	0.43	8	0.05	0.34	Storm criteria met, samples analyzed. Mid-storm check is just prior to start of storm
--	OPUP	5/31/11	46,017	50.1%	1	--	--	0.99	--	--	--	Twelve hour inter-storm dry period - sampled through dry period and into part of a separate storm event - sample not kept
--	OPDN	5/31/11	39,181	45.1%	1	--	--	0.99	--	--	--	Twelve hour inter-storm dry period - sampled through dry period and into part of a separate storm event - sample not kept
--	OPUP	6/7/11	--	--	--	--	--	--	--	--	--	
--	OPDN	6/7/11	--	--	--	--	--	--	--	--	--	
Blank	OPDN	6/13/11	--	--	--	--	--	--	--	--	--	Collected Field Equipment Blank using OP-DN tubing, strainer, & pump head tubing. Sampled into 5 gallon carboy used for regular storm samples. Took to KCEI & process similar to all other samples.
--	OPDN	6/14/11	--	--	--	--	--	--	--	--	--	
--	OPDN	6/14/11	--	--	--	--	--	--	--	--	--	*Sample pacing miss-set; 100 gallons was the intended target for pacing. Resulted in a difference in how the upstream and downstream storm samples were collected. Sample not kept.
--	OPDN	7/12/11	--	--	0	--	--	0.63	2	0.32	0.71	Sampler malfunction



**Table B-4. Project OP Monitoring Summary for 2011 Water Year**

Storm Sample	Project Site ID	Site Visit Date	Composite Sample ID	Storm Sample Targeted ?	Composite Sample Analyzed?	Antecedent Dry Period (hrs)	Pacing (gal)	Flume Level	Meter Level	Off By	Meter Adjusted?	Turbidity Sondes Deployed?	Mid-Storm Check Date	Flume Level	Meter Level	Off By	Sonde Reading? Date/Time	Post-Storm Date	Flume Level	Meter Level	Off By	Adjusted Meter?	Adjustment to Record?	Intra-storm Break (hr)	Stormflow Start (date/time)	Stormflow End (date/time)	Total Stormflow (gal)	1st Sample (date/time)	Last Sample (date/time)	No. of Aliquots
--	OPDN	7/12/11	--	Yes	No	131	50	--	--	--	--	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12	OPUP	8/22/11	L53696-3	Yes	Yes	670	1,000	0	0.006	-0.006	No	No	None	--	--	--	--	08/23/11	Dry	-0.018	--	No	No	<6	8/22/11 19:30	8/22/11 23:40	13,266	8/22/11 19:30	8/22/11 22:26	14
12	OPDN	8/22/11	L53696-4	Yes	Yes	670	1,000	0	-0.002	0.002	No	No	None	--	--	--	--	08/24/11	Dry	-0.006	--	No	No	<6	8/22/11 20:10	8/22/11 23:50	9,903	8/22/11 20:34	8/22/11 22:33	9*

**Notes:**

- <sup>1</sup>Baseflow is gallons per minute flow at start of storm
- hrs - hours
- gal - gallons
- min - minutes
- in - inches
- PDT - Pacific Daylight Time
- PST - Pacific Standard Time



**Table B-4. Project OP Monitoring Summary for 2011 Water Year**

Storm Sample	Project Site ID	Site Visit Date	Sampled Stormflow (gal)	% of Storm Sampled	Baseflow <sup>1</sup> at start of storm (gpm)	Rain Start	Rain Stop	Total Rain (in)	Rainfall Duration (hr)	Average Rainfall Intensity (in/hr)	On-Site Rain gage	Comment
--	OPDN	7/12/11			0			0.63	2	0.32	0.71	
12	OPUP	8/22/11	12,816	96.6%	0	8/22/11 2:30	8/23/11 6:00	0.29	8	0.04	0.32	Storm criteria met. Samples analyzed.
12	OPDN	8/22/11	8,849	89.4%	0	8/22/11 2:30	8/23/11 6:00	0.29	8	0.04	0.32	Storm criteria met. Fewer than 12 aliquots collected, but nine out of 10 attempted aliquots were successful. Sampling is representative of stormflow and comparable to upstream sampling; sample was analyzed.

**Notes:**

- <sup>1</sup>Baseflow is gallons p
- hrs - hours
- gal - gallons
- min - minutes
- in - inches
- PDT - Pacific Dayligh
- PST - Pacific Standarc



