

ACF Environmental
2831 Cardwell Road
Richmond, VA 23234



June 21, 2016

Robert E. Cooper
Office of Stormwater Management
Virginia Department of Environmental Quality
629 East Main Street
Richmond, VA 23218

SUBJECT: FocalPoint Biofiltration System
Supplemental Water Quality Samples

Dear Mr. Cooper:

As discussed in our teleconference meeting (June 21, 2016, 9:30 AM EST), please find included below event mean concentration data for all qualified storms collected from the FocalPoint biofiltration system undergoing field testing at the Campbell's Run Road facility in Pittsburgh, PA.

The original data set consisting of 12 qualified storms (collected from July to Dec of 2015) served as the basis of our original submittal and have been updated based on laboratory analytical results with minimum detection values at the Method Detection Limit (MDL) for Total Phosphorus. Based on the laboratory data sets, there were several influent and effluent concentrations detected between the Reported Detection Limit (RDL) and MDL. This is consistent with TAPE protocol guidelines for reporting limits and analytical methods for Total Phosphorus and has applied to other filtering technologies listed on the VA Stormwater BMP Clearinghouse.

Rainfall characteristics and event mean concentration data are presented in Tables 1 and 2 and demonstrate the ability of the system to reduce TP concentrations by at least 50% per your calculation method defined in our teleconference (i.e., calculate the mean % removal efficiency across all storms with reportable event mean concentrations).

Table 1: Rainfall Characteristics

Event	Total Rainfall Depth (inches)	Duration (hours)	Max Precipitation Intensity (in/hr)
1	0.66	20.22	1.8
2	0.57	19.15	0.6
3	4.03	19.35	2.4
4	0.41	1.78	3.0
5	0.46	11.08	0.6
6	1.95	21.75	2.4
7	0.30	8.08	1.2
8	0.89	14.33	0.6
9	0.21	9.63	0.6
10	0.56	11.23	0.6
11	0.34	7.88	0.6
12	0.36	16.82	0.6
13	0.74	11.37	0.6
14	0.19	5.25	0.6
15	0.22	1.95	1.2
16	0.30	3.52	0.6
17	0.37	13.7	0.6
18	0.25	3.42	0.76
19	0.37	6.42	0.6
20	0.42	7.88	0.6

Table 2: Data from Interim Technical Evaluation Report and Supplemental Monitoring Results – FocalPoint System Phosphorus Treatment

Event	Influent EMC ⁽¹⁾ (mg/L)	Effluent EMC ⁽¹⁾ (mg/L)	Discrete Removal Efficiency ⁽²⁾ (%)
1	0.0874	0.0623	28.72
2	0.121	0.0978	19.17
3	0.0722	0.0692	4.16
4	0.253	0.11	56.52
5	0.0606	0.0574	5.28
6	0.0397	0.0404	-1.76
7	0.16	0.125	21.88
8	0.0728	0.0459	36.95
9	0.424	0.0983	76.82
10	0.181	0.0673	62.82
11	0.184	0.0693	62.34
12	0.172	0.0792	53.95
13	0.0501	0.0562	-0.12
14	2.04	0.114	94.44
15	0.88	0.0997	88.67
16	0.631	0.154	75.59
17	0.536	0.155	71.08
18	1.56	0.096	93.85
19	1.74	0.12	93.1
20	1.50	0.123	91.8
Mean RE% (n=20)			51.1
(1) Flow-weighted composite sampling of Event Mean Concentration (EMC)			
(2) [(Influent EMC– Effluent EMC)/(Influent EMC)]X100			

