Washington Department of Ecology Submission Cover Letter

WQWebSubmittal - Submittal Submission Id: 1495314 - 3/31/2015 12:13:26 PM

Report Received Dated: 3/31/2015 12:13:27 PM

Company Name	Signer Name	System Name
Clark County	Mark McCauley	WQWebPortal

Attachments:

Document Name of Description	Document File Name
WY 2014 Res Site Loading	Appendix 9 WY2014 RES Loading Summary
	Q 40b IDDE Screening QAPP Version 3.0 2014_40b_031
WY 2014 Com Site Loading	Appendix 9 WY2014 COM Loading Summary
Submitted Copy of Record for Clark County	Copy of Record ClarkCounty Tuesday March 31 2015
WY 2014 S8.B. Stormwater Characterization	Appendix 9 WY2014 SW monitoring report

Attestation Agreed to at Signing:

I certify I personally signed and submitted to the Department of Ecology an Electronic Signature Agreement. I understand that use of my electronic signature account/password to submit this information is equal to my written signature. I have read and followed all the rules of use in my Electronic Signature Agreement. I believe no one but me has had access to my password and other account information.

I further certify: I had the opportunity to review the content or meaning of the submittal before signing it; and to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I intend to submit this information as part of the implementation, oversight, and enforcement of a federal environmental program. I am aware there are significant penalties for submitting false information, including possible fines and imprisonment.

For Ecology Use Only ---
Dev

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DEPARTMENT OF ECOLOGY
State of Washington

Water Quality Program

Permit Submittal Electronic Certification

Permittee: CLARK COUNTY

Permit Number: WAR044001 **Site Address:** 1200 FRANKLIN ST
Vancouver, WA 98660

Submittal Name: MS4 Annual Report Phase I City/County

Version: 2 **Due Date:** 3/31/2015

Questionnaire

Number	Permit Section	Question	Answer
1	S9.D.6	Attach a notification of any annexations, incorporations or jurisdictional boundary changes resulting in an increase or decrease in the Permittee's geographic area of permit coverage during the reporting period per S9.D.6.	Q 1 Annexation Map_1_03182015_1155.pdf
2	S5.A.1	Attach updated annual Stormwater Management Program Plan (SWMP Plan). (S5.A.1)	Q 2 SWMP 2015 Final 3.4.15_2_03182015_1156.pdf
3	S5.A.2	Implemented an ongoing program to gather, track, and maintain information per S5.A.2, including costs or estimated costs of developing and implementing the SWMP?	Yes
4	S5.C.2.a	Maintained mapping data for the features listed in S5.C.2.a?	Yes
9	S5.C.3.a	Implemented internal coordination agreement (s) or directives to facilitate compliance with the permit? (S5.C.3.a)	Yes
10	S5.C.3.a	Attach a written description of internal coordination mechanisms. (Required to be submitted once no later than March 31, 2015, S5.C.3.a)	Q 10 Attachment_10_03232015_0124.pdf
11	S5.C.3.b.i	Implemented coordination mechanisms clarifying roles and responsibilities for control of pollutants between physically interconnected MS4s per S5.C.3.b.i?	Yes
12	S5.C.3.b.ii	Coordinated stormwater management activities for shared waterbodies among Permittees and Secondary Permittees, as necessary to avoid conflicting plans, policies and regulations? (S5.C.3.b.ii)	Yes
13	S5.C.4.a	Describe the opportunities created for the public to participate in the decision making processes involving the development, implementation and updates of the SWMP. (S5.C.4.a)	Q 13 Attachment_13_03182015_0328.pdf
14	S5.C.4.b	Posted the updated SWMP Plan and latest annual report on your website no later than May 31? (S5.C.4.b)	Yes

14b	S5.C.4.b	List the website address.	http://www.clark.wa.gov/environment/stormwater/management/plan.html
15	S5.C.5.a.iii	Submitted draft enforceable requirements, technical standards and manual to meet site and subdivision-scale requirements of S5.C.5.a to Ecology no later than July 1, 2014? (S5.C.5.a.iii)	Yes
17	S5.B, S5.C.5.a.i, an	Number of adjustments granted to the minimum requirements in Appendix 1? (S5.B, S5.C.5.a.i, and Section 5 of Appendix 1)	0
18	S5.B, S5.C.5.a.i, an	Number of exceptions/variances granted to the minimum requirements in Appendix 1? (S5.B, S5.C.5.a.i, and Section 6 of Appendix 1)	0
19	S5.C.5.a.v(1)	Reviewed Stormwater Site Plans for all proposed development activities that meet the thresholds in S5.C.5.a.i? (S5.C.5.a.v(1))	Yes
19b	S5.C.5.a.v(1)	Number of stormwater site plans reviewed during the reporting period?	1042
20	S5.C.5.a.v(2)	Inspected, prior to clearing and construction, permitted development sites per S5.C.5.a.v(2)?	Yes
21	S5.C.5.a.v(3)	Inspected permitted development sites during construction to verify proper installation and maintenance of required erosion and sediment controls per S5.C.5.a.v(3)?	Yes
22	S5.C.5.a.v(4)	Inspected permitted development sites upon completion of construction and prior to final approval or occupancy to ensure proper installation of stormwater facilities per S5.C.5.a.v(4)?	Yes
23	S5.C.5.a.v	Number of construction sites inspected per S5.C.5.a.v?	1082
24	S5.C.5.a.v(2), (3) a	Number of enforcement actions taken during the reporting period (based on construction phase inspections at new development and redevelopment projects)? (S5.C.5.a.v(2), (3) and (4))	3073
25	S5.C.5.a.v(4)	Verified that a maintenance plan is completed and responsibility for maintenance is assigned for stormwater treatment and flow control BMPs/facilities? (S5.C.5.a.v(4))	Yes
26	S5.C.5.a.v.(5)	Achieved at least 80% of scheduled construction-related inspections? (S5.C.5.a.v.(5))	Yes
27	S5.C.5.a.vi	Made Ecology's Notice of Intent for Construction Activity and Notice of Intent for Industrial Activity available to representatives of proposed new development and redevelopment? (S5.C.5.a.vi)	Yes
28	S5.C.5.a.vii	All staff whose primary job duties are implementing the program to control stormwater runoff from new development, redevelopment, and construction sites are trained to conduct these activities? (S5.C.5.a.vii)	Yes
31	S5.C.5.c.i	Counties: Notified Ecology of the selected or proposed alternative watershed no later than October 31, 2013? (S5.C.5.c.i)	Yes

31b	S5.C.5.c.i	Insert watershed name.	Whipple Creek
32	S5.C.5.c.ii	Counties: Submitted a scope of work and a schedule to Ecology for the complete watershed planning process no later than April 1, 2014 for Clark and Pierce efforts, no later than November 4, 2015 for the King effort, and no later than March 31, 2015 for the Snohomish effort? (S5.C.5.c.iv)	Yes
34	S5.C.6.c	Submitted a list of planned, individual projects scheduled for implementation during this permit term with the information and formatting specified in Appendix 11 by March 31, 2014? (S5.C.6.c)	Yes
34b	S5.C.6.c	Attach an updated list of planned, individual projects scheduled for implementation during this permit term with the information and formatting specified in Appendix 11. (S5.C.6.c)	Q 34.b Appendix 11 table_34b_03182015_0329.pdf
35	S5.C.7.b.ii	Implemented a program to identify commercial and industrial properties which have the potential to generate pollutants to the Permittee's MS4 per S5.C.7.b.ii?	Yes
36	S5.C.7.b.iii and S5.	Attach a summary of actions taken to implement the source control program per S5.C.7.b.iii and S5.C.7.b.iv.	Q 36 AttachmentreportingsectionS5c7_36_03182015_0331.pdf
37	S5.C.7.b.iii	Number of inspections per S5.C.7.b.iii?	403
38	S5.C.7.b.v	Implemented an ongoing source control training program per S5.C.7.b.v?	Yes
40	S5.C.8.c.i	Implemented procedures for conducting illicit discharge investigations in accordance with S5.C.8.c.i?	Yes
40b	S5.C.8.c.i	Attach citation of field screening methodology.	Q 40b IDDE Screening QAPP Version 3.0 2014_40b_03182015_0336.pdf
41	S5.C.8.c.i(1)	Provide the percentage (to the nearest integer) of conveyance systems screened in reporting year per S5.C.8.c.i(1).	12
44	S5.C.8.c.ii	Provide the hotline telephone number for public reporting of spills and other illicit discharges. (S5.C.8.c.ii)	360-397-2446
44b	S5.C.8.c.ii	Number of hotline calls received?	64
45	S5.C.8.c.iii	Implemented an ongoing illicit discharge training program for all municipal field staff per S5.C.8.c.iii?	Yes
46	S5.C.8.d	Implemented an ongoing program to characterize, trace, and eliminate illicit discharges into the MS4 per S5.C.8.d?	Yes
47	S5.C.8.d.iii and iv	Number of illicit discharges, including illicit connections, eliminated during the reporting year? (S5.C.8.d.iii and iv)	25
48	S5.C.8.d.iv	Attach a summary of actions taken to characterize, trace and eliminate each illicit discharge found by or reported to the permittee. For each illicit discharge, include a description of actions according to required timelines per S5.C.8.d.iv.	Q 48 Attachment_48_03192015_1018.pdf

49	S5.C.8.e	Trained staff responsible for illicit discharge detection and elimination activities per S5.C.8.e?	Yes
50	S5.C.8.f	Participated in a regional emergency response program, or implemented procedures to investigate and respond to spills and improper disposal? (S5.C.8.f)	Yes
51	S5.C.9.a	Implemented maintenance standards per S5.C.9.a?	Yes
52	S5.C.9.a	Applied a maintenance standard for a facility or facilities which do not have maintenance standards specified in the Stormwater Management Manual for Western Washington? (S5.C.9.a)	Yes
52b	S5.C.9.a	Note what kinds of facility or facilities are covered by an alternative maintenance standard. (S5.C.9.a)	Media filter drain and vortechs have standards in the Clark County Stormwater Facility Maintenance Manual (2009).
53	S5.C.9.b.i	Evaluated and, if necessary, updated the existing ordinances or other enforceable documents requiring maintenance of all permanent stormwater treatment and flow control BMPs/facilities (including catch basins that are part of the facilities) regulated by the Permittee. (S5.C.9.b.i)	Not Applicable
54	S5.C.9.b.ii	Implemented an ongoing inspection program for stormwater treatment and flow control BMPs/facilities regulated by the Permittee per S5.C.9.b.ii.	Yes
55	S5.C.9.b.ii	If using reduced inspection frequency on stormwater treatment and flow control BMPs/facilities regulated by the Permittee for the first time during this permit cycle, attach documentation per S5.C.9.b.ii.	Not Applicable
56	S5.C.9.b.iii	Inspected permanent stormwater treatment and flow control BMPs/facilities and catch basins in new residential developments every 6 months per S5.C.9.b.iii?	Yes
57	S5.C.9.b.iv	Achieved at least 80% of inspections required per S5.C.9.b.ii and iii? (S5.C.9.b.iv)	Yes
58	S5.C.9.c.i	Number of known municipally owned or operated stormwater treatment and flow control BMPs/facilities? (S5.C.9.c.i)	978
58b	S5.C.9.c.i	Number of municipally owned or operated stormwater treatment and flow control BMPs/facilities inspected during the reporting period? (S5.C.9.c.i)	975
58c	S5.C.9.c.i	Number of municipally owned or operated stormwater treatment and flow control BMPs/facilities for which maintenance was performed during the reporting period? (S5.C.9.c.i)	978
59	S5.C.9.c.i	If using reduced inspection frequency for municipally owned or operated stormwater treatment and flow control BMPs/facilities for the first time during this permit cycle, attach documentation per S5.C.9.c.i.	Not Applicable

60	S5.C.9.c.ii	Conducted spot checks and inspections (if necessary) of potentially damaged stormwater treatment and flow control BMPs/facilities after major storm events? (S5.C.9.c.ii)	Yes
61	S5.C.9.c.iii	Achieved at least 95% of required inspections per S5.C.9.c.iii?	Yes
62	S5.C.9.d.i	Inspected municipally owned or operated catch basins and inlets every year or used an alternative approach? Cleaned as needed? (S5.C.9.d.i)	Yes
62b	S5.C.9.d.i	Number of known catch basins?	11909
62c	S5.C.9.d.i	Number of catch basins inspected during the reporting period?	11747
62d	S5.C.9.d.i	Number of catch basins cleaned during the reporting period?	2644
62e	S5.C.9.d.i.(1), (2),	Attach documentation of alternative catch basin inspection approach, if used. (S5.C.9.d.i.(1), (2), or (3))	Not Applicable
63	S5.C.9.d.iii	Achieved at least 95% of required catch basin inspections? (S5.C.9.d.iii)	Yes
64	S5.C.9.e	Implemented practices, policies, and procedures to reduce stormwater impacts per S5.C.9.e?	Yes
65	S5.C.9.f	Implemented an ongoing training program per S5.C.9.f?	Yes
66	S5.C.9.g	Implemented a Stormwater Pollution Prevention Plan for all heavy equipment maintenance or storage yards, and material storage facilities per S5.C.9.g?	Yes
67	S5.C.10	Attach description of public education and outreach efforts conducted per S5.C.10.	Q 67 Attachment E andO for 2014_67_03202015_0906.pdf
68	S5.C.10.b	Created stewardship opportunities (or partnered with others) to encourage resident participation in activities such as those described in S5.C.10.b?	Yes
69	S5.C.10.c	Used results of measuring the understanding and adoption of targeted behaviors among at least one audience in at least one subject area to direct education and outreach resources and evaluate changes in adoption of targeted behaviors. (Required no later than February 2, 2016, S5.C.10.c)	Not Applicable
70	S7.A	Complied with the Total Maximum Daily Load (TMDL)-specific requirements identified in Appendix 2? (S7.A)	Not Applicable
71	S7.A	For TMDL listed in Appendix 2: Attach a summary of relevant SWMP and Appendix 2 activities to address the applicable TMDL parameter(s). (S7.A)	
72	S8.A	Attach a description of any stormwater monitoring or stormwater-related studies per S8.A.	Q 72 Attachment_72_03202015_0932.pdf

73	S8.B.1.a	Submitted payment for participating in cost-sharing for regional stormwater monitoring program (RSMP) status and trends monitoring? (S8.B.1.a)	Not Applicable
74	S8.B.1.b.iii	If choosing to conduct monitoring in accordance with S8.B.1.b, attach a data report in accordance with the approved QAPP per S8.B.1.b.iii. (Required to begin monitoring no later than October 31, 2014)	Not Applicable
75	S8.B.2.a	Clark County: Continued stormwater discharge monitoring per S8.B.2.a?	Yes
76	S8.B.2.b	Clark County: Submitted a revised QAPP no later than February 2, 2014? (S8.B.2.b)	Yes
77	S8.C.1	Submitted payment for participating in cost-sharing for RSMP effectiveness studies (S8.C.1)?	Yes
78	S8.C.2.c	If choosing to conduct stormwater discharge monitoring in accordance with S8.C.2, submitted a QAPP to Ecology no later than February 2, 2014? (S8.C.2.c)	Not Applicable
80	S8.C.3.a	Participated in cost-sharing for RSMP effectiveness studies in accordance with S8.C.3.a?	Yes
81	S8.C.3.b.i	Submitted a detailed effectiveness study proposal to Ecology no later than February 2, 2014 per S8.C.3.b.i?	Yes
82	S8.C.3.b.ii	Submitted a QAPP to Ecology within 120 days of Ecology's approval of the detailed effectiveness study proposal? (S8.C.3.b.ii)	Yes
83	S8.C.3.b.iii	Began full implementation of the effectiveness study no later than 6 months following QAPP approval? (S8.C.3.b.iii)	Not Applicable
85	S8.D	Submitted payment for participating in the RSMP for source identification and diagnostic monitoring information repository? (S8.D)	Yes
86	G3	Notified Ecology in accordance with G3 of any discharge into or from the Permittee's MS4 which could constitute a threat to human health, welfare or the environment? (G3)	Yes
87	G3	Number of G3 notifications provided to Ecology?	5
88	G3.A	Took appropriate action to correct or minimize the threat to human health, welfare, and/or the environment per G3.A?	Yes
89	S4.F.1	Notified Ecology within 30 days of becoming aware that a discharge from the Permittee's MS4 caused or contributed to a known or likely violation of water quality standards in the receiving water? (S4.F.1)	Not Applicable
90	S4.F.3.a	If requested, submitted an Adaptive Management Response report in accordance with S4.F.3.a?	Not Applicable
90b	S4.F.3.d	Attach a summary of the status of implementation of any actions taken pursuant to S4.F.3 and the status of any monitoring, assessment, or evaluation efforts conducted during the reporting period? (S4.F.3.d)	

91	G20	Notified Ecology of the failure to comply with the permit terms and conditions within 30 days of becoming aware of the non-compliance? (G20)	Not Applicable
92	G20	Number of non-compliance notifications (G20) provided in reporting year?	
92b	G20	Attach a list of permit conditions described in non-compliance notification(s).	

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

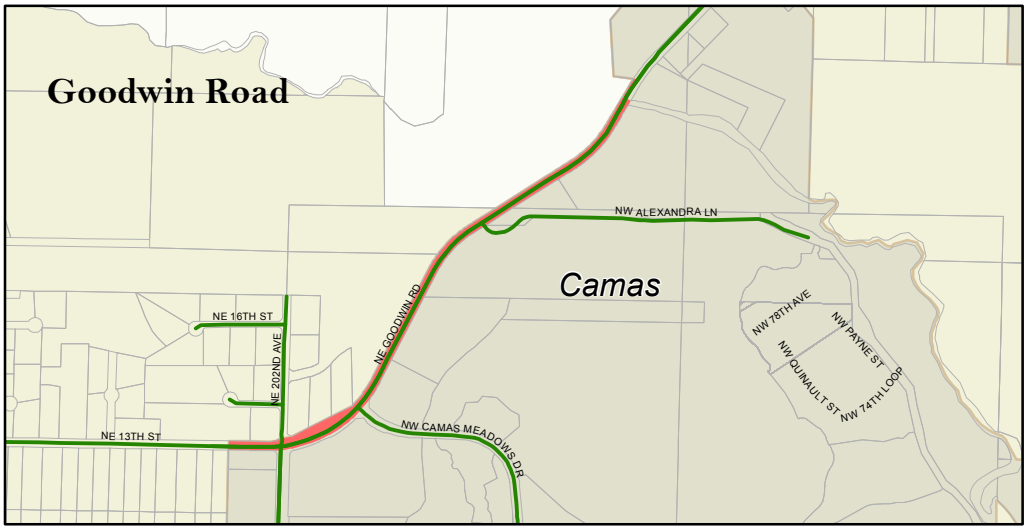
Mark McCauley

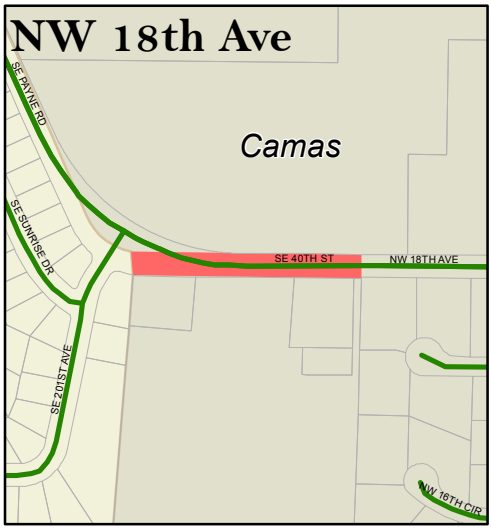
Signature

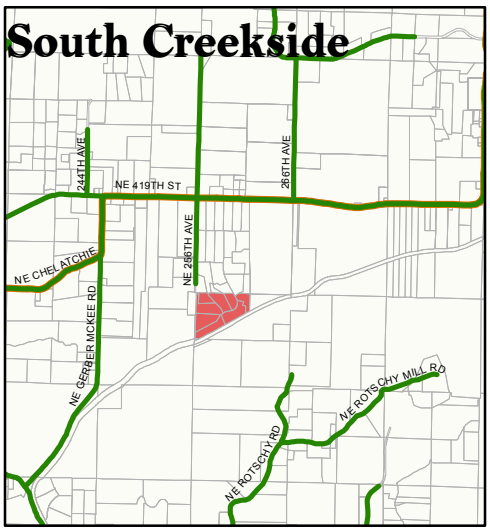
3/31/2015 12:13:25 PM

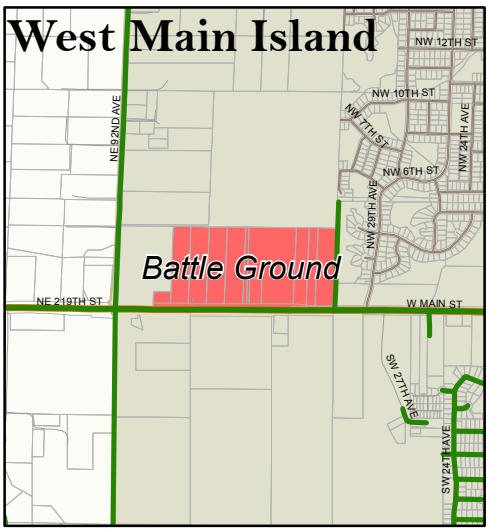
Date

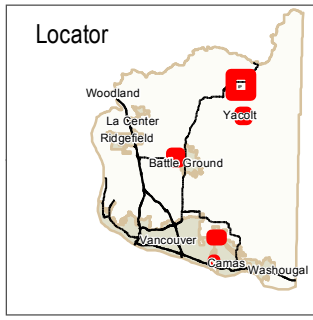
2014 City Annexation











Legend

- Routes
- 2014 City Annexation
- Incorporated
- Urban Growth Area
- Unincorporated

Goodwin Road

Acres - 5.64

Road miles - 0.76

West Main Island

Acres - 44.77

NW 18th Ave

Acres - 0.84

Road miles - 0.10

South Creekside

Acres - 31.11

Recreational Park

Acres - 8.50

CLARK COUNTY WASHINGTON

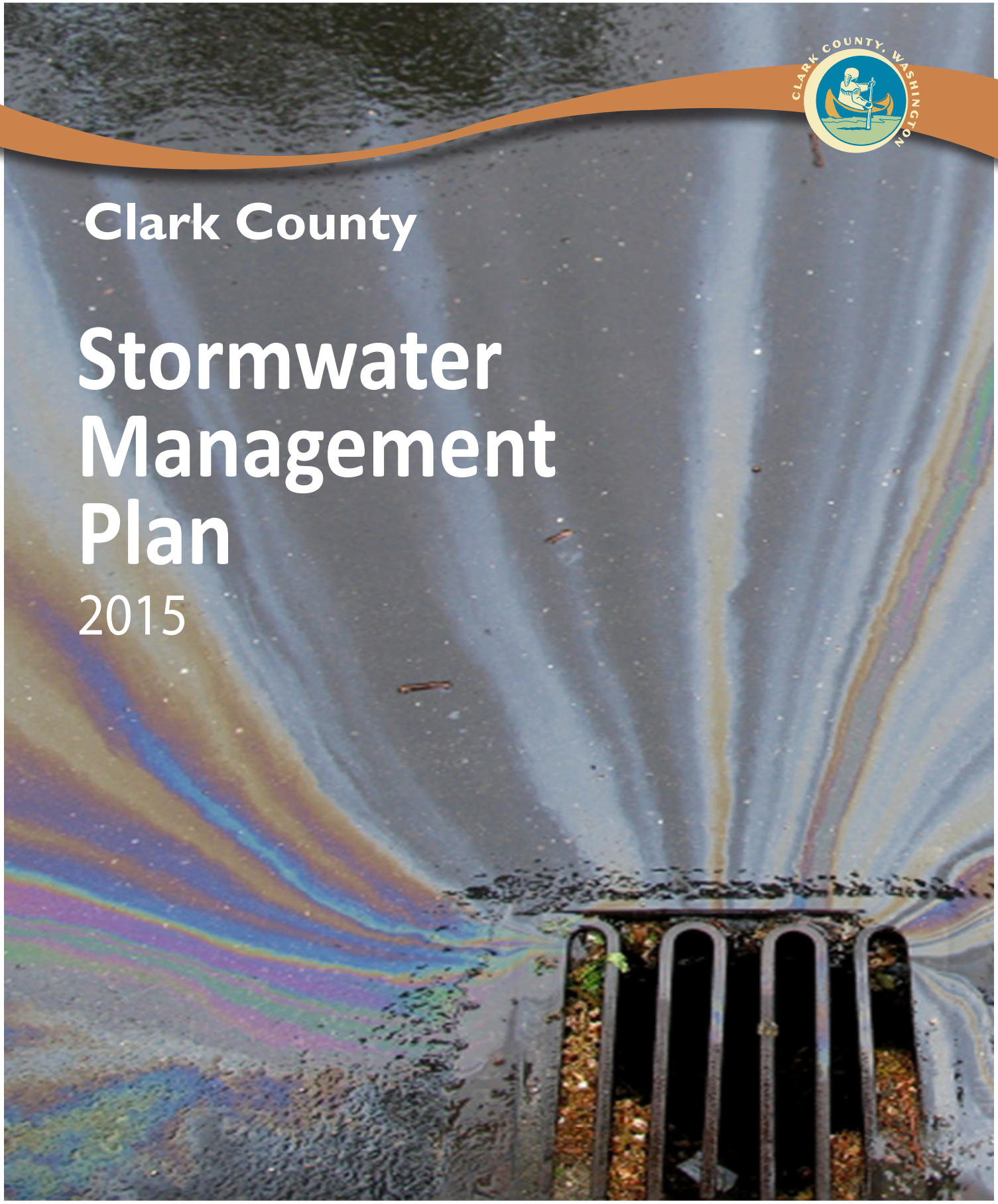
proud past, promising future

Department of Assessment and GIS

N

NOTE: This data is compiled from many sources and scales. Clark county makes this information available as a service, and accepts no responsibility for any inaccuracy, actual or implied.

Path: Q:\Projects\conSrvs\PubWrks\20048\Annexation Analysis\Annexation_2014.mxd



Clark County

Stormwater Management Plan

2015

Protecting water through stormwater management

Stormwater Management Plan Update 2015

Prepared by Clark County Environmental Services, Clean Water Program

1300 Franklin St., Vancouver, WA 98666-9810
www.clark.wa.gov/stormwater

4 March 2015

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INDEX TO NPDES PERMIT COMPONENTS

NPDES Permit Component	Location
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S5.C.2 – Municipal Separate Storm Sewer System Mapping and Documentation	Chapter 2, Section 2
S5.C.3 – Coordination	Chapter 2, Section 7
S5.C.4 – Public Involvement and Participation	Chapter 2, Section 6
S5.C.5 – Controlling Runoff from New Development, Redevelopment and Construction Sites	Chapter 2, Section 5
S5.C.6 – Structural Stormwater Controls	Chapter 2, Section 5
S5.C.7 – Source Control Program for Existing Development	Chapter 2, Section 4
S5.C.8 – Illicit Connections and Illicit Discharges Detection and Elimination	Chapter 2, Section 4
S5.C.9 – Operation and Maintenance Program	Chapter 2, Section 3
S5.C.10 – Education and Outreach Program	Chapter 2, Section 6
S7 – Compliance with Total Maximum Daily Load Requirements	Chapter 2, Section 7
S8 – Monitoring	Chapter 3, Section 1

ACRONYMS AND GLOSSARY

- **AKART –** all known, available, and reasonable methods of prevention, control and treatment as the Ecology standard for the effort required to meet waste water discharge and NPDES permit requirements.
- **BMP** – best management practices (controls for stormwater runoff)
- **BOCC** – Board of Clark County Councilors
- **CCSWMP** – *Clark County Stormwater Management Plan*
- **CIP** – Capital Improvement Program
- **County Manager** – Executive officer for Clark County
- **CWP** – the Clean Water Program, a division of Clark County Environmental Services
- **DES** – the Clark County Department of Environmental Services
- **Ecology** – Washington State Department of Ecology
- **EPA** – Environmental Protection Agency
- **GIS** – geographic information system
- **GMS** – grounds maintenance specialist
- **IDDE** – illicit discharge detection and elimination
- **Illicit discharge** – a non-stormwater discharge or illegal connection to the storm sewer system (e.g. a sanitary sewer line connected to storm sewer system)
- **LID** – low impact development
- **MEP** – maximum extent practicable
- **MS4** – municipal separate storm sewer system
- **NOAA Fisheries** - National Oceanic and Atmospheric Administration, National Marine Fisheries Service
- **NOI** – Notice of Intent
- **NPDES** – National Pollutant Discharge Elimination Systems
- **NRS** – natural resources specialist
- **PPGS** – potential pollutant generating site
- **RCW** – Revised Code of Washington
- **SCIP** – Stormwater Capital Improvement Plan
- **SNAP** – Stormwater Needs Assessment Program
- **StormwaterClk** – a GIS database the county maintains for storm sewer infrastructure
- **SWMMPSB** – 1992 Stormwater Management Manual for the Puget Sound Basin, published by Department of Ecology
- **SMMWW** – 2012 *Stormwater Management Manual for Western Washington*, published by Ecology
- **SWMP** – stormwater management program
- **SWPPP** – stormwater pollution prevention plan

- **Tidemark** – a database the county maintains to track permits and code enforcement
- **TMDL** – total maximum daily load
- **UIC** – underground injection control
- **WAC** – Washington Administrative Code
- **WQDB** – *Water Quality Database*

RESPONSIBILITY INDEX

CD = Community Development
DES = Department of Environmental Services
PW = Public Works

Abbreviation	Full Staff Title	Job Description
Applicant	(as stated)	Customer who utilizes the municipal code and stormwater manual to guide development projects
Assessment and GIS	(as stated)	Supports the county's GIS system
BOCC	Board of County Councilors	Legal authority for permit compliance
CD Building Official	(as stated)	Oversees customer application for development, all building permits and permit counter
CD Dev. Services Mgr.	Development Services Manager	Coordinates a pre-application conference with potential applicants and provides planning approvals
CD Permit Tech	Permit technician	Processes permit applications
CD Building Safety	(as stated)	Enforces erosion control regulations and stormwater for residential building permits
CD Permit Services	(as stated)	Coordinates review of development applications
CD Planner	(as stated)	Supports the pre-application process and land use approvals
County Mngr.	County Manager	Executive official for Clark County
CRWWD	Clark Regional Wastewater District	Supports the coordination of illicit discharge protection
DES Director	(as stated)	Designated director for permit compliance
DES CWP Mgr.	Clean Water Program Manager	Oversees and manages the Clean Water Program
DES CWP NPDES Mgr.	Clean Water Program National Pollution Discharge Elimination System Permit Manager	Oversees compliance with the County's Phase 1 Municipal Stormwater Permit
DES CWP Infrastructure Mgr.	Clean Water Program Infrastructure Manager	Oversees / manages stormwater capital planning and infrastructure mapping, coordinates stormwater infrastructure inspection and maintenance
DES Enhancement & Permitting Mgr.	Enhancement and Permitting Manager	Coordinates environmental permitting for the department
DES CWP Eng.	Clean Water Program Engineer	Coordinates design and engineering of Clean Water projects

DES CWP Eng. Tech	Clean Water Program Engineering Technician	Inventory and maps the stormwater system
DES Source Control Specialist	Source Control Specialist	Technical assistance with citizens and businesses to comply with facility maintenance and source control regulations
DES Code Enforcement	(as stated)	Coordinates citizen complaints and code compliance
DES Natural Res. Spec.	Natural Resource Specialist	Performs monitoring and illicit discharge field work and analysis
DES Project Coordinator	(as stated)	Coordinates specific project tasks and work products
DES CWP Professional staff	(as stated)	Supports various work projects and products
DES Office Assistant (OA)	(as stated)	Coordinates document control and record-keeping
DES CWP Admin.	Clean Water Program Administration	Supports document control and record keeping
DES Environmental Education Manager	(as stated)	Oversees the education and outreach tools used to comply with the permit requirements
DES Americorps staff	(as stated)	Supports education and outreach efforts
DES Vegetation Mgmt. Mgr.	Vegetation Management Manager	Oversees the operations and maintenance of the vegetation management program
DES Vegetation Mgmt. Crew	Vegetation Management Crew	Performs all tasks associated with operations of the program
General Services Facilities Mgr.	Facilities Manager	Oversees the facilities program for county properties
General Services Facilities Crews	(as stated)	Performs all tasks associated with the operations of the program on county properties
Public Health	(as stated)	Coordinates illicit connection/discharge issues with DES staff
PW Answering Service	(as stated)	Coordinates after business hours service calls
PW Engineering Program Mgr.	Engineering Program Manager	Oversees PW engineer activities
PW Eng. Project Manager	Engineering Project Manager	Manages engineering related projects
PW Eng. Program Staff	Engineering Program Staff	Develops engineering related materials
PW Public Information Officer	(as stated)	Supports the development and delivery of public outreach and educational materials
PW Real Property Services	(as stated)	Coordinates property related information, such as titles, legal information, etc.
PW Survey	(as stated)	Coordinates all necessary survey data required for a project
PW Dev. Engineering Mgr.	Development Engineering Manager	Oversees the engineering review of development applications
PW Dev. Engineering Planning Tech	Development Engineering Planning Technician	Reviews development applications for compliance with county code and regulations. Coordinates bonds, compliance and final plat

PW Dev. Engineering Review Engineer	(as stated)	Conducts the engineering development review and participates in application meetings
PW Development Inspectors	(as stated)	Coordinates inspections and education
PW Construction Supervisor.	Construction Management	Oversees the compliance of development construction with approved plans and code
PW Construction Management Engineer	(as stated)	Reviews PW construction projects for compliance with approved plans and applicable regulations
PW Construction Management Supervisor	(as stated)	Oversees the compliance with inspections of development construction
PW Construction Management Inspectors	(as stated)	Conducts on-site construction inspections to ensure compliance with approved plans and applicable regulations
PW Construction Management OA	Construction Management Office Assistant	Coordinates document management associated with project approvals
PW Ops Mgr	Operations Manager	Oversees all operation and maintenance responsibilities
PW Ops Road Super	Operations Road Supervisor	Oversees all elements associated road maintenance and operations
PW Ops Crew Chief	Operations Crew Chief	Leads and coordinates road crew activities
PW Ops Road Crews	Operations Road Crews	Perform all necessary road maintenance and operations activities to meet applicable standards and regulations
PW Ops Administration	Operations Administration	Provides support to various tasks, such as spill response and citizen complaints
PW Parks Mgr	Parks Manager	Oversees all of the administration, customer service, maintenance and operations of parks
PW Parks Super	Parks Superintendent	Oversees the maintenance and operations of the parks
Contract Services	Outside firm or agency contracted with Clark County	Hired to meet specific scope of work items per the appropriate fund and need

Chapter 1
Introduction and Background

Stereoscope of Lucia Falls on Lewis River, early 1900's

Clark County Stormwater Management Plan

The *Clark County Stormwater Management Plan* (*CCSWMP*) describes the various ways that Clark County manages stormwater and related water resources issues in the unincorporated area. It acts as a resource for the public to learn about the county's efforts to reduce pollution in stormwater, an informative guide for staff, and a compliance measure for the county's municipal stormwater permit under permit requirement S5.C.3.a.

Introduction

As the county's population continues to increase (over 443,800 in 2013), Clark County is committed to responsible stormwater management to keep our waterways clean for people, fish, and wildlife.

The Clark County Department of Environmental Services (DES) administers the Clean Water Program (CWP) to protect surface water and groundwater resources from polluted stormwater and to coordinate compliance with state and federal water pollution laws.

Primary responsibilities of the overall stormwater program include planning and building stormwater control facilities, watershed scale stormwater planning, water quality monitoring of stormwater and streams, public education and outreach, development and enforcement of water quality regulations, coordination with other municipalities, and maintenance of the county's stormwater system.

Stormwater and the NPDES Permit

Much of the pollution in Washington State's waters comes from many different, hard-to-trace sources with no obvious point of collection and discharge. It is called "nonpoint source pollution" and it travels to our streams, lakes, and other water bodies through polluted stormwater runoff carried by the county's storm sewer system.

Most U.S. cities and counties that collect stormwater runoff in municipal separate storm sewers and discharge it to surface waters are required to obtain a permit under the federal Clean Water Act. Clark County qualifies under the Environmental Protection Agency (EPA) stormwater regulations for the National Pollutant Discharge Elimination Systems (NPDES) Phase I Municipal Stormwater Permit program. In Washington State,

EPA has delegated the Washington Department of Ecology (Ecology) the authority to develop and administer the NPDES permitting program.