Table B-5. Project PET Flow Data Audit for 2010 Water Year

In-Line Ditch BMP Flow Data Audit

Project Site: PET

BMPs installed 6/30/09

Site Visit Date	Project Site ID	Downloaded File Name	File Date Range	Time (PST)	Pre-Maintenance Levels					Post-Maintenance Levels					Flume/Meter Difference	Offset Adjusted?	Meter Time Verified?	Comments	Corrective Action /Comments /Adjustments to downloaded file			
					Flume Level	Meter Level	Offset	Raw Database Value	Database Time (PST)	Meter/Database Level Difference	Flushed, Zeroed Stilling Well?	Time (PST)	Flume Level	Meter Level						Offset		
8/11/2009	PET_UP	Pet_Up_8941_81109e.csv	8/10/09 - 8/11/09	12:18	Dry	0.770	0.000	--	0.744	12:20	0.026	Yes	12:27	0	-0.001	-0.768	0.001	0.768	Yes	No offset in logger. Value in database at start of visit differs from level noted in field by 0.026. Updated logger with offset -0.768 checked with flume at zero level. Flume Dry	Adjusted record with offset 0.768. Corrected negative level values to zero.	
8/11/2009	PET_DN	Pet_Dn_8939_081109e.csv	6/17/09 - 8/11/09	12:37	Dry	0.006	-0.900	--	0.005	12:35	0.001	No	12:44	0	-0.001	-0.906	0.001	0.003	Yes	Adjusted offset by 0.003 to 0.906 based on flush of stilling well.	Adjusted record with new offset of 0.906. Corrected negative level values to zero.	
8/31/2009	PET_UP	Not Downloaded	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Yes	Could not access logger. Not downloaded	--	
8/31/2009	PET_DN	Pet_Dn_8939_083109e.csv	8/11/09 - 8/31/09	--	Dry	-0.236	-0.906	--	-0.236	12:10	0.000	No	12:28	0	-0.001	-0.906	0.001	--	Yes	Flushed stilling well, check 0. Stilling well tape down -1.32'.	Corrected negative level values to zero.	
9/3/2009	PET_UP	Pet_Up_8939_090309e.csv	8/11/09 - 9/03/09	10:30	Dry	-0.292	-0.768	--	-0.291	10:30	-0.001	Yes	10:33	0	0	-0.768	0	--	Yes	Changed Lock	Corrected negative level values to zero.	
9/8/2009	PET_UP	Pet_Up_8939_090809e.csv	9/03/09 - 9/08/09	11:50	Dry	-0.051	-0.768	--	-0.051	12:50	0.000	No	--	--	--	--	--	--	Yes	Meter set in PST. Field time noted incorrectly; no change to meter data required. Evidence of flume overtopping	Reviewed field monitoring procedures. Corrected negative level values to zero.	
9/8/2009	PET_DN	Pet_Dn_8941_090809e.csv	8/31/09 - 9/8/09	13:17	0.000	-0.004	-0.906	0.004	0.004	13:20	-0.008	No	--	--	--	--	--	--	Yes	Evidence of flume overtopping.	Corrected negative level values to zero.	
9/21/2009	PET_UP	Pet_Up_8941_091909.csv	9/08/09 - 9/21/09	13:20	--	--	--	--	-0.256	12:20	--	No	--	--	--	--	--	--	No	No field observations recorded, data file named with wrong date.	Left file name to match raw data file saved at time of download. Reviewed field procedures. Corrected negative level values to zero.	
9/21/2009	PET_DN	Pet_Dn_8939_091909.csv	9/08/09 - 9/21/09	13:20	--	--	--	--	-0.107	12:30	--	No	--	--	--	--	--	--	No	No field observations recorded, file named with wrong date.	Left file name to match raw data file saved at time of download. Reviewed field procedures. Corrected negative level values to zero.	
9/30/2009	PET_UP	Pet_Up_8941_093009.csv	9/21/09-9/30/09	13:15	Dry	0.438	0*	--	0.438	13:15	0.000	Yes	13:22	0	0.001	-0.759	-0.001	Yes	Yes	No offset in logger. Updated offset. Corrected dataset with Offset of -0.759.	Reviewed field procedures with staff. Offset must be replaced after changing batteries.	
9/30/2009	PET_DN	Pet_Dn_8941_093009.csv	9/21/09-9/30/09	12:46	Dry	0.770	0*	--	0.770	12:45	0.000	Yes	12:53	dry/0	0.901*	0.000	0.901	Yes	Yes	No offset in logger. Updated offset. Corrected dataset with Offset of -0.900.	Reviewed field procedures with staff. Offset must be replaced after changing batteries.	
10/19/2009	PET_UP	Pet_Up_8941_101909.csv	9/30/09 - 10/19/09	*	--	--	--	--	-0.299	14:45	--	--	--	--	--	--	--	--	--	--	Downloaded only - no observations made. Corrected negative level value to 0 level.	Reviewed field procedures with staff. Flume level should be documented with logger values and at every site visit. Meter time should be verified.
10/19/2009	PET_DN	Pet_Dn_8939_101909.csv	9/30/09 - 10/19/09	*	--	--	--	--	-0.087	14:45	--	--	--	--	--	--	--	--	--	--	Downloaded only - no observations made. Corrected negative level value to 0 level.	Reviewed field procedures with staff. Flume level should be documented with logger values at every site visit. Meter time should be verified.
10/26/2009	PET_UP	Pet_Up_8941_102609.csv	10/19/09 - 10/26/09	14:44	0.475	0.461	-0.759	0.014	0.464	14:45	-0.003	No	--	--	--	--	--	--	Yes	Yes	No field adjustments. No after maintenance readings.	Corrected negative level values to zero.
10/26/2009	PET_DN	Pet_Dn_8939_102609.csv	10/19/09 - 10/26/09	14:26	0.470	0.462	-0.900	0.008	0.468	14:25	-0.006	No	--	--	--	--	--	--	Yes	Yes	No field adjustments. No after maintenance readings.	Corrected negative level values to zero.
11/12/2009	PET_UP	Pet_Up_8941_111209.csv	10/26/09 - 11/12/09	15:04	0.295	0.281	-0.759	0.014	0.281	15:05	0.000	Yes	15:05	0.295	0.296	-0.745	-0.001	0.014	Yes	Yes	Offset adjusted by 0.014.	Flume/meter off by less than 0.02 feet; Dataset corrected by 0.014 since downstream meter adjusted to 0.031.
11/12/2009	PET_DN	Pet_Dn_8939_111209.csv	10/26/09 - 11/12/09	14:35	0.290	0.269	0.900	0.021	0.270	14:35	-0.001	Yes	--	0.3	0.3	-0.869	0	0.031	Yes	Yes	Offset adjusted by 0.031.	Dataset corrected by 0.031
11/19/2009	PET_UP	Pet_Up_8941_111909.csv	11/12/09 - 11/19/09	10:38	0.540	0.534	-0.745	0.006	0.537	10:40	-0.003	No	--	--	--	--	--	--	Yes	Yes	No after maintenance readings.	No adjustments or corrections
11/19/2009	PET_DN	Pet_Dn_8939_111909.csv	11/12/09 - 11/19/09	10:18	0.610	0.608	-0.869	0.002	0.609	10:20	-0.001	No	--	--	--	--	--	--	Yes	Yes	No after maintenance readings.	No adjustments or corrections
12/8/2009	PET_UP	Not Downloaded	--	13:54	0.160	0.158	Not Recorded	0.002	0.163	13:55	-0.005	No	--	--	--	--	--	--	No	No	A little ice in flume, but still flowing. Removed leaves from flume. Not downloaded. Offset not recorded. Single readings only.	No adjustments or corrections
12/8/2009	PET_DN	Not Downloaded	--	13:47	0.130	0.132	Not Recorded	-0.002	0.132	14:00	0.000	No	--	--	--	--	--	--	No	No	Ice in flume, but still flowing. Not downloaded. Offset not recorded. Single readings only.	No adjustments or corrections
12/9/2009	PET_UP	Not Downloaded	--	14:04	0.140	0.137	-0.745	0.003	0.137	14:04	0.000	--	--	--	--	--	--	--	No	No	Date incorrect on form, site visit was 12/09/09. Temps below freezing, ice in flume and stilling well	No adjustments or corrections
12/9/2009	PET_DN	Not Downloaded	--	13:57	Ice	0.015	-0.869	--	0.005	13:55	0.010	--	--	--	--	--	--	--	No	No	Temps below freezing, ice in flume and stilling well	No adjustments or corrections
12/17/2009	PET_UP	Pet_Up_8941-121709.csv	11/12/09 - 12/17/2010	14:45	0.335	0.336	-0.745	-0.001	0.336	14:45	0.000	Yes	14:53	0.335	0.337	-0.745	-0.002	0.000	Yes	Yes	No field adjustments, no adjustments to record.	
12/17/2009	PET_DN	Pet_Dn_8939_121709.csv	11/12/09 - 12/17/2010	14:29	0.340	0.345	-0.869	-0.005	0.345	14:30	0.000	Yes	--	0.338	0.338	-0.879	0	0.010	Yes	Yes	Offset changed by 0.010. Record not adjusted except for period of ice affected record (set to zero) 12/8/09 10:30 - 12/14/09 19:15	
1/14/2010	PET_UP	Pet_Up_8941_011410.csv	12/17/10 - 1/14/10	13:28	0.585	0.582	-0.745	0.003	0.576	13:30	0.006	No	13:37	0.6	0.59	-0.745	0.01	No	Yes	Yes	No adjustments or corrections	
1/14/2010	PET_DN	Pet_Dn_8939_011410.csv	12/17/10 - 1/14/10	14:05	0.600	0.600	-0.879	0	0.601	14:05	-0.001	No	14:10	0.6	0.605	-0.879	-0.005	No	Yes	Yes	No adjustments or corrections. Heavy leaf litter building up on BMPs. Removed trash from BMPs.	
2/10/2001	PET_UP	Pet_Up_8941_021010.csv	1/14/10 - 2/10/10	11:59	0.230	0.232	-0.745	-0.002	0.232	11:55	0.000	No	--	--	--	--	--	No	Yes	Yes	No adjustments or corrections	No adjustments or corrections
2/10/2001	PET_DN	Pet_Dn_8939_021010.csv	1/14/10 - 2/10/10	12:16	0.220	0.218	-0.879	0.002	0.218	12:15	0.000	No	--	--	--	--	--	No	Yes	Yes	No adjustments or corrections	No adjustments or corrections
3/8/2010	PET_UP	Pet_Up_8941_030810.csv	2/10/10 - 3/8/10	13:24	0.210	0.212	-0.745	-0.002	0.212	13:25	0.000	Yes	13:33	0.21	0.211	-0.745	-0.001	No	Yes	Yes	No adjustments or corrections	No adjustments or corrections
3/8/2010	PET_DN	Pet_Dn_8939_030810.csv	2/10/10 - 3/8/10	13:41	0.195	0.195	-0.879	0	0.195	13:40	0.000	No	13:46	0.195	0.192	-0.879	0.003	No	Yes	Yes	No adjustments or corrections	No adjustments or corrections