Sincerely,



W. Scott Gorneau, P.E.
ACF Environmental

Cc: Corey Simonpietri, Director of Stormwater Solutions, ACF

Attached – Appendix A – 3rd party, CEC Individual Storm Reports

142-879
FocalPoint Interim Report
Appendix A
Individual Storm Reports

General information			
Monitoring site name	Campbells Run	Campbells Run	Campbells Run
Site location (UTM or latitude/longitude)	40.425999°, -80.114740°	40.425999°, -80.114740°	40.425999°, -80.114740°
Drainage area			
Storm information	See below	See below	See below
Storm name or number	1	2	3
Storm name or number	Event 1	Event 2	Event 3
Storm event date	09/12/15 - 09/13/15	09/27/15 - 09/28/15	09/29/15 - 09/30/15
Start	9/12/15 3:52 AM	9/27/15 8:04 PM	9/29/15 9:42 AM
End	9/13/15 12:05 AM	9/28/15 3:13 PM	9/30/15 5:03 AM
Antecedent dry period conditions (days)	1.60	7.97	0.77
Total precipitation depth (inches) from warehouse gage	0.66	0.57	4.03
Total precipitation depth (inches) from office gage	--	--	--
Precipitation duration (hours)	20.22	19.15	19.35
Mean precipitation intensity (inches per hour)	0.033	0.030	0.208
Maximum precipitation intensity (inches per hour)	1.80	0.60	2.40
Hydrologic information			
Influent peak flow rate (gpm)	127.52	26.65	193.45
Effluent peak flow rate (gpm)	72.35	18.36	2051.74
Average influent flow rate (gpm)	1.88	1.54	25.29
Average effluent flow rate (gpm)	0.91	0.78	84.40
Bypass peak flow rate (gpm)	0	0	tbd
Max Ponding Depth above Mulch (feet)	0.291	0.070	1.034
Total influent runoff volume (gallons)	2278.83	1771.83	30225.45
Total effluent runoff volume (gallons)	1100.38	898.08	100857.74
Total bypass runoff volume (gallons)	0	0	tbd
Data flags for identified QA issues			
Pollutant information			
Number of influent aliquots	6	4	93
Number of effluent aliquots	6	5	146
Percent of storm sampled			
Influent Total Volume (gal) during sampling period	1797.17	1298.29	30106.94
Influent Total Volume (gal) during rain event	2278.83	1771.83	30225.45
Percent of Influent Volume	79%	73%	100%
Effluent Total Volume (gal) during sampling period	816.46	651.67	100660.30
Effluent Total Volume (gal) during rain event	1100.38	898.08	100857.74
Percent of Effluent Volume	74%	73%	100%
Parameters monitored			
Parameter 1	Suspended Solids	Suspended Solids	Suspended Solids
Parameter 2	Nitrate	Nitrate	Nitrate
Parameter 3	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN
Parameter 4	Phosphorus, Total	Phosphorus, Total	Phosphorus, Total
Parameter 5	Copper	Copper	Copper
Parameter 6	Lead	Lead	Lead
Parameter 7	Zinc	Zinc	Zinc
First Flush Event Mean Concentrations			
Suspended Solids	--	--	--
Nitrate	--	--	--
Kjeldahl Nitrogen, TKN	--	--	--
Phosphorus, Total	--	--	--
Copper	--	--	--
Lead	--	--	--
Zinc	--	--	--
Influent Event Mean Concentrations			
Suspended Solids	46.8	48	26.6
Nitrate	0.219	0.126	0.0485
Kjeldahl Nitrogen, TKN	< 0.0350	0.5	0.181
Phosphorus, Total	0.0874	0.121	0.0722
Copper	0.015	0.0111	< 0.00530
Lead	0.00324	< 0.00190	< 0.00190
Zinc	0.123	0.37	0.0311
Effluent Event Mean Concentrations			
Suspended Solids	23.8	16.6	2.54
Nitrate	0.259	0.13	0.0702
Kjeldahl Nitrogen, TKN	0.254	0.243	0.197
Phosphorus, Total	0.0623	0.0978	0.0692
Copper	0.00507	< 0.00530	0.00749
Lead	0.00203	< 0.00190	< 0.00190
Zinc	0.0216	< 0.00590	< 0.00590
Removal efficiency			
Suspended Solids			
Nitrate			
Kjeldahl Nitrogen, TKN			
Phosphorus, Total			
Copper			
Lead			
Zinc			