Ecology issued a NPDES Phase I Municipal Stormwater Permit to Clark County and other western Washington jurisdictions in August 2012 with an effective date of August 1, 2013. This permit is for a five-year period expiring on July 31, 2018, when it is expected that Ecology will issue a revised permit.

Phase I permittees are cities and counties that operate large and medium municipal separate storm sewer systems (MS4s). Governmental bodies within their boundaries, such as state universities, public school districts and drainage districts, are also required to meet permit requirements. The permit regulates discharges to waters of Washington State from the permittees' MS4s in compliance with Washington Water Pollution Control Law (Chapter 90.48 RCW) and the federal Clean Water Act (Title 33 USC, Section 1251 et seq.).

Permit Compliance

The NPDES Permit prescribes a variety of requirements and actions. It lists 21 general conditions; these include, among others, a requirement to notify Ecology of spills, a duty to avoid bypassing water quality treatment and flow control facilities, and a requirement to notify Ecology of a failure to comply with the permit.

The permit also lists nine special conditions that, among other things, specify permit coverage, list permittee responsibilities, and under Special Condition S5, prescribe a ten-component stormwater management program (SWMP).

The SWMP consists of actions meeting the ten required components and any additional actions and activities necessary to comply with Total Maximum Daily Load (TMDL) requirements. Clark County's SWMP is designed to reduce pollutant discharges to the federal maximum extent practicable (MEP) standard, meet state requirements for managing stormwater using all known, available, and reasonable methods of prevention, control and treatment (AKART), and protect water quality.

The county is required to prepare a stormwater management program plan to inform the public of planned program activities for the upcoming calendar year. The SWMP plan must be updated at least annually to include any program changes or revisions that occur and be submitted in part or in whole with the annual report to the Department of Ecology.

The Clark County Stormwater Management Plan and Stormwater Management Program

This *Clark County Stormwater Management Plan* (*CCSWMP*) encompasses efforts undertaken by Clark County, primarily in the Department of Environmental Services Clean Water Program, for the protection and monitoring of water quality and the management of stormwater and related concerns. The *Plan* includes, as chapter 2, the NPDES stormwater management program required by Ecology.

The Clean Water Program

The Clean Water Program (CWP) in Clark County's Department of Environmental Services is responsible for a majority of the county's NPDES compliance actions and activities, coordination and reporting. The program coordinates with a variety of county departments to achieve and facilitate compliance. The CWP is the primary author of reports and other documents required by Ecology.

In addition to activities addressing NPDES Permit compliance and surface water resource management, the CWP manages other important stormwater-related activities, including registering and managing stormwater injection wells regulated under the state's Underground Injection Control Rules (173-218 WAC) pursuant to the federal Safe Drinking Water Act, and giving engineering advice and support on flooding and drainage problems.

Funding & Budget

The Clean Water Program is funded primarily by an annual stormwater fee charged to developed parcels in the unincorporated area of the county. The county collects approximately $5.19 million annually from approximately 68,103 rate payers. Other sources of funding may include grants and the General Fund. The Road Fund provides support for stormwater management associated with county roadways.

Clean Water Fee

Residential and multifamily properties pay a fee based on each residential unit. Commercial properties, roads, churches, and schools are assessed a fee based on the number of ERUs measured on the parcel.

In July 2014, the Board of County Councilors adopted an update to the Clean Water Fee. Updated fees will take effect in 2015 tax bills. The fee varies for residents in the Urban Growth Boundary versus rural areas. The program also includes an annual surcharge of $5 on each base unit for 2015 through 2019 to cover lawsuit settlement costs.

Per Clark County Code 13.30A, fee revenues are used to fund stormwater management activities.

Clean Water Fund

Revenues from the Clean Water Fee, from grants awarded to the Clean Water Program, and from fines are deposited into the Clean Water Fund by the Clark County Treasurer. Revenues in excess of annual operating expenses for maintenance, repair, enforcement, assessment, monitoring, and education remain in the fund balance for use in constructing new public storm sewer infrastructure or in retrofitting inadequate facilities.

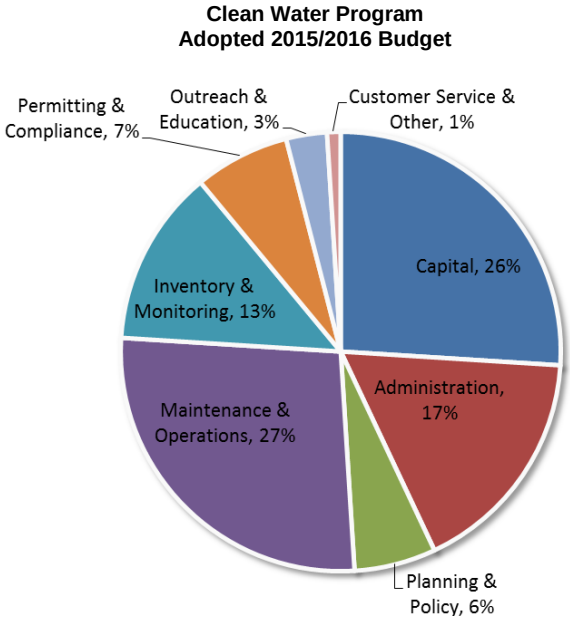
Budget

Clark County budgets on a two-year cycle. The Clean Water Program budget is set at the beginning of each cycle and modified, if necessary, through requests for additional appropriations from the Clean Water Fund during the biennium.

The budget is approved by the elected Board of Clark County Councilors (BOCC). The BOCC sets the Clean Water Program budget in response to state priorities, expressed through the NPDES Municipal Stormwater Permit, and local priorities.

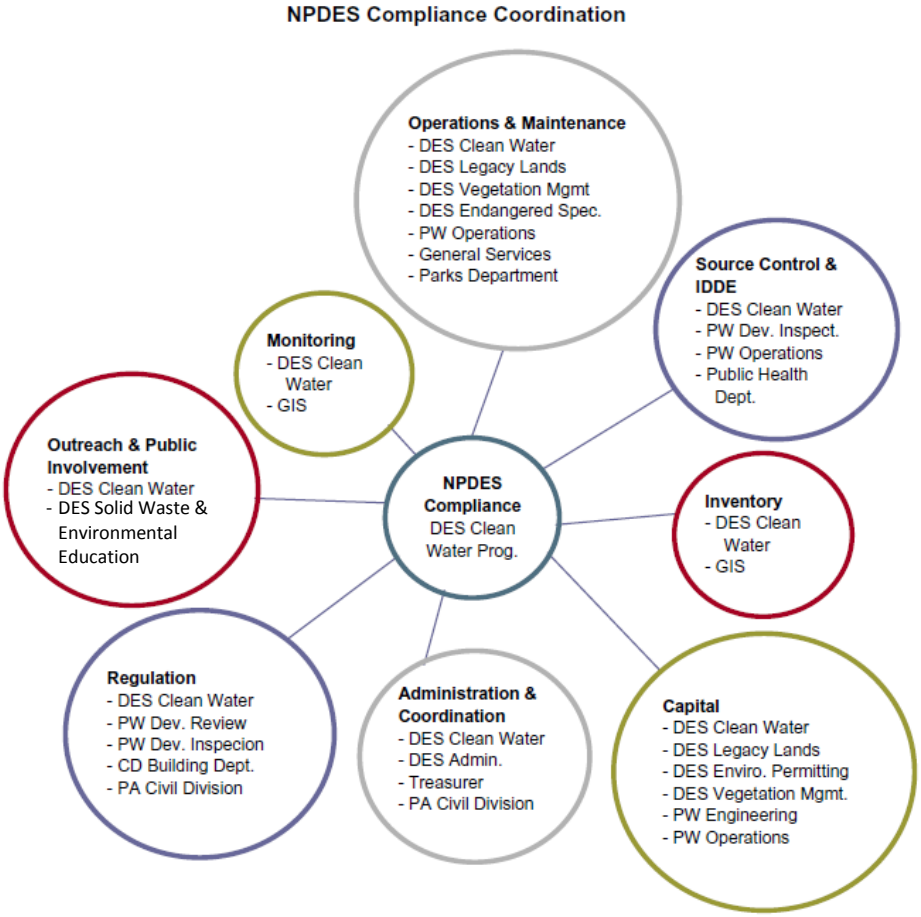
Areas of greatest expenditure include stormwater capital construction, maintenance and operation of storm sewer infrastructure, watershed scale stormwater planning and assessment and monitoring of surface water and stormwater.

In recent years, a focus on building new stormwater facilities in under-served areas and on enhancing existing facilities has increased the overall budget and the proportion dedicated to capital construction. During the 2015-2016 biennium, an additional $1.5 million is expected to be spent on new permit requirements for code revisions and watershed planning.



Organization & Staffing

The Clean Water Program employs a staff of 16 scientists, engineers, technical specialists, program coordinators and administrators who perform essential stormwater management functions. The program also coordinates with other county departments for additional essential stormwater services that fit within those department's core services. This organizational structure allows the Clean Water Program to minimize expenses by engaging technical and professional experts such as design engineers, road maintenance crews, and educators employed by other county departments to complement a core staff of stormwater specialists.



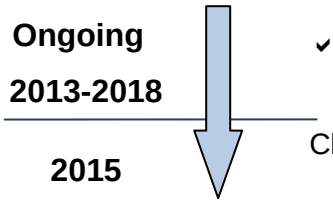
CD = Community Development Department
DES = Department of Environmental Services
GIS = Geographic Information Systems Department
PA = Prosecuting Attorney
PW = Public Works Department

Clean Water Program staff is directly responsible for storm sewer system inventory; source control inspections; illicit connection and discharge inspections; stormwater

capital planning; coordination with other jurisdictions and entities; and surface water and stormwater assessment and monitoring.

The program coordinates with other county departments to collect and process the Clean Water Fee; operate, inspect and maintain the storm sewer system; manage the design and construction of stormwater capital improvements; enforce development and building regulations related to NPDES Permit compliance; inform and educate the public about stormwater problems and solutions; and support the Clean Water Program with database programming and analysis.

County departments are responsible for complying with NPDES Permit requirements in their operational activities under the adopted stormwater plan and by interdepartmental agreements.



- ✔ The Clean Water Program administers the NPDES Municipal Phase I Stormwater Permit for Clark County

Clark County will administer an increase in the Clean Water Fee program to increase revenues

FOR MORE INFORMATION ON THE COUNTY'S CLEAN WATER PROGRAM, CONTACT:

JEFF SCHNABEL, CLEAN WATER PROGRAM MANAGER, 397-2121, X4583
Jeff.Schnabel@clark.wa.gov

Chapter 2
Stormwater Management Program

Turbid flow from Cougar Creek into Salmon Creek

Section 1
Legal Authority

Regulatory Requirements Summary

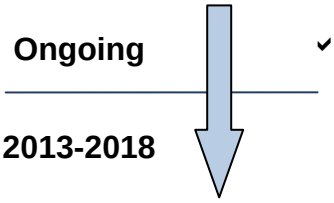
NPDES Permit S5.C.1 – Legal Authority	The NPDES Permit requires the county to demonstrate that it has the legal authority to control discharges to and from its municipal separate storm sewer system (MS4).

Legal Authority to Regulate

Clark County maintains the legal authority required by the permit to control discharges to and from its MS4.

Clark County Code Chapter 13.26A – Water Quality	Chapter 13.26A prohibits illicit discharges and spills into the county's MS4, requires the control of industrial site runoff, and adopts source control requirements in the *Clark County Pollution Control Manual*. It maintains the county's authority to inspect and enforce its provisions.
Clark County Code Title 32 – Enforcement	Title 32 permits Clark County to enforce any of its civil codes through inspection, surveillance, monitoring, and enforcement actions.
Clark County Code Title 40 – Unified Development Code	Title 40 contains a suite of requirements regulating the design, construction, and operation of stormwater controls on development and re-development sites that will discharge to the MS4 or to waters of the state. Stormwater and erosion control measures are outlined in Chapter 40.385.
Legislative Authority of the Board of Clark County Councilors	Through the legislative authority of the Board of Clark County Councilors (BOCC), Clark County has the ability to enter into contracts and intergovernmental agreements with other permittees and secondary permittees for the purpose of controlling pollutants entering or leaving the county MS4.

TIMELINE



- Maintain legal authority to control discharges to and from the MS4

FOR MORE INFORMATION ON THE COUNTY'S LEGAL AUTHORITY TO CONTROL DISCHARGES TO AND FROM THE MS4

JEFF SCHNABEL, CLEAN WATER PROGRAM MANAGER, 397-2121, X4583
JEFF.SCHNABEL@CLARK.WA.GOV

Section 2
Inventorying and Mapping the Storm Sewer Infrastructure

Clark County operates a municipal separate storm sewer system (MS4) within unincorporated Clark County. This system includes stormwater drainage ditches and pipes in county right-of-way and county-operated conveyances on easements.

An MS4 is a conveyance or system of conveyances that meets all of the following criteria:

1. Owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.
2. Designed or used to collect or convey stormwater (including storm drains, pipes, ditches, etc.).
3. Not a combined sewer.
4. Not part of a publicly owned treatment works (sewage treatment plant).

A related type of infrastructure used to manage stormwater is a Class V stormwater injection well, which allows stormwater to be disposed directly into the ground instead of to a surface water body.

Clark County inventories and maps its storm sewer infrastructure and Class V injection wells to serve a variety of purposes. The inventory is a primary source of information for inspection, operation and maintenance of the MS4, illicit discharge detection and removal, drainage and source control support, stormwater assessment and monitoring, and capital planning.

Clark County administers a comprehensive program to inventory the storm sewer system in a geographic information system (GIS) database called *StormwaterClk*. All known existing infrastructure has been inventoried and mapped. An ongoing program inventories and maps storm sewer infrastructure built in the course of development and public capital improvement projects. The inventory includes all stormwater infrastructure inside of and outside of the county MS4, including:

- Flow control and water quality treatment facilities
- UIC-regulated Class V injection wells
- County outfall locations
- Conveyances (pipes, ditches, and culverts)
- Interconnections with other municipal systems
- Connections to the county MS4

Regulatory Requirements Summary

NPDES Permit – S5.C.2. Municipal Separate Storm Sewer Mapping and Documentation

The NPDES Permit requires the county to map and document components of the MS4 including stormwater control facilities, receiving waters, , and land uses within the MS4.

Chapter 173-218 WAC – Underground Injection Control (UIC) Program

Pursuant to Chapter 90.48 RCW, Washington Administrative Code requires owners of Class V injection wells (underground drywells and infiltration trenches with perforated pipes that dispose stormwater into the ground) to comply with regulations designed to protect groundwater quality for use as public water supplies. Clark County owns approximately 2,200 wells that are regulated under this rule.

County Policies, Rules and Regulations

Clark County Code Chapter 40.385 – Stormwater and Erosion Control

Chapter 40.385 describes county regulations for ownership of stormwater facilities and the lands on which they are located. Section 40.385.040 sets forth requirements to submit record drawings for completed projects. Section 40.385.020 sets forth requirements to document facility ownership.

Section 40.385.020 requires developers to register Class V underground injection wells that manage stormwater with the Department of Ecology and to notify the county prior to use.

Section 40.385.040 requires developers to submit record drawings to the county prior to 1) the issuance of building permits for single-family/duplex residential subdivisions, 2) the issuance of occupancy permits for site plan reviews (commercial development), and 3) within sixty days following completion of construction for other types of development.

Clark County Code Chapter 40.540.070 – Final Plat

Chapter 40.540.070 describes county regulations for information about dedications and easements for utilities that must be contained on a plat.

Revised Code of Washington Chapter 58.17.165 – Plats – subdivisions – dedications

Washington state code prescribes information that must be shown on a plat when land is subdivided, including dedications of roadways and utilities and stormwater easements, tracts, or lots.

Public Project Record Drawings Policy

Clark County Public Works Engineering Program maintains a policy for the preparation and distribution of record drawings, also known as as-built drawings, after completion of county capital improvement projects such as roads, parks, and stormwater facilities.

TOOLS

StormwaterClk

Clark County Environmental Services maintains a stormwater database called *StormwaterClk* within its GIS. The database is administered by the GIS Department, while data is maintained and updated by the Clean Water Program.

Tidemark

Clark County Community Development and Public Works maintain *Tidemark*, a database of regulatory and enforcement cases, including permits for land division and development projects.

Annexation Tracker

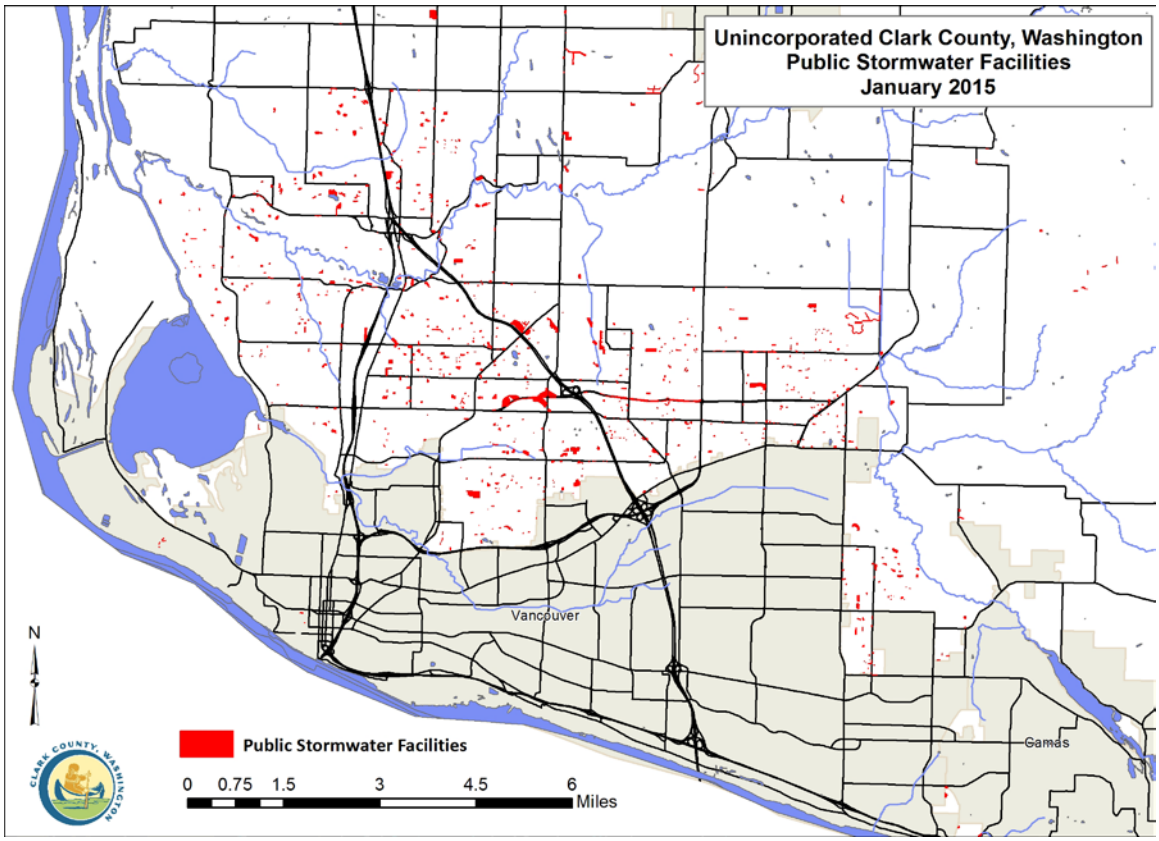
Annexation Tracker is an application developed by the GIS Department that helps county departments track annexations.

On-going Inventory and Mapping

Purpose

Clark County maps and inventories stormwater treatment and control infrastructure because an accurate and complete inventory is critical to a successful program to inspect, maintain and regulate stormwater conveyances, detention facilities, and water quality facilities.

As part of the process, new outfalls, Class V injection control wells, and connections also are documented.



Clark County has been inventorying the MS4 in a GIS since 1999

Responsibilities Matrix

Task	DES CWP Mgr	DES CWP Infrastructure Mgr	DES CWP Eng. Tech	PW Dev. Engineering Planning Tech	PW Dev. Engineering Manager	PW Construction Management Engineer	PW Construction Mgmt. OA	PW Construction Manager	PW Engineering Program Manager	PW Survey	PW Real Property Services
Notify CWP of new private development completion	O	O	I	P	A	O	O	O	O	O	O
Notify CWP of new county capital improvement project physical completion	O	O	I	O	O	O	P	A	O	I	O
Notify CWP of new county capital improvement project final acceptance	O	O	I	O	O	O	P	A	O	I	O
Gather project information	A	S	P	C	O	C	O	O	A	C	C
Notify CWP of county project As-built location	O	O	I	O	O	S	O	S	O	A/P	O
Make final decision on maintenance owner	A	S	S	O	P	C	O	O	O	C	C
Inventory/ Map infrastructure	A	O	P	O	O	O	O	O	O	O	O
Track progress	A	S	P	O	O	O	O	O	O	O	O
Transfer information to Operations	A	S	P	O	O	O	O	O	O	O	O

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

Background

Most stormwater infrastructure and conveyances in the county are built by the private sector during residential and commercial development. Other facilities are built by the county to retrofit previously developed areas or to handle runoff from new roads, parks, and other construction projects. The Clean Water Program builds some stormwater facilities to retrofit developed areas that lack adequate flow control or treatment. (See County Capital Improvements on page 62.)

After a project is constructed, Clean Water Program staff inventory the new facility and its related conveyance infrastructure including pipes, catch basins and connections in *StormwaterClk.*

Notification and Tracking

The first step of inventorying is becoming aware that a new development or county project, potentially with stormwater infrastructure, has been completed. Clean Water Program staff will receive different notifications depending on the source of the project (see below).

Upon receipt of a notification, the Clean Water Program engineering technician in charge of stormwater inventory will begin tracking the project. The engineering technician will create a folder for the project on the Clean Water Program's network drive, where copies of relevant documents relating to the project's storm sewer infrastructure will be stored.

Private Sector Projects Notification

The Public Works Development Engineering planning technician will notify the Clean Water Program engineering technician that a new residential or commercial development has been completed by forwarding a copy of the completion of construction letter sent to the developer.

In some cases, the first notification to the Clean Water Program may be a different document, such as notice of a plat recording. In those cases, the engineering technician will begin tracking the project as documented above.

County Projects Notification - Physical Completion

The Public Works Engineering Program Construction Management section will notify the engineering technician that a new public project is physically complete as a copy of the letter sent to the construction contractor. At this stage, the project's stormwater facilities are functional and should be added to StormwaterClk using the best available information.

Notification of Existing Projects

Infrequently, the engineering technician will discover engineering drawings or other evidence of an existing project that does not appear in the inventory. In those cases, the engineering technician will begin the mapping process as though it were a new facility by researching information about the project (see below), potentially using legacy data storage systems not discussed here.

Research

The engineering technician will research and assemble relevant documentation about the project from various sources, including Public Works Development Engineering and the Auditor.

To inventory and map the stormwater infrastructure, the engineering technician needs:

- Engineering drawings of the project
- For private sector projects, the preferred source is a record drawing (sometimes also called an as-built). An acceptable alternate source is an approved construction plan.
- For county projects, the preferred source is a record drawing; however, most projects will be documented initially from the final construction plan with as-built notes from the construction manager.
- Geographic location of the infrastructure.
- Maintenance responsibility for the infrastructure.
- Ownership of tracts or parcels containing the facilities, if any.
- Location of easements containing the facilities and related infrastructure, if any.

Finding documentation may take several steps, outlined below.

Locate and Verify Engineering Drawings

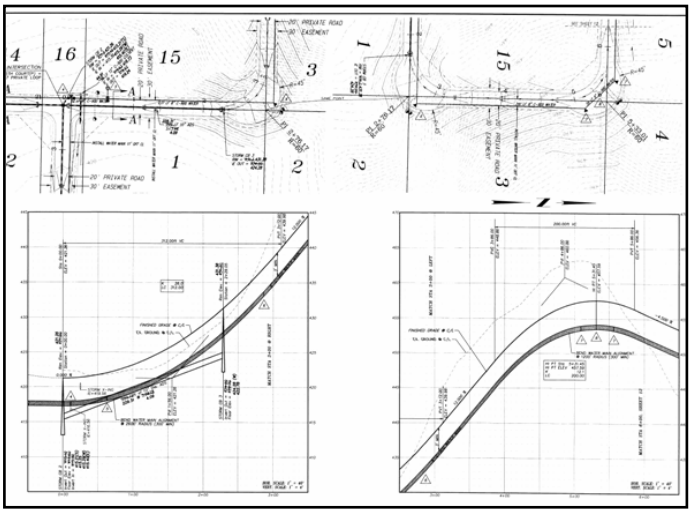
For private sector projects, record drawings are submitted by the private developer to the Development Engineering program. The engineering technician is then notified of the availability of record drawings.

For county capital improvement projects, Public Works Survey section maintains electronic copies of county projects and places them on the county Olympus server where they are accessible to the engineering technician. In cases where record drawings are not available, the engineering technician will verify the accuracy of construction as-built plan notes by the construction manager.

Select Sheets

Once engineering drawings have been located, the engineering technician will review the entire plan set and select sheets relevant to the storm system from the set. Relevant sheets may include:

- One or more plan views of the storm system and facilities (variously called storm sewer plan, street and storm plan, drainage plan, utility plan, or similar name).
- One or more profile views of the storm system and facilities.
- One or more detail views of particular storm system components.



The engineering technician will scan selected paper sheets or copy selected sheets of electronic engineering drawings to the project's folder on the Clean Water Program's network directory.

Determine Ownership and Maintenance Responsibility

The engineering technician will look for several types of information, including:

- The party responsible for maintaining the stormwater infrastructure.
- The owner of parcel(s) underlying any treatment or flow control facilities.
- The existence of easements for access to stormwater facilities and conveyances.

Responsibility for maintaining facilities may change over time. At this stage, the engineering technician will determine the current maintenance responsibility.

The engineering technician will evaluate information on the plat, final site plan, engineering drawings, and other documents as necessary to determine maintenance responsibility of the facility and ownership of the parcel, if any, on which it is sited.

If the engineering technician cannot determine maintenance responsibility due to conflicting or missing information, then the Clean Water Program manager will make the determination.

Inventory and Map (Digitize)

The engineering technician will find the project's location in the GIS. Using the assembled information, the technician will digitize the project's stormwater facility or facilities and related infrastructure, such as conveyance and drywells, in *StormwaterClk.*

The engineering technician also will enter attributes of storm system features in the database. Attributes are unique to each feature type. Some of the most important attributes that are common to most types of features include:

- Subwatershed (auto-populated)
- Custodial county department
- Service status
- Installation date
- Elevations
- Dimensions (pipe diameter, length, etc.)
- Facility name (for facility polygons only)
- Serial number of the parcel containing the facility (if relevant)

Transfer Information

Information in *StormwaterClk* is routinely uploaded electronically into the Public Works Maintenance Management System (MMS) database which is used to track and schedule inspection and maintenance activities for stormwater infrastructure.

Outputs

- Updates to *StormwaterClk*

OTHER PERMIT-REQUIRED MAPPING/INVENTORY

Background

The NPDES Permit requires both continuation of ongoing inventory/mapping activities (S5.C.2.a) and completion of several additional mapping tasks no later than December 31, 2017 (S5.C.2.b).

Specific requirements under permit section S5.C.2.a are addressed through already completed mapping efforts and the ongoing inventory and mapping program includes updates as new development is inventoried.

Most new mapping requirements under S5.C.2.b are addressed through already completed mapping efforts; additional efforts to address specific requirements are described below.

Responsibilities Matrix

Task	DES CWP Mgr	DES CWP Infrastructure Mgr	DES CWP Eng. Tech	Assessment and GIS Department
Map land use	O	O	O	A/P
Map connections to tributary conveyances	O	A	P	O
Map connections between BMPs and tributary conveyances	Completed – updated as needed (DES CWP Eng Tech)			
Map receiving waters	* Completed *			
Map areas not draining to outfalls	* Completed *			
Map outfall catchments	Completed – updated as needed (DES CWP Eng Tech)			
Map tributary conveyances	Completed – updated as needed (DES CWP Eng Tech)			
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted				

Procedures

Map Tributary Conveyances

Clark County completed an inventory of the conveyance system in early 2010.

Map Connections to Tributary Conveyances

No later than December 31, 2017, connections equal to 8 inches nominal diameter to tributary conveyances will be mapped. This effort primarily involves mapping private road ditch connections to public road ditches, and applies only to areas within the UGA where the public ditch leads to an outfall with nominal diameter of at least 24".

Map Connections between BMPs and Tributary Conveyances

Existing connections between BMPs and tributary conveyances are mapped, and new connections will be mapped as part of the ongoing inventory and mapping program.

Map Outfall Catchments

In 2010, the Clean Water Program completed mapping catchments to most outfalls. This includes nearly 500 outfalls, most of which are smaller than 24" nominal diameter. Catchments to new outfalls will be mapped as outfalls are added.

Map Outfall Land Use

Known outfalls are mapped, and new outfalls will be mapped as part of the ongoing inventory and mapping. Outfall catchments for most of the Urban Growth Areas

(UGAs) are now mapped. As a result of Clark County's function as a land use regulator, the Clark County Assessor maintains land use data at the parcel scale in a GIS.

To produce a map of land uses for outfalls, Clean Water Program staff or GIS Department staff will overlay land use data with outfall catchments in the GIS upon request or as needed.

Map Areas Not Draining to Outfalls

In 2010, the CWP and GIS Department mapped areas served by the MS4 that do not drain to surface water.

Outputs

- Updated inventory of Stormwater infrastructure in *StormwaterClk*
- Inventory of connections to tributary conveyances in *StormwaterClk*

INVENTORY QUALITY ASSURANCE AND REPORTING

Purpose

To assure accuracy of data in *StormwaterClk*, Clark County will periodically assess the data using various methods.

Responsibilities Matrix

Task	DES CWP Mgr	DES CWP Infrastructure Mgr	DES CWP Eng. Tech	Assessment and GIS Department
Ongoing Data Updates	A	S	P	O
Reporting	A	S	P	S
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted				

Ongoing Data Updates

The CWP Infrastructure Manager and the Engineering Technician will routinely and periodically verify accuracy of stormwater infrastructure in the GIS as annexations occur and as more accurate project plans are produced or discovered.

Annexation Updates

Annually, the engineering technician will check *Annexation Tracker* to determine if stormwater infrastructure has been annexed to a city. The engineering technician will change facility ownership attributes and update county MS4 municipal connection points in *StormwaterClk* where infrastructure has been annexed.

The engineering technician also will provide Public Works Real Property with a list of county-operated stormwater facilities annexed into each city. A real property agent or a real property assistant will have responsibility for ensuring that property records are updated with the Assessor and for notifying the annexing municipality.

Ongoing Corrections

As possible mistakes in inventory data or needed revisions are discovered, the engineering technician will keep a list of possible corrections, then periodically research and, if necessary, correct *StormwaterClk*. Possible sources of discovery include discovery by Public Works Operations & Maintenance personnel, annual stormwater facility inspectors, and discovery by Clean Water Program engineers.

Reporting

Inventory status is updated quarterly as part of Clean Water Program performance measure reporting established in 2010.

Outputs

- Data updates in *StormwaterClk*
- Reports from *StormwaterClk*

UNDERGROUND INJECTION CONTROL (UIC) REGISTRATION

Purpose

Pursuant to the Safe Water Drinking Act and Chapter 90.48 RCW, Washington Administrative Code 173-218 requires new UIC-regulated stormwater disposal wells, also called Class V injection wells, to be registered with the Department of Ecology prior to construction.

Responsibilities Matrix

Task	DES CWP Infra. Mgr	DES CWP Eng. Tech	DES CWP Engineer	PW Project Mgr	PW Const. Mgr.	Applicant	PW Dev Eng Mgr
Map new Class V injection wells	A	P	O	O	O	O	O
Locate unregistered Class V injection wells	A	P	I	O	O	O	O
Submit private project registrations to Ecology	O	O	O	O	O	P	A
Submit public project registrations to Ecology	O	O	O	P	A	O	O
Update registration status in *StormwaterClk*	A	P	O	O	O	O	O
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted							

UIC registration for County projects

For County projects that include new UICs, the PW Project Manager will register the UICs with the Washington Department of Ecology. Registration materials must be submitted to Ecology prior to construction. Registrations are verified prior to construction by the PW Construction Manager at the pre-construction conference.

The DES CWP Engineering Technician will add new UICs to *StormwaterClk* upon project completion as part of ongoing inventory and mapping activities.

UIC registration for private projects having public UICs

For privately-built projects that include new UICs in the public ROW or that are intended to be turned over to the County, the developer will register the UICs with the Washington Department of Ecology. For all such UICs, Clark County will be designated the owner on the registration form. Registration materials must be submitted to Ecology prior to construction.

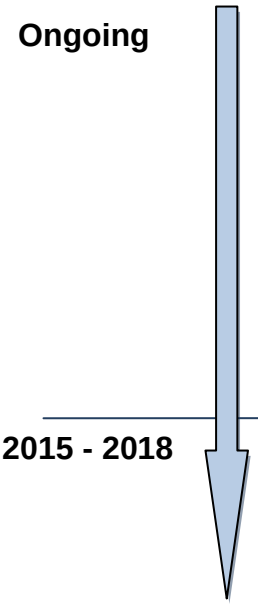
When a developer submits plans for review, Development Engineering staff will confirm if UIC-regulated systems are included, and inform the applicant of registration requirements. Registrations are verified prior to construction by Development Engineering at the pre-construction conference.

The DES CWP Engineering Technician will add new UICs to *StormwaterClk* upon project completion as part of ongoing inventory and mapping activities.

Outputs

- Updates to *StormwaterClk*

TIMELINE



Ongoing

- ✔ Map all known MS4 outfalls and receiving waters, and structural stormwater treatment and flow control BMPs operated by Clark County
- ✔ Map connection points between the MS4 and other municipalities
- ✔ Map existing 8" and greater connections to the MS4
- ✔ Map tributary conveyances and associated drainage areas
- ✔ Map geographic areas served by the MS4 that do not drain to surface water
- ✔ Map connections between BMPs and tributary conveyances

2015 - 2018

- ❑ Continue ongoing inventory and mapping
- ❑ Map connections to tributary conveyances

FOR MORE INFORMATION ON MAPPING THE MS4

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Section 3
Operating and Maintaining the Storm Sewer System, County Property and Roadways

The county inspects and maintains storm sewer infrastructure to maintain its ability to convey, detain, infiltrate, and treat stormwater. Clark County also manages its properties and roadways to reduce stormwater impacts from potential pollutant sources such as erosion, fertilizers, and pesticides.

County crew replacing filters in a stormwater filter vault system

Regulatory Requirements Summary

NPDES Permit – S5.C.9 Operations and Maintenance

The NPDES Permit requires the county to manage its maintenance activities and regulate non-county stormwater facilities to prevent or reduce stormwater impacts. The program must include:

- Maintenance standards and schedules for public and private stormwater facilities.
- Street operation and maintenance practices that reduce stormwater impacts.
- Policies and procedures to reduce pollution from pesticides, herbicides, and fertilizers used by the county.
- Operational practices that reduce stormwater impacts for equipment yards and storage facilities.
- Staff training.

Stormwater Management Manual for Western Washington

The permit requires the use of source control BMPs equivalent to Volume IV of the *Stormwater Management Manual for Western Washington* (Ecology, 2012) (*SMMWW*).

The permit also requires a stormwater facility maintenance inspection program equivalent to Chapter 4 of Volume V of the *SMMWW*.

Chapter 173-218 WAC – Underground Injection Control (UIC) Program

Pursuant to Chapter 90.48 RCW, Washington Administrative Code requires the county to comply with regulations controlling the discharge of fluids, such as stormwater, into Class V injection wells. Examples of wells that handle stormwater include drywells and infiltration trenches. The stormwater management program addresses the UIC Program requirement to maintain and address pollutant sources.