**Table B-5. Project PET Flow Data Audit for 2010 Water Year**

**In-Line Ditch BMP Flow Data Audit**

**Project Site: PET**

**BMPs installed 6/30/09**

Site Visit Date	Project Site ID	Downloaded File Name	File Date Range	Time (PST)	Pre-Maintenance Levels							Post-Maintenance Levels							Comments	Corrective Action /Comments /Adjustments to downloaded file	
					Flume Level	Meter Level	Offset	Flume/Meter Difference	Raw Database Value	Database Time (PST)	Meter/Database Level Difference	Flushed, Zeroed Stilling Well?	Time (PST)	Flume Level	Meter Level	Offset	Flume/Meter Difference	Offset Adjusted?			Meter Time Verified?
3/24/2010	PET_UP	Pet_UP_8941_032410.csv	3/8/10 - 3/24/10	12:48	0.150	0.155	-0.745	-0.005	0.156	12:50	-0.001	Yes	--	--	--	--	--	No	Yes	No adjustments or corrections. Evidence of flows overtopping flume. Notes switched between up & down stations - corrected on field form-no affect on record.	No adjustments or corrections
3/24/2010	PET_DN	Pet_Dn_8939_032410.csv	3/8/10 - 3/24/10	11:58	0.140	0.143	-0.879	-0.003	0.145	12:00	-0.002	Yes	12:19	0.14	0.14	-0.879	0	No	Yes	No adjustments or corrections. Evidence of flows overtopping flume.	
4/26/2010	PET_UP	Pet_UP_8941_042610.csv	3/24/10 - 04/26/10	8:52	0.230	0.236	-0.745	-0.006	0.235	8:50	0.001	Yes	8:59	0.232	0.235	-0.745	-0.003	No	Yes	No edits or adjustments. Orange staining in ditch, assuming from iron bacteria.	
4/26/2010	PET_DN	Pet_Dn_8939_042610.csv	3/24/10 - 04/26/10	9:10	0.230	0.232	-0.879	-0.002	0.235	9:10	-0.003	Yes	9:15	0.23	0.232	-0.879	-0.002	No	Yes	No edits or adjustments. Orange staining in ditch, assuming from iron bacteria.	
5/12/2010	PET_UP	Pet_UP_8941_051210.csv	4/26/10 - 05/12/10	14:16	0.080	0.085	-0.745	-0.005	0.085	14:15	0.000	No	--	--	--	--	--	No	Yes	No adjustments. Edited negative values in record during periods of no flow to zero. Installed YSI sonde.	Corrected negative level values to zero.
5/12/2010	PET_DN	Pet_Dn_8939_051210.csv	4/26/10 - 05/12/10	14:27	0.000	-0.009	-0.879	0.009	-0.010	14:25	0.001	No	--	--	--	--	--	No	Yes	No adjustments. Edited negative values in record during periods of no flow to zero. Installed YSI sonde. Record 4/26/10 09:30 reported "NAN" with no numerical reading. Verified that logger was recording readings correctly before leaving site.	Corrected negative level values to zero. Removed corrected the single "NAN" value to next corresponding level.
5/24/2010	PET_UP	Pet_UP_8941_052410.csv	5/12/10 - 5/24/10	15:15	0.160	0.159	-0.745	0.001	0.159	15:20	0.000	No	--	--	--	--	--	No	Yes	No adjustments. Edited negative values in record during periods of no flow to zero. Installed YSI sonde.	Corrected negative level values to zero.
5/24/2010	PET_DN	Pet_Dn_8939_052410.csv	5/12/10 - 5/24/10	14:44	0.139	0.140	-0.879	-0.001	0.140	14:45	0.000	No	--	--	--	--	--	No	Yes	No adjustments. Edited negative values in record during periods of no flow to zero. Installed YSI sonde.	Corrected negative level values to zero.
6/8/2010	PET_UP	Pet_UP_8941_060810.csv	6/8/2010 - 5/24/10	15:28	0.325	0.326	-0.745	-0.001	0.326	15:30	0.000	Yes	--	0.31	0.31	-0.745	0	No	No	Some algae and silt cleaned from flume. Did not record post Maintenance Time, but no change in levels.	No adjustments to meters, Review of field procedures. Corrected negative level values to zero.
6/8/2010	PET_DN	Pet_Dn_8939_060810.csv	6/8/2010 - 5/24/10	15:45	0.320	0.324	-0.879	-0.004	0.332	15:50	-0.008	Yes	15:49	0.33	0.327	-0.879	0.003	No	Yes	Some algae and silt cleaned from flume. Did not record post Maintenance Time, but no change in levels.	No adjustments to meters, Corrected negative level values to zero.
7/8/2010	PET_DN	Pet_Dn_8939_070810.csv	6/8/2010 - 7/8/10	15:20	Dry	-0.058	-0.879	--	-0.058	15:20	0.000	Yes	--	Flushed	0.002	--	--	0.009	No	Time noted in PDT. Meter reading 0.002 after flushing stilling well -would bring level to zero (-0.058 before flush). Verified probe readings at six levels in stilling well. Adjusted offset by 0.009.	Reviewed field procedures for: time documentation, and record time of post-flush measurement. Offset adjustment to 0.870, less than 0.02; did not revise records with difference of 0.009 feet. Corrected negative level values to zero.
7/20/2010	PET_UP	Pet_UP_8941_072010e.csv	6/8/2010 - 7/20/10	10:28	Dry	0.082	-0.745	--	0.082	10:30	0.000	Yes	10:43	0	0	-0.755	0	-0.005	Yes	Adjusted offset by -0.005 to -0.870 after flushing stilling well. Adjustment less than 0.02, did not adjust records for adjustment.	Offset adjustment less than 0.02, did not adjust records for adjustment. Corrected negative level values to zero.
8/30/2010	PET_UP	Pet_UP_8941_083010e.csv	7/20/10 - 8/30/10	12:13	Dry	-0.134	-0.755	--	-0.134	12:15	0.000	Yes	12:15	0	0.001	-0.0755	-0.001	No	Yes		Corrected negative level values to zero.
8/30/2010	PET_DN	Pet_Dn_8939_08310e.csv	7/8/10 8/30/10	12:25	Dry	-0.137	-0.870	--	-0.139	12:25	0.002	Yes	12:30	0	0.011	-0.87	-0.011	0.011	Yes	Adjusted offset by -0.011 to -0.881 after flushing stilling well. Adjustment less than 0.02, did not adjust records for adjustment.	Corrected negative level values to zero. Adjustment less than 0.02, did not adjust records for change in offset.
9/21/2010	PET_UP	Not Downloaded	--	11:04	Dry	-0.005	--	--	-0.010	11:05	0.005	No	--	--	--	--	--	No	Yes	Site visit only. Meters not downloaded. See visit 9/30/10 for data.	Corrected negative level values to zero.
9/21/2010	PET_DN	Not Downloaded	--	11:09	Dry	-0.019	-0.881	--	-0.020	11:10	0.001	No	--	--	--	--	--	No	Yes	Site visit only. Meters not downloaded. See visit 9/30/10 for data.	Corrected negative level values to zero.
9/30/2010	PET_UP	Pet_UP_8941_93010e.csv	8/30/10 - 9/30/10	9:52	Dry	-0.015	-0.755	--	-0.015	9:55	0.000	Yes	9:57	0	-0.003	-0.755	0.003	No	Yes	Last visit with Campbell Logger as site Pet_Up. No field corrections.	Corrected negative level values to zero.
9/30/2010	PET_DN	Pet_Dn_8939_93010e.csv	8/30/10 - 9/30/10	10:29	Dry	-0.024	-0.881	--	-0.024	10:30	0.000	Yes	10:40	0	0	-0.881	0	No	Yes	Last visit with Campbell Logger as site Pet_DN. No field corrections.	Corrected negative level values to zero.

**Notes:**

**Units:** Tenths of Feet

**Time:** Meters are kept in Pacific Standard Time (PST). Field notes should be recorded in PST. Meter Time should be verified against watch time and maintained within 5 minutes.

**Validation:** Correct measurement of water level in flume verified through comparison of water level or depth in flume to reading recorded in logger. Differences are addressed first by maintenance - ensuring that flume and stilling well port are clear of debris

**Verification:** Field forms are checked for accuracy and downloaded data is compared to field form readings. Corrections are applied to record based on field adjustments. The original or "raw" level readings made by the logger are maintained as part of the record

**Water Levels** in the flume are compared to levels recorded by the meters when first visiting the station and before doing any maintenance checks that might change level (removing debris or flushing the stilling well)

If maintenance activities result in a changed water level the level and meters reading are compared again.