142-879
FocalPoint Interim Report
Appendix A
Individual Storm Reports

General information			
Monitoring site name	Campbells Run	Campbells Run	Campbells Run
Site location (UTM or latitude/longitude)	40.425999°, -80.114740°	40.425999°, -80.114740°	40.425999°, -80.114740°
Drainage area			
Storm information	See below	See below	See below
Storm name or number	4	5	6
Storm name or number	Event 4	Event 5	Event 6
Storm event date	10/09/15	10/24/15 - 10/25/15	10/27/15 - 10/28/15
Start	10/9/15 11:29 AM	10/24/15 3:35 PM	10/27/15 9:13 PM
End	10/9/15 1:16 PM	10/25/15 2:40 AM	10/28/15 6:58 PM
Antecedent dry period conditions (days)	5.99	1.96	2.77
Total precipitation depth (inches) from warehouse gage	0.41	0.46	1.95
Total precipitation depth (inches) from office gage	--	--	--
Precipitation duration (hours)	1.78	11.08	21.75
Mean precipitation intensity (inches per hour)	0.230	0.042	0.090
Maximum precipitation intensity (inches per hour)	3.00	0.60	2.40
Hydrologic information			
Influent peak flow rate (gpm)	131.36	12.98	161.04
Effluent peak flow rate (gpm)	71.27	6.58	37.21
Average influent flow rate (gpm)	18.28	1.94	7.01
Average effluent flow rate (gpm)	14.01	0.95	3.19
Bypass peak flow rate (gpm)	0	0	0
Max Ponding Depth above Mulch (feet)	0.405	0.076	0.808
Total influent runoff volume (gallons)	1956.37	1291.62	9380.27
Total effluent runoff volume (gallons)	1499.33	636.44	4265.24
Total bypass runoff volume (gallons)	0	0	0
Data flags for identified QA issues			
Pollutant information			
Number of influent aliquots	6	4	29
Number of effluent aliquots	9	4	27
Percent of storm sampled			
Influent Total Volume (gal) during sampling period	1717.65	989.33	9175.14
Influent Total Volume (gal) during rain event	1956.37	1291.62	9380.27
Percent of Influent Volume	88%	77%	98%
Effluent Total Volume (gal) during sampling period	1291.88	525.93	4032.59
Effluent Total Volume (gal) during rain event	1499.33	636.44	4265.24
Percent of Effluent Volume	86%	83%	95%
Parameters monitored			
Parameter 1	Suspended Solids	Suspended Solids	Suspended Solids
Parameter 2	Nitrate	Nitrate	Nitrate
Parameter 3	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN
Parameter 4	Phosphorus, Total	Phosphorus, Total	Phosphorus, Total
Parameter 5	Copper	Copper	Copper
Parameter 6	Lead	Lead	Lead
Parameter 7	Zinc	Zinc	Zinc
First Flush Event Mean Concentrations			
Suspended Solids	--	--	--
Nitrate	--	--	--
Kjeldahl Nitrogen, TKN	--	--	--
Phosphorus, Total	--	--	--
Copper	--	--	--
Lead	--	--	--
Zinc	--	--	--
Influent Event Mean Concentrations			
Suspended Solids	197	19.8	4.9
Nitrate	0.265	0.456	0.0425
Kjeldahl Nitrogen, TKN	1.22	< 0.0350	0.158
Phosphorus, Total	0.253	0.0606	0.0397
Copper	0.014	0.00899	0.00807
Lead	0.0117	< 0.00190	< 0.00190
Zinc	0.202	0.0378	0.019
Effluent Event Mean Concentrations			
Suspended Solids	24.4	9.88	2.5
Nitrate	0.265	0.299	0.0367
Kjeldahl Nitrogen, TKN	0.531	6.08	0.571
Phosphorus, Total	0.11	0.0574	0.0404
Copper	< 0.00530	0.00922	0.0072
Lead	0.00379	< 0.00190	0.00227
Zinc	0.042	0.0234	0.00807
Removal efficiency			
Suspended Solids			
Nitrate			
Kjeldahl Nitrogen, TKN			
Phosphorus, Total			
Copper			
Lead			
Zinc			