Endangered Species Act 4(d) Rule

The federal Endangered Species Act prohibits "take" of threatened or endangered salmon. Take is harassment, harm, wounding, or killing of an ESA-listed salmon, or harming the critical habitat upon which it depends. The 4(d) rule directly prohibits take without authorization. However, the prohibition is limited under 13 different programs that describe procedures and processes by which an activity may be conducted to contribute to the conservation of the species overall. Road maintenance is an activity that, when

conducted according to the Regional Road Maintenance Forum guidelines, is certified by National Marine Fisheries Service to contribute to the conservation of listed salmon.

County Policies, Rules and Regulations

Clark County Code Chapter 40.385 – Stormwater and Erosion Control

Chapter 40.385 requires newly constructed stormwater treatment facilities to be maintained in accordance with the county *Stormwater Facility Maintenance Manual*, and it gives the county authority to inspect privately-operated facilities for compliance.

The chapter also requires ownership and maintenance responsibility of private facilities to be noted on subdivision final plats.

Clark County Code Chapter 13.26A – Water Quality

Chapter 13.26A requires inspection and maintenance of all public and private stormwater facilities and Class V injection wells in accordance with the *Stormwater Facility Maintenance Manual*, and adopts the *Clark County Stormwater Pollution Control Manual* that provides BMPs for business and public agency activities such as materials handling, landscape management, trash management and building exterior maintenance.

Stormwater Facility Maintenance Manual

The Clark County *Stormwater Facility Maintenance Manual* (2009) adopts maintenance standards for public and private stormwater facilities equivalent to the *SMMWW*.

Clark County Stormwater Pollution Control Manual

The *Clark County Stormwater Pollution Control Manual: Best Management Practices for Businesses and Government Agencies* (2009) adopts source control and treatment standards for public and private properties equivalent to Volume IV of the *SMMWW*.

Enforcement Procedures for Un-maintained Private Stormwater Facilities

Clark County Clean Water Program has a written procedure for responding to non-compliant private regulated stormwater facilities.

Environmentally Responsible Purchasing Policy

Clark County adopted its Environmentally Responsible Purchasing Policy in 2004. One element addresses purchase of landscaping and vegetation maintenance products, including pesticides. The policy establishes a set of criteria, any of which will disqualify a pesticide from purchase, and a waiver system, allowing chemicals with no equivalent that is more environmentally-friendly to be used within specific limiting guidelines.

ESA Regional Road Maintenance Forum

Clark County Public Works has been a member of the ESA Regional Road Maintenance Forum since 2003. The group assisted the county in developing a regional road maintenance program designed to meet the requirements of the Endangered Species Act (ESA). In 2004, NOAA Fisheries approved the program and determined that it was compliant with the ESA 4(d) rule. The program seeks to protect salmon and steelhead by relying on the extensive use of pre-approved BMPs for routine maintenance activities.

TOOLS

Maintenance Management System (MMS)

The *Maintenance Management System* (MMS) is a database operated by Public Works for tracking infrastructure assets, recording condition, and scheduling inspections and maintenance. The MMS was implemented in 2011 and continues to evolve. The MMS will be used to prioritize, schedule, and track stormwater infrastructure inspections and maintenance by Public Works crews, as well as track asset condition.

For stormwater facilities and related infrastructure, the inventory in MMS is provided directly from *StormwaterClk* (see Inventorying and Mapping the Storm Sewer System on page 12).

INSPECTIONS

Purpose

Clark County inspects both county-owned and regulated non-county stormwater facilities to evaluate condition and function and to determine if maintenance or repairs are warranted. In the case of regulated non-county facilities, follow-up actions include technical support to the BMP owner and, in some cases, enforcement.

Responsibilities Matrix

Task	DES CWP Infrastructure Mgr	DES CWP Admin	DES CWP Eng. Tech	PW Construction Management OA	PW Construction Management Supervisor	PW Construction Management Inspectors	PW Ops Road Crews	PW Ops Road Super
Inspect Regulated Facilities	I	O	S	S	A	P	O	O
Inspect Facilities During Heaviest Home Construction	I	S	S	S	A	P	O	O
Inspect County-owned Facilities	I	O	S	S	A	P	O	O
Inspect Catch Basins	I	O	S	O	O	O	P	A
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted								

Inspect Regulated Facilities

Regulated facilities are treatment and flow control facilities owned and operated by private parties and non-county governmental bodies. Clark County will annually inspect at least 80% of regulated stormwater treatment and flow control facilities.

County responsibility for inspecting regulated facilities will begin at issuance of the completion of construction letter by Public Works Development Engineering. (See Regulatory Program for Development, Redevelopment, and Construction Projects on page 74.)

For facilities not in compliance with maintenance standards, the county will follow procedures to compel compliance through follow-up and enforcement actions if needed.

Track and Schedule Annual Inspections

Public Works Construction Management will use MMS to schedule and track regulated facility inspections.

Inspection

Inspections will be completed by Public Works Construction Management engineering technicians. The inspectors will compare facility condition with maintenance standards from the *Stormwater Facility Maintenance Manual*.

Contact Owners of Non-Compliant Facilities

If an inspection shows that a facility is out of compliance, the lead engineering tech will send a mailing to the owner(s) and/or responsible party. The mailing packet will include:

Facility inspection

- Introductory letter.
- Property identification.
- Postcard to return for technical assistance.
- Facility defect report.
- *Managing Stormwater Facilities* pamphlet with links to additional information.

Recipients will be referred to Construction Management for questions or problems.

Facility ownership or Homeowner Association leadership may change. In some cases, no viable Homeowner Association exists. Construction Management will refer these facilities to the Clean Water Program source control specialist.

Contact Owners of Compliant Facilities

If an inspection shows that a facility is compliant, the owner will be sent a postcard stating that the facility is compliant and thanking them.

Follow-Up Technical Assistance

The Construction Management inspectors will educate and assist owners who reply to the initial letter by giving advice on maintenance, including referrals to the City of Vancouver Small Works Roster for construction and maintenance companies. The assistance may include phone calls, additional correspondence and site visits. The inspector will facilitate compliance and use professional judgment to set deadlines for compliance activities.

Facilities that are not compliant after deadlines will be referred to the Clean Water Program source control specialist for further action. At this point, the case is entered into *Tidemark* as a code enforcement case.

Further Enforcement

If the owner or owners of a non-compliant facility are unresponsive, then the source control specialist will refer the case to the code enforcement officer.

The code enforcement officer will use progressive enforcement methods, terminating with a Notice and Order and issuance of fines and liens in cases of severe non-compliance.

Alternate Compliance Strategy

The county retains the option of maintaining the facility and billing the owner at any point after an inspection demonstrates that a facility is out of compliance.

Compliance Tracking

Public Works Construction Management will update facility records in the MMS with compliance information on a regular basis, including inspection results, contact information and other relevant facility information. A spread sheet system tracks correspondence to regulated facility owners and assistance provided. Follow-up and enforcement actions will be tracked by the Clean Water source control specialist and entered into *Tidemark* as code enforcement cases.

Facility Ownership Transfer

While it rarely occurs, the county has a policy, criteria and procedures for accepting ownership of private stormwater facilities serving residential subdivisions. Facilities must meet county maintenance, safety and access standards before acceptance.

Inspect Facilities During Heaviest Home Construction

Clark County will inspect permanent stormwater treatment and flow control facilities, including catch basins, in new residential developments every six months during the period of heaviest construction. The NPDES permit defines the period of heaviest construction as the time until 90 percent of the lots are built-out (see condition S5.C.9.b).

Create and Maintain Inspection List

The Clean Water Program office assistant will maintain a spreadsheet of potentially relevant subdivisions from *Tidemark*, including the number of lots in the subdivision and the number of lots having active building permits. The Clean Water Program office assistant will forward the list to the Public Works Construction Management inspection lead.

Schedule Inspections

The Public Works Construction Management lead inspector will consult the spreadsheet monthly and schedule project sites requiring inspection for the following month. Any subdivision with less than 90 percent of the lots built out will be scheduled. The Public

Works Construction Management lead inspector will schedule future six-month inspections for each project using the spreadsheet.

Inspection

Public Works Construction Management inspectors will inspect project sites using standards from the *Stormwater Facility Maintenance Manual* and fill out a paper field inspection sheet printed from the MMS.

Track Inspections

The Public Works Construction Management inspector or office assistant will enter the inspection results into Tidemark under the DIN (development inspection number). The electronic field inspection form is attached to the DIN case.

If the project is past warranty and owned by Clark County, the results will be entered into the MMS.

Enforcement

The method used to enforce maintenance compliance of a facility found to be out of compliance will depend on its ownership.

When a private facility or catch basin is out of compliance, the standard process for enforcement on a regulated facility will be followed.

When a county-owned facility or catch basin on maintenance warranty is out of compliance, the inspector will refer the violation to the Public Works development inspector assigned to that development project.

When a county-owned facility or catch basin is out of compliance after the warranty period, the facility will be treated as any other county-owned facility.

Inspect County-owned Facilities

The Clark County Public Works Construction Management Program annually will inspect at least 95% of county-owned stormwater treatment and flow control facilities. Facilities with known problems may be spot-checked by Public Works Operations and Maintenance after significant storm events in addition to routine inspections.

- For county capital improvement projects, inspection responsibility will transfer to the county at the issuance of the final acceptance letter to the contractor by Public Works Construction Management.
- For facilities constructed as part of a private-sector development project, responsibility will transfer to the county at issuance of the completion of construction letter to the developer. (See Regulatory Program for Development, Redevelopment, and Construction Projects on page 74.)

Inspection

Public Works Construction Management will inspect facilities using standards from the *Stormwater Facility Maintenance Manual*. Crews will note compliance and defects on paper field forms.

Spot Checks

After significant storms, Public Works crews will inspect facilities that are on a list of facilities with known problems associated with heavy rainfall.

Tracking

Public Works Construction Management inspectors or office staff will enter inspection records from the paper field forms into MMS.

Inspect and Clean Catch Basins

The Clark County Public Works Operations and Maintenance Program will inspect catch basins in road right-of-way annually. Each catch basin is inspected and those exceeding sediment depth standards are scheduled for cleaning. Annual inspections may also be conducted on a circuit basis whereby 25% of catch basins and inlets are inspected, as described in permit section S5.C.9.d.

Catch basins in parks and other county facilities will be inspected and cleaned as part of routine maintenance by the custodial department.

Outputs

- MMS records of regulated facility inspections
- Updates to six-month inspection list
- Spot checks of public facilities after severe storms
- Catch basin cleaning
- MMS records of public facility inspections

County Stormwater Facility and Class-V Injection Well Maintenance

Purpose

Maintenance of stormwater facilities and stormwater disposal wells ensures that facilities continue to perform their important environmental and drainage functions. Clark County Public Works is responsible for maintenance of most county stormwater infrastructure when it fails to meet a maintenance standard established by permit and county standards.

Responsibility for maintaining county-owned stormwater treatment and flow control facilities will begin at issuance of the final acceptance letter for those constructed as part of a county capital improvement and at the end of the maintenance warranty period for those built as part of a private-sector development project. (See Regulatory Program for Development, Redevelopment, and Construction Projects on page 74.)

The county does not maintain private stormwater facilities except in emergency situations or when pursuing an alternate compliance strategy for a non-compliant facility, whereby the county maintains the private facility at the owner's expense.

Responsibilities Matrix

Task	DES CWP Infrastructure Manager	DES CWP NPDES Mgr	DES CWP Eng. Tech	PW Road Ops and Parks Supers	PW Ops Roads and Parks Crews	Contract Services
Routine Facility Maintenance	I	I	S	A	P	O
Non-routine Facility Maintenance	C	C	S	A	P	P

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

Typical Facility Maintenance

Clark County will perform routine maintenance, such as litter removal, mowing, and weed control, on swales, ponds, and filter strips that it owns. Typical maintenance is regular activities that maintain a facility's function that can be accomplished primarily with hand tools, lawn mowers, and weed whackers, and do not require engineering evaluation or heavy equipment. It does include cleaning sediment traps using vacuum trucks.

The following procedure applies to stormwater facilities maintained by Public Works, such as those in subdivisions and road right-of-way. Maintenance of other county stormwater facilities located in parks and on county campuses is covered in the section pertaining to operation of county lands (below).

Schedule and Prioritize

Most of the typical facility maintenance will occur during the growing season (April to September). The Clark County Public Works water quality crew chief will schedule the work.

Maintenance

Mowing grass and controlling weeds by weed whacking are the primary typical maintenance activities. Other maintenance for defects including sediment accumulation in sediment traps, minor erosion, presence of trees in pond or swale bottoms, etc., are also part of typical maintenance.

Capital Construction Facility Maintenance

Prioritization and Budget

The Clean Water Program and Public Works will develop an annual work plan for maintaining and repairing facilities that require capital construction under $25,000.

Individual maintenance projects estimated to cost more than $25,000 are referred to the Stormwater Capital Program (page 62).

Inspection Data Review

The Public Works NPDES road operations superintendent and crew chief will schedule facility maintenance requiring construction in consultation with the Clean Water Program Infrastructure Manager

Implementation

Maintenance requiring construction is accomplished as resources and weather allow within permit timelines.

Drywell Maintenance

Public Works Operations and Maintenance Roads crews will maintain drywells (Class V stormwater injection wells) as necessary based on a visual inspection of defects. Drywells in stormwater facilities will be inspected annually as part of routine facility inspections. Drywells in streets and roads will be inspected at the time catch basins are inspected.

Outputs

- Stormwater facilities maintained and repaired to meet county standards.
- List of projects referred to the capital planning program for repairs greater than $25,000.
- Database records of facility maintenance work (MMS).

Use of Water Quality BMPs during Roadway and County Property Operation and Maintenance

Purpose

Clark County maintains its properties and roadways in a manner that prevents or reduces stormwater impacts.

Responsibilities Matrix

Task	DES CWP Infra-structure Mgr	DES CWP Permit Mgr	DES CWP Source Control Specialist	PW Ops and Parks Managers	PW Road Ops Super	PW Ops Roads Crews	PW Parks Super	PW Parks Crews	DES Vegetation Mgmt. Mgr	DES Vegetation Mgmt. Crews	General Services, Facilities Mgr	General Services, Facilities Crews
Annually inspect and maintain catch basins in parks	I	I	O	A	O	O	A	P	O	O	O	O
Annually inspect and maintain catch basins on campuses	I	I	O	C	O	O	A	P	O	O	A	O
Road maintenance practices	I	I	O	A	C	P	O	O	O	O	O	O
Landscape maintenance on campuses	I	I	C	C	O	O	A	P	O	O	A	O
Landscape maintenance in parks	I	I	C	A	O	O	A	P	O	O	O	O
Noxious weed removal practices	I	I	C	O	O	O	O	S	A	P	O	O
Exterior building and grounds maintenance	I	I	C	O	O	O	O	S	O	O	A	P
Training road maintenance crews	I	S	S	A	P	I	O	O	O	O	O	O
Training parks maintenance crews	I	S	S	A	O	O	P	I	O	O	O	O
Training weed management crews	I	S	S	O	O	O	O	O	A	P	O	O
Training Facilities Maintenance crews	I	S	S	O	O	O	O	O	O	O	A	P
Check SWPPPs	I	S	O	A	O	P	O	O	O	O	O	O

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

Maintain Roadways and Sweep Streets

Road maintenance and operation will be conducted by the Public Works Operations and Maintenance program.

Clark County will maintain roadways and other traveled surfaces using pollution reduction practices defined by the ESA Regional Road Maintenance Program and in *Water Quality Best Management Practices for Businesses and Government Agencies*.

Specific pollution-reduction activities include:

- Routinely sweeping road surfaces to remove sediment and to prevent first flush contamination.
- Periodic removal of litter from conveyances, such as ditches.
- Catch basin cleaning.

Practices to prevent pollution will be implemented for the following maintenance activities:

- Pipe cleaning
- Culvert cleaning
- Ditch maintenance
- Street cleaning
- Road repair and resurfacing, including pavement grinding
- Snow and ice control
- Utility installation
- Maintaining roadside areas, including vegetation management
- Dust control
- Pavement striping maintenance
- Application of fertilizers, pesticides, and herbicides
- Sediment and erosion control
- Landscape maintenance and vegetation disposal
- Trash and pet waste management
- Building exterior cleaning and maintenance

Maintain Parks

Parks may contain any or all of the following types of land cover: pavement, landscaped areas, natural areas, structures, and stormwater facilities. Parks will be maintained by Public Works, Parks Division.

Clark County will maintain park vegetation and structures according to *Water Quality Best Management Practices for Businesses and Government Agencies* and the *Clark County Stormwater Pollution Control Manual* and current pesticide application rules. Pesticides will be purchased according to the county's Environmentally Responsible Purchasing Policy. Parks maintenance crew members are trained under the ESA Regional Forum and are state licensed pesticide operators.

Parks crews will inspect catch basins within parks during routine park maintenance and will clean them as needed.

Parks crews will mow and remove litter from stormwater facilities within parks frequently during routine park maintenance. Public Works Road Operations will provide the balance of the maintenance.

Maintain County Property

County campuses are managed by the General Services department. General Services personnel maintain pavement and building exteriors; General Services has an agreement with Public Works, Parks Division for most outdoor vegetation management activities.

Clark County will maintain landscaping and hard surfaces on its campuses according to the *Water Quality Best Management Practices for Businesses and Government Agencies*. Pesticides will be purchased according to the county's Environmentally Responsible Purchasing Policy. Parks maintenance crew members are trained under the ESA Regional Forum and are state licensed pesticide operators.

Parks crews will inspect and maintain catch basins on county campuses as needed.

Parks crews will mow and remove litter from stormwater facilities on county campuses as needed based on visual inspection.

Clark County implements a Stormwater Pollution Prevention Plan (SWPPP) for each of its seven heavy equipment and materials storage yards, operated by Public Works. Copies of the SWPPPs are kept at each site.

Control Weeds on County Property

State regulated noxious weed control on county properties is provided by the Environmental Services, Vegetation Management program.

Clark County will control weeds according to current pesticide application rules. Pesticides will be purchased and used according to the county's Environmentally Responsible Purchasing Policy.

Vegetation Management field crews are state licensed pesticide operators.

For some areas, such as mitigated wetlands and properties with legacy lands designation, Vegetation Management will compose a Site Specific Plan to ensure that compliance with all environmental regulatory requirements, including NPDES permit requirements, will be achieved.

Employee Training

Crews from Public Works Operations and Maintenance, Public Works Parks, and Environmental Services Vegetation Management are trained under the ESA Regional Road Maintenance tracks 2 and 3. Track 2 coursework describes the biology of endangered fish and how road and park maintenance activities can harm them; it is generally provided to supervisors and managers. Track 3 provides crew chiefs and crew members with maintenance guidelines and procedures to protect endangered species during maintenance work.

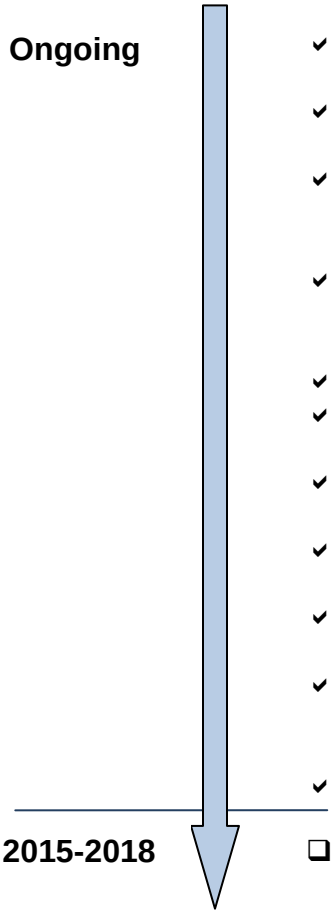
Train New Personnel

Clark County Public Works will provide ESA Regional Road Maintenance training using an approved vendor for new or promoted staff, as necessary.

Outputs

- Maintenance of county property using proper BMP manuals
- Employee training
- Stormwater Pollution Prevention Plan at each heavy equipment and storage yard

TIMELINE



Ongoing

- ✔ Spot check facilities with known problems after significant storms
- ✔ Annually inspect and clean, if needed, county-owned catch basins
- ✔ Implement established practices to reduce stormwater impacts from county road maintenance activities
- ✔ Implement established practices to reduce stormwater impacts from property and landscape maintenance activities for county property
- ✔ Employee training
- ✔ Implement updated SWPPPs for county equipment yards
- ✔ Adopt and implement maintenance standards equivalent to the SMMWW
- ✔ Require maintenance of regulated facilities to the SMMWW
- ✔ Implement program to annually inspect all regulated facilities
- ✔ Inspect all new facilities in new residential developments every 6 months during the period of heaviest construction
- ✔ Inspect all county-owned facilities annually

2015-2018

- ❑ Continue the above

FOR MORE INFORMATION ON COUNTY OPERATION AND MAINTENANCE OF THE MS4

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Section 4
Detecting and Reducing Pollutants and Contamination

Contaminants may enter the MS4 through improper connections and through discharge of contaminants from sites with private storm systems that are connected to the MS4. Eliminating improper connections and reducing the discharge of contaminants is an important part of the county's Stormwater Management Program.

Improper connections may be discovered through routine screening of the system, site inspections or by complaint. When an improper connection is discovered, removal and disconnection is a high priority.

Regular and wide-spread inspections of business and multi-family sites helps ensure that sites are properly managing potential contaminants, maintaining catch basins and conveyance systems, and preventing non-stormwater discharges into their private systems that discharge to the MS4. Above NPDES Permit requirements, the program also addresses sources that do not discharge to the Permit-regulated MS4, including discharges to Class V injection wells, non-county storm drains and other conveyances to surface water and groundwater.

Source Control Program

Regulatory Requirements Summary

NPDES Permit S5.C.7 – Source Control Program for Existing Development

The NPDES Permit requires the county to reduce pollutants in runoff from areas that discharge to the MS4 by applying operational, structural source control, and treatment Best Management Practices (BMPs); enforcing proper BMPs on commercial, industrial and multifamily properties; enforcing water quality ordinances; and reducing pollutants from pesticides, herbicides and fertilizers entering the MS4.

Stormwater Management Manual for Western Washington

Volume IV of the SMMWW contains technical guidance for source control BMPs to meet Minimum Requirement 3 of the Permit.

County Policies, Rules and Regulations

Clark County Code Chapter 40.385 – Stormwater and Erosion Control

Chapter 40.385 adopts the *Clark County Stormwater Pollution Control Manual* 2009 as the technical manual for meeting the Minimum Requirements of the Permit, including Minimum Requirement 3, Source Control of Pollution.

Clark County Code Chapter 13.26A – Water Quality

Clark County prohibits non-stormwater discharges to the MS4 and regulates the discharge of contaminants to surface water, stormwater, and groundwater to protect the county's surface and groundwater quality. The code and manual provide minimum requirements for reducing and controlling the discharge of contaminants by requiring all sites and activities to utilize source control Best Management Practices (BMPs) to control release of contaminants.

Chapter 13.26A also adopts the *Clark County Stormwater Pollution Control Manual* that provides BMPs for materials handling, landscape management, trash management, and building exterior maintenance.

Clark County Stormwater Manual

The *Clark County Stormwater Manual* contains technical guidance for meeting county stormwater code when developing, redeveloping, or constructing buildings on a site. It directs

users to consult the *Clark County Stormwater Pollution Control Manual* to fulfill minimum requirement 3, Source Control of Pollution.

Clark County Stormwater Pollution Control Manual

The *Clark County Stormwater Pollution Control Manual: Best Management Practices for Businesses and Government Agencies* adopts source control and treatment standards for public and private properties equivalent to Volume IV of the SMMWW.

Inventory Potential Pollutant Generating Sites

Purpose

The inventory helps target education and enforcement of source control requirements on commercial, industrial, and multifamily sites.

Responsibilities Matrix

Task	DES Source Control Specialist	GIS Analyst	CWP NPDES Mgr.
Create inventory of tax lots by type	Completed		
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted			

Inventory Maintenance

The Clean Water Program used the Clean Water Fee database to identify commercial, industrial, and multifamily sites in the county that have impervious surfaces.

The database is derived from the Clark County Assessor tax lot database and a GIS overlay of impervious surfaces. It includes parcel owner, site address, owner's mailing address, square footage of impervious surface, and the primary land use code. As inspections have progressed to include most permanent business sites, a separate, inspection-based site inventory is maintained in the *Tidemark* inspection and enforcement tracking database. The inventory is updated as new stormwater fee sites are added to the GIS and business changes are found during inspection work.

Outputs

- Inventory of business and multifamily sites

Source Control at Business and Multifamily Sites

Purpose

Clark County inspects all business sites and many multifamily sites for compliance with

source control requirements to ensure pollutants are not discharged to the MS4 or groundwater via Class V stormwater infiltration wells.

Responsibilities Matrix

Task	DES CWP NPDES Manager	DES Source Control Specialist	DES Code Enforcement Officer	DES Environmental Education	DES Office Assistant
Site selection	A	P	O	O	O
Inspection / education	A	P	S	S	O
Follow-up for compliance	A	P	P	O	O
Referral	A	P	P	O	O
Record-keeping	A	P	P	O	P
	A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted				

Site Selection

Each year, all business sites within selected subwatersheds will be inspected. The selection of subwatersheds will be the least recently visited subwatershed.

Inspection and Education

Inspections are conducted by qualified county staff. Currently, Clean Water Program Source Control Specialists inspect sites.

At each business site, county staff will approach the owner, manager, or other employees to obtain access to the storm system on the site and to ask questions about source control practices and, if relevant, structural source control BMPs.

Staff will note inspection findings on the "Clark County Stormwater Business Site Visit Report" field form.

During the visit, county staff will provide education and technical assistance as judged necessary or beneficial. Education or assistance could include brochures, BMP handouts, general information on stormwater pollution topics, copies of the county's water quality ordinance, *Clark County Stormwater Pollution Control Manual: Best Management Practices for Businesses and Government Agencies*, or referrals to maintenance companies.

Follow-up Actions for Compliance

If a business is not in compliance, the source control specialist will work with the manager or owner to reach compliance. Follow-up actions may include phone calls, additional site visits, and letters. County staff may give additional technical assistance such as locating engineering drawings, providing handouts from the *Clark County Stormwater Pollution Control Manual: Best Practices for Businesses and Government Agencies* or Ecology and recommending new source control BMPs.

The source control specialist will set deadlines as necessary for compliance actions (e.g. cleaning catch basins).

Follow-up actions will also be recorded on the "Clark County Stormwater Business Site Visit Report" field form.

Referral

If necessary to gain compliance, the source control specialist will refer the case to another agency such as Clark County Public Health or the Clark Regional Wastewater District. The source control specialist will continue to follow the case to conclusion.

Further Enforcement Actions

Further enforcement will be provided by Clean Water Program Code Enforcement or by referral to Ecology in cases of continued inaction.

Record-keeping

Data from field forms for both inspection and follow-up will be entered into *Tidemark* as a CWP case type by an Environmental Services Clean Water Program office assistant.

Outputs

- Records of inspections and follow-up cases in *Tidemark*
- Report of numbers of inspections and referrals
- Case files

Water Quality Complaint Investigation

Purpose

Clark County investigates all legitimate complaints about water quality problems to reduce contamination of stormwater, surface water, and groundwater as well as to comply with its NPDES Permit.

Responsibilities Matrix

Task	DES CWP NPDES Mgr.	DES Source Control Specialist	DES Office Assistant	DES Natural Res. Spec.	CD Code Enf. Officer
Refer potential cases to CWP	O	I	O	O	P
Open case	A	P	O	O	O
Investigation	A	P	O	S	O
Education and compliance	A	P	O	O	O
Record-keeping	A	S	P	O	O
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted					

Open Case

Water quality complaints may arrive in a variety of ways, including the 24-hour water quality complaint line, referral from other agencies, referrals from Community Development Code Enforcement Officers, e-mail to the Clean Water Program general address, and phone calls to the Clean Water Program. Complaints may be made by the general public or agency staff.

Complaints will be referred or forwarded to the Environmental Services Clean Water Program source control specialist.

Investigation

The source control specialist will investigate every legitimate complaint beginning with a phone call and site visit.

For business sites, the specialist will fill out the "Clark County Stormwater Business Site Visit Report" field form and begin a case file.

For residential sites, the specialist will fill out the field form but generally will not begin a case file. In difficult or egregious cases, the specialist will begin a case file.

Education and Compliance

If a water quality or source control violation is found, the specialist will work with the property owner on compliance or refer the case to another agency, generally following the procedures for source control follow-up (above), and, if necessary, further enforcement actions.

Record-keeping

A Clean Water Program office assistant will enter data from the field forms into *Tidemark* as a CWP case type. The specialist will keep any case files.

Outputs

- Records of complaints, investigations and follow-up in *Tidemark*
- Case files

Source Control Success

In an ongoing effort to identify and reduce pollutants entering our storm water system, our Source Control Specialists took to the streets and commercial properties in the Salmon Creek watershed. With a requirement to visit 20% of our entire commercial properties inventory, over 400 businesses were visited and inspected in 2014. The approach to site visits kept inspections in a focused, geographical area an efficient method for revisits, for an ongoing presence, for documenting progress, and for an all-inclusive approach.

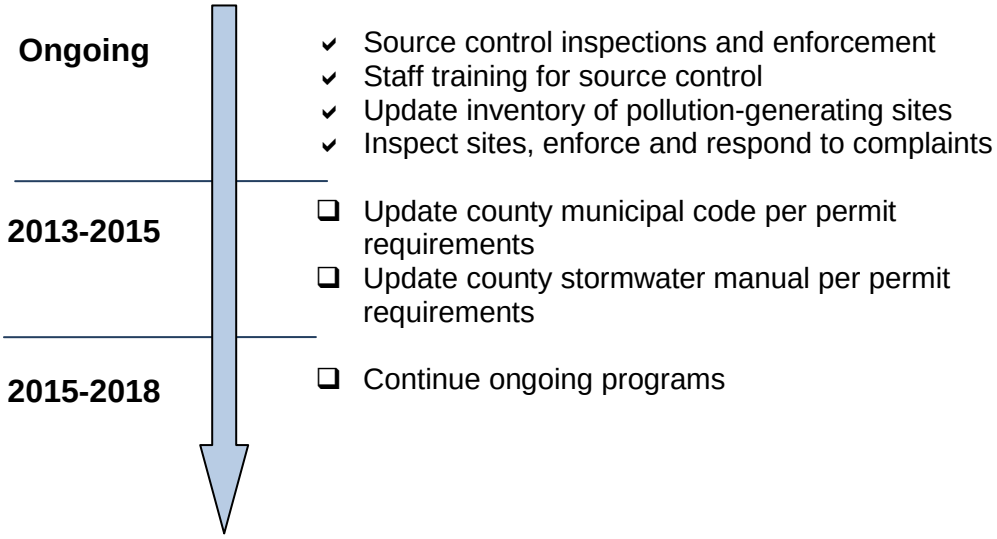
While each individual business and business practice is evaluated for pollution potential, common or universal best management practices are always addressed. One of those shared sources of potential pollution is the dumpster/compactor. During our site visits an estimated 200 commercial containers in service to these businesses were inspected for their ability to keep rain water out and polluted liquids in. 24 dumpsters or compactors were identified as inadequate and where promptly replaced or repaired in order to contain their pollutants at the source.

Training

Clean Water Program and Code Enforcement personnel have been performing source control inspections and enforcement since 2000. When applicable, new staff will be trained on enforcing the Water Quality Ordinance, including legal basis, BMPs,

inspection procedures, enforcement process, and record keeping. When changes to manuals or procedures are made, all appropriate staff will be trained.

TIMELINE



FOR MORE INFORMATION ON THE SOURCE CONTROL PROGRAM

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Illicit Connections and Illicit Discharges Detection and Elimination (IDDE)

Regulatory Requirements Summary

NPDES Permit S5.C.8 – Illicit Connections and Illicit Discharges Detection and Elimination

The NPDES Permit requires the county to have a program to detect, remove, and prevent illicit connections and illicit discharges, including spills, into the MS4. Illicit connections are man-made conveyances connected to the MS4 without a permit, such as sanitary sewers and floor drains that can carry materials other than stormwater. Illicit discharges are discharges to the MS4 not composed entirely of storm water, except where allowed by a state waste discharge permit.

The Permit designates timelines for beginning an investigation of a suspected illicit connection and for terminating a confirmed illicit connection.

Revised Code of Washington Chapter 90.48 – State Water Pollution Control Act

The State Water Pollution Control Act prohibits the discharge of contaminants to waters of the state.

County Policies, Rules and Regulations

Clark County Code Chapter 13.26A – Water Quality

Chapter 13.26A prohibits the discharge of contaminants into surface water, stormwater, or groundwater, and it defines contaminants and illicit connections. It gives inspection and enforcement authority to authorized representatives of the Environmental Services Director or other department heads specified in established procedures to enforce that chapter.

Clark County Code Chapter 13.10 – Use of Sewer

Chapter 13.10 requires the use of sewers to dispose of liquid wastes and water carrying waste materials.

Clark County NPDES Illicit Discharge Detection and Elimination Screening Quality Assurance Project Plan

The Project Plan addresses project design, schedule, methods of data collection and management, quality assurance and control requirements, data analysis, thresholds for further investigation, and reporting for the county's program to screen the MS4 for illicit connections.

Illicit Connection Screening

Purpose

Screening for evidence of illicit connections helps county staff identify outfalls or points in the MS4 that appear to convey something other than stormwater, as well as meeting Permit requirements for ongoing screening.

Responsibilities Matrix

Task	DES CWP Manager	DES CWP Permit Manager	DES Natural Resources Specialist
Basin selection	A	S	P
Outfall selection	A	I	P
Site visits / screening	A	I	P
Sampling / evaluation	A	I	P
Record-keeping	A	I	P

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

Ongoing Work

Clark County carried out an extensive screening program in 2006, 2007, 2008 and 2012, completing the 2013 NPDES Permit requirement to screen the conveyance systems in the high density area and at least one rural sub-basin began under the 2007 permit term.

Environmental Services Clean Water Program natural resources specialists (NRS) will continue effectiveness monitoring on illicit connections discovered during previous field screening operations (see Illicit Connection and Discharge Response and Removal on page 54). In addition, a NRS or the source control specialist will respond to any complaints and referrals.

Source control inspections are an important element of illicit discharge detection (see Source Control Program on page 44).

Basin Selection

In 2015, a Clean Water Program NRS will select urbanized subwatersheds for screening based on professional judgment and watershed management objectives. This area will include at least 12 percent of the urban stormwater conveyance systems.

Outfall Selection and Scheduling

A Clean Water Program NRS will use the county stormwater infrastructure inventory GIS database, *StormwaterClk*, to locate and map all outfalls within chosen basins. Staff will schedule site visits using this information.

Site Visits

During dry weather, a NRS will screen outfalls for indicators of illicit connections, such as flow or deposits.

Sampling and Evaluation

The NRS will take samples at flowing outfalls, send them for laboratory analysis, and then evaluate the results using defined protocols to determine if an investigation is warranted. In cases where an investigation is warranted, the discharge is called a suspected illicit discharge or connection.

Investigations and follow-ups are part of the Illicit Connections and Discharge Response program (below).

Record-keeping

The NRS will track all information regarding screening, illicit connection investigations and response to illicit discharges if applicable, in the IDDE screening database.

Reporting

Each year, the NRS will complete a report suitable for an auditor review describing the year's work from planning through removal of any discovered illicit connections or discharges, including those discovered by source control inspections. The report will be stored in the project folders by year.

Outputs

- Records in the IDDE screening database
- Annual written summary of screening activities, investigations and results
- Report of number of inspections and follow-ups
- Laboratory data and field measurements entered in the *Water Quality Database*

Illicit Connection and Discharge Response and Removal

Purpose

Clark County responds to all suspected illicit discharges and connections to the MS4 that it identifies through screening or other methods. Response is designed to eliminate the source of the discharge or the connection.

Responsibilities Matrix

Task	DES CWP NPDES Mgr.	DES Natural Resources Specialist	DES Source Control Specialist	Public Health	CRWWD	Ecology
Open case	A	I	P	O	O	O
Investigation	A	S	P	S	S	S
Follow-up / removal	A	I	P	S	S	S
Continued follow-up	A	S	P	S	S	S
Record-keeping	A	P	S	O	O	O
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted						

Suspected Illicit Connection and Discharge Response

The DES Clean Water Program and Public Works Operations Division will receive and respond to reports of suspected illicit connections; however, some illicit connections of on-site sewage treatment systems are discovered and terminated by Clark County Public Health. The process described here is that used by the Clean Water Program and Public Works.