**"Dry" Flume Levels** mean there is no flow in ditch, and no flow or standing water in flume to measure. Water in stilling wells typically has dropped below the zero level in the flume resulting in negative level value:

**Meter Level** is the level seen while communicating with the meter in the field.



Table B-6. Project 276 Flow Data Audit 2010 Water Year

In-Line Ditch BMP Flow Data Audit

Project Site: 276

BMPs Installed: 7/10/09 - 7/11/09

Site Visit Date	Station	Downloaded File Name	File Date Range	Pre-Maintenance Levels								Post-Maintenance Levels							Comments	Corrective Action /Comments /Adjustments to downloaded file	
				Time (PST)	Flume Level	Meter Level	Offset	Flume/ Meter Level Difference	Raw Database Value	Database Time (PST)	Meter/ Database Level Difference	Flushed, Zeroed Stilling Well?	Time (PST)	Flume Level	Meter Level	Offset	Flume/ Meter Level Difference	Offset Adjusted?			Meter Time Verified?
8/31/2009	276_UP	276_UP_8940_083109e.csv	8/10/09 - 8/31/09	13:00	Dry	0.338	0.000	0.338	0.329	13:05	0.009	Yes	--	Dry	0.000	-0.690	--	-0.690	Yes	Station operational since 8/10/09. No offset in logger, flushed and filled stilling well to zero level to create offset.	Corrected record with offset of -0.690. Adjusted all negative level values to zero level in flume.
8/31/2009	276_DN	276_DN_8937_83109e.csv	7/16/09/09 - 8/31/09	13:15	Dry	0.278	0.000	0.278	0.278	13:15	0.000	Yes	14:20	Dry	0.000	-0.831	--	-0.831	Yes	Station operational since 8/10/09. No offset in logger, flushed and filled stilling well to zero level to create offset.	Corrected record with offset of -0.690. Adjusted all negative level values to zero level in flume.
9/8/2009	276_UP	276_UP_8940_090809e.csv	8/10/09 - 9/8/09	13:59	Dry	-0.008	-0.690	--	-0.141	14:00	--	Yes	14:05	--	0.000	0.681	--	-0.689	Yes	Record and field meter reading are not in agreement. Logger level reading was recorded after flushing and topping off stilling well, and no pre-maintenance reading was recorded. Offset was adjusted 0.009 based on topped off stilling well reading of -0.008.	Reviewed field procedures with staff. Corrected negative level values to zero.
9/8/2009	276_DN	276_DN_8937_090809e.csv	8/10/09 - 9/8/09	14:11	Dry	-0.026	-0.831	--	-0.025	14:10	-0.001	Yes	--	--	--	--	--	No	Yes	No adjustments. Noted time but not flume water depth after maintenance.	Adjusted all negative level values to zero level in flume.
9/21/2009	276_UP	276_UP_8940_091909e.csv	9/8/09 - 9/21/09	14:00	--	--	--	--	-0.350	13:15	--	--	--	--	--	--	--	--	Yes	Site visited and meter downloaded. No levels recorded. Notes that flumes were free of debris. Downloaded files given wrong date. Offset not reapplied to logger after download.	Dry during period of record. All data accepted and values below zero corrected to zero level. Reviewed procedures with field staff.
9/21/2009	276_DN	276_DN_8937_091909e.csv	9/8/09 - 9/21/09	14:00	--	--	--	--	-0.354	13:25	--	--	--	--	--	--	--	--	Yes	Site visited and meter downloaded. No levels recorded. Notes that flumes were free of debris. Downloaded files given wrong date. Offset not reapplied to logger after download.	Dry during period of record. All data accepted and below zero values corrected to zero level. Reviewed procedures with field staff.
9/30/2009	276_UP	276_UP_8940_093009e.csv	9/21/09 - 9/30/09	10:37	Dry	0.031	--	--	0.031	10:40	0.000	Yes	10:45	dry	0.003	-0.690	--	-690.000	Yes	Flushed stilling well but reported after maintenance level as "dry" instead of zero. Level appears within 0.003 of flume.	Applied offset to all data and corrected negative values to zero level.
9/30/2009	276_DN	276_DN_8937_093009e.csv	9/21/09 - 9/30/09	11:08	Dry	0.135	--	--	0.134	11:05	--	Yes	11:12	Dry	-0.001	-0.825	--	-0.825	Yes	Flume and meter levels in agreement. Levels are considered valid back to site visit 9/08/09. Flushed stilling well but reported after maintenance level as "dry" instead of zero. Level is within -0.001 of base of flume.	Applied offset to all data and corrected negative values to zero level.
10/19/2009	276_UP	276_UP_8940_101909e.csv	9/30/09 - 10/19/09	--	--	--	--	--	0.058	13:35	--	--	--	--	--	--	--	--	Yes	Site visited and meter downloaded but no levels or other site observations recorded. Offset was maintained in logger.	Applied offset to all data and corrected negative values to zero level. Reviewed procedures with staff that the monitoring program requires having a field verification of water level in the flume.
10/19/2009	276_DN	276_DN_8937_101909e.csv	9/30/09 - 10/19/09	--	--	--	--	--	-0.045	13:45	--	--	--	--	--	--	--	--	Yes	Site visited and meter downloaded but no levels or other site observations recorded. Offset was maintained in logger.	Applied offset to all data and corrected negative values to zero level. Reviewed procedures with staff that the monitoring program requires having a field verification of water level in the flume.
10/26/2009	276_UP	276_UP_8940_102609e.csv	10/19/09 - 10/26/09	13:23	0.440	0.435	-0.690	0.005	0.432	13:20	0.003	No	--	--	--	--	--	--	Yes	Meter and flume agree within 0.005 feet. Level values are considered valid back to visit 9/30/09. Stilling well not flushed but reading ok.	No corrections
10/26/2009	276_DN	276_DN_8937_102609e.csv	10/19/09 - 10/26/09	13:40	0.500	0.470	-0.825	0.030	0.474	13:40	--	No	--	--	0.499	-0.795	--	0.030	Yes	Meter off by 0.03 from flume, offset adjusted by 0.030 to -0.795. Did not note time of offset adjustment. Did not flush stilling well.	Adjusted record by +0.03 for new offset. Reviewed field procedures with staff to flush stilling wells before making offset adjustments and general documentation for time.
11/12/2009	276_UP	276_UP_8940_111209e.csv	10/26/09 - 11/12/09	15:40	0.260	0.251	-0.690	0.009	0.250	15:45	--	Yes	15:46	0.26	0.261	-0.681	-0.001	0.009	Yes	Flushed stilling well. No debris but some algae growing in flume. Offset adjusted by 0.009, less than 0.02. No adjustments to record.	Offset adjusted by 0.009, less than 0.02. No adjustments to record.
11/12/2009	276_DN	276_DN_8937_111209e.csv	10/26/09 - 11/12/09	15:57	0.230	0.236	-0.795	-0.006	0.230	15:55	0.006	Yes	16:00	0.23	0.230	-0.080	0.000	No	Yes	Flushed stilling well. No adjustments.	No corrections
11/19/2009	276_UP	276_UP_8940_111909e.csv	11/12/09 - 11/19/09	11:29	0.480	0.475	-0.681	0.005	0.475	11:30	0.000	Yes	--	--	--	--	--	No	Yes	Cleaned algae from flume. No adjustments	No corrections
11/19/2009	276_DN	276_DN_8937_111909e.csv	11/12/09 - 11/19/09	11:52	0.500	0.497	-0.795	0.003	0.498	11:50	-0.001	No	--	--	--	--	--	No	Yes	Multiple lines used to cross out on form.	changes.
12/1/2009	276_UP	276_UP_8940_120109e.csv	11/19/09 - 12/01/09	14:25	0.270	0.266	-0.681	0.004	0.266	11:55	0.000	No	--	--	--	--	--	No	Yes	No change in reading, no adjustments.	No corrections
12/1/2009	276_DN	276_DN_8937_120109e.csv	11/19/09 - 12/01/09	15:00	0.235	0.237	-0.795	-0.002	0.237	15:00	0.000	No	15:10	0.235	0.237	-0.080	-0.002	No	Yes	No change in reading, no adjustments.	No corrections
12/28/2009	276_UP	276_UP_8940_122809e.csv	12/01/09 - 12/28/09	14:08	0.220	0.200	-0.681	0.020	0.201	14:10	-0.001	No	14:16	0.205	0.204	-0.661	0.001	0.020	Yes	Adjusted offset by 0.020. Additional reading after adjustment: @ 14:33 Flume = 0.195, Meter = 0.198.	Edited Record by +0.02.
12/28/2009	276_DN	276_DN_8937_122809e.csv	12/01/09 - 12/28/09	14:31	--	0.044	-0.795	--	0.052	14:35	-0.008	No	14:34	0.05	0.049	-0.795	0.001	No	Yes	No flow but standing water with heavy leaf litter prevented initial water depth reading in flume -leaves removed.	No corrections
1/14/2010	276_UP	276_UP_8940_011410e.csv	12/28/10 - 1/14/10	15:15	0.365	0.375	-0.661	-0.010	0.373	15:15	0.002	No	--	0.375	0.370	-0.661	0.005	no	Yes	Raining hard. No adjustments	No corrections