142-879
FocalPoint Interim Report
Appendix A
Individual Storm Reports

General information			
Monitoring site name	Campbells Run	Campbells Run	Campbells Run
Site location (UTM or latitude/longitude)	40.425999°, -80.114740°	40.425999°, -80.114740°	40.425999°, -80.114740°
Drainage area			
Storm information	See below	See below	See below
Storm name or number	7	8	9
Storm name or number	Event 7	Event 8	Event 9
Storm event date	11/06/15	11/10/15	12/14/15
Start	11/6/15 5:26 AM	11/10/15 1:22 AM	12/14/15 3:06 PM
End	11/6/15 1:31 PM	11/10/15 3:42 PM	12/14/15 6:56 PM
Antecedent dry period conditions (days)	4.86	3.49	4.71
Total precipitation depth (inches) from warehouse gage	0.3	0.89	0.21
Total precipitation depth (inches) from office gage	--	--	--
Precipitation duration (hours)	8.08	14.33	3.83
Mean precipitation intensity (inches per hour)	0.037	0.062	0.055
Maximum precipitation intensity (inches per hour)	1.20	0.60	0.60
Hydrologic information			
Influent peak flow rate (gpm)	78.45	24.33	7.51
Effluent peak flow rate (gpm)	38.68	10.44	7.51
Average influent flow rate (gpm)	2.88	3.37	1.48
Average effluent flow rate (gpm)	1.72	0.95	1.81
Bypass peak flow rate (gpm)	0	0	0
Max Ponding Depth above Mulch (feet)	0.313	0.194	0.080
Total influent runoff volume (gallons)	1396.59	2899.05	340.26
Total effluent runoff volume (gallons)	835.03	819.96	416.84
Total bypass runoff volume (gallons)	0	0	0
Data flags for identified QA issues			
Pollutant information			
Number of influent aliquots	4	9	3
Number of effluent aliquots	5	4	8
Percent of storm sampled			
Influent Total Volume (gal) during sampling period	967.35	2555.22	210.48
Influent Total Volume (gal) during rain event	1396.59	2899.05	340.26
Percent of Influent Volume	69%	88%	62%
Effluent Total Volume (gal) during sampling period	631.35	506.71	342.06
Effluent Total Volume (gal) during rain event	835.03	819.96	416.84
Percent of Effluent Volume	76%	62%	82%
Parameters monitored			
Parameter 1	Suspended Solids	Suspended Solids	Suspended Solids
Parameter 2	Nitrate	Nitrate	Nitrate
Parameter 3	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN
Parameter 4	Phosphorus, Total	Phosphorus, Total	Phosphorus, Total
Parameter 5	Copper	Copper	Copper
Parameter 6	Lead	Lead	Lead
Parameter 7	Zinc	Zinc	Zinc
First Flush Event Mean Concentrations			
Suspended Solids	--	--	--
Nitrate	--	--	--
Kjeldahl Nitrogen, TKN	--	--	--
Phosphorus, Total	--	--	--
Copper	--	--	--
Lead	--	--	--
Zinc	--	--	--
Influent Event Mean Concentrations			
Suspended Solids	84.4	31.2	238
Nitrate	0.104	0.0453	0.401
Kjeldahl Nitrogen, TKN	47.4	0.233	< 0.0350
Phosphorus, Total	0.16	0.0728	0.424
Copper	0.00751	0.00753	0.0121
Lead	0.00365	0.00243	0.0106
Zinc	0.127	0.0609	0.0921
Effluent Event Mean Concentrations			
Suspended Solids	19.6	8.91	8
Nitrate	0.167	0.0579	0.775
Kjeldahl Nitrogen, TKN	0.371	0.189	< 0.0350
Phosphorus, Total	0.125	0.0459	0.0983
Copper	< 0.00530	0.00758	< 0.00530
Lead	< 0.00190	< 0.00190	< 0.00190
Zinc	0.0293	0.0182	0.0191
Removal efficiency			
Suspended Solids			
Nitrate			
Kjeldahl Nitrogen, TKN			
Phosphorus, Total			
Copper			
Lead			
Zinc			