Notify Ecology of Severe Threats

The county immediately will notify Ecology if an illicit discharge or connection poses a severe threat to human health or the environment.

Open Case

The process begins with notification about a suspected illicit discharge or connection through referral from illicit detection screening (above), discovery through source control inspections (above), or complaint.

The source control specialist will open a case file.

Investigation

Within 21 days, the Clean Water Program source control specialist and a NRS will attempt to trace a suspected illicit discharge or connection back to its source to identify the problem. If tracing back to the source is not possible, they may elect to follow other protocols established in the IDDE Project Plan.

The source control specialist will confirm the presence or absence of the suspected illicit discharge or connection based on the findings, and, when possible, will specify the source.

Follow-up and Removal

For confirmed illicit discharges or connections, the source control specialist will work with the property owner and, if necessary, other county departments or agencies to eliminate the illicit connection. If relevant, Clark Regional Wastewater District, Public Health, cities, or the Department of Ecology may be requested to assist in areas where they have responsibility.

Addressing illicit discharges will follow standard source control procedures for follow-up actions (e.g. personal contacts) and further enforcement by a Code Enforcement Officer, if necessary.

Removal of illicit connections will be completed within six months of confirmation of an illicit connection through field verification.

Continued Follow-up

Following the IDDE Project Plan, questionable outfalls require continued follow up, which may include effectiveness monitoring at sites where illicit connections or discharges were found, repeat screening where low levels of pollutants were found, or additional visits by the source control specialist to verify that actions leading to an illicit discharge are ended.

Record-keeping

The source control specialist will inform the NRS of the results of the follow-up actions involving illicit discharge or connection abatement. The NRS will enter information into the IDDE screening database.

If the case is a suspected illicit connection, the date it was first discovered or reported will be used to track the requirement to initiate an investigation with 21 days.

After the illicit connection is confirmed, the requirement to terminate the connection within six-months will apply. If the suspected connection was identified through field observation, source control inspection, or complaint, the discovery date is the date the observation or complaint was made. If the suspected connection was identified through laboratory analysis, the discovery date is the date of the official laboratory report. Discovery dates will be recorded and tracked in the IDDE screening database.

A record is kept for every illicit connection referred to Ecology as a severe threat to human health or the environment.

Outputs

- Removal of illicit connections and reduction of illicit discharges to the MS4
- Entries in the IDDE screening database
- Reporting to Ecology

SPILL RESPONSE

Clark County responds to spills on surfaces, such as roadways, that discharge to the MS4, surface water, or ground water, and to improper dumping into the MS4.

Purpose

The purpose is to reduce and prevent contamination of surface water, ground water, and stormwater.

Responsibilities Matrix

Task	PW Operations Admin	PW Operations Crew Chief	PW Operations Road Crew	PW Operations OA
Open case	I	A	I	P
Spill response / clean-up	I	A	P	O
Notify Ecology	A	P	S	P
Record-keeping	A	P	C	S
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted				

Notification

Spill notification can arrive in a variety of ways, including detection by Public Works Operations and Maintenance roads crews or citizen complaint.

Clark County staff receiving notification of a spill will immediately notify Public Works Operations and Maintenance dispatch. For spills responded to by Public Works crews, the Crew Chief will call Ecology's spill response team in the Vancouver Field office if necessary.

The phone operator will also notify Ecology using the 24-hour spill reporting number. County personnel also will immediately refer significant spills to Department of Ecology.

Response

Spill reports received by Public Works generate a Maintenance Management System work order, the appropriate crew responds to work order and, if necessary, they call Ecology. For urgent complaints arriving after hours via telephone, the answering service will page the Public Works Operations and Maintenance on-call crew chief, who will determine the level of response following established Public Works guidelines.

Record-keeping

Records of spill incidents and responses will be kept in the Public Works customer service database. The Public Works phone operator enters the phoned-in spill report into the tracking system. The crew chief enters all follow-up information and closes out the work order.

Outputs

- Spill clean-up
- Records of incidents responses

WATER QUALITY PROBLEM REPORTING LINE

Purpose

Clark County advertises its 24-hour Public Works customer service line as a water quality complaint line. The line gives citizens an opportunity to report spills, dumping, and other water quality concerns at any time. The Ecology spill response number is also posted on the Clean Water Program web page.

Responsibilities Matrix

Task	PW Operations Admin	PW Operations OA	PW Answering Service	CD Code Enf	Public Health	CWP
Take calls during business hours	A	P	O	P	P	P
Take calls after hours	A	I	P	O	O	O
Receive web comment form via email	A	P	I	O	O	P
Referral	A	P	P	P	P	P
Log calls in database	A	P	O	P	O	P
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted						

Complaint and Referral

Complaints arriving on the Public Works 24-hour line are logged to the Public Works customer service database by Public Works office assistants. Incidents are generally routed to the Environmental Services Source Control Specialist or Department of Ecology, depending upon the nature of the incident.

Web form comments *(http://www.clark.wa.gov/environment/stormwater/report_online.html)* are sent via email to the Clean Water Program who directs the report to the appropriate response staff as per phone call protocols.

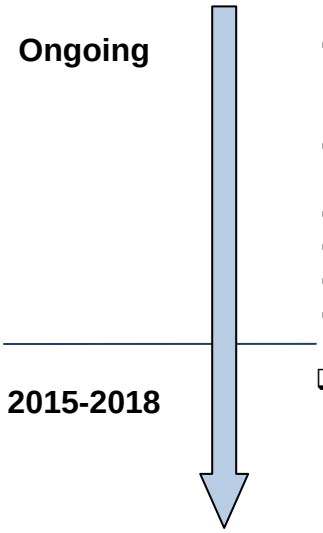
Water quality complaints are also received by other agencies or county departments including Ecology, Clark County Code Enforcement, and Clark County Public Health.

Response to complaints is described under Water Quality Complaint Investigation.

Outputs

- Report of number of calls and emails to the general customer service line

TIMELINE



- ✔ Continue implementing on-going program to prevent, identify and respond to illicit connections and illicit discharges
- ✔ Procedures for addressing pollutants entering the MS4 from interconnected MS4s
- ✔ Staff training
- ✔ Implement procedures to respond to spills
- ✔ Operate a water quality citizen complaint line
- ✔ Revise program to include new Ecology guidance

- ❑ Continue ongoing programs

FOR MORE INFORMATION ON THE COUNTY PROGRAM TO DETECT AND ELIMINATE ILLICIT CONNECTIONS AND DISCHARGES TO THE MS4

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Section 5
Expanding and Improving the Stormwater Management Infrastructure

As county population and development pressure increase, the primary means of controlling runoff from areas of new growth and for fixing problems caused by uncontrolled runoff from existing developed areas is by expanding and improving the existing stormwater management infrastructure.

In Clark County, stormwater management infrastructure is expanded in two ways:

County Stormwater Capital Improvement Projects

The county has a program to plan and construct new stormwater infrastructure and improve existing infrastructure to better control and treat runoff from areas where existing development does not include adequate stormwater controls. This addresses the permit requirement to mitigate for stormwater impacts from existing development.

Regulation of Development, Redevelopment, and Construction Projects

Private entities and government agencies develop the land, and the county regulates the design and construction of stormwater controls on it, many of which eventually become part of the county's own stormwater infrastructure.

The process for each of these types of projects is described below.

Roadway flooding during winter storm, 2007

County Stormwater Capital Improvements

Past stormwater management and drainage practices and development regulations have proven inadequate to prevent impacts of runoff on surface water, and thousands of developed acres in Clark County contribute to problems in streams, lakes, and rivers. Accordingly, the county has a program to construct stormwater capital improvements primarily to control and treat stormwater from areas of existing development with inadequate stormwater controls. In addition, the county may take opportunities to expand the treatment and flow control capacity of existing facilities when making repairs. These activities all are part of the county's stormwater capital improvement program.

Regulatory Requirements Summary

NPDES Permit – S5.C.6. Structural Stormwater Controls

The NPDES Permit requires the county to implement a structural stormwater controls program to prevent or reduce impacts to waters of the state caused by discharges from the MS4. The program considers projects including new flow control facilities, new water quality treatment facilities, retrofits of existing facilities, property acquisition, and maintenance with capital construction costs >$25,000 to provide water quality or flow control benefits. Other means to reduce impacts are also considered, including riparian habitat acquisition, restoration of forest in upland areas and in riparian buffers, and floodplain reconnection projects. Small scale projects that are not planned in advance may also be included in meeting this requirement.

While the permit requires a structural stormwater control program, it does not prescribe a scope for it other than to note that the program will demonstrate it meets AKART and MEP standards.

The SWMP must include a list of planned individual projects updated in each annual report to the state.

The description of the structural stormwater control program in the SWMP must include the program's goals and the planning process, including budget and public involvement. Individual project descriptions must include estimated pollutant load reduction (if applicable), flow control benefits (if applicable), other expected environmental benefits, and plans for monitoring the facility. A table describing the 2013-2018 capital projects is attached as Appendix A.

Chapter 173-218 WAC – Underground Injection Control (UIC) Program

Pursuant to Chapter 90.48 RCW, the state's requirements for stormwater infiltration wells may result in capital improvements associated with county systems that are found to pose a threat to groundwater.

County Policies, Rules and Regulations

The Clean Water Program has the following policies for county stormwater capital improvements:

- Meet NPDES Permit requirements for the structural stormwater control program through stormwater capital planning and capital construction.

County goals for stormwater capital improvements include:

- Protect and enhance streams and wetlands in Clark County through planning and constructing modifications to the stormwater infrastructure.
- Minimize the degradation of receiving waters from impacts attributable to stormwater runoff in existing developed areas.
- Maximize public benefits of county-owned land by providing multiple uses, including recreation, and by leveraging funding from multiple sources.
- Provide stormwater facilities for future development and redevelopment.

Guiding Principles

In support of county policies and goals, the capital planning process strives to:

- Prioritize projects with the greatest potential to support multiple county programs and goals, including local and regional fish recovery, habitat enhancement, and water cleanup goals.
- Ensure a reliable scientific and engineering basis for projects.
- Establish that each project in the plan is needed, feasible, and cost-effective.
- Focus limited resources on the most pressing concerns and the most cost-beneficial solutions.
- Incorporate environmental benefits into needed infrastructure repair projects.
- Maintain a sufficient list of potential projects to enable replacement of any projects that become infeasible, and to take advantage of funding opportunities.
- Utilize partnerships, where feasible, to meet multiple community goals.

As-Built Plan Preparation

Clark County Public Works follows a management practice for the production of record drawings at the final acceptance of a public capital project.

Stormwater Capital Planning

Purpose

Planning ensures that stormwater capital improvements meet the county's goals.

Capital planning is a process for identifying potential projects, deciding if they are feasible, selecting the best for further development, and tracking their progress from inception through construction. The stormwater capital program will list projects scheduled for implementation on a six-year horizon.

- The proposed projects are considered to comply with MEP and AKART requirements under Permit Condition S5.C.6.
- Projects reflect what Clark County is best able to implement within its available funding and demands for structural control projects.
- Projects address stormwater impacts not adequately controlled by other permit-required actions, chiefly those caused by uncontrolled or untreated runoff from existing development, and habitat degradation that has already occurred.

By complying with permit condition S5.C.6, together with all of the remaining other permit requirements, Clark County complies with MEP and AKART as set forth in the county's NPDES Municipal Stormwater Permit condition S4.E.

Individually, projects meet AKART by being designed following practices described in the *Stormwater Management Manual for Western Washington*.

Responsibilities Matrix

Task	DES CWP Infrastructure Manager	DES CWP Engineer	PW Eng. Program Manager	PW Eng. Project Manager	PW Eng. Program Staff	BOCC	DES Director
Accept referrals	A	P	O	O	O	O	O
ID potential projects	A	P	O	O	S	O	O
Database entry & updates	A	P	O	O	O	O	O
List of potential projects	A	P	I	I	C	O	O
Formulate selection criteria	A	P	I	O	S	C	C
Apply selection criteria	A	P	C	C	S	O	C
Scoping and Selection	A	P	O	O	S	O	I
Six-year capital plan	A	P	C	S	S	C	C

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

Referrals

Project ideas may be referred to the Clean Water Program from several sources, including field work completed by the Assessment and Monitoring Section, CWP engineer review of watershed plans and water quality reports, problems identified by Road Operations crews, and projects suggested by the public.

Referrals can arrive continuously throughout the year.

Project Tracking / Capital Planning Database

CWP engineers will enter potential capital projects selected for further consideration into the *Capital Planning Database* as they are evaluated.

The database tracks stormwater capital projects from inception to construction and close-out, or their status as shelved or dropped including the following attributes:

- Project category/type.
- Description and basis of the project and the problem being addressed.
- Estimated project benefits including flow control, pollutant load reduction, habitat enhancements, and other environmental benefits.
- Status of preliminary engineering and construction.
- Funding summary.
- Types of potential environmental impacts, including wetland, priority habitat, cultural resource, floodplain impacts, etc.

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As projects advance and more information is developed, CWP engineers will update the database with new details on a regular basis.

Project Identification

The capital plan considers projects within the entire unincorporated urban area and rural Clark County, but focuses on urban and urbanizing areas where stormwater impacts are greatest.

Most projects considered for the current capital plan were identified through one of three mechanisms: the county's Stormwater Needs Assessment Program (SNAP), stormwater facility inspections, and assessment of drywell systems. Additionally, property acquisitions were identified through the Legacy Lands program under the Conservation Areas Acquisition Plan.

The SNAP watershed assessment effort evaluated the stormwater and surface water systems, identifying problems and opportunities that could be addressed through capital projects. SNAP was conducted county-wide from 2006-2010.

Routine field inspections of stormwater infrastructure identify the majority of repair projects. In addition, stormwater engineers may identify project opportunities while conducting regular business such as responding to drainage complaints, evaluating problems identified by county road operations crews and looking into projects suggested by members of the public.

The county's Underground Injection Control Well Assessment (2013) identified wells potentially needing retrofits to eliminate threats to groundwater. Other focused efforts may include catch basin retrofits in highly urbanized drainages.

Screening

Project identification may generate a large number of candidate projects. Screening is the first step in determining which opportunities should be evaluated more extensively.

Initial screening eliminates clearly infeasible or unproductive stormwater capital projects early in the planning process by determining at a general level whether the project is both worthwhile and feasible. The first question is answered through an objective scoring of *resource-based* criteria for whether or not they are likely to produce a significant benefit to the environment. The second, feasibility question is answered through an objective scoring of *engineering* criteria.

Scoping

Project scoping is perhaps the most critical step in the planning process. Where initial screening takes a general approach, scoping begins to look quantitatively at feasibility and benefit as well as project costs. Scoping is where observed stormwater problems are linked to tangible solutions.

The goal of the scoping process is to ensure that projects have the best possible chance of successful implementation. While significant issues can still arise later in the design phase, scoping is expected to expose most barriers to project implementation and determine with good confidence that the project is both cost-effective and feasible.

Scoping includes the following elements:

- Feasibility and Cost Effectiveness Check (CWP engineering staff)
- Independent Review (PW engineering staff)
- Project justification and discussion (selected CWP/PW managers and staff)

Prioritization

A robust capital planning program generates more scoped projects than can be implemented in a six-year plan. Prioritization is the process of determining which of the feasible projects of each type best meet program goals and provides the most cost-effective solutions. Within the constraints of regulatory requirements and available funding, the subsequent Programming step strives to implement higher-priority projects.

Each project type requires slightly different prioritization criteria; in all cases, criteria are intended to be simple yet meaningful. The Resource screen provides an initial prioritization step for all project types by forwarding only those projects that appear to provide significant natural resource benefits. Another key consideration goes beyond the parameters of stormwater management: in all cases, priority is given to projects that also meet other related county goals, such as leveraging Public Works road project wetland mitigations to include stormwater functions.

Programming Projects

Programming applies regulatory requirements and available funding to the list of scoped and prioritized projects to develop a six-year program matrix that can meet Permit requirements and program goals. Where specific projects have not yet been identified for implementation, placeholder values for projected spending are included in the matrix as ongoing programs.

Funding

The anticipated budget for the 2013-2018 plan is approximately $9 million. Completion of these projects is dependent on funding through the Clean Water Fee, General Fund, Road Fund, Conservation Futures fund and grants.

Outputs

- Database entries of potential projects and scoped projects, and detailed project attributes, for consideration in subsequent years
- Submittal of NPDES permit report Appendix 11
- Six-year capital plan with funding allocation

Construction of the Thomas Wetland East Stormwater Facility

Capital Project Construction Program

Purpose

The construction program is the engine for designing, permitting, and building stormwater capital projects. The Public Works Engineering Program leads the effort through established project management systems.

Responsibilities Matrix

Task	DES CWP Infrastruct-ure Manager	DES CWP Engineer	DES Enhance. & Permitting Mgr.	DES Env. Permitting Manager	PW Eng. Program Manager	PW Eng. Project Manage-ment Manager	PW Eng. Project Manager	PW Eng. Program Engineers	PW Eng. Construction Manager	PW Eng. Construction Mgmt. Staff
Assign Project Team	I	I	S	S	A	P	S	S	S	S
Schedule and Budget	S	S	S	S	A	C	P	S	S	S
Preliminary Engineering	I	O	O	O	A	S	S	P	O	O
Permitting	I	O	A	P	I	O	I	C	C	O
Construction Management	I	I	I	C	I	S	S	C	A	P
Project Close Out	I	S	I	C	A	I	P	C	C	C
Update Capital Planning Database	A	P	O	O	O	O	O	O	O	O

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

The Public Works Engineering Program designs and oversees construction of all types of capital improvement projects, including county stormwater projects. Their services include project management, survey, property acquisition, engineering, and construction management.

The program is responsible for the advancement of stormwater capital projects from the Stormwater Capital Program to construction. The responsibilities and procedures for this program are briefly reviewed below.

Team, Schedule, and Budget

From the Stormwater Capital Program, the manager of the Project Management section will assign a team of professionals led by a project manager to each project.

The project manager, with the help of the team, will develop a detailed scope, schedule and budget for his/her assigned projects. The project manager will monitor each item closely throughout each project's life.

Preliminary Engineering and Environmental Permitting

Public Works engineers will create engineering plans, design specifications, and cost estimates for each project in the plan. Department of Environmental Services permitting coordinators will shepherd each project through local, state, and federal permitting processes.

Encore Stormwater Facility Retrofit

As projects near completion of engineering design, the Engineering Program manager, in consultation with the Clean Water Program manager, will make the final decision to advance selected projects to construction.

Bid

The project manager will coordinate with the Clean Water Program and the team to prepare and execute a project bid schedule.

Construction Management

The Public Works Engineering Program Construction Management team will review bids and prepare an award recommendation for the Board of Clark County Councilors.

Once the contract is awarded, Construction Management will administer it and oversee construction.

As a project reaches completion, the construction manager will send a copy of the letter of physical completion to the Clean Water Program and Public Works Operations and Maintenance program. The Clean Water Program also will be copied on the letter of final acceptance.

Receipt of the physical completion and final acceptance letters by the Clean Water Program will initiate stormwater inventory tasks (see section 2 on page 12). Receipt of the final acceptance letter by Operations will initiate maintenance and operations tasks (see section 3 on page 26).

Close Out

The project manager and construction manager will coordinate preparation of close out documents, including final expenditures. The project manager will provide a final report and a CD of the electronic project files to the Clean Water Program Infrastructure Manager.

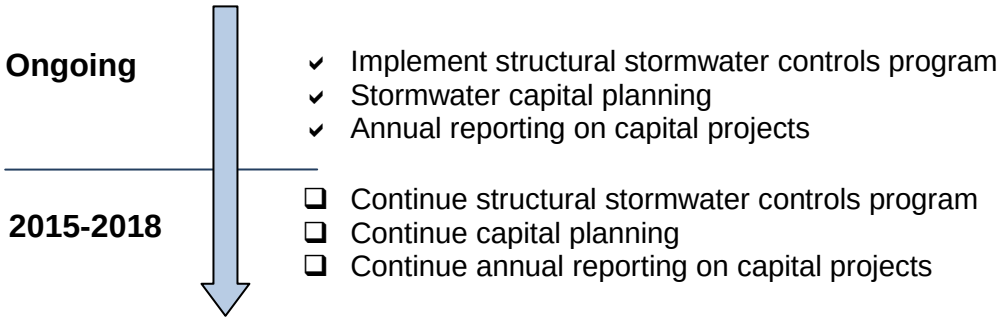
CWP engineers will update the *Capital Planning Database* with metrics from the final report.

Construction Management will oversee the production of record drawings, and Survey staff will notify the Clean Water Program of their location. The receipt of record drawings by Clean Water Program will initiate tasks to verify the stormwater infrastructure inventory.

Outputs

- Project plans, specifications, and estimates
- Completed stormwater capital projects
- As-built drawings (record drawings)
- Final expenditures and metrics for each project
- CD of electronic files to Clean Water Program
- Project final report

Timeline



FOR MORE INFORMATION ON PLANNING AND BUILDING COUNTY STORMWATER INFRASTRUCTURE

JEFF SCHNABEL, CLEAN WATER PROGRAM INFRASTRUCTURE MANAGER, (360) 397-6118, X4583
JEFF.SCHNABEL@CLARK.WA.GOV

Development and Redevelopment Flow Restoration Program

On August 1, 2013, in response to a federal court ruling of liability for violating the Clean Water Act, Clark County amended its development code to include the Washington State Department of Ecology's historic, forested land cover requirements as its predevelopment flow control standard. This eliminated the program need for stormwater capital projects to provide credit for restoring historic flows. Therefore, the county's flow restoration program has been eliminated.

Subsequent to the federal court ruling the county negotiated a settlement with the plaintiffs in the Clean Water Act lawsuit. Under a Consent Decree, the county is required to pay $3,000,000 in six annual payments of $500,000 each to the Lower Columbia Fish Recovery Board to fund grants for third-party water quality enhancement and habitat improvement projects within the watersheds of WRIA 28 and Gee Creek. These projects are to reduce or prevent degradation caused by stormwater runoff associated with Clark County's municipal stormwater system. See Attachment A to the Consent Decree.

For more information on development and redevelopment flow restoration

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Jeff.Schnabel@clark.wa.gov

Regulatory Program for Development, Redevelopment, and Construction Projects

The county is the local land use regulator. As such, the NPDES Permit requires the county to regulate the discharge of runoff from new development, redevelopment, and construction activities in the county.

In 2013, the county began a project to update its regulations in response to the newly issued 2013-2018 NPDES Permit, submitting updated code and stormwater manual . to Ecology in June 2014. During 2015, Clark County will complete the equivalent code and manual for adoption and implementation under the schedule prescribed by the Permit.

Regulatory Requirements Summary

NPDES Permit S5.C.5.a and b. – Controlling Runoff from New Development, Redevelopment and Construction Sites

The NPDES Permit requires the county to have a program to prevent and control the impacts of runoff from new development, redevelopment, and construction activities. The program must apply to all development activity, including private-sector development and county projects such as roads and parks. The program must enforce development regulations that provide protection equivalent to the minimum requirements, thresholds, and definitions in Appendix 1 of the NPDES Phase I stormwater permit and the design standards in the December 2014 version of the *Stormwater Management Manual for Western Washington*. The program must also revise code and manuals to make low impact development the standard approach for stormwater management.

NPDES Permit S5.C.5.c. – Completing a watershed-scale stormwater plan

Along with updates to code, the NPDES Permit requires the county complete a study of Whipple Creek watershed that will identify stormwater management strategies that would result in hydrologic and water quality conditions that fully support "existing uses" and "designated uses" as defined by state law under WAC 173-201A.

Clark County staff started work on the plan in summer 2014, including data collection (gages, macroinvertegrate collections, GIS database management, etc.) and project coordination. Work will continue in 2015 with analysis of data and formulation of strategy scenarios.

County Policies, Rules and Regulations

Clark County Code 40.385 – Stormwater and Erosion Control

Clark County regulates stormwater runoff and erosion control on development, redevelopment, and construction sites primarily in Chapter 40.385 Stormwater and Erosion Control. The purpose of the code is to safeguard public health, safety, and welfare by protecting the quality of surface and ground waters for drinking water supply, recreation, fishing and other beneficial uses through the application of best management practices (BMPs) for stormwater management and erosion control. It was adopted to minimize the degradation of receiving waters from impacts attributable to stormwater runoff, thereby not precluding the preservation of future restoration of beneficial uses.

The regulations generally apply to all development and construction projects, including county roads and parks that vested after April 13, 2009, whether or not they discharge to county storm sewers or to waters of the state. A notable exception is construction of buildings and impervious area for agricultural activity, which is only regulated under the stormwater and erosion control code if projects discharge directly or indirectly to the county storm sewer system.

Clark County Code 40.380 – Stormwater and Erosion Control

For development, redevelopment, and construction sites that received final engineering approval prior to December 28, 2011 and a vesting date before April 13, 2009, Clark County regulates stormwater runoff and erosion control under Chapter 40.380 Stormwater and Erosion Control (Clark County Code). Although this code has been superseded by Chapter 40.385, it remains in effect for those projects that remain vested under it.

Clark County Code 13.26A – Water Quality

Clark County regulates the discharge of contaminants to surface water, stormwater, and groundwater to protect the county's surface and groundwater quality by providing minimum requirements for reducing and controlling the discharge of contaminants and stormwater flows. It requires certain sites and activities to utilize best management practices to control release of contaminants.

For purposes of regulating development activities, the Chapter applies to those limited projects that only trigger minimum requirement 3 of the *Clark County Stormwater Manual*.

Clark County Code 40.430 – Geologic Hazard Areas

Identifies sites where geologic concerns such as erosion and steep slopes are coincident in preparation of erosion control and stormwater site plans.

Clark County Stormwater Manual

The *Clark County Stormwater Manual* is the technical guide that project proponents follow to meet the minimum requirements of the 2007 permit and meet county stormwater management requirements for development and construction projects in the county. The manual contains county requirements and procedures specific to Clark County that differ from the 2005 *SMMWW*; for the most part, the county manual references the 2005 *SMMWW* to meet the minimum requirements.

Stormwater Facility Maintenance Manual

Chapter 40.385 CCC requires that all new stormwater treatment and flow control facilities be maintained according to the standards in Clark County's *Stormwater Facility Maintenance Manual*. The manual is also applied to all existing facilities under Chapter 13.26A.

Stormwater Pollution Control Manual

The *Clark County Stormwater Pollution Control Manual: Best Management Practices for Businesses and Government Agencies* is the BMP manual for meeting minimum requirement #3 from the *SMMWW*.

Clark County Code 40.450 and 40.440 – Wetlands and Habitat Protection

Chapters 40.450 *Wetland Protection* and 40.440 *Habitat Conservation* regulate some stormwater discharges and the placement of treatment and control facilities in habitat and wetland buffers.

Clark County Code 40.510

Applications for development, redevelopment, and construction require different levels of review depending on their impacts to the community, which are defined in Chapter 40.510. The levels of review are ministerial decisions (Type I), administrative decisions (Types II and II-A), and quasi-judicial decisions (Type III).

Management Practice: Review and Approval for Non-Manual Stormwater Treatment BMPs

The Environmental Services Department follows a management practice that conforms to the SMMWW guidance for determining acceptability of stormwater treatment BMPs that are not in the *SMMWW*.

Stormwater Review and Enforcement of Development and Construction Applications

Purpose

Clark County has a system of ordinances, technical manuals, plan review, inspection and enforcement to apply the NPDES Permit minimum requirements to development, redevelopment, and construction projects.

For stormwater, the purpose of the review is to determine:

- Applicability of the stormwater and erosion control minimum requirements.
- Compliance with applicable minimum requirements.
- Compliance with other county-specific stormwater requirements listed in chapters eight through 11 of the Clark County Stormwater Manual.

Inspection and enforcement strives to ensure that construction sites correctly and consistently use erosion control BMPs to prevent sediment-laden runoff from leaving the sites, and that permanent stormwater BMPs for conveyance, treatment, and flow control are properly installed, constructed, and transferred in good condition to the ultimate owners/operators.

Interdepartmental Responsibilities Summary

Responsibility for implementing the stormwater code is shared by several departments and is guided by interdepartmental MOUs. Environmental Services will update and maintain these agreements.

Community Development Department – Permit Services

Permit Services will accept most types of development and construction applications and determine if applications include the required submittals. Permit Services staff review residential building permit applications for stormwater compliance.

Community Development Department – Building Safety

Building Safety will accept and review site plans, condition building permits for stormwater requirements, inspect building construction sites for compliance with erosion control, source control, preservation of natural drainage, and onsite stormwater management.

Public Works Department – Development Engineering

Development Engineering staff will provide engineering review of stormwater and erosion control plans on development sites, including residential and non-residential

development sites. Development Engineering staff will oversee the issuance of the plat, the final engineering as-built documents (record drawings), and the maintenance warranty, if applicable.

Public Works Department – Construction Management

Construction Management staff will inspect development sites, including county projects, for compliance with stormwater engineering plans and erosion control plans.

Environmental Services Department – Clean Water Program

Clean Water Program staff will support decision-making regarding interpretation of the code and manuals, providing documentation of their findings.

Environmental Services Department – Code Enforcement

Code Enforcement will enforce erosion control violations on development and building construction sites as needed.

Responsibilities Matrices

The review and enforcement process varies depending on complexity and scope of the project. For stormwater review purposes, projects generally can be divided into residential development projects (subdivisions), non-residential development projects, residential construction projects (individual home construction), and Public Works projects.

The first matrix below describes responsibilities at the department and division level, and then four separate matrices describe responsibilities and accountability at the staff level for each type of review.

Overview of Regulatory Review and Enforcement Responsibilities

Task	CD Permit Services	CD Building Safety	CD Building Official	DES Code Enforce-ment	PW Development Engineering	PW Dev. Engineering Manager	PW Construction Management	PW Const. Manager	DES Clean Water Program
Plan Review - residential construction	P	S	A	O	O	O	O	O	S
Inspect building construction sites	I	P	A	O	O	O	O	O	I
Engineering review - development	S	O	O	O	P	A	C	O	I
Accept "non-manual" treatment BMPs	O	O	O	O	P	A	O	O	C
Inspect development sites	O	O	O	O	S	O	P	A	I
Inspect Public Works sites	O	O	O	O	S	O	P	A	I
Enforce erosion control	I	P	A	P	O	O	P	A	I
Maintenance warranty inspection	O	O	O	O	S	O	P	A	I
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted									

Residential Development (Subdivision, Short Plat)

Task	CD Permit Services Mgr	CD Permit Tech	CD Dev. Services Mgr.	CD Planner	PW Dev. Engineering Manager	PW Review Engineer	PW Eng. Team Lead	PW Planning Technician	PW Office Assistant	PW Const. Manager	PW Inspector	DES CWP Engineering Tech
Accept applications and plans	A	P	O	S	C	O	S	S	S	O	O	O
Pre-application conference	O	S	A	S	C	P	S	I	I	O	O	O
Preliminary engineering review	O	S	I	I	A	P	C	S	S	O	O	O
Final engineering review	O	S	O	O	A	P	C	S	S	O	C	O
Construction approval	O	O	O	O	A	P	C	S	S	O	C	O
Pre-construction conference	O	O	O	O	I	C	C	S	S	A	P	O
Development inspection	O	O	O	O	I	C	C	S	S	A	P	O
Approve record drawings	O	O	O	O	A	P	C	S	S	S	S	O
Accept maintenance bond	O	O	O	O	A	S	O	P	S	S	I	I
Issue completion of construction notice	O	O	O	O	A	I	O	P	S	S	I	I
Record final plat	O	O	O	O	A	O	C	P	S	S	O	I
Distribute as-built to DES	O	O	O	O	A	O	O	S	P	S	O	I
22-month off-warranty inspection	O	O	O	O	A	O	O	S	S	S	P	O
Release warranty bond	O	O	O	O	A	O	O	P	S	S	I	I

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

Non-Residential Development

Task	CD Permit Services Mgr	CD Permit Tech	CD Dev. Svcs. Mgr.	CD Planner	PW Dev. Eng. Mgr.	PW Review Engineer	PW Eng. Team Lead	PW Planning Tech	PW Office Assistant	PW Inspector	DES CWP Eng. Tech
Accept applications and plans	A	P	I	S	O	S	O	S	S	S	O
Pre-application conference	O	S	A	P	O	S	O	O	O	O	O
Preliminary engineering review	O	S	I	I	A	P	C	S	I	O	O
Final engineering review	O	S	O	O	A	P	A	S	I	C	O
Construction approval	O	O	O	O	A	S	A	S	I	C	O
Pre-construction conference	O	O	O	O	A	C	O	O	O	P	O
Development inspection	O	O	O	O	A	C	O	O	S	P	O
Approve as-builts	O	O	O	O	A	P	O	I	S	S	I
Issue completion of construction notice	O	O	O	O	A	I	O	P	S	I	I
Distribute as-built to DES	O	O	O	O	A	O	O	O	P	O	I
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted											

Residential Construction (Individual Lots)

Task	CD Permit Technician	CD Building Safety Inspector	CD Building Official	CD Permit Services Mgr
Accept applications and plans	P	O	I	A
Initial drainage inspection	S	P	A	O
Stormwater review	P	O	I	A
Issue Building Permit	P	O	I	A
Construction inspection	I	P	A	I
Issue Occupancy Permit	S	P	A	A
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted				

Public Works Projects

Task	DES CWP Eng. Tech	PW Eng. Design Manager	PW Design Engineer	PW Construction Section Manager	PW Construction Engineer	PW Construction Inspector	PW Survey	PW Operations and Maintenance
Design	O	A	P	I	I	I	S	O
Final engineering review	O	I	C	I	O	O	O	O
Construction approval	O	O	O	A	P	S	O	O
Construction inspection	O	O	C	A	S	P	O	O
Final walk-through	O	O	S	A	S	P	O	S
Issue substantial completion	I	O	O	A	P	S	O	I
Issue physical completion	I	O	O	A	P	S	O	I
Issue final acceptance	I	O	O	A	P	S	O	I
Produce and distribute record drawings	I	O	S	A	P	S	S	I

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

Residential Development Project Review

Residential development projects are divisions of land to create individual lots and construction of infrastructure such as roads and storm sewer. Many aspects of residential development project review will not concern stormwater; only aspects concerning stormwater are covered in this plan.

Pre-Application Phase

Applicants typically submit initial information and may meet with a planner, engineer, and other pertinent staff in a Pre-application Conference (PAC) before an applicant submits a completed development application. The PAC will help determine options and likely requirements for stormwater control, among many other regulations and requirements.

Preliminary Land Division and Preliminary Engineering Review Phase

The applicant will submit an application for residential land division (subdivision or short plat) to the Permit Center along with a preliminary stormwater plan in accordance with section 3.2 of the *Clark County Stormwater Manual*.

Development Engineering staff will review the preliminary stormwater plan to evaluate whether the proposal for stormwater controls is feasible given existing site conditions and constraints. The engineer's Findings and Conditions of Approval will appear in the Staff Report, which will be forwarded to the applicant..

Findings describe the engineer's determination of whether or not each aspect of the stormwater proposal meets county code. Conditions of Approval list the engineer's requirements for how to meet code, in cases where the proposal does not meet it, and they must be met in the final engineering plan.

Final Engineering Review Phase

The applicant will submit final plans for the residential development, including a final stormwater plan in accordance with section 3.3 of the *Clark County Stormwater Manual*. The final stormwater plan will provide final engineering design (Technical Information Report) and construction drawings for the stormwater aspects of the proposed project and a construction Stormwater Pollution Prevention Plan (SWPPP).

Development Review engineers will:

- Ensure that the Conditions of Approval from the preliminary land division have been met.
- Verify that applicable county and NPDES permit requirements have been met.
- Review engineering calculations of stormwater flows, sizing of flow control facilities, and sizing of conveyances.

- Verify adequacy of erosion control BMPs.
- Perform any other engineering review required for stormwater.

Responsible officials from Public Works, Community Development, Environmental Services, and Public Health will sign the final plans. The Development Engineering manager will make the final approval. Then the planning technician will return the approved plans to the applicant.

The Development Engineering office assistant will open a development inspection case in *Tidemark* in preparation for the next phase of the process.

Development Inspection Phase

During development inspection, the applicant will construct the development's infrastructure, including grading, roads, and stormwater controls, according to the approved final plans. Public Works development inspectors will inspect the site for conformity with the plans.

The process begins when the applicant submits the final construction plan and application for development inspection.