**Table B-6. Project 276 Flow Data Audit 2010 Water Year**

**In-Line Ditch BMP Flow Data Audit**

**Project Site: 276**

**BMPs Installed: 7/10/ 09 - 7/11/09**

Site Visit Date	Station	Downloaded File Name	File Date Range	Pre-Maintenance Levels								Post-Maintenance Levels							Comments	Corrective Action /Comments /Adjustments to downloaded file	
				Time (PST)	Flume Level	Meter Level	Offset	Flume/ Meter Level Difference	Raw Database Value	Database Time (PST)	Meter/ Database Level Difference	Flushed, Zeroed Stilling Well?	Time (PST)	Flume Level	Meter Level	Offset	Flume/ Meter Level Difference	Offset Adjusted?			Meter Time Verified?
1/14/2010	276_DN	276_DN_8937_011410e.csv	12/28/10 - 1/14/10	15:46	0.370	1.158	0.000	-0.788	1.030	15:50	0.128	no	15:52	0.37	0.372	-0.790	-0.002	0.005	Yes	Offset not replaced at after last download. Replaced offset adjusted by 0.005 for a difference of -0.790.	Edited Record by -0.790 for missing offset.
2/10/2010	276_UP	276_UP_8940_021010e.csv	1/14/10 - 2/10/10	12:52	0.235	0.234	-0.661	0.001	0.234	12:55	0.000	No	--	--	--	--	--	No	Yes	Site ok, no post maintenance readings. Noted dead possum on BMPs downstream.	No corrections
2/10/2010	276_DN	276_DN_8937_021010e.csv	1/14/10 - 2/10/10	13:12	0.094	0.087	-0.790	0.007	0.087	13:15	0.000	No	--	--	--	--	--	No	Yes	Site ok, no post maintenance readings.	No corrections
3/8/2010	276_UP	276_UP_8940_030810e.csv	2/10/10 - 3/08/10	14:17	0.248	0.243	0.661	0.005	0.244	14:15	-0.001	No	--	--	--	--	--	No	Yes	Site ok, no post maintenance readings.	No corrections
3/8/2010	276_DN	276_DN_8937_030810e.csv	2/10/10 - 3/08/10	14:21	0.200	0.191	-0.790	0.009	0.189	14:20	0.002	Yes	14:26	0.21	0.210	-0.776	0.000	0.014	Yes	Adjusted offset by 0.014	Edited Record by 0.014 for updated offset.
3/24/2010	276_UP	276_UP_8940_032410e.csv	3/8/10 - 3/24/10	9:55	0.205	0.853	0.000	-0.648	0.854	9:55	-0.001	Yes	11:04	0.2	0.180	0.655	0.020	0.655	Yes	Offset not replaced at after last download. Replacement offset of 0.655 is too low.	Edited record using previous offset of 0.661. Offset will require an adjustment next site visit.
3/24/2010	276_DN	276_DN_8937_030810e.csv	3/8/10 - 3/24/10	10:50	0.110	0.121	-0.776	-0.011	0.122	10:50	-0.001	no	11:00	0.11	0.109	-0.786	0.001	0.010	Yes	Offset adjusted by 0.010	Edited record by 0.014 for updated offset.
4/30/2010	276_UP	276_UP_8940_043010e.csv	3/24/10 - 4/30/10	10:34	0.240	0.220	-0.655	0.020	0.220	10:35	0.000	No	10:41	0.24	0.241	-0.630	-0.001	-0.025	Yes	Offset adjusted by 0.025 to -630	Edited record by 0.02 for updated offset.
4/30/2010	276_DN	276_DN_8937_043010e.csv	3/24/10 - 4/30/10	10:51	0.210	0.210	-0.786	0.000	0.210	10:50	0.000	No	10:55	0.21	0.210	-0.786	0.000	No	Yes	Cleaned light algae on flume. No adjustments	No corrections
5/18/2010	276_UP	276_UP_8940_051810e.csv	4/30/10 - 5/18/10	12:50	0.148	0.148	-0.630	0.000	0.147	12:50	0.001	Yes	12:55	0.15	0.154	-0.630	-0.004	No	Yes	No adjustments.	No corrections
5/18/2010	276_DN	276_DN_8937_051810e.csv	4/30/10 - 5/18/10	13:12	Dry	-0.001	-0.786	--	-0.001	13:10	0.000	Yes	13:18	dry	0.001	-0.786	--	No	Yes	No adjustments.	No corrections
6/9/2010	276_UP	276_UP_8940_060910e.csv	5/18/10 - 6/09/10	13:16	0.570	0.574	-0.634	-0.004	0.574	13:15	0.000	Yes	13:27	0.56	0.562	-0.634	-0.002	No	Yes	No adjustments.	No corrections
6/9/2010	276_DN	276_DN_8937_060910e.csv	5/18/10 - 6/09/10	13:41	0.600	0.572	-0.786	0.028	0.576	13:35	-0.004	Yes	13:41	0.585	0.587	-0.766	-0.002	-0.020	Yes	Offset adjusted by 0.02	Edited record by 0.02 for updated offset.
7/8/2010	276_UP	276_UP_8940_070810e.csv	6/9/10 - 7/8/10	13:45	Dry	-0.009	-0.634	--	-0.009	13:35	0.000	Yes	--	--	--	--	--	-0.006	--	Offset adjusted by -0.006 to -0.640. Time recorded in PDT. No post adjustment reading. No watch time/logger time comparison.	Corrected negative level values to zero.
7/8/2010	276_DN	276_DN_8937_070810e.csv	6/9/10 - 7/8/10	14:23	Dry	0.017	-0.766	--	-0.007	14:20	0.024	Yes	--	--	--	--	--	-0.013	--	Offset adjusted by -0.013 to -0.0.779. No post adjustment reading. Time noted in PDT. No watch time/logger time comparison.	Reviewed field documentation. Corrected negative level values to zero.
8/30/2010	276_UP	276_UP_8940_083010e.csv	7/8/10 - 8/30/10	13:20	Dry	-0.017	-0.640	--	-0.017	13:20	0.000	Yes	13:23	0	-0.001	-0.640	0.001	No	Yes	No adjustments.	Corrected negative level values to zero.
8/30/2010	276_DN	276_DN_8937_083010e.csv	7/8/10 - 8/30/10	13:33	Dry	-0.401	-0.640	--	-0.401	13:30	0.000	Yes	13:39	0	0.022	0.801	-0.022	-0.022	Yes	Adjusted offset by -0.022 from -0.779 to -0.801 based on flushing stilling well then topping off to zero level. All data in this record is already less than zero, no additional adjustments necessary to dataset.	Corrected negative level values to zero.
9/30/2010	276_UP	276_UP_8940_093010e.csv	8/30/10 - 9/30/10	11:18	0.075	0.067	-0.640	0.008	0.068	11:20	-0.001	No	--	--	--	--	--	No	Yes	Time noted in PST. No post maintenance readings.	Corrected negative level values to zero.
9/30/2010	276_DN	276_DN_8937_093010e.csv	8/30/10 - 9/30/10	11:26	Dry	-0.010	-0.801	--	-0.010	11:25	0.000	Yes	11:28	0	-0.005	-8.010	0.005	No	Yes	Time noted in PST.	Corrected negative level values to zero.

**Notes:**

**Units:** Tenths of Feet

**Time:** Meters are kept in Pacific Standard Time (PST). Field notes should be recorded in PST. Meter Time should be verified against watch time and maintained within 5 minutes.

**Validation:** Correct measurement of water level in flume verified through comparison of water level or depth in flume to reading recorded in logger. Differences are addressed first by maintenance - ensuring that flume and stilling well port are clear of debris

**Verification:** Field forms are checked for accuracy and downloaded data is compared to field form readings. Corrections are applied to record based on field adjustments. The original or "raw" level readings made by the logger are maintained as part of the record

**Water Levels** in the flume are compared to levels recorded by the meters when first visiting the station and before doing any maintenance checks that might change level (removing debris or flushing the stilling well)

If maintenance activities result in a changed water level the level and meters reading are compared again.