142-879
FocalPoint Interim Report
Appendix A
Individual Storm Reports

General information			
Monitoring site name	Campbells Run	Campbells Run	Campbells Run
Site location (UTM or latitude/longitude)	40.425999°, -80.114740°	40.425999°, -80.114740°	40.425999°, -80.114740°
Drainage area			
Storm information	See below	See below	See below
Storm name or number	10	11	12
Storm name or number	Event 10	Event 11	Event 12
Storm event date	12/17/15	12/22/15	12/28/15 - 12/29/15
Start	12/17/15 5:17 AM	12/22/15 2:54 AM	12/28/15 1:25 PM
End	12/17/15 4:31 PM	12/22/15 10:47 AM	12/29/15 6:14 AM
Antecedent dry period conditions (days)	2.19	0.22	0.67
Total precipitation depth (inches) from warehouse gage	0.56	0.34	0.36
Total precipitation depth (inches) from office gage	--	--	--
Precipitation duration (hours)	11.23	7.88	16.82
Mean precipitation intensity (inches per hour)	0.050	0.043	0.021
Maximum precipitation intensity (inches per hour)	0.60	0.60	0.60
Hydrologic information			
Influent peak flow rate (gpm)	4.82	15.00	8.83
Effluent peak flow rate (gpm)	5.95	10.96	6.32
Average influent flow rate (gpm)	1.23	1.22	0.41
Average effluent flow rate (gpm)	1.49	0.96	0.33
Bypass peak flow rate (gpm)	0	0	0
Max Ponding Depth above Mulch (feet)	0.082	0.184	0.288
Total influent runoff volume (gallons)	828.61	575.51	409.34
Total effluent runoff volume (gallons)	1002.48	453.22	333.25
Total bypass runoff volume (gallons)	0	0	0
Data flags for identified QA issues			
Pollutant information			
Number of influent aliquots	7	5	3
Number of effluent aliquots	19	9	6
Percent of storm sampled			
Influent Total Volume (gal) during sampling period	600.58	400.81	217.77
Influent Total Volume (gal) during rain event	828.61	575.51	409.34
Percent of Influent Volume	72%	70%	53%
Effluent Total Volume (gal) during sampling period	943.26	377.00	239.88
Effluent Total Volume (gal) during rain event	1002.48	453.22	333.25
Percent of Effluent Volume	94%	83%	72%
Parameters monitored			
Parameter 1	Suspended Solids	Suspended Solids	Suspended Solids
Parameter 2	Nitrate	Nitrate	Nitrate
Parameter 3	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN
Parameter 4	Phosphorus, Total	Phosphorus, Total	Phosphorus, Total
Parameter 5	Copper	Copper	Copper
Parameter 6	Lead	Lead	Lead
Parameter 7	Zinc	Zinc	Zinc
First Flush Event Mean Concentrations			
Suspended Solids	--	--	--
Nitrate	--	--	--
Kjeldahl Nitrogen, TKN	--	--	--
Phosphorus, Total	--	--	--
Copper	--	--	--
Lead	--	--	--
Zinc	--	--	--
Influent Event Mean Concentrations			
Suspended Solids	142	122	51.8
Nitrate	0.233	0.508	< 0.100
Kjeldahl Nitrogen, TKN	0.715	1.69	3.42
Phosphorus, Total	0.181	0.184	0.172
Copper	< 0.00530	0.014	< 0.0100
Lead	0.00801	0.00595	0.00518
Zinc	0.0774	0.0934	0.0938
Effluent Event Mean Concentrations			
Suspended Solids	4.8	11.6	3.6
Nitrate	0.32	0.401	0.142
Kjeldahl Nitrogen, TKN	0.125	0.194	0.681
Phosphorus, Total	0.0673	0.0693	< 0.100
Copper	< 0.00530	0.00942	< 0.0100
Lead	< 0.00190	< 0.00190	< 0.00500
Zinc	0.0123	0.0189	< 0.0500
Removal efficiency			
Suspended Solids			
Nitrate			
Kjeldahl Nitrogen, TKN			
Phosphorus, Total			
Copper			
Lead			
Zinc			