The assigned development inspector will hold a Preconstruction Conference with the applicant. During the Preconstruction Conference, the inspector will review erosion control requirements, including requirements related to a high potential for sediment to be discharged from the site with the applicant and will receive the name of the Certified Erosion Control and Sediment Lead (CECSL) for the site. The inspector will reiterate storm system requirements and additional inspection-related policies for storm system installation. Department of Ecology state construction stormwater permit enforcement staff are also invited to each Preconstruction Conference. After the conference, the development inspector will give approval to begin constructing the project after completion of a preconstruction inspection to verify proper installation of erosion control BMPs.

During construction of the development, the development inspector will inspect the site to ensure that erosion control measures are operational and effective. The inspector will work with the developer to achieve compliance, using correction notices and stop work orders if necessary. If there is evidence of continued neglect, the inspector will call a code enforcement officer to enforce erosion control measures through citations and penalties.

The development inspector also will verify that stormwater facilities are constructed as designed.

At the end of construction, the applicant will submit record drawings and a maintenance bond, if applicable, for any public improvements. (Public improvements are roads and

stormwater conveyance and facilities that will fall into public ownership upon acceptance of the development.) A Development Engineering engineer will approve the record drawing and then a Development Engineering planning technician will accept the maintenance bond, if applicable.

Development Engineering staff will provide an electronic record drawing file to Environmental Services, then send the Mylar plan to the state archives.

After these steps are complete, the planning technician will issue a notice of completion of construction to the applicant and copy it to several departments, including the Clean Water Program and Public Works Maintenance and Operations. The notice signals the start of the stormwater facility maintenance warranty period, if applicable (see below).

The notice of completion of construction constitutes provisional county acceptance of the public infrastructure, including public stormwater facilities. In the case of private facilities, completion of construction is the end of county involvement in construction and the regulated facility operation and maintenance inspection process will begin.

Receipt of the notice of completion of construction will initiate some stormwater mapping tasks (see Mapping the Storm Sewer Infrastructure on page 12) and some maintenance inspection tasks (see Operating and Maintaining the Storm Sewer System, County Property and Roadways on page 26).

Final Land Division Phase

The final land division will begin after the development inspection phase begins but before it ends.

The applicant will submit the final land division application and the draft plat. The plat will contain required information describing facility ownership and maintenance responsibility, stormwater tracts, and drainage easements. The plat will be routed to several departments for review and approval.

After approval of the draft plat, the applicant will submit a Mylar version that will be signed by the Planning Director, the County Engineer, and the Board of Clark County Commissioners. Development Engineering staff then will record the final plat with the Auditor and issue a plat notification to the developer, copied to several departments, including the Clean Water Program.

Receipt of the plat notification by Clean Water program may initiate some stormwater mapping tasks, (see Mapping the Storm Sewer Infrastructure on page 12).

The final plat must be recorded before building permits for home construction will be issued for lots in the development (see Residential Construction Project Review on page 90).

Maintenance Warranty Period

Most, but not all, residential developments will have public improvements, including public stormwater infrastructure.

For residential developments with public improvements, a two-year maintenance warranty period will begin at completion of construction. During the maintenance warranty period, the developer will be responsible for continued maintenance of the stormwater facilities.

During the 22nd month of the maintenance warranty, a development inspector will inspect the public stormwater facilities for compliance with maintenance standards.

If the stormwater facilities are found to be in good condition and properly maintained, the development inspector will recommend release of the maintenance bond. The Development Engineering planning technician will release the bond and notify the Clean Water Program and Public Works Maintenance and Operations.

If the facility has components that fail the maintenance inspection, the planning technician and development inspector will work with the developer to obtain needed repairs. If the developer fails to make repairs, the planning technician will demand the bond from the surety company.

After repairs are made, the Clean Water Program will initiate stormwater mapping tasks, if necessary, (see Mapping the Storm Sewer Infrastructure on page 12), and Public Works Maintenance and Operations will initiate maintenance and operations tasks (see Operating and Maintaining the Storm Sewer System, County Property and Roadways on page 26).

Non-Residential Development Project Review

Non-residential developments include commercial and industrial projects as well as schools, churches, and other non-residential land uses. These projects construct infrastructure such as roads and stormwater along with the buildings. Multifamily housing projects also are reviewed using this process. Occasionally, commercial projects may also go through a land division. Many aspects of non-residential development project review will not concern stormwater and are not covered in this plan. Also, many projects do not trigger stormwater requirements because they do not add or replace a sufficient amount of impervious surface; examples include cell tower placement, sign construction, and building façade replacement.

Pre-Application Phase

Applicants typically submit initial information and meet with a planner, engineer, and other pertinent staff in a Pre-application Conference (PAC) before submitting a

completed development application. The PAC will help determine options and tentative requirements for stormwater control, among many other regulations and requirements.

Preliminary Site Plan and Preliminary Engineering Phase

To begin the process, the applicant submits an application for preliminary site review to the Permit Center along with a preliminary stormwater plan in accordance with chapter 3.2 of the *Clark County Stormwater Manual*.

The assigned Development Engineering engineer will review the preliminary stormwater plan to evaluate whether the proposal for stormwater controls is feasible given the available information on existing site conditions and constraints. The engineer's Findings and Conditions of Approval will appear in the Staff Report and Decision (or Land Use Hearing Examiner Decision), which will be forwarded to the applicant.

Findings describe the engineer's determination of whether or not each aspect of the stormwater proposal meets county code. Conditions of Approval list the engineer's requirements for how to meet code, in cases where the proposal does not meet it, and they must be met in the final engineering plan.

Under state development project vesting rules, the applicant will have several years to begin the construction process, depending on circumstances.

Final Site Plan and Final Engineering Review Phase

The applicant will submit final plans for the development, including a final stormwater plan in accordance with section 3.3 of the *Clark County Stormwater Manual*. The final stormwater plan will provide final engineering design and construction drawings for the stormwater aspects of the proposed project and a construction Stormwater Pollution Prevention Plan (SWPPP).

The assigned Development Review engineer will:

- Ensure that the Conditions of Approval from the Final Decision have been met.
- Verify that applicable NPDES permit and county code minimum requirements have been met.
- Review engineering calculations of stormwater flows, sizing of flow control facilities, and sizing of conveyances.
- Verify adequacy of erosion control BMPs.
- Perform any other engineering review required for stormwater.

Responsible officials from Public Works, Community Development, and Public Health will sign the final plans. The Development Engineering manager will make the final approval. The approved plans are returned to the applicant.

Development Engineering will open a development inspection case in *Tidemark* in preparation for the next phase of the process.

Building Permit Review

The applicant will submit building permit applications to Permit Services. Construction of structures will be concurrent with construction of the development; therefore, most stormwater review will have already occurred.

The building permit must be issued before construction of structures may begin.

Development Inspection Phase

During development inspection, the applicant will construct the development's infrastructure, including grading, roads, and stormwater controls. The project's buildings are also erected during this phase.

The process begins when the applicant submits the final construction plans and application for development inspection.

The assigned Public Works development inspector will hold a Preconstruction Conference with the applicant. The inspector will review erosion control requirements with the applicant, including requirements related to a high potential for sediment to be discharged from the site and will receive the name of the Certified Erosion Control and Sediment Lead worker (CECSL) for the site. Department of Ecology state construction stormwater permit enforcement staff are also invited to each Preconstruction Conference. The inspector will reiterate storm system requirements and additional inspection-related policies for storm system installation. After the conference, the development inspector will give approval to begin constructing the project after completion of a preconstruction inspection to verify proper installation of erosion control BMPs.

During construction, the development inspector will inspect the site as needed to ensure that erosion control measures are operational and protective. If necessary, a code enforcement officer will be called to enforce erosion control measures. If the project has a state-issued NPDES construction permit, then violations may be referred to Ecology.

The inspector also will ensure that stormwater facilities are constructed as designed.

At the end of construction, the inspector will verify that the facility was built as shown on approved design plans. The applicant will submit record drawings and, if applicable, a maintenance bond for any public improvements in the right-of-way. A Public Works engineer will review the record drawings for accuracy before approving it. After approval of the completed facilities and record drawings, a Development Engineering planning technician will accept the maintenance bond.

When a record drawing is received, Development Engineering staff will give an electronic file to Environmental Services and send the Mylar plan to the state archives.

The planning technician will issue the notice of completion of construction to the applicant and copy it to several county agencies, including the Clean Water Program. The notice signals the start of the maintenance warranty period, if applicable.

Receipt of the completion of construction by the Clean Water Program will initiate some stormwater mapping tasks for projects with either public or private stormwater facilities (see Mapping the Storm Sewer Infrastructure on page 12).

Maintenance Warranty Period

The maintenance warranty period is relevant for those few non-residential developments that have public stormwater infrastructure in public right-of-way. However, with increasing use of LID BMPs such as bioretention facilities in county right-of-way, they will become more common.

A two-year maintenance warranty period will begin at completion of construction. During the period, the developer will be responsible for continued maintenance of the stormwater facilities.

During the 22nd month of the warranty, a development inspector will inspect the public stormwater facilities for compliance with maintenance standards.

If the stormwater facilities are found to be in good condition and properly maintained, the development inspector will authorize release of the maintenance bond and will notify the Clean Water Program and Public Works Maintenance and Operations that the bond has been released.

Receipt of the bond release notification will initiate maintenance and operations tasks, (see Operating and Maintaining the Storm Sewer System, County Property and Roadways on page 26).

If the facility has components that fail the maintenance inspection, the planning technician and development inspector will require the developer to obtain needed

maintenance and repairs. If the developer fails to make repairs, the county will demand the bond from the surety company.

After repairs are made, the Clean Water Program will initiate stormwater mapping tasks, if necessary, (see Mapping the Storm Sewer Infrastructure on page 12), and Public Works Maintenance and Operations will initiate maintenance and operations tasks (see Operating and Maintaining the Storm Sewer System, County Property and Roadways on page 26).

Single Lot Residential Construction Project Review

Single lot residential construction projects include construction or expansion of single-family and duplex homes and their appurtenances, such as decks, garages, and driveways, and outbuildings. Many aspects of residential construction project review will not concern stormwater and are not addressed here.

Building Permit Application Review – Stormwater

The applicant will submit a residential building permit application including a stormwater site plan showing proposed building footprint(s), erosion control measures, and on-site stormwater control BMPs to the Permit Center. Projects triggering Minimum Requirements 1-10 are referred to Development Engineering for review.

The permit technician will review the residential building permit application to verify applicability of the minimum requirements and selection and use of allowed stormwater BMPs and erosion control BMPs. They will also check for the mapped presence of steep slopes or geo-hazard areas. If they conflict with the proposed stormwater BMPs, the applicant will be required to consult a licensed geotechnical engineer to design stormwater controls.

If the residential construction site is within an existing subdivision with an approved stormwater plan that provides flow control and treatment, then the permit technician will recommend that the applicant consult the development project's engineering plans to determine stormwater requirements, such as roof drain infiltration and amended soils, for the lot. In those cases, the permit technicians also will include requirements from the recorded plat and subdivision engineering drawings and attach them as conditions on the building permit.

If the residential construction site is not part of an existing subdivision with an approved stormwater plan, then applicants will follow minimum requirements applicable to their projects. Generally, if minimum requirements 1- 5 apply, the applicant can complete the stormwater plan on his or her own. If minimum requirements 1-10 apply, the applicant will need to consult an engineer complete the stormwater plan that complies with county code and the NPDES permit requirements under an engineering review by Public Works Development Engineering.

The Permit Center will issue the building permit before construction may begin.

Construction Inspection

Before construction is allowed to begin on the site, a Building Safety Division inspector will inspect the site as part of a foundation inspection to also verify that the erosion control BMPs are properly installed and that any unusual site conditions that might lead to sediment transport off site.

All sites are required to maintain an erosion control log with an attached site plan and form that includes the required onsite stormwater management BMPs.

At the end of construction, an inspector will retrieve the erosion control log and stormwater plan to place in the project file.

Public Works Project Review

Projects built by the Public Works department, including roads, parks, and stormwater facilities will be reviewed by the Public Works Engineering and Design Group independently from the design team for compliance with county stormwater standards. Many Public Works projects will not require land use review, including roadways through existing right-of-way; therefore, the process will frequently begin at the final engineering review phase. Those that require land use review will begin at the preliminary site plan and preliminary engineering phase (above).

Additionally, the development inspection phase is replaced by a construction management phase. Public Works will use its own construction inspectors to oversee the construction of the project to ensure that it is built as designed and bid. Enforcement of erosion control and other measures is through contract management.

Before completion of a project, the construction engineer will invite stakeholders, including the Public Works Maintenance and Operations water quality crew chief, to a walk-through of the new roadways and/or facilities. The construction manager also will copy the Clean Water Program and the Public Works Operations and Maintenance program on the letters of physical completion and final acceptance of the project.

At the final acceptance, Public Works will develop a record drawing according to its *As-Built Plan Preparation Policy*, dated May 7, 2009.

Outputs

General outputs:

- Stormwater site plans that meet county standards
- Construction site management that controls excessive runoff and sediment
- Completed projects include stormwater facilities meeting county standards

- Assigned ownership and maintenance responsibility for stormwater control facilities
- Record drawings are completed
- Completed project notifications to programs

Residential Development Project Review Outputs

- Final Decision denying, approving, or approving with conditions the proposed development project
- Technical Information Report
- Approved final construction plan
- SWPPP
- Record drawings
- Approved final plat
- Notice of completion of construction
- Maintenance bond release letter, if applicable

Non-Residential Development Project Review Outputs

- Final Decision denying, approving, or approving with conditions the proposed development project
- Technical Information Report
- Approved Final Site Plan
- Approved final construction plan
- SWPPP
- Record drawings
- Erosion control log
- Building plan
- Notice of completion of construction
- Maintenance bond release letter, if applicable

Residential Construction Project Review Outputs

- Building Permit including plot plan with stormwater requirements
- Erosion control plan
- Erosion control log
- Building Plans

Public Works Project Review Outputs

- Technical Information Report
- Approved final construction plan
- Record drawings
- Completion of Construction notice
- Physical Completion letter

- Final Acceptance letter

Code and Manual Revisions

Updates to Implement the 2012 SWMWW

The 2013-2018 NPDES permit requirement S5.C.5.a. requires Clark County to update its development code and stormwater manuals to be equivalent to minimum requirements in Appendix 1 of the permit and the design standards of the *2012 Stormwater Management Manual for Western Washington*. Draft code and manuals must be submitted to Ecology for review by July 1, 2014, with final adoption by June 30, 2015. This final deadline will be updated to reflect the updates to the permit and receipt of the Ecology comments on the Review Draft of the Clark County Stormwater Manual that was submitted in June 2014.

To meet these deadlines, Clark County began a project early in 2013to update the code and create a *Clark County Stormwater Manual* based on the Ecology 2012 SWMMWW and existing county manual elements. In June 2014, Clark County submitted draft code and manual language to Ecology for review and approval. At the time of this report, Clark County anticipates completion of the code and manual update in late 2015 or early 2016 depending on the timing of Ecology response to the draft code and manual submittal in June 2014.

Outputs

- Stormwater and Erosion Control Chapter 40.386
- Updates to Chapter 13.26A Water Quality
- *Clark County Stormwater Manual* to meet all relevant NPDES permit code and manual requirements

Adopt LID Standards and Associated Code Changes

The 2013-2018 NPDES permit requirement S5.C.5.b. requires Clark County to make code and standards revisions that make LID the preferred and commonly used approach to site development. This is primarily a code and standards to minimize creation of impervious surfaces, minimize the loss of native vegetation, and other methods to reduce stormwater runoff. Stormwater LID BMPs themselves are included in the 2014SWMMWW. The code and process revisions must be completed and adopted on the same schedule as the stormwater code and manual. .

During 2015, county staff will draft final code revisions to Title 40 Clark County Unified Development Code.

Outputs

- Draft revisions to Title 40 Clark County Unified Development Code

WATERSHED-SCALE STORMWATER PLANNING

Adopt LID Standards and Associated Code Changes

The 2013-2018 NPDES permit requirement S5.C.5.c. requires Clark County to select a basin and complete a watershed-scale stormwater plan following permit prescribed steps. The final report must be submitted to Ecology by September 6, 2017, with a scope of work submitted by April 1, 2014.Clark County began development of a scope of work in spring of 2013, submitted the scope of work on schedule in March 2014 and received Ecology approval in September 2014.

During 2015, Clark County will continue work to implement the approved scope of work and schedule including

- Collecting stream flow data
- Collecting rainfall data
- Collecting additional water quality and benthic macroinvertebrate data
- Evaluating existing watershed conditions
- Calibrating hydrologic and water quality model calibration
- Completing other specific elements of the Ecology-approved scope of work

Outputs

- Scope and schedule submittal to Ecology (completed June 2014)
- Stream gauges construction and operation (installed fall 2014)
- Hydrology and water Workspace and existing data report
- Delineation of areas of special interest for hydrologic and water quality impacts
- Calibrated hydrologic and water quality models
- Base case model scenario output
- Stormwater management strategies for evaluation

STORMWATER BASIN PLANNING

The county's NPDES Permit allows certain requirements for controlling runoff on development sites to be tailored to local circumstances through the use of basin plans or other similar water quality and quantity plans. The alternate requirements must provide equal or similar protection of receiving waters and equal or similar levels of pollutant

control as compared to Appendix 1 of the permit, which defines minimum requirements.

Currently two basin plans are under review by Ecology for inclusion in the June 2014 draft Clark County Stormwater Manual as alternative flow control standards under Minimum Requirement #7.

The technical analysis process is discussed in more detail in Chapter 3.

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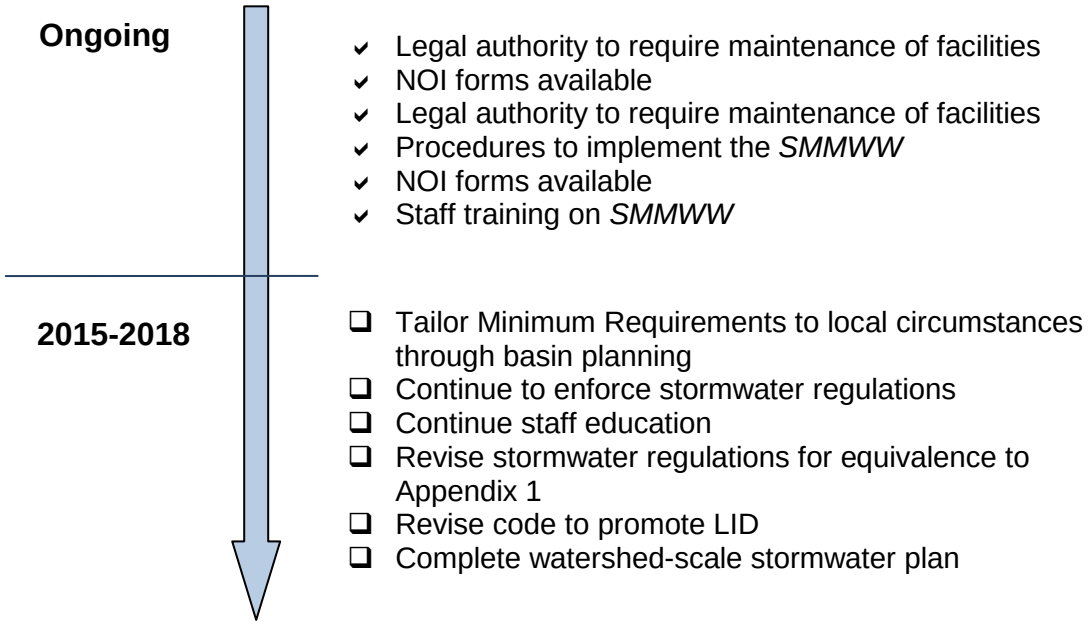

FOR MORE INFORMATION ON HOW DEVELOPMENT, REDEVELOPMENT, AND CONSTRUCTION SITES ARE REGULATED FOR STORMWATER AND EROSION CONTROL

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Section 6
Public Involvement, Education and Outreach about Stormwater and the Stormwater Management Program

Clark County provides ongoing opportunities for the public to review and comment on the stormwater management program through various mechanisms. Public input is one way to tailor policy within the guidelines of the NPDES Permit. The county also offers numerous stormwater education opportunities for the public. The education program is aimed at various audiences and is designed to help raise awareness to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts.

Public Information, Involvement and Participation

Regulatory Requirements Summary

NPDES Permit S5.C.4 - Public Involvement and Participation

The NPDES Permit requires the county to provide ongoing opportunities for public involvement in the stormwater management program development and implementation. The public must have opportunities to participate in the development, implementation and update of the SWMP and the county must consider public comments on it. The Stormwater Management Program Plan, annual report and other submittals required by the permit must be posted on the Web.

County Policies, Rules and Regulations

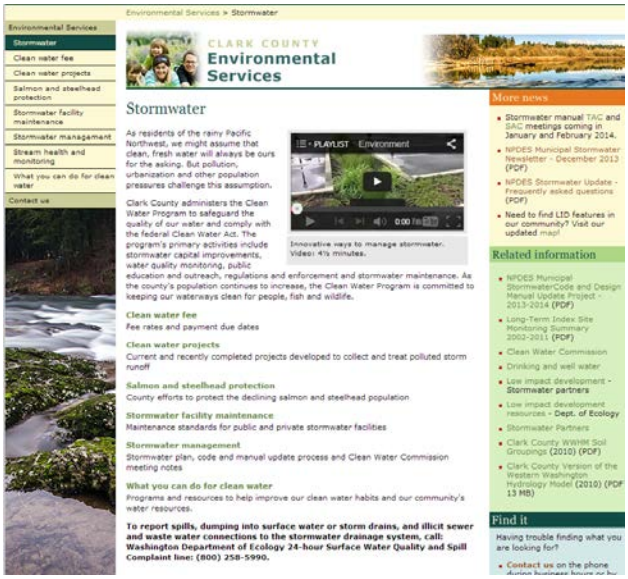
Clark County Code Chapter 13.30A

County Code Chapter 13.30A.040 defines the role of the Clark County Clean Water Commission (CWC), a citizen commission formed to advise the Board of Clark County Councilors (BOCC). The CWC will advise the BOCC on the focus of the SWMP, the effectiveness of the SWMP, program service levels, financing, and policies on surface and stormwater issues.

Public Information

Purpose

The Clean Water Program provides information to the public about the stormwater management program to publicize the program's services to rate payers and keep the community abreast of current stormwater management issues.



Responsibilities Matrix

Task	DES CWP Manager	DES Environmental Education Coordinator	DES Outreach Project Coordinator	PW Public Information Officer	DES CWP Professional Staff
Provide content	A	I	I	S	P
Write / design eNewsletter	S	A	P	S	S
Manage CWP mailing list	O	A	P	O	O
Web updates	I	A	P	O	S
Write media releases	S	A	P	S	S

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

e-Newsletter

Clark County Environmental Services Clean Water Program publishes an e-Newsletter to distribute information about current NPDES stormwater code and manual updates. The current distribution is about 300 email addresses, including local businesses, school districts, non-profit organizations and individual citizens. During the stormwater manual update process, the e-Newsletter is distributed quarterly and posted on the stormwater web page.

Clean Water Program Web Site

The Clean Water Program Web site offers an opportunity for the public to review many program activities, services and documents, as well as receive educational messages about stormwater. The website address is: www.clark.wa.gov/stormwater. Older technological reports and information that used to be on the web are available to citizens upon request.

Media Releases

The Clean Water Program releases information on various topics to the media to publicize noteworthy events. The Environmental Services director or Clean Water Program manager will call for a media release. The program coordinator will write the release with the support of the Public Works Department public information officer and the Clark County Public Information Office. Releases will be distributed to the media by the Clark County Public Information Office.

Outputs

- E-Newsletter
- Content on CWP Web site
- Media releases

Public Involvement and Participation

Purpose

The purpose of involving the public in the SWMP is to make an effort to tailor the program, while considering the prescriptive nature of the permit, to the local community's priorities. Public feedback about program effectiveness and the public's needs also helps the Board of Clark County Councilors set policies for stormwater management.

Responsibilities Matrix

Task	BOCC	DES CWP Manager	DES CWP Program Coord.	DES CWP NPDES Permit Manager	DES CWP Office Assistant	DES CWP Staff	DES Enhanc. & Permitting Manager	DES Enviro. Permitting Coord.
Appoint Clean Water Commission	A / P	I	I	I	I	I	O	O
CWC liaison	C	A	P	S	S	S	O	O
CWC secretary	O	A	S	O	P	O	O	O
Respond to SWMP public comments	I	A	S	P	I	I	O	O
Respond to SEPA comments for stormwater capital projects	I	I	O	O	O	S	A	P
Community presentations	I	A	P	S	S	S	O	O
Other code update coordination	I	A	responsibilities assigned as needed				O	O
Customer service adaptive management	I	A	any CWP staff may be primary in his/her area				O	O

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

Clean Water Commission

The Clean Water Commission (CWC) is a nine-member advisory panel appointed by the Board of Clark County Councilors. It provides a forum for public participation in the stormwater management program and also informs the BOCC about stormwater topics and policy recommendations.

Staff Support

Clean Water Program staff support the CWC in a variety of ways. A program coordinator is the primary staff liaison to the CWC. The liaison will attend most meetings and provide minimal facilitation when required and respond to requests for information from CWC members.

The Clean Water Program office assistant will attend each meeting to take notes and distribute meeting materials. The Clean Water Commission Web pages will be updated

with current commission member information and terms, meeting summary notes and meeting audio files.

Other staff members may attend meetings, as required, to present updates on program activities or documents.

Member Appointments

Openings on the CWC will be listed in local newspapers by the BOCC. Interested applicants, including incumbents seeking another term, must submit a letter of interest and a resume to the BOCC, which will conduct interviews and select a candidate to fill the position.

Public Meetings

The Clean Water Commission will hold a minimum of six public meetings each year, every other month starting in January. Meetings are held on the first Wednesday of the month at 6:30 p.m. usually in the Public Service Center (1300 Franklin St.) in downtown Vancouver, Washington.

Discussion topics will include program updates from staff on the stormwater management program and updates from staff on other Clean Water Program functions, such as surface water / stormwater monitoring, capital project planning, and regulatory changes.

At meetings, the CWC will review and discuss major stormwater policy recommendations. All meetings will be documented with a meeting summary (.pdf file) and an audio recording (MP3). The meeting documentation will be available on the Clean Water Commission web page.

The Commission will hear public comment both prior to and following the discussion.

Communications with the Board of Clark County Councilors

Annual Meeting

Annually, the Clean Water Commission will request a meeting with the Board of County Councilors (BOCC) in a public meeting to present a review of the effectiveness of the Clean Water Program and to discuss other stormwater topics or concerns. The CWC will present an annual report at this meeting.

Other Communications

The Clean Water Commission may elect to communicate with the BOCC at any time via letter, memorandum, or during scheduled public comment periods at BOCC Work Sessions and Hearings.

Stormwater Management Plan Review and Input

Clark County will offer its *Stormwater Management Plan* each year on the Clean Water Program Web site for review and comment by the public at www.clark.wa.gov/environment/stormwater/management/plan.html.

The Clean Water Program manager or a designee will respond to comments.

Stormwater Capital Projects SEPA

As the Clean Water Program builds stormwater capital projects (see County Stormwater Capital Projects on page 62), each project will be subject to public review and comment under the Washington State Environmental Policy Act (SEPA).

The DES Environmental Permitting coordinator assigned to the project will write and distribute to stakeholders a Determination of Significance or a Determination of Non-Significance. The required public comment period will be held. The coordinator will respond to any comments received, and, if warranted, require changes to the project's design.

Each capital project may also include a package of outreach materials to inform potentially impact citizens and stakeholders of the project. Typical products include a "Head's Up" notice to citizens in the immediate project area, a detailed project letter to adjacent property owners (describing project timeline and potential impacts), a project sign at the construction site, and informational fliers. Materials may also be posted on the CWP stormwater capital project web page.

Community Presentations

As requested, Clean Water Program staff will provide information on the program's activities to community and civic groups, at times in concert with the Clean Water Commission, to distribute information about the stormwater management program and get feedback on community priorities.

Code Updates

Code revisions for water quality, stormwater and erosion control, and the Clean Water Fee regulations require extensive public outreach, review and comment, which will be coordinated by the Clean Water Program. The code update process will include significant public involvement to consult and inform the community and stakeholders.

Per the 2013-2018 NPDES Municipal Stormwater Permit, a public outreach plan was developed to inform the public about stormwater code and manual updates. The plan describes outreach efforts via several venues, including: a Technical Advisory Committee (meets every 6 weeks); a Stakeholder Advisory Committee (meets every

two months); monthly e-newsletters; web page updates and special media releases for special communications.

Customer Service / Adaptive Management

The Clean Water Program and its designees maintain regular contact with the public through daily programmatic activities such as customer service for the Clean Water Fee, source control inspections (section 4), inspections of regulated stormwater control facilities at businesses and subdivisions (section 3), response to information requests, and complaint response. Staff receives feedback during these contacts and frequently incorporates suggestions into their daily procedures and processes.

For example, as a result of public feedback, the Clean Water Program initiated a program to educate residential subdivision Homeowners' Associations about proper maintenance of their stormwater facilities http://www.stormwaterpartners.com/maintenance/index.html.

Outputs

- Clean Water Commission notes including public comments
- Clean Water Commission Annual Report to the Board of Clark County Councilors
- Log of public comments on the Stormwater Management Program
- Log of public comments from community presentations
- SEPA file for each stormwater capital project
- Public testimony transcripts from code update Hearings
- Record of public input for code updates
- Media releases
- E-Newsletters
- Web content

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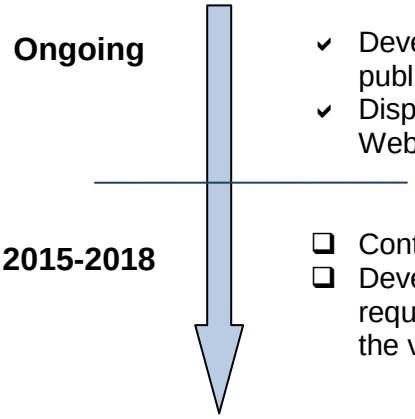

- ✔ Develop and implement a process to involve the public in the SWMP
- ✔ Display SWMP and other NPDES submittals on Web site

- ❑ Continue ongoing outreach programs
- ❑ Develop additional materials to meet permit requirements for awareness and affect behavior of the various audiences

FOR MORE INFORMATION ON THE COUNTY'S EFFORTS TO INFORM AND INVOLVE THE PUBLIC IN THE STORMWATER MANAGEMENT PROGRAM

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Education and Outreach Program

Regulatory Requirements Summary

NPDES Permit S5.C.10 - Education and Outreach Program

The NPDES Permit requires the county to have an educational program aimed at various audiences to build general awareness and effect behavior change to help reduce or eliminate pollution in runoff. The Clean Water Program will provide stewardship opportunities to encourage residents to participate in stormwater related activities.

County Policies, Rules and Regulations

Clark County Code Chapter 13.26A

County Code Section 13.26A.005 describes the use of education and technical assistance to business owners and the general public as a primary means of implementing a successful pollution source control and prevention program.

Clark County Code Chapter 13.30A

Section 13.30A.050(D) states that "many of the difficulties in managing of surface and stormwater problems result in part from the general lack of public knowledge about the relationship between human actions and surface and stormwater management. In order to achieve a comprehensive approach to surface and stormwater management, the county should provide general information to the public about land use and human activities that affect surface and stormwater management."

Education for the General Public

Purpose

The goal of the stormwater education and outreach program is to build general awareness and effect behaviors changes that adversely impact stormwater runoff. The support and awareness of the general public is crucial to achieving this goal. Education for the general public will focus on the following topics:

- Importance of clean water.
- General impacts of stormwater flows into surface waters, including watershed management.
- Impacts from impervious surfaces.
- Contributions we each make to the problem.

- Each person's ability to help protect and improve the quality of Clark County's water resources through source control BMPs and environmental stewardship.
- Low impact development principles and practices

Responsibilities Matrix

Task	DES CWP Manager	DES Environmental Education Manager	DES Outreach Project Coordinator	DES AmeriCorps	Partner Agencies / Contractors
Coordinate education programs	A	P	P	S	C
Track and measure deliverables	S	A	P	S	S
Create messages, programs and collateral	S	A	P	P	P
Distribute messages and collateral	C	A	P	P	P
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed,					

Regional Advertising Campaign

The Regional Coalition for Clean Rivers and Streams is a group of Portland/Vancouver metropolitan-area cities, counties, and stormwater utilities. The focus of the group is to coordinate, develop and implement a regional public awareness media campaign promoting nonpoint stormwater pollution prevention.

Clark County will continue to participate in the coalition's regional awareness campaign through the remainder of the permit term, including a new campaign in 2015

Educational information is on the Web at www.cleanriversandstreams.org.

Canines for Clean Water

The Canines for Clean Water program provides information to dog owners about proper management and disposal of pet waste. The program's web page provides educational information, directions for properly managing and disposing of pet waste, and a pledge for dog owners to pick up after their dogs.

A sustainability specialist will oversee the program, and an AmeriCorps staff will complete the majority of the tasks, including creation of collateral materials such as calendars and a coloring book.

The AmeriCorps staff will distribute flyers and posters to local veterinarians; attend local community events, including dog park openings and fairs; and give presentations to community groups.

The AmeriCorps staff will track and respond to pledges, coordinate with veterinarians, book and staff events, and generally distribute information to the public.

The program web page also provides information for community members to work in their neighborhood to support pet waste pick-up. Signs are available to place in yards and common pet walking areas.

Green Neighbors

Clark County launched the Green Neighbors program in 2012. The program, which promotes sustainable practices (including stormwater runoff and pollution prevention) to homeowners is web-based (www.clarkgreenneighbors.org), however, will host workshops and other educational events, including information on what homeowners can do to protect minimize polluted stormwater runoff.

Web Site

The Clean Water Program operates a web site at www.clark.wa.gov/stormwater , as well as specific program sites, that showcase information about stormwater pollution and prevention techniques aimed at all audiences. The site also contains information on endangered species at www.clark.wa.gov/environment/stormwater/salmon, with multiple links to additional resources on endangered species.

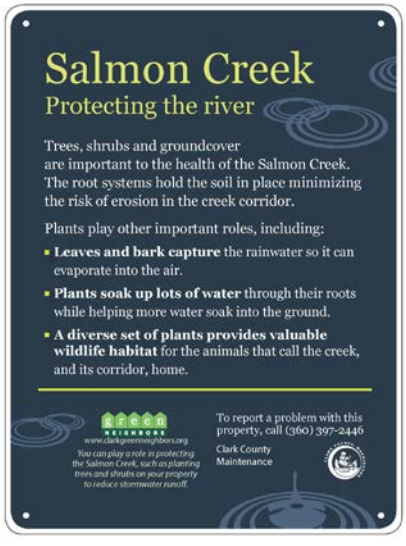
The web site also contains a web page dedicated to "What you can do for clean water." The page includes educational information and stewardship opportunities for home projects, community projects, businesses and property managers.

The Web site is updated on a monthly basis or as needed primarily by the DES Clean Water Program staff.

Publications and Displays

Environmental Services staff will produce displays and publications generally as a part of specific program areas, such as pet waste management, natural gardening to prevent toxic runoff, pollution prevention techniques, and others.

Many displays and publications are in stock and ready for distribution. Staff will continue to display and distribute them at community events, targeted



environmental events, Clean Water Program presentations, and Clean Water Commission meetings .

An additional tool has been developed to include interpretive signs on county capital projects. Interpretive / educational messages are tailored to each site. Typical messaging includes information on watersheds, value of the stormwater project, contact information for the Green Neighbors program, etc.

Outreach Events

Environmental Services sustainability specialists staff informational booths at a variety of community events. Outreach includes information about water quality, the effects of stormwater pollution and pollution prevention along with other environmental messages about recycling, solid waste, toxics control, etc.

Environmental Services partners with Clark County Community Development to use the "Planet Clark" trailer containing environmental displays, including a stormwater display, for educational outreach. The trailer is set up at numerous community events each year.

Outputs

- www.cleanriversandstreams.org, and www.cleanwaterdogs.com
- Public contacts at events
- Workshops
- Fact sheets / brochures
- Pledges to pick up pet waste
- Collateral materials such as stickers, magnets, etc.