**"Dry" Flume Levels** mean there is no flow in ditch, and no flow or standing water in flume to measure. Water in stilling wells typically has dropped below the zero level in the flume resulting in negative level values

**Meter Level** is the level seen while communicating with the meter in the field.



Table B-7. Project 276DN Flow Data Audit for 2011 Water Year

In-Line Ditch BMP Flow Data Audit

Project Site: 276

Additional BMPs Installed: 12/15/2010 - 12/16/2010

Pre-Maintenance Levels

Post-Maintenance Levels

Site Visit Date	Project Site ID	Downloaded File Name	File Date Range	Time (PST)	Flume Level	Meter Level	Offset	Flume/Meter Difference	Raw Database Value	Database Time	Meter/Database Difference	Flushed, Zeroed, Stilling Well?	Time (PST)	Flume Level	Meter Level	Offset	Flume/Meter Difference	Offset Adjusted?	Meter Time Verified?	Comments	Corrective Action /Comments /Adjustments to downloaded file
10/12/2010	276_UP	276_UP_8940_101210e.csv	9/30/2010 - 10/12/10	8:30	0.170	0.164	-0.640	0.006	0.163	8:30	0.001	No	8:36	0.17	0.163	-0.640	0.007	No	Yes	No issues	Corrected negative level values to zero.
10/12/2010	276_DN	276_DN_8937_101210e.csv	9/30/2010 - 10/12/2010	8:17	0.080	0.058	-0.801	0.022	0.057	8:20	0.001	No	8:21	0.075	0.078	-0.779	-0.003	0.022	Yes	Corrected offset by 0.022, applied correction to data. Adjusted negative level values to zero.	Applied 0.022 correction to data. Adjusted negative level values to zero.
11/10/2010	276_UP	276_UP_8940_111010e.csv	10/12/11 - 11/10/10	12:34	0.240	0.235	-0.640	0.005	0.238	12:40	-0.003	Yes	12:40	0.25	0.236	-0.640	0.014	0.014	Yes	Adjusted offset by 0.014 ft. to -0.626	No adjustments to record.
11/10/2010	276_DN	276_DN_8937_111010e.csv	10/12/11 - 11/10/10	12:14	0.190	0.196	-0.779	-0.006	0.195	12:15	0.001	Yes	12:18	0.195	0.195	-0.779	0.000	No	yes	Removed some leaves at upper end of flume.	No adjustments to record.
11/10/2010	276_DN2	Installed at 276_DN2	installed 11/10/11	11:45	0.210	0.693	--	-0.483	--	11:56	--	Yes	11:56	0.21	0.210	-0.499	0.000	-0.499	Yes	Installed meter downstream of site for 2011 Flow Control BMP study at 276th. BMPs not yet in place.	Meter started - no data yet.
12/10/2010	276_UP	276_UP_8940_121010e.csv	11/10/10 - 12/10/10	12:16	0.380	0.375	-0.626	0.005	0.367	12:25	0.008	Yes	12:26	0.375	0.371	-0.613	0.004	-0.013	Yes	Adjusted offset by 0.013 to -0.613 feet.	No adjustments to record.
12/10/2010	276_DN	276_DN_8937_121010.csv	11/10/10 - 12/10/10	12:36	0.370	0.364	-0.779	0.006	0.367	12:40	-0.003	Yes	12:41	0.375	0.372	-0.768	0.003	-0.011	Yes	Adjusted offset by 0.011 to -0.768 feet.	No adjustments to record.
12/10/2010	276_DN2	276_DN2_8941_121010.csv	11/10/11 - 12/10/11	12:51	0.390	0.378	-0.499	0.012	0.378	12:55	0.000	Yes	12:57	0.385	0.385	-0.488	0.000	-0.011	Yes	Baseline Flow Monitoring; no BMPs in place yet. Adjusted offset by 0.011 ft. to -0.488. Checked Flume with carpenters level-OK	No adjustments to record.
12/16/2010	276_UP	276_UP_8940_121610e.csv	12/10/10 - 12/16/10	10:02	0.420	0.433	-0.613	-0.013	0.433	10:00	0.000	No	--	--	--	--	--	No	--	Time on field form is one hour off from meter time-suspect field form is off due to order of monitoring at the site. No post-maintenance readings. No adjustment to offset. Flume and meter off by 0.013 feet.	No adjustments to record.
12/16/2010	276_DN	276_DN_8937_121610e.csv	12/10/10 - 12/16/10	9:47	0.430	0.434	-0.768	-0.004	0.434	9:45	0.000	No	--	--	--	--	--	No	Yes	No post-maintenance readings. No adjustment to offset. Flume and meter off by 0.004 feet.	No adjustments to record.
12/16/2010	276_DN2	276_DN2_8941_121610.csv	12/10/10 - 12/16/10	9:19	0.085	0.095	-0.488	-0.010	0.088	9:20	0.007	No	9:28	0.12	0.135	-0.496	-0.015	0.008	Yes	Installing 2011 BMPs below 276th Downstream Station and above this flume. Adjusted offset by 0.008 to -0.496.	No adjustments to record.
1/20/2011	276_UP	276_UP_8940_012011e.csv	12/16/10 - 01/20/11	12:15	0.310	0.329	-0.613	-0.019	0.333	12:20	-0.004	Yes	12:25	0.31	0.308	-0.632	0.002	0.019	Yes	Adjusted offset by 0.019 to -0.632	Offset adjustment <0.2; No adjustments to record.
1/20/2011	276_DN	276_DN_8937_012011e.csv	12/16/10 - 01/20/11	12:35	0.300	0.304	-0.760	-0.004	0.305	12:35	-0.001	Yes	12:37	0.3	0.305	-0.768	-0.005	No	Yes	No adjustments	No adjustments to record.
1/20/2011	276_DN2	276_DN2_8941_012011.csv	12/16/10 - 01/20/11	12:50	0.310	0.317	-0.496	-0.007	0.317	12:50	0.000	Yes	13:25	0.31	0.310	-0.498	0.000	0.002	Yes	Adjusted offset by -0.002 to -0.498	1/20/11 - logger recording without offset from 12:50 - 13:20; adjust for offset of -0.498 during this time period.
2/28/2011	276_UP	276_UP_8940_022811e.csv	1/20/11 - 2/28/11	13:09	0.445	0.446	-0.632	-0.001	0.445	13:10	0.001	Yes	13:15	0.445	0.446	-0.632	-0.001	No	Yes	No adjustments	No adjustments to record.
2/28/2011	276_DN	276_DN_8937_022811e.csv	1/20/11 - 2/28/11	13:26	0.470	0.468	-0.768	0.002	0.467	13:25	0.001	Yes	13:31	0.47	0.468	-0.768	0.002	No	Yes	No adjustments	No adjustments to record.
2/28/2011	276_DN2	276_DN2_8941_022811.csv	1/20/11 - 2/28/11	13:39	0.480	0.477	-0.498	0.003	0.478	13:40	-0.001	Yes	13:42	0.48	0.473	-0.498	0.007	No	Yes	No adjustments	No adjustments to record.
3/13/2011	276_UP	276_UP_8940_031511e.csv	2/28/11 - 3/15/11	11:40	0.330	0.335	-0.632	-0.005	0.334	11:40	0.001	Yes	11:58	0.33	0.335	-0.632	-0.005	No	Yes	No adjustments	No adjustments to record.
3/13/2011	276_DN	276_DN_8937_031511e.csv	2/28/11 - 3/15/11	11:24	0.340	0.350	-0.768	-0.010	0.351	11:25	-0.001	Yes	11:28	0.35	0.350	-0.768	0.000	No	Yes	No adjustments; meter value corrected after flushing stilling well.	No adjustments to record.
3/13/2011	276_DN2	276_DN2_8941_031511.csv	2/28/11 - 3/15/11	10:59	0.350	0.356	-0.491	-0.006	0.356	11:00	0.000	Yes	11:12	0.35	0.357	-0.491	-0.007	No	Yes	No adjustments	No adjustments to record.
4/12/2011	276_UP	276_UP_8940_041211e.csv	3/15/11 - 4/12/11	13:05	0.280	0.286	-0.632	-0.006	0.289	13:05	-0.003	Yes	13:10	0.28	0.269	-0.632	0.011	No	Yes	No adjustments - third reading: flume =0.265, meter = 0.267	No adjustments to record.
4/12/2011	276_DN	276_DN_8937_041211e.csv	3/15/11 - 4/12/11	13:47	0.275	0.284	-0.768	-0.009	0.286	13:40	-0.002	Yes	13:50	0.28	0.279	-0.768	0.001	No	Yes	No adjustments - third reading: flume =0.270, meter = 0.273	
4/12/2011	276_DN2	276_DN2_8941_041211.csv	3/15/11 - 4/12/11	14:23	0.270	0.272	-0.491	-0.002	0.273	14:15	-0.001	Yes	14:33	0.27	0.27	-0.487	0.000	No	Yes	No adjustments-offset not recorded at start of visit, and lost when changing batteries. Calculated new offset of -0.487.	
5/4/2011	276_UP	276_UP_8940_050411e.csv	04/12/11 - 05/04/11	9:48	0.260	0.266	-0.632	-0.006	0.267	9:50	-0.001	Yes	9:55	0.26	0.263	-0.632	-0.003	No	Yes	No adjustments	
5/4/2011	276_DN	276_DN_8937_050411e.csv	04/12/11 - 05/04/11	10:15	0.260	0.272	-0.768	-0.012	0.272	10:10	0.000	Yes	10:16	0.265	0.274	-0.768	-0.009	No	Yes	No adjustments	
5/4/2011	276_DN2	276_DN2_8941_050411e.csv	04/12/11 - 05/04/11	10:34	0.260	0.746	0	-0.486	0.262	10:30	0.484	Yes	10:57	0.26	0.26	-0.486	0.000	0.005	Yes	Logger Offset not recorded before downloading data. Data download and viewing in field apparently deletes the offset-all data appears to have the correct offset except for the last recorded value. Flume and logger levels were compared and verified before finishing with site and a new offset of -0.486 was entered. New offset is 0.005 different from previous offset.	
5/19/2011	276_UP	276_UP_8940_041211e.csv	05/04/11 - 05/19/11	12:56	0.220	0.228	-0.632	-0.008	0.227	13:00	0.001	Yes	13:00	0.23	0.227	-0.632	0.003	No	Yes	No adjustments	
5/19/2011	276_DN	276_DN_8937_041211e.csv	05/04/11 - 05/19/11	13:10	0.220	0.224	-0.786	-0.004	0.225	13:05	-0.001	Yes	13:13	0.22	0.224	-0.768	-0.004	No	Yes	No adjustments	
5/19/2011	276_DN2	276_DN2_8941_041211e.csv	05/04/11 - 05/19/11	13:21	0.210	0.209	-0.486	0.001	0.209	13:20	0.000	Yes	13:23	0.21	0.206	-0.486	0.004	No	Yes	5/4/11 10:40 to 11:10 - corrected with new offset of -0.480.	
6/9/2011	276_UP	276_UP_8940_060911e.csv	05/19/11 - 06/09/11	10:41	0.230	0.229	-0.632	0.001	0.229	10:40	0.000	Yes	10:55	0.23	0.229	-0.632	0.001	No	Yes	No adjustments	
6/9/2011	276_DN	276_DN_8937_060911e.csv	05/19/11 - 06/09/11	10:57	0.210	0.214	-0.768	-0.004	0.214	11:00	0.000	Yes	11:59	0.21	0.215	-0.768	-0.005	No	Yes	No adjustments	
6/9/2011	276_DN2	276_DN2_8941_060911e.csv	05/19/11 - 06/09/11	11:07	0.205	0.199	-0.486	0.006	0.199	11:05	0.000	Yes	11:59	0.21	0.215	-0.768	-0.005	0.005	Yes	No adjustments	
6/21/2011	276_UP	276_UP_8940_062111e.csv	06/09/11 - 0 6/21/11	13:26	0.160	0.162	-0.632	-0.002	0.162	13:30	0.000	Yes	13:31	0.16	0.162	-0.632	-0.002	No	Yes	No adjustments	