142-879
FocalPoint Interim Report
Appendix A
Individual Storm Reports

General information			
Monitoring site name	Campbells Run	Campbells Run	Campbells Run
Site location (UTM or latitude/longitude)	40.425999°, -80.114740°	40.425999°, -80.114740°	40.425999°, -80.114740°
Drainage area			
Storm information	See below	See below	See below
Storm name or number	13	14	15
Storm name or number	Event 13	Event 14	Event 15
Storm event date	01/09/16 - 01/10/16	04/22/16	04/26/16
Start	1/9/16 11:03 PM	4/22/16 1:20 PM	4/26/16 5:58 AM
End	1/10/16 10:25 AM	4/22/16 6:35 PM	4/26/16 7:55 AM
Antecedent dry period conditions (days)	0.93	0.23	3.18
Total precipitation depth (inches) from warehouse gage	0.74	0.09	0.22
Total precipitation depth (inches) from office gage	0.65	0.19	0.23
Precipitation duration (hours)	11.37	5.25	1.95
Mean precipitation intensity (inches per hour)	0.065	0.036	0.113
Maximum precipitation intensity (inches per hour)	0.60	0.60	1.20
Hydrologic information			
Influent peak flow rate (gpm)	17.43	9.78	51.70
Effluent peak flow rate (gpm)	6.08	5.03	9.14
Average influent flow rate (gpm)	1.65	0.38	5.59
Average effluent flow rate (gpm)	0.96	0.28	2.97
Bypass peak flow rate (gpm)	0	0	0
Max Ponding Depth above Mulch (feet)	0.491	0.177	0.815
Total influent runoff volume (gallons)	1128.30	119.13	788.67
Total effluent runoff volume (gallons)	655.47	87.70	418.30
Total bypass runoff volume (gallons)	0	0	0
Data flags for identified QA issues			
Pollutant information			
Number of influent aliquots	11	3	21
Number of effluent aliquots	11	4	24
Percent of storm sampled			
Influent Total Volume (gal) during sampling period	1039.38	71.84	734.35
Influent Total Volume (gal) during rain event	1128.30	119.13	788.67
Percent of Influent Volume	92%	60%	93%
Effluent Total Volume (gal) during sampling period	520.50	50.75	399.28
Effluent Total Volume (gal) during rain event	655.47	87.70	418.30
Percent of Effluent Volume	79%	58%	95%
Parameters monitored			
Parameter 1	Suspended Solids	Suspended Solids	Suspended Solids
Parameter 2	Nitrate	Nitrate	Nitrate
Parameter 3	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN
Parameter 4	Phosphorus, Total	Phosphorus, Total	Phosphorus, Total
Parameter 5	Copper	Copper	Copper
Parameter 6	Lead	Lead	Lead
Parameter 7	Zinc	Zinc	Zinc
First Flush Event Mean Concentrations			
Suspended Solids	--	--	2,130
Nitrate	--	--	0.0497
Kjeldahl Nitrogen, TKN	--	--	33.8
Phosphorus, Total	--	--	2.78
Copper	--	--	0.111
Lead	--	--	0.102
Zinc	--	--	0.854
Influent Event Mean Concentrations			
Suspended Solids	153	1,560	602
Nitrate	0.362	< 0.0227	0.147
Kjeldahl Nitrogen, TKN	1.01	31.9	9.82
Phosphorus, Total	0.0501	2.04	0.88
Copper	0.0148	0.202	0.0692
Lead	0.0104	0.139	0.0452
Zinc	0.13	1.63	0.499
Effluent Event Mean Concentrations			
Suspended Solids	11	18.3	20.7
Nitrate	0.28	< 0.0227	< 0.0227
Kjeldahl Nitrogen, TKN	0.505	2.86	3.26
Phosphorus, Total	0.0562	0.114	0.0997
Copper	< 0.00530	0.00707	0.00756
Lead	0.0021	0.00155	0.00184
Zinc	0.0266	0.343	0.0179
Removal efficiency			
Suspended Solids			
Nitrate			
Kjeldahl Nitrogen, TKN			
Phosphorus, Total			
Copper			
Lead			
Zinc			