EDUCATION FOR BUSINESSES

Purpose

Education for businesses helps meet county goals for assisting commercial, industrial, and governmental enterprises in preventing contribution of pollutants to stormwater runoff or to receiving waters. Outreach and assistance will focus on:

- General stormwater issues
- Information about illicit discharges
- Preventing and controlling the discharge of contaminants through proper use of Best Management Practices
- Equipment maintenance.

Responsibilities

Most activities for this requirement are conducted concurrently or in association with procedures described elsewhere in the SWMP. Responsibilities are described in their respective sections.

Clark County Green Business Program

Clark County's Green Business Program (www.clarkgreenbiz.com) recognizes and promotes local businesses that document "green" practices, including stormwater BMPs. The program currently supports over 44 local businesses that have completed sustainability assessments and have met the requirements to be a local Green Business.

Technical assistance visits and education to promote proper handling and disposal of toxic and hazardous materials and stormwater BMPs is an integral part of the program.

Targeted Messaging

The Clean Water Program has identified a number of businesses that would benefit from targeted messaging towards how their business can modify everyday practices to minimize pollution to stormwater. One specific messaging brochure was created providing information on proper dumpster management and maintenance.

Specific business types were also identified for mobile businesses that may have a large impact on surface water quality. Messaging in the brochure provides reminders of good business practices and certain activities to avoid (such as dumping any materials down storm drains like rinse water). Businesses include:

- Landscapers
- Mobile carpet cleaners
- Mobile surface cleaners (e.g. power washing, window washing, etc.)

Outputs

- www.clarkgreenbiz.com
- Other outputs listed in relevant sections

Education for Homeowners, Landscapers and Property Managers

Purpose

Homeowners, landscapers and property managers are caretakers for a large percentage of the county's impervious surfaces, such as roofs and driveways, as well as lawn and landscaped areas that may contribute pollutants to runoff. Education messages will focus on the following topics:

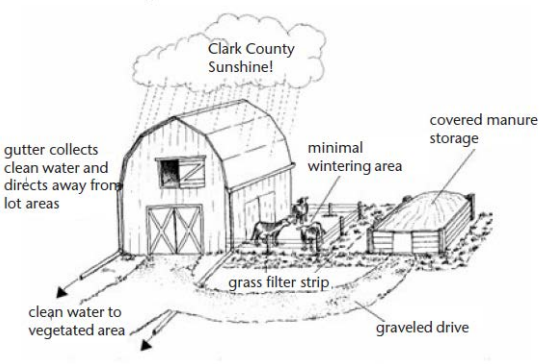
- Impacts of stormwater on surface waters.
- Rural property management techniques.
- Yard care techniques.
- Proper storage and use of pesticides, fertilizers, and other chemicals.
- Proper maintenance of stormwater treatment and flow control facilities.
- Low Impact Development principles and practices.
- Proper maintenance of vehicles, equipment and home/buildings.
- Proper techniques for carpet cleaning and auto repair.

Responsibilities Matrix

Task	DES CWP Manager	DES Environmental Education Coordinator	DES Outreach Project Coordinator	DES AmeriCorps	Agencies Providing Services
Coordinate education programs	A	P	P	S	C
Track and measure deliverables	S	A	P	S	S
Create messages, programs and collateral	S	A	P	P	P
Distribute messages and collateral	C	A	P	P	P
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted					

Small Acreage Education Program

The Small Acreage program, funded by the Clean Water Program in partnership with WSU Clark County Extension, provides educational workshops and other outreach to residents on water



quality topics unique to rural properties.

The goal of the Small Acreage (SA) program is to reduce pollution entering storm and surface water coming from residential and agricultural properties by giving residents the knowledge and skills necessary to manage their land and animals.

WSU Clark County Extension will provide one full-time program coordinator and oversight by the Extension director. The coordinator will facilitate workshops, training sessions, and follow-up activities. The coordinator also will attend community events to recruit new trainees.

The DES education and outreach program coordinator will track deliverables of the program and negotiate the annual scope of work with the Extension director. Extension will submit quarterly and annual reports detailing deliverables.

Workshops

The Small Acreage program offers workshops throughout the year on issues of interest to rural landowners. Topics include mud and manure management, pasture management, wells and septic maintenance, and fencing for livestock.

The SA program coordinator will coordinate and give most presentations.

Living on the Land: Stewardship for Small Acreages

For those landowners who seek more in-depth information, the program offers a 12-week training series twice a year. During training, each participant creates a workable plan for his or her property using knowledge gained in class.

The SA program coordinator will coordinate each training and follow-up activities.

The SA program coordinator will offer "Model Farm" recognition signage to graduates who implement a plan to protect water quality on their properties.

Targeted Outreach for Workshops and Presentations

Clark County participates in the Local Interagency Networking Cooperative (LINC), an education and outreach partnership between Clark County departments of Environmental Services and Public Health, City of Vancouver Department of Public Works, and the Washington States departments of Agriculture and Labor & Industries.

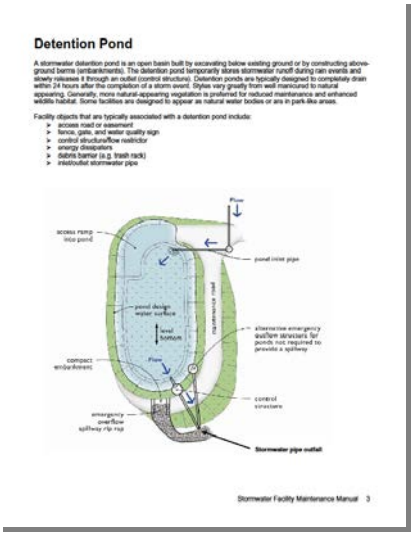
Regulated Facility Maintenance Inspections

Clark County combines site visits for regulated stormwater facility maintenance inspection with delivery of technical assistance materials such as relevant pages from the *Stormwater Facility Maintenance Manual*. Refer to the "Operating and Maintaining the Storm Sewer

System, County Property, and Roadways" section on page 26 for a complete description of the process.

Stormwater Facility Assistance & Stormwater Partners

Clark County continues to partner with municipalities within the county in the Stormwater Partners of SW Washington, a program to provide common stormwater messages and education and guidance to the public on how to properly maintain privately-owned stormwater treatment and flow control facilities.



The Stormwater Partners Web site (www.stormwaterpartners.com) contains how-to videos and a user-friendly guidebook, as well as traditional outreach materials, such as brochures, door hangers, and newsletters.

The Clean Water Program education and outreach coordinator will continue to work with the Stormwater Partners to develop and implement additional activities.

Low Impact Development Training (LID)

Clark County staff has several tools for educating the public on LID, including a tour book of LID sites in Clark County. The book is in hard copy as well as a Google map on the Stormwater Partners web page.

Clark County has developed a series of outreach tools to help residents modify their homes and yards to minimize pollution to stormwater runoff.

Homeowner Targeted Messaging

- Grasscycling – Natural yard care to maintain healthy lawns without chemicals
- Demonstration site information – A demonstration home garden site has been established at a local park to educate on home to manage diverse home landscapes while conversing and protecting water.
- Technical Assistance for Natural Gardening – this program offers technical assistance to homeowners to improve yards to minimize water use, runoff, the use of native plants and creation of wildlife habitat.

Related Activities

Other Environmental Services programs distribute information about water quality, the effects of stormwater pollution, and pollution prevention techniques as integral parts of their program outreach and education messages to the general public.

- Naturally Beautiful Backyards curriculum delivered through a contract with WSU Clark County Extension's Master Gardeners program - less toxic gardening and yard care
- Master Composter Recyclers - less toxic gardening and yard care
- Hazardous Waste Reduction - proper disposal of household and business hazardous wastes
- Recycling A-Z Web site at www.recyclinga-z.com – proper disposal of tires, electronics and household hazardous waste

Outputs

- Fact sheets
- Workshops
- Videos
- Landowner trainings
- Staff LID training
- LID site tour guidebook
- Collateral materials

Education for Development and Construction Community and County Planners and Reviewers

Purpose

The individuals, businesses and agencies involved in development project planning and construction (both regulated communities and the regulators) have great influence on the impacts of stormwater from new development and redevelopment. Education to these communities will focus on the following topics:

- Technical standards for stormwater site and erosion control plans.
- Low impact development techniques.
- Stormwater treatment and flow control BMPs and facilities.

Responsibilities Matrix

Task	DES CWP Manager	DES Outreach Project Coordinator	DES Ameri Corps	DES CWP Permit Manager	DES CWP NRS	Comm. Dev.	PW Dev. Eng.
Code update outreach	A	P	O	P	O	I	S
Construction Management training	A	O	O	P	O	O	O
Facility inspection training	A	O	O	S	P	O	O
WWHM training	A	O	O	S	O	I	I
CD web site	O	O	O	O	O	A / P	C
Pre-application conference	O	O	O	O	O	A / P	P
Small Projects BMP handout	A	S	S	S	O	P	O
DEAB	I	O	O	O	O	I	P

A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted

Workshops and Presentations

Stormwater Facility Inspection Training

Public Works Construction Management has an ongoing stormwater facility inspection program. Training will be provided to new inspectors or when there is a change in procedures or manual requirements. Staff are also trained to be certified erosion and sedimentation control leads.

Training on Demand

Clean Water Program staff will provide training, code interpretation, BMP manual interpretation and informational materials to technical, professional and field workers as requested.

Education Delivered Through Development Review

Many active development community stakeholders receive educational and outreach messages about stormwater and erosion control and water quality topics as an integral aspect of the regulatory development review process, including individual residential building permits.

For detailed information on the development review process, see Regulatory Program for Development, Redevelopment, and Construction Projects on page 74.

Community Development Web Site

The Clark County department of Community Development hosts a Web site devoted to compliance with erosion control measures at http://www.clark.wa.gov/development/building/erosion.html

Pre-Application Conference

All Type II and Type III development applications require the applicant to attend a pre-application conference with county planners and engineers where, among other topics, stormwater and erosion control requirements and submittal requirements are reviewed.

Clark County Stormwater Manual

The *Clark County Stormwater Manual*, which guides applicants for development and new development through stormwater requirements and submittal requirements, contains educational messages about the importance of stormwater management.

Small Project BMP Handouts for Permit Center

Clark County provides BMP packet handouts for small projects that are required to have stormwater site plans, erosion controls and on-site stormwater management BMPs but don't require an engineered design. The target audience is mainly applicants for single family residential building permits and other small building projects.

Advisory Board

The Development engineering Advisory Board (DEAB) is a technical and policy review body reporting to the Board of Clark County Councilors. The DEAB also serves as a mechanism for coordinating with the development community and consulting engineers to distribute information and organize training.

Outputs

- Presentations
- Employee training
- Development community training
- Small Project BMP Handout
- Sustainable and affordable development reports
- Educational messages in *Clark County Stormwater Manual*

EDUCATION FOR STUDENTS

Purpose

Students are the next generation to own property, own or manage businesses, or simply live, work, and recreate in Clark County. Education for students will focus on the following topics:

- Raising awareness of the importance of clean water.
- Introducing the idea of pollutants entering water through stormwater.

Responsibilities Matrix

Task	DES Environmental Education Coordinator	DES Outreach Project Coordinator	DES AmeriCorps	Agencies Providing Services
Coordinate education programs	A	P	S	C
Track and measure deliverables	A	P	S	S
Create messages, programs and collateral	A	P	P	P
Distribute messages and collateral	A	P	P	P
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted				

Student Water Quality Monitoring Program

In partnership with City of Vancouver, Clark County involves K – 12 grade students in water quality monitoring of sites near their schools. Teachers and students receive mentoring in water quality and macroinvertebrate monitoring, and conduct stream studies. Students share their findings with peers and the community at an annual Student Watershed Congress.

Program activities and outreach will be conducted primarily by City of Vancouver staff. Clark County staff will negotiate the annual scope of work and track deliverables.

County staff may participate in the Student Watershed Congress as facilitators or judges during student presentations.

Student Outreach Program

In 2014, Clark County partnered with the City of Vancouver to receive a GROSS grant that would expand student monitoring and educational outreach, "Connecting Schools and Families to Healthy Stormwater Actions." The grant provides the following additional activities for students in the Clark County school districts:

- Land-based stormwater impact monitoring investigations (tied to Washington K-12 Learning Standards)
- Develop hands-on toolkits to build stormwater projects on or near school sites (i.e. rain gardens, etc.) (up to six projects would be supported)
- Host "Watershed Family Science Festivals" throughout the school year (up to three activities were conducted)

Washington Green Schools

Environmental Services helped launch the statewide Washington Green Schools program. A non-profit organization now runs the program full time, with financial support from Clark County and other entities. http://www.wagreenschools.org/

Schools complete assessments in five environmental categories, including water. More than 40 schools in Clark County currently participate in the program. A sustainability specialist serves as a resource for local participating Green Schools.

The School Grounds Assessment covers stormwater management and use on school grounds, as well as natural landscaping techniques to reduce chemical use on schoolgrounds.

Outputs

- Student Watershed Monitoring Network and Watershed Congress
- Washington Green Schools
- Connecting Schools and Families to Healthy Stormwater Actions outreach to students

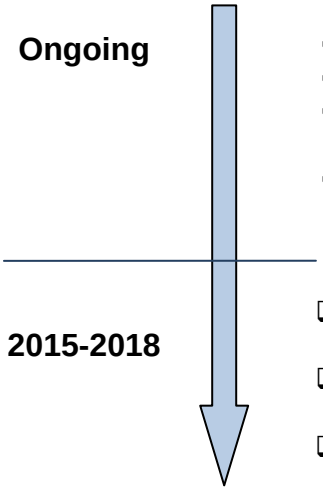
STEWARDSHIP OPPORTUNITIES

Purpose

Per the NPDES Permit S5.C.10.b, the county shall create stewardship opportunities and/or partner with existing organizations to encourage residents to participate in educational activities. The county has restructured hands-on activities to include the following:

- Storm drain marking – kits are available to citizens, businesses, and community groups to mark drains on private property or local roads less than 25 mph.
- River-friendly car wash kit – This kit is available to businesses that host community charity car washes for local community groups.
- Build bat boxes at stormwater facilities – A great project for neighborhoods or scouts, the county is encouraging the location of bat boxes in the urban to promote habitat. Educational signage is then included at the site.
- Other individual site projects – Other projects are available based on the site, such as informational kiosk construction. Community projects build the kiosk and the county provides signage / poster / educational materials to post that tell about the site, the watershed and key messages.

TIMELINE



Ongoing

- ✔ Educate the general public
- ✔ Educate businesses
- ✔ Educate homeowners, landscapers, and property managers
- ✔ Educate the development and land use planning community

2015-2018

- ❑ Increase awareness and education for homeowners, landscapers and property managers
- ❑ Effect behavior through hands on activities, workshops, trainings and stewardship.
- ❑ Measure the understanding and adoption of target behaviors for a target audience

FOR MORE INFORMATION ON PROGRAMS TO PROVIDE EDUCATION AND OUTREACH ABOUT STORMWATER AND THE SWMP

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Section 7
Coordination

Clark County coordinates internally and with other local governments and agencies on a variety of environmental and planning topics.

Regulatory Requirements Summary

NPDES Permit S5.C.3 – Coordination

The NPDES Permit requires the county to coordinate among its own departments and with neighboring jurisdictions to eliminate barriers to permit compliance and to encourage coordinated stormwater policies, programs and projects within a watershed.

County Policies, Rules and Regulations

The following policies and regulations promote permit implementation by county departments.

Clark County Code Chapter 13.26A – Water Quality

Chapter 13.26A requires inspection and maintenance of all public and private stormwater facilities and stormwater disposal wells in accordance with the *Stormwater Facility Maintenance Manual*, and adopts the *Clark County Stormwater Pollution Control Manual* that provides source control BMPs for materials handling, landscape management, trash management and building exterior maintenance. Both of these manuals are equivalent to maintenance standards in Volume V and source control standards in Volume IV of the *SMMWW*.

Environmentally Responsible Purchasing Policy

Clark County adopted its Environmentally Responsible Purchasing Policy in 2004. One element addresses purchase of landscaping and vegetation maintenance products, including pesticides. The policy establishes a set of criteria, any of which will disqualify a pesticide from purchase. A waiver process requires further examination of the pesticide by the Environmentally Responsible Purchasing Team to determine if a more environmentally-friendly alternative exists. If no alternative is found, the pesticide can be purchased and used within specific limiting guidelines. The policy promotes a coordinated approach to the pesticide and fertilizer use reduction.

Regional Road Maintenance Program

Clark County has been a member of the ESA Regional Road Maintenance Forum since 2003. The group assisted the county in developing a Regional Road Maintenance Program that is designed to meet the requirements of the Endangered Species Act (ESA). In 2004, NOAA Fisheries approved Clark County's Regional Road Maintenance Program and determined that it was compliant with the ESA. The program seeks to protect salmon and steelhead by relying on the extensive use of pre-approved BMPs for routine maintenance activities. The program promotes systematic adherence to pollution control standards for road operations.

Intra-governmental Coordination

Purpose

Intra-governmental coordination helps ensure cooperation of all Clark County departments in meeting the terms of the NPDES Municipal Stormwater Permit and in protecting local water resources.

Responsibilities

Responsibility for negotiating interdepartmental and programmatic agreements lies with the Clean Water Program manager or a designee and with managers of coordinating programs and departments.

Responsibilities for implementing the agreed-upon activities are shown in detail in responsibility matrices and program descriptions in the appropriate sections.

Agreements

The Clean Water Program coordinates the county's NPDES Permit compliance efforts. Although the program coordinates with other departments, it is not responsible for all compliance actions. The Clean Water Program maintains memoranda of understanding or other agreement mechanisms with several county departments to support compliance. Agreements include services provided for payment by the CWP and description of permit requirements that must be met by departments.

Public Works Road and Parks Maintenance Divisions

Public Works completed an intra-departmental agreement between the Clean Water Program and the Road and Parks Maintenance Division to implement requirements under permit requirements S5.C.9, Operations and Maintenance Program, including:

- Standards and schedules for stormwater facility and catch basin maintenance.
- Practices for operating streets, roads, and highways.
- Spill response practices.
- Private facility inspection and enforcement.
- Water quality BMPs for maintaining public land.
- Training.
- Stormwater Pollution Prevention Plans (SWPPs) for heavy equipment yards.
- Record keeping.
- Reporting requirements for the NPDES Permit annual report.

Public Works Development Engineering Division

Public Works provides development review services for enforcing Clark County Code Chapter 40.385 Stormwater and Erosion Control and its predecessor, Chapter 40.380.

Public Works provides the following services:

- Review and approval of development project applications.
- Administration of development project record keeping.
- Training for staff whose primary job duties include permitting and plan review.

Public Works Engineering and Construction Division

Public Works provides services to implement permit requirements under S5.C.5, S5.C.6 and S5.C.7.

Public Works provides the following services:

- Project management for stormwater capital improvements.
- Design and construction management for stormwater capital improvements.
- Capital planning assistance.
- Development site inspection.
- Program to inspect stormwater facilities during maintenance warranty.
- Enforce stormwater, erosion control, and water quality codes.
- Inspection program record keeping.
- Regulated stormwater facility inspection and follow-up.
- Training for staff whose primary job duties include design, construction site inspection, and enforcement.

Community Development

Department of Environmental Services maintains an interdepartmental agreement with Community Development to implement requirements under permit requirement S5.C.5, including:

- Accept development applications.
- Review site plans for residential building projects that do not require engineered designs.
- Review and inspect erosion controls, on-site stormwater controls at residential building sites, primarily single-family residential construction sites.
- Enforce stormwater, erosion control, and water quality codes.
- Maintain records of applications, reviews, inspections and enforcement actions.
- Training for staff whose primary job duties include permitting and plan review.

General Services

The Clean Water Program established an interdepartmental agreement with General Services that includes operation and maintenance of stormwater facilities, use of source control BMPs, and technical assistance and training from Environmental Services.

GIS Department and Application Services

Department of Environmental Services maintains an agreement with the GIS Department for various services that support SWMP implementation, including administration of the county's storm sewer infrastructure asset database, *StormwaterClk*, the stormwater asset Maintenance Management System, stormwater fee database administration, software support, GIS data used for capital planning and monitoring studies, developing Web applications and internet access to program information, and database development.

Other Intra-governmental Coordination

The Clean Water Program also coordinates informally with other county programs and departments on various stormwater-related and environmental efforts.

Public Health

The Clean Water Program coordinates with Clark County Public Health on spill responses, illicit discharge investigations, and other environmental complaints.

Outputs

- Interdepartmental memoranda of understanding for services and permit requirements performed

INTERGOVERNMENTAL COORDINATION

Purpose

Clark County informally coordinates with Phase II permittees and other local organizations to control pollutants between physically interconnected storm sewer systems, to attempt to provide consistent stormwater management for shared water bodies and to collaborate on permit implementation tools and TMDL implementation.

Responsibilities Matrix

Task	DES Director	DES CWP Manager	DES NPDES Permit Manager	DES Infrastructure Manager	DES Legacy Lands Manager	DES Project Coordinator
VLWP Steering Committee rep.	A	P	O	S	O	P
VLWP TAC representative	A	S	O	P	O	O
Provide input to TMDL DIPs	O	A	S	P	O	O
TMDL advisory committees rep.	O	A	S	P	O	O
WRIA Planning coordination	A	S	S	S	P	O
A = Accountable, **P** = Primary (doer), **S** = Supports, **C** = Consulted, **I** = Informed, **O** = Omitted						

Coordination to Clarify Roles and Responsibilities for Interconnected Systems

The Clean Water Program has identified approximately 500 connection points between the county MS4 and other municipal entities such as cities and WSDOT right of way. Within the urban area, the Clean Water Program assesses the potential for intersystem pollutant discharges using IDDE procedures.

Clark County has informal discussions with NPDES Phase II permittees regarding mapping and illicit discharge screening programs. Clark County will develop a more formal agreement during the permit term.

General Intergovernmental Coordination

Clark County participates with other local governments and agencies on several joint efforts, including:

- Shared education and outreach programs with the city of Vancouver
- A regional education program covering facility maintenance to stormwater facility owners within Vancouver, Battle Ground, Camas, Washougal, Ridgefield, and La Center
- Operation of the regional street waste decant facility with WSDOT, Vancouver, Battle Ground, Camas, and Washougal

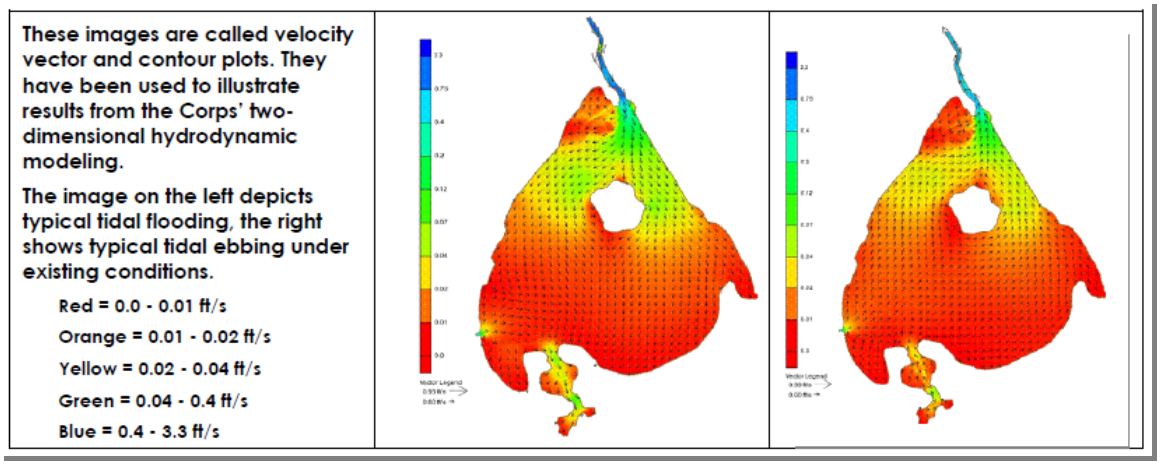
Coordination for Shared Water Bodies: Vancouver Lake Watershed Partnership

The Vancouver Lake Watershed Partnership (VLWP) was established through an intergovernmental agreement between the Port of Vancouver, the city of Vancouver, Clark County, and Vancouver-Clark Parks and Recreation. Other participants include the Fruit Valley Neighborhood Association, the Port of Ridgefield, Clark Public Utilities, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, Washington Department of Ecology, the U.S. Army Corps of Engineers, the Lower Columbia River Estuary Partnership, and nine citizen members.

The partnership was formed to consider the community vision and strategies to manage Vancouver Lake.

Clark County will continue to act as the financial manager for the partnership.

The Clean Water Program will continue to provide a representative to the Steering Committee and a representative to attend general Partnership meetings in support of ongoing work. The Clean Water Program manager and a Program Coordinator with public outreach expertise will share these responsibilities.



Images from the Vancouver Lake Watershed Partnership 2008 Annual Report

TMDL Coordination

Clark County coordinates with other local entities on TMDL implementation. Upon request, the NPDES Permit Manager will provide input to Ecology in development and update of Detailed Implementation Plans. The Stormwater Infrastructure Manager will continue to participate on the local advisory committees for the following existing or emerging TMDL water bodies:

- Burnt Bridge Creek Watershed
- East Fork Lewis River
- Gibbons Creek
- Salmon Creek
- Lacamas Creek

Clark County complies with TMDL requirements by implementing its Stormwater Management Program.

Water Resources Inventory Area (WRIA) Planning

The Legacy Lands Manager will coordinate with Ecology, the Lower Columbia Fish Recovery Board and local partners for WRIA plan development and implementation for WRIA 27 and WRIA 28. Goals of the WRIA plan include improving stream habitat and low flows, which are compatible with stormwater program objectives and actions.

Outputs

- Various outputs from education and outreach programs (see section 6)
- Vancouver Lake Watershed Partnership reports and publications
- Notes and summaries from each TMDL's Advisory Committee meetings
- WRIA Plan implementation input from Clark County

FOR MORE INFORMATION ON WAYS THE COUNTY COORDINATES WITH OTHER JURISDICTIONS AND PERMITTEES

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Chapter 3
Assessment and Monitoring

County staff monitoring water quality at the Jones Creek stream gauge

Assessment and Monitoring

Clark County is a regional leader in natural resource monitoring and assessment. The Assessment and Monitoring section implements a variety of projects to collect scientific data about stormwater, surface waters, stream corridor condition, and habitat to support and implement NPDES permit requirements.

The core goal is to provide information leading to successful on-the-ground actions that improve natural resources in Clark County. The program utilizes sound science and data collection practices to inform the county's policy and program management decisions, and provide information vital to the success of Clark County programs.

Regulatory Requirements Summary

NPDES Permit – S8 Monitoring

The NPDES Permit requires the county to develop and implement a monitoring program with two components: 1) characterize status and trends in stormwater runoff quantity and quality, and 2) evaluate the effectiveness stormwater management BMPs.

NPDES Permit – S5.C.5 Controlling Runoff from New Development, Redevelopment and Construction Sites

The NPDES Permit allows flow control regulations for controlling runoff on development sites to be tailored to local circumstances through the use of basin plans. The alternate requirements must provide equal or similar protection of receiving waters and equal or similar levels of pollutant control as compared to Appendix 1 of the permit.

The permit also allows alternative flow control or treatment requirements to be tailored on a local basis through the adoption of basin plans.

County Policies, Rules and Regulations

Clark County Code Chapter 40.385 – Stormwater and Erosion Control

Clark County regulates stormwater runoff and erosion control on development, redevelopment, and construction sites in Chapter 40.385 Stormwater and Erosion Control. The purpose of the code is to safeguard public health, safety, and welfare by protecting the quality of surface and ground waters for drinking water supply, recreation, fishing and other beneficial uses through the application of BMPs for stormwater management and erosion control. It was adopted to minimize the degradation of receiving waters from impacts attributable to stormwater runoff, thereby not precluding the preservation of future restoration of beneficial uses.

At present, the code applies flow control regulations equally across all subwatersheds in the county.

Tools that Support Permit Compliance

The Assessment and Monitoring section provides the tools and staffing to support completion of permit-required Watershed-Scale Stormwater Planning technical analysis and the permit's S8 stormwater monitoring requirements. These are standard procedures for collecting environmental data, database systems for storing data, quality assurance and quality control procedures, and methods to analyze and present data results.

Standard Procedures for Monitoring Activities

The Clean Water Program maintains the *Standard Procedures for Monitoring Activities* for use in guiding field and laboratory work. It details the protocols and means used to generate data.

Water Quality Database

The *Water Quality Database* (WQDB) is a centralized repository for the Clean Water Program's water quality and benthic macroinvertebrate data. The WQDB is a SQL 2000® database with Access® interfaces for data entry and retrieval. A batch uploading tool enables rapid entry of large datasets.

Capital Planning Database

The *Capital Planning Database* is an integrated data management system for tracking information about stream problems and project opportunities from discovery through implementation. The tool is a SQL 2000® geodatabase with two interfaces: 1) an

Access® interface for tracking data relating to stormwater capital projects and 2) an ArcMap® interface for photos and data relating to stream problems and project opportunities.

Hydrology Databases

Data from the county's hydrologic and stormwater monitoring sites (storm flow, stream flow and rainfall gages) is stored in an Aquarius® database.

MONITORING

STORMWATER MONITORING

Purpose

Stormwater monitoring includes projects that address an ongoing need for information about the quality of stormwater stemming from different land uses, the effectiveness of specific stormwater facilities in controlling flow and pollutants, and the ability of management activities to improve stormwater quality.

Stormwater Characterization is a multi-year project evaluating stormwater quality from one commercial and one high-density suburban residential area under Permit requirement S8.B. The project focuses on characterizing runoff from typical land uses and describing long-term changes in pollutant loading and stormwater quality as the stormwater management program is implemented.

Best Management Practice Effectiveness Monitoring is a project proposal under requirement S8.C. to continue a permeable paver installation monitored under the 2007 permit. As required by the permit, Clark County submitted a project proposal to Ecology in February 2014. The proposal was approved by Ecology in September 2014, with a detailed draft monitoring plan submitted for Ecology approval in January 2015. At this point, the project is expected to begin in late summer 2015..

The county is also required to pay into a collective fund managed by Ecology for effectiveness studies. By electing to perform two effectiveness studies on its own the county's annual payments to Ecology will be $43,308 and will begin in 2014 through the permit term.

Method

Stormwater characterization monitoring utilizes sophisticated automatic sampling equipment and technology to collect data and samples from targeted locations. The county has made a significant investment in the installation of stormwater monitoring stations, including data recorders, sensors, telemetry equipment, and water/sediment samplers that are programmed to operate during targeted storm and runoff events.

Multiple samples are collected for individual storms to create a composite of each storm that represent the average chemical composition of the entire storm. The samples are sent to an analytical lab to be tested for scores of pollutants. Continuous flow data is collected to calculate pollutant loads. Additional water and sediment samples are collected for characterization and toxicity testing during first-flush storm events.

Outputs

- Annual stormwater data reports and pollutant loads for two sites
- Completed report for targeted effectiveness study (2014)
- Project plan for status and trends monitoring (2014)
- Project plan for treatment BMP monitoring (2014)
- Updated project plan for permeable paver site monitoring (2014)
- Enter stormwater data into the Ecology EIM database (July 2013)

Crews install a weir at a treatment wetland BMP monitoring site

Long-term Stream Monitoring

Purpose

Long-term stream monitoring includes three projects that address an ongoing need for information about the physico-chemical, biological, and hydrological health of Clark County streams.

Clark County suspended long-term stream monitoring in October 2013 due to funding limitations. Activities may resume in the future if funding becomes available or as requirements in future NPDES stormwater permits change.

Illicit Discharge Monitoring

This activity is described in detail in Illicit Connections and Illicit Discharges Detection and Elimination (IDDE) on page 51.

Other Functions

Basin Planning and Studies

Purpose

Basin planning is the technical and policy process by which Ecology recommends tailoring state standards to local conditions. Under the NPDES permit, basin planning may be used to tailor minimum requirements #6 (Runoff Treatment), #7 (Flow Control), and #8 (Wetlands) in *Appendix 1 Minimum Technical Requirements for New Development and Redevelopment*. Section 4.7 Flow Control states that alternative flow control requirements may be established through watershed-scale hydrological modeling and supporting field observations.

The goal of basin planning in Clark County is to develop appropriate alternative flow control standards in selected basins that are tailored to basin-specific conditions, protective of existing and desired beneficial uses, and approvable by Ecology.

Along with basin plans, other types of studies may be employed to support an alternative standard. Recently, the city of Issaquah established an alternative flow control standard of existing land cover for areas draining to stable, low gradient streams. A field geomorphology assessment was used to support the alternative standard.

Method

The development of alternative flow control standards relies on basin-wide hydrologic models, coupled with detailed hydraulic modeling and sediment transport calculations carried out at representative reaches. Technical analysis at each detailed study reach includes a geomorphic assessment, a hydrologic assessment, and a hydraulic assessment to provide an integrated understanding of the historic, current, and projected fluvial processes at work. Alternative flow control standards are then recommended based on the combined results of these analyses.

Technical analyses are submitted to Ecology for approval. Policy options are then drafted for presentation to the BOCC. Code revision or basin plan adoption may follow, at the discretion of the BOCC.

Clark County began developing an alternative flow control standard for the Mill Creek subwatershed in 2009. Fieldwork and technical analyses were completed in early 2010. The technical report and recommended alternative standards was approved with conditions by Ecology in April 2014.

Clark County began a study of Curtin Creek basin land use, channel gradient, channel geomorphology and channel stability in 2012, and expects to submit an alternative flow

control standard for parts of Curtin Creek basin in 2013. If approved the plans will be incorporated into the pending code and stormwater design manual updates in 2015.

Outputs during the Permit Term

- An alternative flow control proposal for parts of Mill Creek (conditionally approved by Ecology in 2014)
- An alternative flow control proposal for parts of Curtin Creek (proposal to Ecology in 2013 in development)

Stream bed stability testing in the Mill Creek subwatershed, 2009

MONITORING RESOURCE CENTER

Purpose

The Volunteer Monitoring Resource Center lends monitoring equipment to volunteers who wish to monitor water bodies in Clark County. The program loans sampling equipment and professional-grade field meters. Staff scientists provide limited overview of how to use the equipment for their project.

Method

Staff assemble, calibrate, and track equipment on loan to qualified borrowers. Citizens can visit the volunteer website for equipment checklists and resource information to support a

successful project. The web page is:
clark.wa.gov/environment/stormwater/streamhealth/monitoring.html

Many of the users for this service are related to school research or neighborhood information.