**Table B-7. Project 276DN Flow Data Audit for 2011 Water Year**

**In-Line Ditch BMP Flow Data Audit**

**Project Site: 276**

**Additional BMPs Installed: 12/15/2010 - 12/16/2010**

**Pre-Maintenance Levels**

**Post-Maintenance Levels**

Site Visit Date	Project Site ID	Downloaded File Name	File Date Range	Time (PST)	Flume Level	Meter Level	Offset	Flume/ Meter Difference	Raw Database Value	Database Time	Meter/ Database Difference	Flushed, Zeroed Stilling Well?	Time (PST)	Flume Level	Meter Level	Offset	Flume/ Meter Difference	Offset Adjusted?	Meter Time Verified?	Comments	Corrective Action /Comments /Adjustments to downloaded file
6/21/2011	276_DN	276_DN_8937_062111e.csv	06/09/11 - 0 6/21/11	13:48	0.120	0.127	-0.768	-0.007	0.127	13:40	0.000	Yes	13:41	0.12	0.125	-0.768	-0.005	No	Yes	No adjustments	
6/21/2011	276_DN2	276_DN2_8941_062111e.csv	06/09/11 - 0 6/21/11	13:49	0.100	0.098	-0.48	0.002	0.099	13:50	-0.001	Yes	13:53	0.1	0.096	-0.480	0.004	No	Yes	No adjustments	
7/28/2011	276_UP	276_UP_8940_062811e.csv	06/21/11 - 07/28/11	11:04	Dry	0.001	-0.632	--	0.001	11:05	0.000	Yes	11:04	0	0.002	-0.632	-0.002	No	Yes	No adjustments	
7/28/2011	276_DN	276_DN_8937_062811e.csv	06/21/11 - 07/28/11	11:19	Dry	-0.189	-0.768	--	-0.189	11:20	0.000	Yes	11:27	0	0.023	-0.768	-0.023	0.02	Yes	Ajusted offset by 0.02 from -0.768 to -0.788. Correction comes after a long period when flume was dry; decided not to ajust record.	
7/28/2011	276_DN2	276_DN2_8941_062811e.csv	06/21/11 - 07/28/11	11:33	Dry	-0.021	-0.48	--	-0.017	11:35	-0.004	Yes	11:38	0	-0.004	-0.480	0.004	No	Yes	No adjustments	
7/28/2011	276_UP	276_UP_8940_092911e.csv	07/28/11 - 09/29/11	9:29	Dry	0.001	-0.632	--	0.001	9:30	0.000	Yes	10:32	0	0.001	-0.632	-0.001	No	Yes	Ajusted negetive level values to zero.	
7/28/2011	276_DN	276_DN_8937_092911e.csv	07/28/11 - 09/29/11	9:36	Dry	-0.010	-0.788	--	-0.010	9:35	0.000	Yes	10:39	0	0.011	-0.768	-0.011	No	Yes	Ajusted negetive level values to zero.	
7/28/2011	276_DN2	276_DN2_8941_092911e.csv	07/28/11 - 09/29/11	9:44	Dry	-0.016	-0.48	--	-0.016	9:40	0.000	Yes	10:47	0	-0.007	-0.480	0.007	No	Yes	Ajusted negetive level values to zero.	

**Notes:**

**Units:** Tenths of Feet

**Time:** Meters are kept in Pacific Standard Time (PST). Field notes should be recorded in PST. Meter Time should be verified against watch time and maintained within 5 minutes.

**Validation:** Correct measurement of water level in flume verified through comparison of water level or depth in flume to reading recorded in logger. Differences are addressed first by maintenance - ensuring that flume and stilling well port are clear of debris

**Verification:** Field forms are checked for accuracy and downloaded data is compared to field form readings. Corrections are applied to record based on field adjustments. The original or "raw" level readings made by the logger are maintained as part of the record

**Water Levels** in the flume are compared to levels recorded by the meters when first visiting the station and before doing any maintenance checks that might change level (removing debris or flushing the stilling well)

If maintenance activities result in a changed water level the level and meters reading are compared again.