142-879
FocalPoint Interim Report
Appendix A
Individual Storm Reports

General information			
Monitoring site name	Campbells Run	Campbells Run	Campbells Run
Site location (UTM or latitude/longitude)	40.425999°, -80.114740°	40.425999°, -80.114740°	40.425999°, -80.114740°
Drainage area			
Storm information	See below	See below	See below
Storm name or number	16	17	18
Storm name or number	Event 16	Event 17	Event 18
Storm event date	04/28/16	04/30/16 - 05/01/16	05/05/16
Start	4/28/16 8:39	4/30/16 18:30	5/5/16 2:35 PM
End	4/28/16 12:10	5/1/16 8:12	5/5/16 6:00 PM
Antecedent dry period conditions (days)	1.65	2.04	2.51
Total precipitation depth (inches) from warehouse gage	0.30	0.37	No Data, Gage Clogged
Total precipitation depth (inches) from office gage	0.30	0.39	0.25
Precipitation duration (hours)	3.52	13.70	3.42
Mean precipitation intensity (inches per hour)	0.085	0.027	0.074
Maximum precipitation intensity (inches per hour)	0.60	0.60	0.76
Hydrologic information			
Influent peak flow rate (gpm)	12.79	27.55	85.45
Effluent peak flow rate (gpm)	6.71	5.48	5.48
Average influent flow rate (gpm)	3.23	0.77	3.54
Average effluent flow rate (gpm)	2.72	0.57	1.78
Bypass peak flow rate (gpm)	0	0	0
Max Ponding Depth above Mulch (feet)	0.397	0.479	0.802
Total influent runoff volume (gallons)	766.56	630.39	803.42
Total effluent runoff volume (gallons)	644.81	470.55	403.13
Total bypass runoff volume (gallons)	0	0	0
Data flags for identified QA issues			
Pollutant information			
Number of influent aliquots	21	13	21
Number of effluent aliquots	39	21	25
Percent of storm sampled			
Influent Total Volume (gal) during sampling period	717.29	502.49	738.06
Influent Total Volume (gal) during rain event	766.56	630.39	803.42
Percent of Influent Volume	94%	80%	92%
Effluent Total Volume (gal) during sampling period	630.10	390.77	385.63
Effluent Total Volume (gal) during rain event	644.81	470.55	403.13
Percent of Effluent Volume	98%	83%	96%
Parameters monitored			
Parameter 1	Suspended Solids	Suspended Solids	Suspended Solids
Parameter 2	Nitrate	Nitrate	Nitrate
Parameter 3	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN
Parameter 4	Phosphorus, Total	Phosphorus, Total	Phosphorus, Total
Parameter 5	Copper	Copper	Copper
Parameter 6	Lead	Lead	Lead
Parameter 7	Zinc	Zinc	Zinc
First Flush Event Mean Concentrations			
Suspended Solids	329	192	278
Nitrate	< 0.0227	< 0.0227	< 0.0227
Kjeldahl Nitrogen, TKN	12	7.95	9.26
Phosphorus, Total	1.43	0.962	1.4
Copper	0.0467	0.0249	0.0229
Lead	0.0263	0.0116	0.0125
Zinc	0.348	0.169	0.14
Influent Event Mean Concentrations			
Suspended Solids	350	260	886
Nitrate	0.253	< 0.0227	0.319
Kjeldahl Nitrogen, TKN	4.92	1.77	2.35
Phosphorus, Total	0.631	0.536	1.56
Copper	0.0288	0.0277	0.0655
Lead	0.0152	0.0136	0.0439
Zinc	0.225	0.194	0.483
Effluent Event Mean Concentrations			
Suspended Solids	26.6	14.5	9
Nitrate	0.112	<0.0227	0.161
Kjeldahl Nitrogen, TKN	3.13	2.43	1.76
Phosphorus, Total	0.154	0.155	0.096
Copper	0.00664	0.00604	0.00535
Lead	0.00155	0.00191	0.000998
Zinc	0.038	0.0182	0.0129
Removal efficiency			
Suspended Solids			
Nitrate			
Kjeldahl Nitrogen, TKN			
Phosphorus, Total			
Copper			
Lead			
Zinc			