Outputs during Permit Term

- Log of Monitoring Resource Center borrowers
- Log of data requests

Outcomes during Permit Term

- Equipment checkouts to individuals, agencies and groups

FOR MORE INFORMATION ON SERVICES PROVIDED BY THE ASSESSMENT AND MONITORING SECTION

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Appendix A. Stormwater Management Plan 2015 -- Capital Projects List

Project Name	Type[1]	Start Year	Status[2]	End Year	Cost Estimate	Funding (%) Local	State	Federal	WQ Benefit	Hydro Benefit	Hydro Benefit #	Retrofit Incentive	Other Benefit	Monitoring Planned	Lat	Long	Receiving Water Body	Comments
Parkside Manor SWF Retrofit	3	2009	4	2013	$950K	25%	75%	0%	809.0	43%	1	12.000	None	No	45.727247	-122.674051	Whipple Creek	Retrofit to combine and improve three undersized facilities; partially funded by Ecology grant G1200577
Stones Throw SWF Repair	5	2011	4	2013	$170K	100%	0%	0%	NA	NA		0.500	None	No	45.663706	-122.604186	Burnt Bridge Creek	Facility repair >25K
Thomas Wetland East SWF	2	2009	4	2014	$2.2M	55%	45%	0%	2,686.0	26%	1	91.500	improve wetland habitat and recreation	No	45.661303	-122.618772	Burnt Bridge Creek	Construction of new stormwater wetland; partially funded by Ecology grant G1200576
Drywell Retrofits	3	2011	3	2015	$723K	37%	63%	0%	868.0	NA		18.300	None	No	45.679741	-122.516272	Groundwater	Installation of treatment BMPs upstream of drywells; partially funded by Ecology grant G1200566
Harding Farms SWF Retrofit	3	2009	2	2016	$1.2M	17%	83%	0%	952.0	11%	1	50.750	improve wetland habitat	No	45.712419	-122.630671	Salmon Creek	Retrofit to provide stormwater treatment and wetland enhancement; partially funded by 2013 Legislative Proviso
Flume Creek Riparian Acquisition	6	2012	1	2015	$2.2M	41%	59%	0%	NA	NA		82.500	None	No	45.792906	-122.736473	Flume Creek	Purchase of priority riparian habitat; partially funded by Grant #12-1504 through the Salmon Recovery Funding Board administered by the state Recreation and Conservation Office.
Schmid Riparian Acquisition	6	2012	1	2015	$500K	100%	0%	0%	NA	NA		10.325	None	No	45.585013	-122.339341	Washougal River	Purchase of priority riparian habitat
Poch Riparian Acquisition	6	2012	5	-	$130K	100%	0%	0%	NA	NA		2.680	None	No	45.737449	-122.559108	Salmon Creek	Purchase of priority riparian habitat (2014 project abandoned per Board of Clark County Commissioners)
Catch Basin Treatment Retrofits	3	2014	2	2018	$320K	100%	0%	0%	NA	NA		NA	None	No	tbd	tbd	tbd	Install water quality treatment retrofits for catch basins in priority areas with no existing stormwater treatment
UIC Water Quality Retrofits	11	2015	1	2018	$250K	100%	0%	0%	NA	NA		NA	None	No	tbd	tbd	tbd	Decommission existing UIC wells identified as high threat to groundwater
Trillium Park Subdivision SWF Repair	5	2015	2	2016	$85K	100%	0%	0%	NA	NA		2.375	None	No	45.670968	-122.654877	Burnt Bridge Creek	Facility repair >25K
Cold Creek Court SWF Repair	5	2015	2	2016	$140K	100%	0%	0%	NA	NA		0.575	None	No	45.671597	-122.620217	Cold Creek	Facility repair >25K
Whipple Creek Place SWF Repair	5	2016	1	2017	$150K	100%	0%	0%	NA	NA		11.500	None	No	45.731412	-122.677782	Whipple Creek	Facility repair >25K
Pleasant Valley Park 'B' SWF Repair/ Retrofit	5	2016	1	2017	$170K	100%	0%	0%	NA	NA		15.875	None	No	45.724768	-122.626537	Salmon Creek	Facility repair >25K
Andy's Acres (A) SWF Repair	5	2016	1	2017	$55K	100%	0%	0%	NA	NA		0.725	None	No	45.690239	-122.694724	Lakeshore	Facility repair >25K
40 et 8 Chateau SWF Repair/Retrofit	5	2017	1	2018	$300K	100%	0%	0%	NA	NA		6.075	None	No	45.678349	-122.643588	Salmon Creek	Facility repair >25K

[1]Type	Description
1	New flow control facility, including Low Impact Development (LID) Best Management Practices (BMPs)
2	New treatment facility (or treatment and flow control facility), including LID BMPs
3	Retrofit of existing treatment and/or flow control facility
4	Property acquisition for water quality and/or flow control benefits (not associated with future facility)
5	Maintenance with capital construction costs ≥ $25,000
6	Property acquisition for riparian habitat
7	Restoration of forest cover
8	Restoration of riparian buffer
9	Floodplain reconnection projects on water bodies that are not flow control exempt per Appendix 1
10	Capital projects related to the MS4 which implement an Ecology approved basin or watershed plan
11	Other actions to address stormwater runoff into or from the MS4 not otherwise required in S5.C

[2]Status (as of December 31st of the reporting year)	Description
1	Planning
2	Design and permitting
3	Construction
4	Complete/Maintenance
5	Project cancelled
6	Property acquisition

Attachment to Annual Report Question 10: Description of Internal Coordination Mechanisms

Purpose

Intra-governmental coordination helps ensure cooperation of Clark County departments in meeting the terms of the NPDES municipal stormwater permit (Permit).

Management Structure

Clark County recently adopted a charter ending years of government structure solely under state statute. In November 2014, voters approved a charter creating a legislative body as the Clark County Board of County Councilors and created an appointed chief executive officer having the title of County Manager to administer the executive branch of county government.

Departments with primary roles for implementing permit requirements report to the county manager. These departments oversee management of county lands and roads, develop and implement county code, design and build capital projects, conduct stormwater monitoring and assessment, and perform education and outreach.

Agreements

The Department of Environmental Services Clean Water Program coordinates the county's NPDES Permit compliance efforts. The Clean Water Program maintains memoranda of understanding and service agreements with several county departments to support SWMP development and implementation. Agreements include both contract services such as stormwater facility maintenance and the permit requirements that must be met by departments.

Public Works

Public Works and the Clean Water Program have both a service agreement for stormwater facility maintenance and an interdepartmental agreement for permit compliance measures not funded by the Clean Water Program.

Road and Parks Maintenance Divisions.

Public Works Road Operations and Parks Divisions implement requirements under permit requirements S5.C.9., Operations and Maintenance Program, including:

- Follow standards and schedules for stormwater facility and catch basin maintenance.
- Use BMPs for operating county lands such as streets, roads, highways, parks and maintenance yards
- Spill response practices
- Private facility inspection and technical assistance
- Use of water quality BMPs for maintaining public land

- Provide training for staff who have primary job functions that can impact water quality
- Implementing Stormwater Pollution Prevention Plans (SWPPs) for heavy equipment yards
- Record keeping
- Meet reporting requirements for the NPDES Permit annual report

Public Works Development Engineering Division

Public Works provides development review services to meet permit requirement S5.C.5.a. to enforce design standards for Clark County Code Chapter 40.385 Stormwater and Erosion Control and its predecessor, Chapter 40.380. Public Works provides the following services:

- Review and approval of development project applications
- Administration of development project record keeping
- Training for staff whose primary job duties include permitting and plan review
- Meet reporting requirements for the NPDES Permit annual report

Public Works Engineering and Construction Division

Public Works provides services to implement permit requirements under S5.C.5., S5.C.6., and S5.C.7. Public Works provides the following services:

- Project management for stormwater capital improvements
- Design and construction management for stormwater capital improvements
- Development site inspection
- A program to inspect stormwater facilities during maintenance warranty
- Enforcing stormwater, erosion control, and water quality codes
- Inspection program record keeping
- Regulated stormwater facility inspection and follow-up
- Training for staff whose primary job duties include design, construction site inspection, stormwater facility inspection, and enforcement
- Meet reporting requirements for the NPDES Permit annual report

Community Development

Department of Environmental Services has an interdepartmental agreement with Community Development to implement requirements under permit requirement S5.C.5., including:

- Accept development applications
- Review site plans for residential building projects that do not require engineered designs
- Review and inspect erosion controls and on-site stormwater controls at building permit construction sites
- Enforce stormwater, erosion control, and water quality codes
- Maintain records of applications, reviews, inspections and enforcement actions

- Training for staff whose primary job duties include permitting, plan review, inspection and enforcement
- Meet reporting requirements for the NPDES Permit annual report

General Services

The Clean Water Program established an interdepartmental agreement with General Services that includes operation and maintenance of stormwater facilities, use of source control BMPs, annual report submittals, and technical assistance and training from Environmental Services.

GIS Department and Application Services Department

Department of Environmental Services maintains an agreement with the GIS Department for various services that support SWMP implementation, including administration of the county's storm sewer infrastructure asset database, *StormwaterClk*, stormwater fee database administration, software support, maintaining GIS data used for capital planning and monitoring studies, developing Web applications and internet access to program information, and database development.

Public Health

The Clean Water Program coordinates with Clark County Public Health on spill responses, illicit discharge investigations, and other environmental complaints.

Stormwater Management Plan

The Clark County Stormwater Management Plan is a detailed description of how the county meets the requirements of Permit Special Conditions S5 Stormwater Management Program and S8 Monitoring and Assessment. The 130-page plan includes programmatic descriptions for permit components by department and division. It includes detailed responsibility matrices describing position roles as primary performer, supporting, informed, consulted and accountable for program tasks.

Attachment to Annual Report Question 13: Description of Public Involvement Mechanisms in Program Development

Overview

Clark County held scheduled and additional Clean Water Commission meetings to review stormwater management program activities and advise the Board of County Councilors on program development and implementation. The stormwater budget and policies such as code and manual adoption are approved through public involvement process including public hearings. Stakeholder advisory committees were formed and meetings held as part of an ongoing process to adopt an equivalent stormwater code and manual.

Stormwater Management Plan

The Clark County Stormwater Management Plan is a detailed description of how the county meets the requirements of Permit Special Conditions S5 Stormwater Management Program and S8 Monitoring and Assessment. The 130-page plan includes a description of public involvement in development of the Stormwater Management Program.

Clark County posts the Stormwater Management Plan on the Environmental Services Web page and invites public comments on the plan.

Clean Water Commission

The Clean Water Commission (CWC) is a nine-member advisory panel appointed by the Board of Clark County Councilors. It provides a forum for public participation in the stormwater management program and also informs the Board of County Councilors about stormwater topics and policy recommendations. The CWC was created in 1999 by ordinance and is required by Chapter 13.30A of Clark County Code.

The CWC is staffed by the Clean Water Program, supporting meetings held at least every two months and an annual presentation to the County Councilors. Public input is solicited at each CWC meeting. The CWC also provides input to the County Councilors via letters, reports or public testimony at County Councilor meetings.

Public Process for Program Actions

Actions taken to implement the Stormwater Management Program often include public input. Examples include SEPA review for county capital projects and code amendments, Planning Commission hearings for adopting equivalent stormwater code and manuals, public hearings for equivalent code and manual adoption, and stormwater program budget approval by the County Councilors. As part of equivalent stormwater code and manual development, stakeholder committees for technical and general issues played a key role in identifying and deciding issues in the draft submitted to Ecology in June 2014.

2014 Annual Report Q34.b Project List

Project Name	Type[1]	Start Year	Status[2]	End Year	Cost Estimate	Funding (%) Local	State	Federal	WQ Benefit	Hydro Benefit	Hydro Benefit #	Retrofit Incentive	Other Benefit	Monitoring Planned	Lat	Long	Receiving Water Body	Comments
Parkside Manor SWF Retrofit	3	2009	4	2013	$950K	25%	75%	0%	809.0	43%	1	12.000	None	No	45.727247	-122.674051	Whipple Creek	Retrofit to combine and improve three undersized facilities; partially funded by Ecology grant G1200577
Stones Throw SWF Repair	5	2011	4	2013	$170K	100%	0%	0%	NA	NA		0.500	None	No	45.663706	-122.604186	Burnt Bridge Creek	Facility repair >25K
Thomas Wetland East SWF	2	2009	4	2014	$2.2M	55%	45%	0%	2,686.0	26%	1	91.500	improve wetland habitat and recreation	No	45.661303	-122.618772	Burnt Bridge Creek	Construction of new stormwater wetland; partially funded by Ecology grant G1200576
Harding Farms SWF Retrofit	3	2009	2	2016	$1.2M	17%	83%	0%	952.0	11%	1	50.750	improve wetland habitat	No	45.712419	-122.630671	Salmon Creek	Retrofit to provide stormwater treatment and wetland enhancement; partially funded by 2013 Legislative Proviso
Flume Creek Riparian Acquisition	6	2012	1	2015	$2.2M	41%	59%	0%	NA	NA		82.500	None	No	45.792906	-122.736473	Flume Creek	Purchase of priority riparian habitat; partially funded by Grant #12-1504 through the Salmon Recovery Funding Board administered by the state Recreation and Conservation Office.
Schmid Riparian Acquisition	6	2012	1	2015	$500K	100%	0%	0%	NA	NA		10.325	None	No	45.585013	-122.339341	Washougal River	Purchase of priority riparian habitat
Poch Riparian Acquisition	6	2012	5	-	$130K	100%	0%	0%	NA	NA		2.680	None	No	45.737449	-122.559108	Salmon Creek	Purchase of priority riparian habitat (2014 project abandoned per Board of Clark County Commissioners)
Catch Basin Treatment Retrofits	3	2014	2	2018	$320K	100%	0%	0%	NA	NA		NA	None	No	tbd	tbd	tbd	Install water quality treatment retrofits for catch basins in priority areas with no existing stormwater treatment
Trillium Park Subdivision SWF Repair	5	2015	2	2016	$85K	100%	0%	0%	NA	NA		2.375	None	No	45.670968	-122.654877	Burnt Bridge Creek	Facility repair >25K
Cold Creek Court SWF Repair	5	2015	2	2016	$140K	100%	0%	0%	NA	NA		0.575	None	No	45.671597	-122.620217	Cold Creek	Facility repair >25K
Whipple Creek Place SWF Repair	5	2016	1	2017	$150K	100%	0%	0%	NA	NA		11.500	None	No	45.731412	-122.677782	Whipple Creek	Facility repair >25K
Pleasant Valley Park 'B' SWF Repair/ Retrofit	5	2016	1	2017	$170K	100%	0%	0%	NA	NA		15.875	None	No	45.724768	-122.626537	Salmon Creek	Facility repair >25K
Andy's Acres (A) SWF Repair	5	2016	1	2017	$55K	100%	0%	0%	NA	NA		0.725	None	No	45.690239	-122.694724	Lakeshore	Facility repair >25K
40 et 8 Chateau SWF Repair/Retrofit	5	2017	1	2018	$300K	100%	0%	0%	NA	NA		6.075	None	No	45.678349	-122.643588	Salmon Creek	Facility repair >25K

[1]Type	Description
1	New flow control facility, including Low Impact Development (LID) Best Management Practices (BMPs)
2	New treatment facility (or treatment and flow control facility), including LID BMPs
3	Retrofit of existing treatment and/or flow control facility
4	Property acquisition for water quality and/or flow control benefits (not associated with future facility)
5	Maintenance with capital construction costs ≥ $25,000
6	Property acquisition for riparian habitat
7	Restoration of forest cover
8	Restoration of riparian buffer
9	Floodplain reconnection projects on water bodies that are not flow control exempt per Appendix 1
10	Capital projects related to the MS4 which implement an Ecology approved basin or watershed plan
11	Other actions to address stormwater runoff into or from the MS4 not otherwise required in S5.C

[2]Status (as of December 31st of the reporting year)	Description
1	Planning
2	Design and permitting
3	Construction
4	Complete/Maintenance
5	Project cancelled
6	Property acquisition

Attachment to Annual Report Question 36: A summary of actions to implement the source control program

Clark County Environmental Services implemented an inspection program in 2014 for 20 percent of the business and multifamily properties within the permit area, in compliance with **S5.C7.b.iii.(1).** All identified sites within the subwatershed Salmon Creek (r.m 03.83) were inspected because of their geographic location within the watershed, their proximity to receiving waters, and potential to have non-stormwater discharges such as leaky dumpers. Visiting all sites in a stream basin allows in-person distribution of source control information to all businesses as required in S5.C.7.b.iii. During each site visit, information about activities that may generate pollutants and applicable source control requirements was provided.

Achieving the requirements of **S5.C7.b.iii. (2),** Clark County Environmental Services completed inspections for 20 percent of the businesses and multifamily properties in our source control inventory. Inspections and follow-up actions brought compliance with source control BMP requirements. During 2014, 403 new records of inspection and follow-up actions were logged into *Tidemark,* Clark County's official database.

To meet the requirements of **S5.C7.b.iii. (3),** 100% of sites identified through legitimate complaints were inspected. Clark County Environmental Services responded to 64 water quality complaints.

Follow-up inspections were conducted in accordance with **S5.C7.b.iv. (1)** for sites that Clark County determined, through inspections, to inadequately implement required BMPs. Follow-up actions included: phone calls, letters and emails. On 6 sites, referrals were made to other agencies or departments such as, Clark County Environmental Services Code Enforcement, Clark Regional Wastewater District, Clark County Health Department, and Ecology.

No enforcement actions were taken as outlined by **S5.C7.b.iv. (2)** because 100 percent compliance was reached through follow-up actions.

Clark County Environmental Services maintained records required by **S5.C7.b.iv. (3)**. Each site inspection was documented. Records included inspection reports, correction letters, photos, and actions documented to bring facilities into compliance. No access or entry was denied by property owners.

Clark County Environmental Services referred no non-emergency violations of local ordinances to Ecology, as provided for in **S5.C7.b.iv. (4)**.

Clark County NPDES Illicit Discharge Detection and Elimination Screening

Quality Assurance Project Plan

Version 3.0 March 2014

Project Name:	Illicit Discharge Detection and Elimination Screening
Project Code:	IDDE Screening
Agency Name:	Clark County Washington
Agency Contact Name:	Ian Wigger
Department:	Environmental Services, Clean Water Program
Funding Source:	Clark County Clean Water Fee

Approvals:

Project Manager: _____ Date: _____

Ian Wigger, Natural Resources Specialist II
Clark County Public Works Water Resources
Contact: 360-397-6118 x4282
ian.wigger@clark.wa.gov

Technical Support: _____ Date:_____

Jeff Schnabel, Natural Resources Specialist III
Clark County Public Works Water Resources
Contact: 360-397-6118 x4583
jeff.schnabel@clark.wa.gov

Supervisor: _____ Date: _____

Rod Swanson, Monitoring Coordinator
Clark County Public Works Water Resources

Client Approval: _____ Date: _____

Earl Rowell, Water Resources Manager
Clark County Public Works Water Resources

QC Coordinator: _____ Date: _____

Jeff Schnabel, Natural Resources Specialist III

Prepared by: Jeff Schnabel

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Illicit Discharge Detection and Elimination Screening Project Quality Assurance Project Plan

Purpose of the Quality Assurance Project Plan

Clark County Public Works Water Resources (Water Resources) follows the general Quality Assurance Project Plan (QAPP) format defined by the State of Washington Department of Ecology (Ecology) (Lombard and Kirchmer, 2001). Water Resources requires a QAPP for each monitoring project. The plan addresses project design, schedule, methods of data collection and management, quality assurance and quality control requirements, data analysis, and reporting.

Background and Problem Statement

Illicit discharges are broadly defined as polluted, non-stormwater discharges entering the storm sewer system. Examples include improper cross-connections, leaking sewer lines or septic systems, and illegal dumping of materials such as waste oil or paint. Illicit discharges may contribute to exceedences of water quality criteria in receiving waters during baseflow conditions, and may also increase pollutant levels in stormwater.

Section S5.C.8 of Clark County's 2007 Phase I Municipal Stormwater Permit requires an ongoing program to detect, remove, and prevent illicit connections and illicit discharges entering the county's municipal separate storm sewer system (MS4).

The Illicit Discharge Detection and Elimination Screening (IDDE Screening or Screening) project includes field screening and source tracking and is one component of a larger set of county activities designed to meet the requirements in Section S5.C.8. Additional permit-required illicit discharge prevention activities are not within the scope of the IDDE Screening project, including: the development and maintenance of an MS4 map; the development and enforcement of county ordinances prohibiting illicit discharges; preventing, responding to, containing, and cleaning up spills or improper disposal; construction and maintenance inspections; training for county crews to recognize and report violations, and; creating and publicizing a citizen complaint hotline.

Clark County first implemented a systematic Storm Sewer Screening project in the year 2000. Details of that implementation are provided in annual project reports, in particular the Storm Sewer Screening Project 2002 Annual Summary and Final Project Review (Clark County Public Works, April 2003).

The IDDE Screening project was designed and initiated during 2006, drawing upon experience gained during the 2000 – 2002 screening project and on updated guidance contained in Illicit Discharge Screening: A guidance manual for Program Development and Technical Assessments (Center for Watershed Protection, October 2004). In particular, the project was structured to focus more effectively on the types of discharges routinely encountered during the earlier screening project. These include bacterial contamination and inappropriate discharge of commercial washwater.

Version 2.0 of this QAPP applies to IDDE project activities beginning in 2007. Version 2.0 updates certain aspects of field procedures and data management to increase project efficiency based on observations from the 2006 project.

Organization and Schedule

Project Staff

Water Resources activities are administered through Clark County Public Works as part of the county's NPDES Clean Water Program.

Client:	Earl Rowell, Water Resources Manager
Supervisor:	Rod Swanson, Senior Planner
Project Manager:	Chad Hoxeng, Natural Resources Specialist II
Technical Support:	Jeff Schnabel, Natural Resources Specialist III
QC Coordinator:	Jeff Schnabel
Project Team:	Chad Hoxeng
	Jason Wolf, Natural Resources Specialist I
	Bob Hutton, Natural Resources Specialist III
	Jeff Schnabel

Laboratory Contracts

Laboratory water quality analyses for the project are performed by TestAmerica Laboratories (TA), an Ecology-accredited laboratory located in Beaverton, Oregon.

Laboratory:	TestAmerica
Address:	9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
Phone:	503-906-9200
Contact:	Howard Holmes or Mary Fritzman-Smith

Other laboratory and field investigation services are contracted on an as-needed basis with appropriate agencies or laboratory facilities.

Project Timeline

The IDDE Screening project follows several steps in each watershed, including: initial screening, follow-up investigations, and referrals for source removal.

The initial screening step proceeds systematically through county watersheds in tandem with Water Resources' Stormwater Needs Assessment Program (SNAP) and in response to NPDES permit requirements. Initial screening in each subwatershed is expected to require no more than one year.

Subsequent followup investigations or source removal tasks lag behind initial screening work due to the time required to plan and carry out the activities. The timing and order of followup investigations depends on the number, complexity, and severity of problems discovered during initial screening.

Project Description

The goal of the IDDE Screening project is to detect, isolate, and eliminate illicit discharges to and from Clark County's MS4.

Project objectives are to:

- Identify dry-weather flows at MS4 outfalls
- Conduct dry-weather field screening and analytical testing to detect illicit discharges
- Conduct and/or coordinate followup investigations to isolate sources when suspected illicit discharges are detected
- Refer suspected illicit discharges to appropriate staff or agencies for source removal
- Perform followup inspection or monitoring to confirm that source removal activities are successful

The IDDE Screening project fulfills or partially fulfills the requirements under Clark County's 2007 Phase I Municipal Stormwater permit sections S5.C.8.b.i, vi., and vii.

The project is based on methods found in Illicit Discharge Screening: A guidance manual for Program Development and Technical Assessments (Center for Watershed Protection, October 2004).

The IDDE Screening framework

The framework shown in Figure 1 outlines the general approach of the Screening project. The process begins with systematic outfall screening using a series of physical and water quality indicators. Screened outfalls may be non-flowing, flowing, or an obvious illicit discharge. Obvious illicit discharges are immediately referred for removal or scheduled for further investigation to isolate the source. Field and analytical results from flowing outfalls are interpreted using a flowchart and selected industrial discharge benchmarks. Non-flowing outfalls are assessed for possible intermittent discharges and may be sampled using off-hours monitoring, caulk dams, sandbags, or other methods to capture intermittent flow.

If an illicit discharge is suspected, further steps are taken in an attempt to isolate the specific source. Depending on the type of discharge, this may include investigations of the upstream storm drain network, the upland drainage area, a specific business or pollution-generating site, septic systems, or sanitary sewer infrastructure. These followup investigations may be performed by county departments or by other agencies.

When a source or source area has been isolated to the extent practicable, the case is referred to the appropriate agency or county department for removal. County technical assistance staff, code enforcement officers, or health department staff may be involved, in addition to local wastewater districts and the state Department of Ecology.

Following source removal, effectiveness monitoring is completed to confirm the source has been eliminated.

Limitations

Illicit discharge screening projects cannot locate and remove *all* illicit discharges or inappropriate connections to the MS4. Illicit discharges may be continuous, intermittent, or transitory. Continuous discharges are generally the easiest to detect and often produce the greatest pollutant load. Intermittent discharges occur over a shorter period of time and are harder

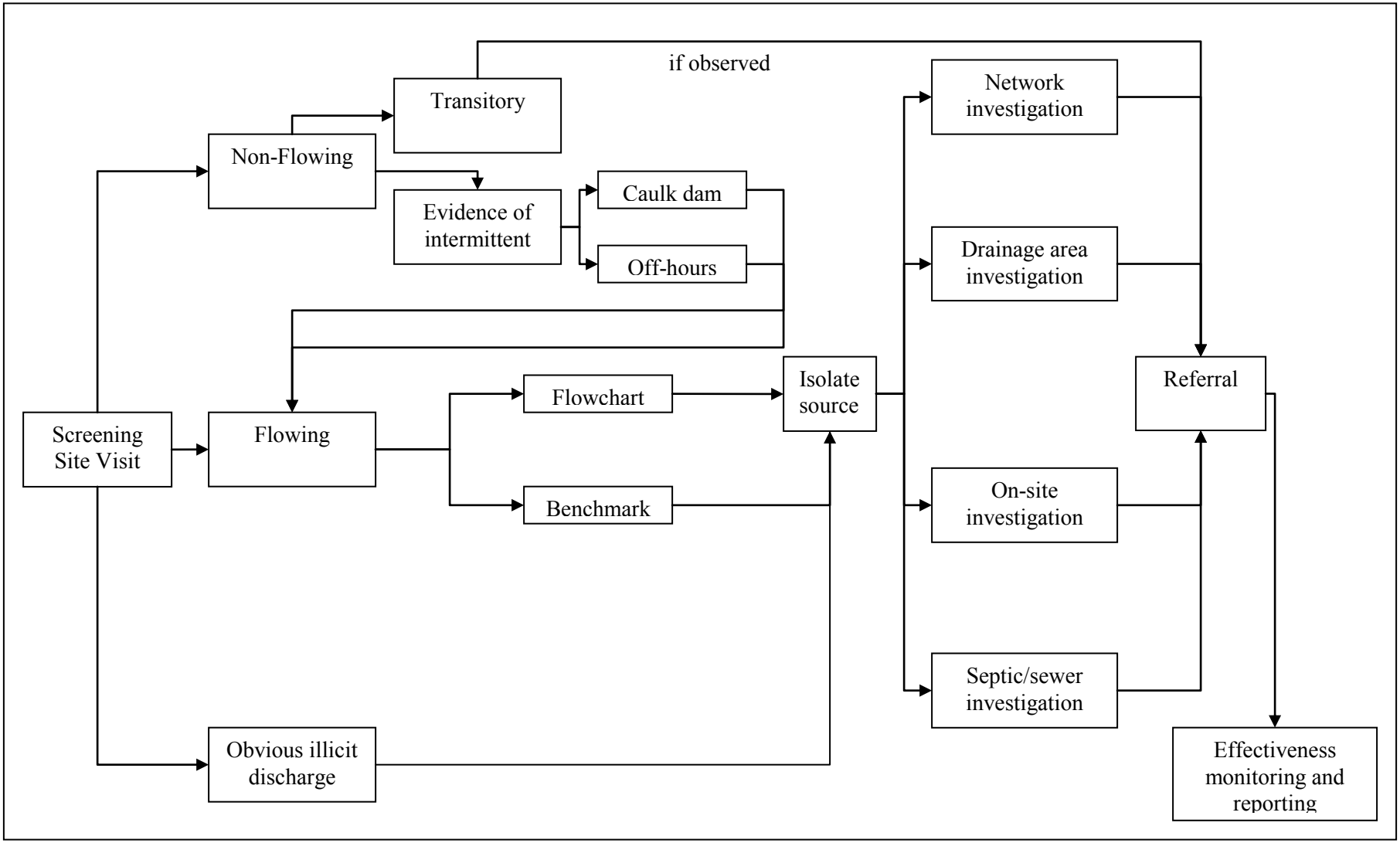

Figure 1. IDDE Screening project framework. (adapted from Center for Watershed Protection, October 2004)

to detect. The IDDE Screening project utilizes specialized sampling methods in an attempt to capture intermittent discharges. Transitory discharges are usually due to a singular event such as illegal dumping or an industrial spill. Such discharges are not likely to be detected by an illicit discharge screening project, but may have significant water quality impacts.

Successful elimination of illicit discharges also depends on effective coordination and cooperation between agencies that manage storm, sanitary, and septic systems, including: Clark County Water Resources, Clark County Public Health, local wastewater utilities, and the Department of Ecology. Budget and resource limitations may impact the ability of various agencies to respond to illicit discharges discovered through the IDDE Screening project.

Sampling Design

Subwatershed prioritization

Water Resources utilizes a systematic framework called the Stormwater Needs Assessment Program to direct and coordinate many Water Resources section activities, including the IDDE Screening project. IDDE Screening is implemented according to a prioritization schedule determined under the SNAP framework. The basin prioritization takes into account a range of watershed factors including current and projected land use, existing water quality, amount of stormwater infrastructure, hydrologic conditions, and regional watershed management initiatives.

Mapping/Outfall locations

Water Resources stormwater infrastructure staff update the county MS4 map on an ongoing basis. Additional updates, including detailed ditch mapping, will generally be completed in the early stages of needs assessments under the SNAP.

Additionally, streams may be surveyed for stormwater impacts, including stormwater outfalls, during the needs assessment process. Previously unknown outfalls discovered during this process are added to the MS4 map.

When feasible, initial screening in a subwatershed is implemented after updated MS4 mapping has been completed. However, the Screening project is a required activity under the stormwater permit and will proceed using the available mapped outfalls at the time screening is initiated, regardless of the status of mapping activities.

Selection of initial screening sites

Because most county subwatersheds have a relatively small number of stormwater outfalls, the project attempts to screen every known MS4 outfall based on the available MS4 map. When possible, private outfalls to streams are also screened.

Initial screening frequency/schedule

A flexible field schedule is required for initial screening, due to the necessity of monitoring during dry weather. Each outfall is visited a single time during the initial screening process. Outfalls with potential illicit discharges may be re-visited one or more times as part of followup investigations.

Screening indicators

Initial screening is a systematic monitoring approach that describes each outfall and utilizes a series of indicator characteristics selected for their ability to discern illicit discharges. Table 1 outlines the outfall descriptions, physical indicators, field measurements, and laboratory analyses

utilized during initial screening. Outfall descriptions and certain physical indicators are noted at each screening site, regardless of whether water is present. Additional physical indicators, field measurements, and samples for laboratory analysis are collected at each outfall where ponded or flowing water is observed.

Table 1. IDDE Screening indicators

Category	Indicators
Outfall description:	type shape and dimensions
	material
Physical indicators:	
flowing outfalls:	floatables
	odor
flowing and non-flowing outfalls:	deposits/stains
Field measurements (flowing only):	discharge (estimated) temperature
	pH turbidity
	conductivity
Laboratory analyses (flowing only):	fecal coliform potassium
	ammonia surfactants (as MBAS)
	hardness

Interpreting Indicator Data

As shown in Figure 1, two methods are routinely used to interpret indicator data, identify outfall flow types, and confirm illicit discharges.

Flow chart

The flow chart method utilizes several indicators to distinguish four major discharge types commonly found in residential watersheds. These include sanitary wastewater, washwater, tap water, and natural water sources. The flow chart method is recommended by the Center for Watershed Protection because it is relatively simple technique utilizing four indicators that are safe, reliable, and inexpensive to measure (October 2004). Figure 2 outlines the flow chart method.

The flow chart separates clean flows from contaminated flows using detergents (measured as surfactants), and separates washwater from sanitary wastewater using the ammonia/potassium ratio. The flow chart used by Clark County has been modified slightly to incorporate fecal coliform bacteria as an additional indicator of potential sewage contamination.

Benchmarks

Commercial and industrial sites produce discharges that are often not composed of either sewage or washwater. The Center for Watershed Protection identifies seven indicators that serve as commercial/industrial flow benchmarks: ammonia, color, conductivity, hardness, pH, potassium, and turbidity. Two of these indicators (ammonia and potassium) are incorporated into the flow chart method described above. The remaining indicators are included in the list of standard

indicators utilized by the project, with the exception of color. Color is not measured as a routine indicator, but may be measured in cases where substantial discharge coloration is apparent.

Initial benchmark values established by the CWP (October, 2004) may be refined for local conditions as the project progresses and a larger amount of local data becomes available for comparison.

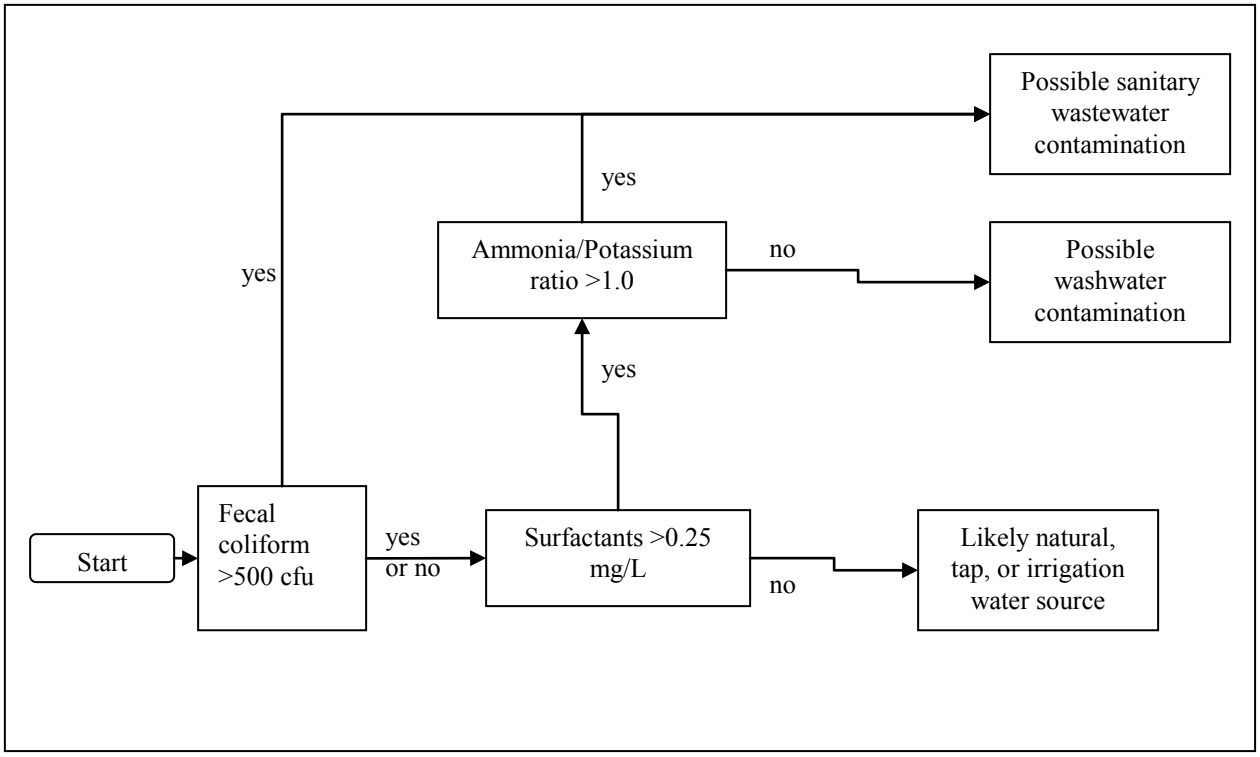

Figure 2. The IDDE Screening flowchart method to identify illicit discharges in residential watersheds (adapted from Center for Watershed Protection, October 2004).

Professional judgment

The project is intended to provide flexibility to enable staff to respond to water quality problems as determined by all available qualitative and quantitative information.

Best professional judgment (BPJ) is also used to interpret screening data. In some cases, BPJ may indicate that results exceeding a benchmark are the result of natural or background factors, or stem from a source other than an illicit discharge. Conversely, if visual or qualitative observations indicate the presence of an illicit discharge, then a followup investigation may be pursued despite the lack of data exceeding a benchmark or flowchart target. A site with multiple indicator results slightly below benchmark levels may also warrant followup.

Followup Investigations

Section S5.C.8.b.vii of the 2007 permit requires that a source investigation be initiated within twenty-one (21) days of the discovery of a suspected illicit discharge. The four general methods utilized to isolate the source are storm drain network investigations, drainage area investigations, on-site investigations, and septic system investigations. In some cases a combination of methods may be used. Each method is described in more detail below:

Storm drain network:

Network investigations are generally performed by the monitoring staff, possibly with assistance from operations and maintenance staff. These investigations involve strategically inspecting manholes or other infrastructure within the MS4 to isolate discharges to a specific segment. Once the correct segment has been identified, an on-site investigation may be used to locate the discharge. Network investigations may be as simple as observing the flow pattern within manholes, or as complex as a series of additional indicator monitoring sites spread through a section of the MS4.

Drainage area:

Drainage area investigations are generally performed by monitoring staff or Water Resources Waste Reduction Specialists. Drainage area investigations examine land use or other characteristics of the drainage area to pinpoint the area producing the discharge. This approach works best when initial screening suggests an obvious discharge source. In this case, a simple windshield survey of the drainage area may be enough to isolate the source.