**"Dry" Flume Levels** mean there is no flow in ditch, and no flow or standing water in flume to measure. Water in stilling wells typically has dropped below the zero level in the flume resulting in negative level value:

**Meter Level** is the level seen while communicating with the meter in the field.



**Table B-8. Project 192DN Flow Data Audit for 2011 Water Year**

**In-Line Ditch BMP Flow Data Audit**

**Project Site: 192DN \***

**Additional BMPs Installed: 9/27/10**

Site Visit Date	Project Site ID	Downloaded File Name	File Date Range	Time (PST)	Pre-Maintenance Levels							Post-Maintenance Levels							Comments	Corrective Action /Comments /Adjustments to downloaded file	
					Flume Level	Meter Level	Offset	Flume/ Meter Difference	Raw Database Value	Database Time	Meter/ Database Difference	Flushed, Zeroed Stilling Well?	Time (PST)	Flume Level	Meter Level	Offset	Flume/ Meter Difference	Offset Adjusted?			Meter Time Verified?
10/11/2010	192_DN	192_DN_8939_101110e.csv	9/30/10 - 10/11/10	13:47	0	0.883	0.000	-0.883	0.884	13:45	-0.001	Yes	13:52	0	0	-0.883	0	-0.883	Yes	No offset in logger. Added offset of -0.883	Corrected dataset with offset of -0.883. Corrected Neg. level values to zero level.
10/25/2010	192_DN	192_DN_8939_102510e.csv	10/11/10 - 10/25/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	File downloaded but no field notes collected.	Staff review - downloads must be accompanied by field notes! Corrected Neg. level values to zero level.
11/4/2010	192_DN		10/25/10 - 11/4/10																	Missing data from 10/25/11 to 11/4/11	Missing Dataset?
11/17/2010	192_DN	(Not Downloaded)	--	10:43	0.38	--	--	--	0.382	--	--	--	--	--	--	--	--	--	--	Mid-storm site visit only. Flume and database in agreement.	
11/29/2010	192_DN	192_DN_8939_112910e.csv	11/4/10 - 11/29/10	14:58	0.29	0.286	-0.877	0.004	0.287	14:55	-0.001	Yes	14:58	0.28	0.278	0.870	0.002	0.007	yes	Ajusted offset by 0.007 ft.	No adjustment to record
12/10/2010	192_DN	192_DN_8939_121010e.csv	11/29/10 - 12/10/10	13:39	0.62	0.607	-0.870	0.013	0.608	13:40	-0.001	Yes	13:45	0.62	0.617	0.860	0.003	0.01	Yes	Ajusted offset by 0.01 ft.	No adjustment to record. Checked flume with carpenters level - ok.
12/13/2010	192_DN	192_DN_8939_121310e.csv	12/10/10 - 12/13/10	12:14	0.89	0.876	-0.860	0.014	0.876	12:15	0	Yes	12:16	0.88	0.854	-0.860	0.026	No	Yes	Flume/meter difference >0.2. Visit was during high-flow conditions with flume flowing 80% full. Offset not adjusted.	Flume overtopped during storm. No corrections made to dataset.
1/20/2011	192_DN	192_DN_8939_121310e.csv	12/10/11 - 01/20/11	13:59	0.41	0.421	-0.860	-0.011	0.421	14:00	0	Yes	14:07	0.41	0.411	-0.870	-0.001	0.01	Yes	Ajusted offset by -0.01 from -0.086 to -0.087	No adjustment to record.
2/3/2011	192_DN	192_DN_8939_010211e.csv	01/20/11 - 02/03/11	12:06	0.27	0.283	0.870	-0.013	0.282	12:00	0.001	Yes	12:15	0.28	0.278	-0.878	0.002	0.008	Yes	Ajusted offset by 0.008 ft	No adjustment to record.
2/28/2011	192_DN	192_DN_8939_022811e.csv	02/03/11 - 02/28/11	14:24	0.58	0.56	-0.878	0.02	0.56	14:25	0	Yes	14:32	0.56	0.561	-0.858	-0.001	-0.020	Yes	Water level dropping. Ajusted offset by -0.02	No adjustment to record.
3/7/2011	192_DN	192_DN_8939_030711e.csv	02/28/11 - 3/07/11	13:35	0.33	0.343	-0.858	-0.013	0.344	13:35	-0.001	Yes	13:42	0.33	0.33	-0.872	0	0.014	No	Ajusted offset by -0.014	No adjustment to record.
3/15/2011	192_DN	192_DN_8939_031511e.csv	03/07/11 - 03/15/11	12:55	0.55	0.545	-0.872	0.005	0.546		-0.001	Yes		0.55	0.547	-0.872	0.003	No	Yes	No adjustments. Time not noted on post-flush readings	No adjustment to record.
3/31/2011	192_DN	192_DN_8939_033111e.csv	03/15/11 - 03/31/11	14:15	0.59	0.588	-0.872	0.002	0.587	14:15	0.001	Yes	14:25	0.59	0.559	-0.872	0.031	No	Yes	Post - maintenance level does not make sense compared to pre-maintenance level. Post maint. Level may have been recorded incorrectly, and should be a logger level of 0.59 instead of 0.559. Will look at next site visit to evaluate.	No adjustment to record.
4/11/2011	192_DN	192_DN_8939_041111e.csv	03/31/11 - 04/11/11	11:24	0.4	0.391	-0.872	0.009	0.392	11:37	-0.001	Yes	11:37	0.38	0.375	0.372	0.005	-0.002	Yes	Ajusted offset by 0.002 to 0.870. Database value at 0.586 at 14:35 verifies that the post maintenance meter level was recorded in error on 3/31/11 and no adjustment is required.	No adjustment to record.
5/4/2011	192_DN	192_DN_8939_050411e.csv	04/11/11 - 05/04/11	11:38	0.28	0.278	-0.870	0.002	0.282	11:45	-0.004	Yes	11:44	0.28	0.275	-0.870	0.005	No	Yes	No adjustments.	No adjustment to record.
5/24/2011	192_DN	192_DN_8939_052411e.csv	05/04/11 - 05/24/11	13:31	0.13	0.132	-0.870	-0.002	0.132	13:35	0	Yes		0.125	0.128	-0.870	-0.003	No	Yes	No adjustments. Post flush reading within 5 minutes of pre-flush reading.	No adjustment to record.
6/9/2011	192_DN	192_DN_8939_060911e.csv	05/24/11 - 06/09/11	11:46	0	0.012	-0.870	-0.012	0.013	11:50	-0.001	Yes	11:47	0	0.012	-0.870	-0.012	No	Yes	No adjustments.	
8/4/2011	192_DN	192_DN_8939_080411e.csv	06/09/11 - 08/04/11	14:18	Dry	-0.116	-0.870	--			-0.116	Yes	14:18	0	0.006	-0.870	-0.006	0.009	Yes	Meter flume difference only 0.006, but ajusted offset to -0.879 at 15:30 - brought meter reading to -0.001.	Ajusted negative values to zero flow.
9/8/2011	192_DN	192_DN_8939_090811e.csv	08/04/11 - 09/08/11	14:22	Dry	-0.15	-0.879	--			-0.15	Yes	14:22	0	0.007	-0.879	-0.007	no	Yes	No corrections	Ajusted negative level values to zero.
9/29/2011	192_DN	192_DN_8939_092911e.csv	09/08/11 - 09/29/11	9:04	Dry	-0.02	-0.879	--	-0.006	9:00	-0.014	Yes	9:06	0	-0.002	-0.879	0.002	No	Yes	No corrections	Ajusted negative level values to zero.

**Notes:**

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**Time:** Meters are kept in Pacific Standard Time (PST). Field notes should be recorded in PST. Meter Time should be verified against watch time and maintained within 5 minutes.

**Validation:** Correct measurement of water level in flume verified through comparison of water level or depth in flume to reading recorded in logger. Differences are addressed first by maintenance - ensuring that flume and stilling well port are clear of debris

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If maintenance activities result in a changed water level the level and meters reading are compared again.

**"Dry" Flume Levels** mean there is no flow in ditch, and no flow or standing water in flume to measure. Water in stilling wells typically has dropped below the zero level in the flume resulting in negative level values

**Meter Level** is the level seen while communicating with the meter in the field.

\* 192\_UP and 192\_M data is summarized in Table B-3 for Water Quality BMP data review.