142-879
FocalPoint Interim Report
Appendix A
Individual Storm Reports

General information		
Monitoring site name	Campbells Run	Campbells Run
Site location (UTM or latitude/longitude)	40.425999°, -80.114740°	40.425999°, -80.114740°
Drainage area		
Storm information	See below	See below
Storm name or number	19	20
Storm name or number	Event 19	Event 20
Storm event date	05/10/16 - 05/11/16	05/13/16
Start	5/10/16 19:32	5/13/16 1:09
End	5/11/16 0:40	5/13/16 5:18
Antecedent dry period conditions (days)	0.37	0.42
Total precipitation depth (inches) from warehouse gage	0.33	0.2
Total precipitation depth (inches) from office gage	Data only pulled from warehouse gage	Data only pulled from warehouse gage
Precipitation duration (hours)	5.13	4.15
Mean precipitation intensity (inches per hour)	0.064	0.048
Maximum precipitation intensity (inches per hour)	0.60	0.60
Hydrologic information		
Influent peak flow rate (gpm)	33.00	6.32
Effluent peak flow rate (gpm)	6.71	3.46
Average influent flow rate (gpm)	4.13	1.83
Average effluent flow rate (gpm)	1.95	1.20
Bypass peak flow rate (gpm)	0	0
Max Ponding Depth above Mulch (feet)	0.473	0.179
Total influent runoff volume (gallons)	1272.75	456.09
Total effluent runoff volume (gallons)	599.99	298.13
Total bypass runoff volume (gallons)	0	0
Data flags for identified QA issues		
Pollutant information		
Number of influent aliquots	24	11
Number of effluent aliquots	37	15
Percent of storm sampled		
Influent Total Volume (gal) during sampling period	840.10	345.28
Influent Total Volume (gal) during rain event	1272.75	456.09
Percent of Influent Volume	66%	76%
Effluent Total Volume (gal) during sampling period	569.00	228.50
Effluent Total Volume (gal) during rain event	599.99	298.13
Percent of Effluent Volume	95%	77%
Parameters monitored		
Parameter 1	Suspended Solids	Suspended Solids
Parameter 2	Nitrate	Nitrate
Parameter 3	Kjeldahl Nitrogen, TKN	Kjeldahl Nitrogen, TKN
Parameter 4	Phosphorus, Total	Phosphorus, Total
Parameter 5	Copper	Copper
Parameter 6	Lead	Lead
Parameter 7	Zinc	Zinc
First Flush Event Mean Concentrations		
Suspended Solids	218	639
Nitrate	< 0.0227	0.103
Kjeldahl Nitrogen, TKN	6.49	3.92
Phosphorus, Total	2.56	1.47
Copper	0.052	0.0312
Lead	0.0385	0.0202
Zinc	0.386	0.197
Influent Event Mean Concentrations		
Suspended Solids	862	376
Nitrate	0.407	0.253
Kjeldahl Nitrogen, TKN	1.71	2.63
Phosphorus, Total	1.74	1.5
Copper	0.0449	0.0264
Lead	0.0311	0.0161
Zinc	0.33	0.184
Effluent Event Mean Concentrations		
Suspended Solids	10.5	7.7
Nitrate	0.44	0.573
Kjeldahl Nitrogen, TKN	1.35	1.16
Phosphorus, Total	0.12	0.123
Copper	0.00465	0.00414
Lead	0.000767	0.000577
Zinc	0.0122	0.00887
Removal efficiency		
Suspended Solids		
Nitrate		
Kjeldahl Nitrogen, TKN		
Phosphorus, Total		
Copper		
Lead		
Zinc		