On-site:

On-site investigations are typically performed by Water Resources Waste Reduction Specialists or by other agencies such as local wastewater utilities. On-site investigations are used to trace the source of an illicit discharge within a pipe segment. These investigations target a single suspected source or small number of possible sources and often involve dye or video testing.

Septic/sewer system:

Sanitary sewer investigations are performed by local wastewater districts, while septic system inspections are performed by Clark County Public Health.

Referrals for source removal

The Screening project seeks to isolate sources to the extent that the correcting entity is able to proceed without significant further monitoring once the referral has been made. Sites may be referred for source removal activities at any stage of investigation if an illicit discharge source can be identified with a reasonable degree of accuracy. Section S5.C.8.b.vii of the 2007 permit requires that illicit *connections* to the MS4 must be terminated within six (6) months of source confirmation.

In many cases the agency responsible for correcting the problem may also be involved in monitoring to assist in identifying the source. In particular, this applies to septic/sewer investigations and some types of onsite investigations.

Referrals typically follow one of several patterns:

1) Illicit discharges identified through chance observations by monitoring staff or through public complaints are referred immediately for technical assistance initiated by Water Resources Waste Reduction Specialists.

2) Illicit discharges identified and isolated during initial outfall screening are referred to Waste Reduction Specialists, other county departments (e.g. Community Development, Public Health), or the appropriate agency (e.g. wastewater utility, Department of Ecology)

3) Illicit discharges isolated during followup investigations are referred to the appropriate department or agency at the conclusion of the investigation.

Lead responsibility for coordination of investigation and removal activities
The IDDE project manager serves as the point of contact and coordinator for followup investigations, up to and including the referral to the correcting agency. From that point on, oversight and tracking of removal activities becomes the responsibility of Water Resources Waste Reduction Specialists. Following completion of removal activities, the IDDE project manager is responsible for designing and overseeing completion of effectiveness monitoring.

Some followup investigations may be planned independently by IDDE project staff; however, in cases where the assistance of other agencies is required a meeting will be held with appropriate agency staff to develop an investigation plan, typically including staff from the Public Health Department Resource Protection Program and Clark Regional Wastewater District. Funding for followup investigations is addressed on a case-by-case basis.

Effectiveness monitoring
Effectiveness monitoring is completed following source removal activities. Typically this involves re-sampling the affected outfall to confirm removal, and may also be accomplished through on-site inspection.

Repeat screening
At the discretion of the project manager, outfalls may be subject to initial screening activities for two years in a row. Typically, this applies to outfalls where initial screening suggested a possible illicit discharge, but followup investigations failed to confirm the presence of a discharge. Such outfalls may be considered high risk for future discharges and a repeat visit may be warranted the following year. After two successive years with no illicit discharge found, the site will typically not be re-visited.

Quality Objectives

Measurement Quality Objectives
Analytical methods, reporting or precision limits, and Measurement Quality Objectives (MQO) for accuracy, precision, and bias are listed in Table 2. Data quality objectives and quality control procedures for laboratory parameters are detailed in TestAmerica quality assurance documents.

Collection, preservation, transportation, and storage of samples follow standard procedures designed to reduce most sources of sampling bias. Analytical bias is minimized by adherence to the methods listed in Table 2. The laboratory employs quality control procedures appropriate to the analytical procedures, including analysis of method blanks, matrix spikes, and check standards.

Table 2. IDDE Screening analytical methods and reporting or precision limits.

Characteristic	Method	Resolution/ Reporting Limit	Accuracy	Precision	Bias	Reference
		conc./ units	Units / % error	%RSD	%REC	lab
Temperature	Thermistor	0.01 C	± 0.15 °C	NA	NA	
pH	Glass electrode	0.01 units	± 0.2 pH units	NA	NA	
Conductivity	Electrode	4 digits	± 0.5% of reading	NA	NA	
Turbidity	Nephelometric	0.01 NTU	± 2% of reading	NA	NA	
Ammonia	Colorimetric	0.05 mg/L	25%	10%	5%	EPA 350.1
Fecal coliform	Membrane filtration	2 cfu/100 mL	NA	28%	NA	SM 9222
Total hardness	Calculation (Ca+Mg)	0.66 mg\L	25%	10%	5%	SM 2340B
Surfactants	Methylene Blue active substance (MBAS)	0.1 mg/L	25%	10%	5%	SM 4500C
Potassium	ICP	1.0 mg/L	25%	10%	5%	EPA 200.7

Field Procedures

General

For purposes of initial screening, "dry weather" means no measurable rainfall (<0.01") in the 48 hours preceding screening. If rain has fallen in the general vicinity within 48 hours, screening will typically not be conducted. Regardless of the length of antecedent dry periods, screening is also not performed if local conditions suggest that storm-related flow is still occurring at a site. Sources of current rainfall information include the National Weather Service website (http://www.weather.gov/climate/index.php?wfo=pqr) and the Salmon Creek Treatment Plant automated rainfall recording at 397-6118 ext. 7030.

Equipment calibration, quality assurance, and field data collection protocols for data collected by the project are described in Standard Procedures for Monitoring Activities: Clark County Water Resources Section (2002). Field activities are generally conducted by 2-person field crews. Sample containers for laboratory delivery are labeled in indelible ink with the following information:

- Clark County
- IDDE Screening
- Location ID
- Date and Time

Water quality samples are collected in properly preserved bottles prepared by the laboratory, and stored on ice or refrigerated until delivery to TA. Water quality samples are picked up by laboratory personnel within 24 hours of collection. Formal Chain of Custody documentation is maintained for all samples sent to TA.

Outfall descriptions, physical indicators, and certain field measurements are recorded electronically using tablet PCs or handheld data collection platforms such as a Trimble GeoExplorer GPS unit.

Records are cross-checked for consistency between labels, custody documents, data sheets, and other relevant data.

Water samples are generally collected using a 1-L sample bottle or long-handled dipper. Other techniques may be used as necessary (e.g. sampling bucket lowered on a rope, cut-off milk container for collecting very low flows, etc).

Field measurements for pH, conductivity, and water temperature are recorded with a calibrated YSI 6920 multi-probe. Turbidity is measured in the field using a Hach 2100P turbidimeter, and color (if assessed) is measured using a standard Hach color wheel.

Digital photographs are taken only for outfalls where water samples are collected and/or where an illicit discharge is suspected during initial screening. Long-term photo storage is limited to those locations where followup investigations are performed or where illicit discharges are confirmed.

Ditch outfall procedures

Ditch outfalls (as opposed to piped system outfalls) comprise a high percentage of the existing stormwater outfalls in many areas, but tend to exhibit a very low occurrence of dry weather flow and illicit discharges. Standard procedures for ditch outfall screening are described below:

Depending on the data collection platform being used, crews may opt not to enter data in the field for dry ditch outfalls. In these cases, data may be entered directly into the database in the office to reduce field time. The exception is ditches where water samples are collected or where illicit discharges are suspected: in these cases, data must be logged in the field.

For flowing ditch outfalls, if flow is sufficient to collect samples relatively quickly and with no contamination, samples are collected for all standard characteristics. However, in many cases, ditch outfalls have very low flows that are difficult or impossible to sample effectively. In these cases, staff attempt to collect a clean sample for fecal coliform only. Field meter measurements are collected only if there is sufficient flow to submerge the sensors or if a sufficient volume can be collected in a clean container to obtain measurements.

Unreachable or hidden outfalls

If a mapped outfall cannot be located or is unreachable due to vegetation, terrain, property access, or other hazards, one of several options may be pursued:

a) Skip the outfall. Further steps taken by the project manager may include:
   i) contact Public Works Operations and request a crew to clear vegetation and/or locate the outfall.
   ii) contact landowner for access permission
   iii) remove the outfall from consideration under IDDE Screening

b) If the outfall is from a stormwater facility and the facility is obviously dry, assume the outfall is also dry and complete as much of the data collection as possible. In most cases, such outfalls will also be referred to Operations for vegetation clearing.

c) Locate the nearest “upstream” accessible point (manhole, ditch access point, etc) and perform the screening at that location. Note the change under a comment field in the data entry form.

Safety
Field crews are instructed to make safety the highest priority. Field crews consist of a minimum of two persons, at least one of which must have completed certified flagger training. Safety vests are worn at all times when outside the vehicle. Road signs, stop/slow paddles, and traffic cones are utilized as needed.

Screening locations may be located in areas where access is difficult due to steep slopes and heavy vegetation. Crews should use caution with machetes and when traversing difficult terrain.

If a field crew feels a particular location cannot be visited safely, the location should not be visited and an alternative sampling location should be used.

Laboratory Procedures

Ammonia, surfactants (MBAS), fecal coliform, total hardness, and potassium analyses are conducted by TestAmerica. All procedures are performed according to TA's Ecology-approved quality assurance program and according to accepted conventions for data manipulation and reporting as described in Standard Methods (APHA, 1992). Table 2 shows the constituents measured, analytical methods, and reporting limits.

Quality Control

Laboratory QC
Laboratory check standards, matrix spikes, analytical duplicates, and blanks are analyzed in accordance with the TA Quality Assurance Program. All QC results are reported to Water Resources staff along with sample data. Laboratory data reduction, review, assessment and reporting are performed according to the TA Quality Assurance Program.

Field QC
Field QC sample types, frequencies, and definitions for IDDE Screening water quality samples are found in Table 3. A standard 10% duplication rate is used for laboratory water quality samples and field meter measurements, except for bacteria samples which are duplicated at a rate of 20%. One transfer blank and one transport blank are collected annually.

All meters are calibrated and maintained in accordance with the manufacturer's instructions. Check standards for conductivity and turbidity are used to verify the accuracy of field meters. A NIST-certified thermometer (National Institute of Standards and Testing) is used to verify the accuracy of temperature sensors. Calibration logs are completed during each calibration and are archived in Water Resources files. Calibration drift in pH meters is checked against pH buffer solutions. These activities are used to confirm that field instruments are attaining stated accuracy and resolution specifications.

Corrective Actions
Data quality problems encountered in the analysis of QC samples are addressed as needed through re-calibration, modifications to the field procedures, increased staff training, or by qualifying results appropriately. Documentation of corrective action steps includes problem identification, investigation procedures, corrective action taken, and effectiveness of the corrective action.

Table 3. IDDE Screening QC sample types, frequencies, and definitions.

Field QC sample type	Frequency	Definition
Field measurement replicate	10% of samples	repeat field meter measurements
Sample duplicate (bacteria) (all other)	 20% of samples 10% of samples	duplicate sample collected for laboratory analysis
Transfer blank	Annually	D.I. water sample collected in field with sampling equipment
Transport blank	Annually	D.I. water sample prepared in office and carried through field trip

Data Management Procedures

Project data related to IDDE Screening is stored in three separate databases with information linked using a unique outfall ID.

Clarkstorm Database

The Clarkstorm SDE database stores locations and descriptive attributes for the mapped MS4, including stormwater outfalls. Each outfall stored in Clarkstorm is assigned a unique ID. These mapped outfalls form the sample location set for the IDDE Screening project.

Clarkstorm includes a table named PWFieldLocs which associates Clarkstorm features with data stored in the two databases discussed below, using the UNIQUEID field assigned in Clarkstorm. The Clarkstorm database is available to users as a series of shapefiles stored in \\olympus\gisdata\clarkgis\avdata\shapes\clarkstorm.

IDDE Screening Database

The IDDE Screening database is a series of SQL tables with an Access front-end to facilitate data entry and management. This database stores information collected during field screening visits, in addition to overall project tracking information including investigations and referral activities. The IDDE Screening database front-end is located under Water Resources on the NT05 server at: W:\PROJECT\011111, outfall screening\MONITORING\Data\Entry tracking.

Water Quality Database

The Water Quality Database (WQDB) is a series of SQL tables with an Access front-end to facilitate data entry and management. This database was designed to store water quality data from most Water Resources monitoring projects in a centralized location. Field measurements and laboratory analytical results from the IDDE Screening project are stored in this database. The WQDB front-end is located under Water Resources on the NT05 server at: W:\NON-PROJECT\Collective Databases\Monitoring\WQ Database. Each user has an individual folder for access to the database entry forms.

Audits and Reports

Audits

The project manager and QC coordinator periodically review the field data, methods, lab results, and data management activities to make an assessment of the program and identify corrective actions or method revisions.

Reports

Screening project results are reported annually in an overall project summary, and individual case report appendices are prepared for each location requiring a followup investigation. Both report types conform to a standardized template for consistency and brevity, and to ensure inclusion of metrics required for annual stormwater permit reporting to Ecology.

The annual summary report is produced at the conclusion of each calendar year. Summaries address project activities and methods, overall results and program tracking, data accuracy and completeness, and adaptive management suggestions for future monitoring. An overall summary of site visits, illicit discharges located, followup activities, and outfall status is included. Reports are peer reviewed by Water Resources staff. Reports are posted on the county's website to facilitate dissemination of information to the public.

Individual case studies address the followup techniques, status of followup and removal activities, and available effectiveness monitoring data. For lengthy followups, case studies are updated periodically to reflect case status.

Data Review, Verification, and Validation

During each sample trip, field crews review data entry fields and forms to confirm that all necessary field measurements and samples have been collected. Laboratory QC results are reviewed and verified by NCA staff and documented in data reports to Water Resources. Upon receipt, laboratory data are reviewed for errors, omissions, and data qualifiers prior to data entry.

Data verification involves examination of QC results analyzed during the project to provide an indication of whether the precision and bias MQOs have been met. To evaluate whether precision targets have been met, pairs of duplicate sample results are pooled and an estimate of standard deviation is calculated. This estimate, divided by the mean concentration of the duplicate results and converted to percent, is used to judge whether the %RSD target has been met.

To evaluate whether bias targets have been met, the mean percent recovery of the check standards should be within +/- %bias target of the true value (e.g. true value +/- 10%). Unusually high blank results indicate bias due to contamination that may affect low-level results. To evaluate whether the target for reporting limit has been met, results will be examined to determine if any of the values exceed the required reporting limits.

Data validation consists of a detailed examination of the complete data package using professional judgement to assess whether the procedures in the SP's and QAPP have been followed. Data validation is performed by the project manager and QC coordinator.

Data Quality Assessment

Taking into account the results of data review, verification, and validation, an assessment will be made as to whether the data are of sufficient quality to attain project objectives.

References

APHA (1992). *Standard Methods for the Examination of Water and Wastewater, 18th ed*.

Clark County Public Works, Water Resources Section. (June 2002). *Standard Procedures for Monitoring Activities, Clark County Water Resources Section.*

Lombard, S. and C. Kirchmer. (February 2001). *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies.* Washington State Department of Ecology. Publication No. 01-03-003, revision of Publication No. 91-16.

TestAmerica – Portland, OR. (December 2006). *Quality Assurance/Quality Control Manual*

Attachment to Annual Report Question 44: Illicit Discharge Reporting Options

Overview

Clark County Public Works maintains a 24-hour line for the public to call with road-related problems. That line is used to receive calls that include spills to county roads, which are the principal pathway for pollutants to enter the MS4. Along with the 24-hour road problem line, the public uses other reporting tools depending on their preferred means to interact with county government.

Environmental Services Web Page

The Environmental Services web page has a report spills under the quick find list:
http://www.clark.wa.gov/environment/index.asp

http://www.clark.wa.gov/environment/contacts.html

The Clean Water Program web page has a notice referring callers to the department of Ecology 24-hour water quality and spill line:
http://www.clark.wa.gov/environment/stormwater/index.html

The Clean Water Program web page also includes a link to report spills and illicit discharges:http://www.clark.wa.gov/environment/stormwater/report_online.html

There is also a "who-to-call" list on the web page:
http://www.clark.wa.gov/environment/stormwater/report.html

Community Development Department Code Enforcement

Community Development has a code enforcement unit that receives calls during business hours and web submittals that include spills and water quality complaints:
http://www.clark.wa.gov/development/report.html

Public Health Department

The Clark County Health Department has a complaints web page that includes reporting spills that can create a hazard to the environment or the public:
http://www.clark.wa.gov/public-health/concern.html

Clark Regional Emergency Services Agency

The Clark Regional Emergency Services Agency operates the 911 system in unincorporated Clark County. The public may use the 911 system to report hazardous materials spills: http://cresa911.org/

Attachment to Annual Report Question 48: Summary of actions taken to characterize, trace and eliminate illicit discharges found by or reported to the Permittee

Overview

The Phase 1 Municipal Stormwater Permit (Permit) S5.C8.d.iv outlines various timelines for the Illicit Discharge Detection and Elimination (IDDE) program. This attachment summarizes the applicable activities associated with S5.C8.d.iv requirements.

2014 Actions to Trace and Eliminate Illicit Connections

Clark County has an established program to characterize, investigate and trace the source of illicit discharges. Where illicit connections were suspected, staff initiated an investigation within 21 days of either the initial screening visit (visual evidence) or receipt of laboratory data indicating a possible connection. Clark County completed dry weather visitation of 110 outfall discharge points or their closest upstream accessible feature, such as a manhole. Depending on land use, location and the judgment of the field staff, the sites were sampled for different illicit discharge indicator parameters.

Clark County source control staff responds to water quality issues discovered through water quality complaints, construction and maintenance inspections, and field screening observations (Table 1). Complaints are addressed by county staff or are forwarded to either Ecology or Washington Department of Health no later than 7 days. Clark County source control staff received 64 water quality complaints in 2014. Of the 64 water quality complaints received, 15 were contributors to the MS4. Most complaints are addressed the same day or the next business day (Table 1).

Clark County source control staff visited 345 sites. Source control visits include site walk-throughs of commercial and multi-family sites to look for illicit discharges to the MS4 and receiving water from private storm drains. These visits look at a variety of things such as poor housekeeping practices and leaking waste dumpsters. Clark County Source Control staff focused on illicit discharges from dumpsters in 2014. Table 2 lists the illicit discharges due to dumpsters and their resolutions.

Illicit Connections

Where illicit connections were suspected, staff initiated an investigation within 21 days of either the initial screening visit (visual evidence) or receipt of laboratory data indicating a possible connection.

In the 2014 screening, Clark County IDDE identified one site where sewage was discharging to a creek from a private system. On 26 August 2014, field staff opened a manhole behind a large grocery store and other commercial properties. The line in the manhole had feces and feminine hygiene products inside. The manhole was very close to a discharge pipe with an outfall to a nearby creek. The IDDE field staff immediately informed source control staff. Ecology was informed the next day, August 27, 2014.

Clark County source control staff contacted the property management company and dye tests were performed. Dye test confirmed a sewer cross-connection to the private storm sewer coming from a small retail shop with in the commercial complex. The property management company hired a construction company and the cross-connection was eliminated. The pipe was inspected and the investigation was closed on October 1, 2014.

W:\PROJECT\011156, NPDES Reporting\2014 reporting\Annual Report\Attachments\Q 48 Attachment.doc

Address	Complaint Summery	Complaint received	Date responded	Date case resolved
6212 NE Highway 99	Ecology Spill Response along with county DES staff respond to Environmental Report Tracking System (ERTS) complaint of a gasoline spill at convenience store reported that same day. The majority of the spill is contained in the parking lot catch basins but some of the spill occurred on Highway 99 and flowed into the storm drains. The convenience store hired company to manage the spill and perform the clean-up including vacuuming out all the catch basins. Clark County Public Works crews cleaned up the spill in the county Right of Way.	10-Jan-14	10-Jan-14	10-Jan-14
1312 NW 98th Street	Responding to a citizen call, county DES staff investigates the complaint of a citizen working on cars in the street spilling oil and gas on the county street. DES staff determines the citizen working on cars has no spill control or spill cleanup materials and instructs him to purchase some and use them accordingly. Small spills and drips were evident but were old and unrecoverable.	10-Jan-14	10-Jan-14	10-Jan-14
2513 NE 157th Street	County DES staff responds to an ERTS complaint about a commercial car washing discharging soapy suds into the street. Upon investigation DES staff discovers it was the washing three cars in one day for personal use. There was no commercial car washing. Soapy water had run down the curb line into the storm drain but it was unrecoverable. Education for future residential car washing was provided.	25-Feb-14	25-Feb-14	25-Feb-14
10614 NE 41st Court	Responding to a phone call from a citizen received that morning, the county investigated the complaint of a landscaping company dumping bark mulch in the street without a cover. The bark mulch had been in the street for a week and was starting to wash into the storm drain. The county contacted landscapers to put a tarp on the bark mulch or move it off the street. County staff returned on and found the bark mulch was out of the street and the street swept up.	10-Mar-14	10-Mar-14	12-Mar-14
1209 NW Westgate Avenue	Responding to a phone call complaint from a citizen earlier that day, the county investigated the complaint of someone stuffing dog manure and dirt into a storm drain. County DES staff confirmed what the citizen called to say and identified the offending citizen. DES staff educated the offenders on proper disposal of dog manure then called Public Works to request a crew come out to vacuum out the storm drain. Public Works vacuumed out the storm drain.	6-Jun-14	6-Jun-14	9-Jun-14
8600 NE 117th Avenue	Responding to an ERTS complaint, DES staff and Ecology investigated the complaint of an oil sheen on I-205 to Padden Parkway. We discover the sheen following it until it ends at NE 117th Avenue north of Padden Parkway. The drips are washing into the county storm system all along the way. It appears to be a diesel leak but we determine the amount dripping onto the pavement as the vehicle is driving along is unrecoverable. County DES staff and Ecology are unable to determine which vehicle is leaking.	26-Jun-14	26-Jun-14	26-Jun-14
13005 NW 33rd Avenue	Responding to a phone call from a citizen county DES staff investigate the report of a neighbor washing painting supplies into the storm drain over the weekend in front of their house at this address. Upon arriving, it is obvious by signs of paint around the storm drain that paint was washed into the storm drain; however, no more paint tainted water is recoverable in the storm drain. DES staff makes several attempts to talk with the offenders but is never able to speak to them, nor do they return phone calls requested by door hangers left at their door. A letter is sent with information about proper washing and disposal of painting supplies.	11-Aug-14	11-Aug-14	27-Aug-14
4918 NE 54th Street	Responding to a phone call received earlier that day, county DES staff investigates the complaint of citizen parking two cars that are dripping oil in the county road. DES staff talks to the car owner explaining dripping oil is a pollutant and is prohibited on the county road. The car owner moves the cars off the county road and put pans underneath to collect the drips.	12-Aug-14	12-Aug-14	27-Aug-14
7407 NE 153rd Avenue	Responding to a phone call earlier that day, county DES staff investigates the complaint of sewage leaking from a motor home parked on the street. County staff talks to the motor home owner who explains the brown stain on the street is not sewage but a special cleaner she used to wash the inside and outside of the motor home. She shows DES staff the product which confirms it is not sewage. Education is provided to prevent future discharges of the cleaner on the street.	19-Sep-14	19-Sep-14	19-Sep-14
NW 2nd Avenue and NW 134th	Responding to a phone call from a citizen earlier that day, county DES staff investigate the complaint of a sidewalk repair contractor having no erosion control in place so rain is washing wet cement and dirt into storm drain. County staff confirms the lack of erosion control and calls Public Works to notify the contractor of the need for erosion control while fixing the sidewalks. The following day DES staff confirms erosion control measures had been put in place preventing future discharges.	24-Sep-14	24-Sep-14	25-Sep-14
12408 NE 71st Street	Responding to a referral from county Maintenance and Operations, county DES staff investigates the concern of a citizen repairing many pickup trucks in the county street and dripping oil and other automotive liquids all over the road. County DES staff educates the responsible party on proper spill control and spill cleanup requirements. County DES staff then works with the Sheriff's Department to get the vehicles marked for towing if the practice continues. On revisit, the citizen had moved the vehicles off the street and cleaned up the spilled oil with kitty litter.	6-Oct-14	6-Oct-14	17-Oct-14
NE 43rd Avenue and NE 105th	Responding to a call from Clark Regional Wastewater District (CRWWD), county DES staff met CRWWD staff onsite at the location of a sewage spill the night before. About 700 gallons of sewage was estimated to have flowed into the county storm system. CRWWD pumped the storm drains and control structures and connecting lines. No evidence of sewage reached the public stormwater facility downstream. County storm system and streets were cleaned by CRWWD.	17-Oct-14	17-Oct-14	17-Oct-14
16510 NE 199th Street	Responding to an ERTS report received earlier that day and after receiving a phone call from Clark Regional Wastewater District, county DES staff investigated the issue. A communications company punched a hole in a sewer line spilling approximately 1200 gallons of sewage in the county road ditch along NE 199th Street. Clark Regional Wastewater District was on the scene removing the spilled sewage from the ditch and completed the cleanup that day.	20-Oct-14	20-Oct-14	20-Oct-14
8606 NE 64th Street	Responding to a citizen phone call from earlier that day, county DES staff investigates the complaint of a car leaking oil on the county road. In talking to the resident with the oil spot in the road in front of his house, DES staff learned that the leaking vehicle is not his but a construction worker who used to park their daily while working on a nearby project. That project is finished so the pickup no longer parks there.	22-Oct-14	22-Oct-14	22-Oct-14
1704 NE 97th Street	Responding to a citizen call earlier that day, county DES staff investigate the complaint of an oil sheen running down the curb line into a storm drain. DES staff discovers that a neighbor's car caught fire last night. The fire department came and put it out. The oily sheen was runoff from what was left of the car. Oil absorbent pads were put in place to pick up the remaining oil.	3-Nov-14	3-Nov-14	3-Nov-14

Table 1. Water quality complaints with discharges to Clark County's MS4.

Property	Case ID	Name of Business	Address	Date of discovery	Start of investigation	Close of investigation
118255160	2014-270	Universal Drywall	11100 NE Hwy 99	1-Aug-2014	1-Aug-2014	8-Aug-2014
189614000	2014-325	Century Link	2411 NE 119th St	8-Sep-2014	9-Sep-2014	29-Sep-2014
186562010	2014-370	Salmon Creek Executive Suites	2101 NE 129th St	30-Sep-2014	30-Sep-2014	16-Oct-2014
186540000	2014-397	Carousel Cleaners	13023 NE Hwy 99	1-Oct-2014	2-Oct-2014	3-Oct-2014
186540000	2014-387	Beastie Boutque	13023 NE Hwy 99 #8	6-Oct-2014	6-Oct-2014	24-Oct-2014
185739000	2014-495	Ear Nose &Throat Clinic	14411 NE 20th Ave	16-Oct-2014	16-Oct-2014	20-Oct-2014
187750000	2014-460	CHEM-DRY of Vancouver	14413 NE 10th Ave #B-111	20-Oct-2014	21-Oct-2014	24-Oct-2014
185777000	2014-485	HYDAC	1101 NE 144th St	21-Oct-2014	22-Oct-2014	24-Oct-2014
185844000	2014-477	TUI	14407 NE 13th Ave	21-Oct-2014	22-Oct-2014	13-Nov-2014
186584000	2014-493	Jubitz VOCI	1503 NE 136th St	28-Oct-2014	29-Oct-2014	20-Nov-2014
186579000	2014-614	Loann's Salon & Spa	13317 NE 12th Ave #119	30-Oct-2014	30-Oct-2014	5-Nov-2014
117896330	2014-527	Krenzler Construction	1412 NE 134th St	3-Nov-2014	6-Nov-2014	7-Nov-2014
189204000	2014-555	Dollar Tree	10017 NE Hazel Dell Ave	12-Nov-2014	12-Nov-2014	19-Nov-2014
186639000	2014-529	Gatewat National Corp	2501 NE 134th St #300	12-Nov-2014	13-Nov-2014	17-Nov-2014
118261196	2014-561	Hostess House	10017 NE 6th Ave	17-Nov-2014	17-Nov-2014	19-Nov-2014
186866000	2014-552	Fuller Park	417 NW 136th Ave	19-Nov-2014	19-Nov-2014	9-Dec-2014
145773000	2015-00010	Ichi 16 Teriyaki	9303 NE 5th Ave	19-Nov-2014	19-Nov-2014	9-Dec-2014
189342000	2014-577	David Michaelsen Rentals	505 NE 105th St	24-Nov-2014	24-Nov-2014	9-Dec-2014
118083000	2015-00012	Erica Village Apartments	1101 NE 105th St	24-Nov-2014	24-Nov-2014	9-Dec-2014
189393000	2015-00011	Crown Plaza Apartments	10117 NE 9th Ave	25-Nov-2014	25-Nov-2014	9-Dec-2014
189342000	2014-577	David Michaelsen Rentals	505 NE 105th St	20-Nov-2014	21-Nov-2014	2-Dec-2014
144978002	2014-329	Batteries & Bulbs	1218 NE 88th St	11-Sep-2014	18-Nov-2014	9-Dec-2014
144992000		TBDA LLC	9105 NE Hwy 99	18-Nov-2014	18-Nov-2014	2-Dec-2014
185676000	2014-426	Kaiser Permanente	143000 NE 20th Ave	9-Oct-2014	9-Oct-2014	27-Jan-2015

Table 2. Clark County source control dumpster replacement inventory and timeline

Department of Environmental Services

Date: 19 February 2015
To: Rod Swanson
Re: NPDES Municipal Stormwater Permit 2013-2018
S5.C.10 – Public Outreach and Education requirements

BACKGROUND

Clark County Department of Environmental Services (DES) manages stormwater per the Washington Department of Ecology National Pollution Discharge Elimination System (NPDES) municipal stormwater permit. The new permit that **went into effect August 1, 2013** has a list of requirements for education and outreach (S5.C.10). In the permit, there are requirements for the *Clark County Stormwater Management Plan* to include programs to "create awareness" and "effect behavior" with our citizens, related to protection of stormwater management. The program also includes elements to encourage the public to participate in stewardship activities. The education may be developed and implemented locally or regionally. Sections of the permit discussed in this memo include:

- **S5.C.10.a(1)** – Shall educate audiences to build awareness of stormwater problems (multiple audiences and topics identified)
- **S5.C.10.a (2)** – Shall educate audiences to effect behavior (multiple audiences and practices identified)
- **S5.C.10.b** – Shall create and/or partner with others to provide stewardship opportunities
- **S5.C.10.c** – Shall measure understanding and adoption of targeted behaviors
- **S5.C.10.c** – Shall use measurements to direct efforts

This memorandum has been updated to reflect activities that have occurred in 2013-2014. Changes have been noted in **BLUE**.

MATERIALS USED FOR OUTREACH:

- ***Web based information and data*** – this is the most extensive set of information available for the public, businesses, students, professionals, etc.
- ***Printed materials*** – DES has a variety of printed posters, brochures, flyers, fact sheets and guides that cover a broad range of topics. These are distributed at a variety of venues including DES booths at events/fairs, display racks, etc.
- ***Event based learning activities***- DES provides learning opportunities at workshops, trainings, etc.
- ***Hands-on Learning***- there is limited opportunities for hands-on activities to implement some of the stewardship options, such as student monitoring, volunteer support, etc.

PROGRAM INFORMATION:
Listed below are the requirements in the new 2013 permit for education and outreach along with the programs that are used to meet those specific requirements and targets. An estimated existing compliance level is indicated by "Met," "Minimal," or "Not Met." * Future outreach efforts will identify opportunities to increase level of outreach and compliance with the targeted audiences.

Target Audience	Education Goal	Program used to meet goal	Compliance Level
BUILD AWARENESS			
General public (including school-aged children and businesses)	1. General impacts of stormwater	▪ Green Neighbors program ▪ Green Business program ▪ Printed / web materials ▪ Stream Health Report ▪ WA Green schools ▪ Regional Coalition Clean Streams & Rivers	Met
	2. Impacts from impervious surfacing	▪ Stormwater Management Plan ▪ Small Acreage Program	Met
	3. Impacts of illicit discharges 4. How to report	▪ CWP web page (how to report a spill) ▪ Hotline (posted on web page) ▪ Stormwater Management Plan	Met
	5. LID principles 6. LID BMPs	▪ Stormwater Partners of SW WA ▪ LID Tour Guide	Met
	7. Opportunities to become involved in stewardship activities	▪ Green Neighbors ▪ Green Business ▪ Small Acreage Program ▪ Earth Day program ▪ Stormdrain stencil kit ▪ River-friendly Car Wash Kit	Met
Engineers, contractors, developers and land use planners	8. Technical standards for SW sites 9. Erosion control	▪ Stormwater Management Plan ▪ Clark County Stormwater Manual	Met
	10. LID principles 11. LID BMPs	▪ Stormwater Management Plan ▪ Clark County Stormwater Manual ▪ Stormwater Partners of SW WA ▪ LID Tour Guide	Met
	12.Stormwater treatment 13. Flow control BMPs	▪ Stormwater Partners of SW WA ▪ LID Tour Guide **/ Map** ▪ Clark County SW Maintenance Manual	Met
EFFECT BEHAVIOR			
General public (including school-aged children and businesses)	14.Use and storage of automotive chemical, hazardous supplies, carwash soaps, and HHW	▪ Green Business ▪ Green Neighbors ▪ Stormwater Partners ▪ DES Household Hazardous Waste program	Met
	15. Equipment maintenance	▪ Green Business ▪ Stormwater Partners of SW WA	Met
	16. Prevention of illicit discharges	▪ CWP web page (how to report a spill) ▪ Stormwater Management Plan ▪ Dumpster management brochure	Met
Residents, landscapers & property managers	17. Yard care techniques to protect water quality	▪ Green Neighbors ▪ Master Gardeners ▪ Small Acreage program ▪ Regional Coalition for Clean Rivers & Streams ▪ **Mobile Business brochure for landscape companies– Fall 2014**	Met

Target Audience	Education Goal	Program used to meet goal	Compliance Level
	18. Use and storage of pesticides, fertilizers and household chemicals	▪ Green Neighbors ▪ Clark County Recycle Guide A-Z ▪ Household Hazardous Waste program	Met
	19. Carpet cleaning	▪ **Mobile Business brochure (to be mailed and posted on web) – 2014/2015**	Met **(upgraded)**
	20. Auto repair / maintenance	▪ Green Neighbors ▪ **Auto leak door hangers – to be placed in the event of a leaking vehicle is observed**	Met
	21. Vehicle, equipment maintenance 22. Home/building maintenance	▪ Green Business ▪ Green Neighbors ▪ **Mobile Business brochure for power washing (to be mailed and posted on web) – 2014/2015 (LINC workshop)**	Met
	23. Pet waste management & disposal	▪ Green Neighbors ▪ Canines for Clean Water ▪ Signs/waste stations at parks and trails	Met
	24. LID principles 25. LID BMPs	▪ Green Neighbors ▪ Green Biz ▪ SW Partners of SW WA ▪ LID Tour Guide	Met
	26. SW facility maintenance	▪ SW Partners of SW WA ▪ Stormwater Facility Maintenance Manual	Met
	27. Dumpster / trash compactor maintenance	▪ SW Partners of SW WA ▪ Green Business program ▪ **Mobile Business brochure (to be hand delivered as part of the business technical assistance visits) –2014/2015**	Met **(upgraded)**
STEWARDSHIP OPPORTUNITIES			
Residents - Such as stream teams, volunteer monitoring, drain marking, riparian plantings, educational activities	28. Participate in activities	▪ Student Watershed Monitoring Network ▪ Earth Day Event ▪ Green Neighbors – events calendar ▪ **River-friendly car wash kit (Fall 2014)** ▪ **Storm drain stenciling kit (Fall 2014)**	Met
MEASUREMENT			
Target Audience	29. Measure the understanding and adoption of targeted behaviors on one target area	▪ Develop survey tool ▪ Could utilize Small Acreage program	On-going for 2015
	30. Final report due Feb. 2016	▪ Implement and report on survey	Not met
REPORTING			
Department / Ecology	31. Tracking and reporting of educational activities	Incorporate into annual report and SWMP update to Ecology	On-going
	32.Post on web	CWP program administration	On-going

Attachment to Annual Report Question 72: Description of any stormwater monitoring or stormwater-related studies

McCord Toyota Modular Permeable Pavement Monitoring

After completing the Stormwater Flow Reduction Strategy Monitoring final report, Clark County continued monitoring the site through water year 2014. Continuing the site monitoring will allow a smooth transition in to the next monitoring project under the 2013 permit and fill data gaps between the proposed and previous effectiveness projects.

Field visits included checks of the base material monitoring well crest gauge levels and site observations of paver clogging and site activities. Clark County continued to operate the site outlet's precipitation, stage and discharge measuring equipment. Gauge operation included maintenance of the monitoring equipment to assure data quality, and continued precipitation, stage and discharge data collection via telemetry.

Water Year 2014
Stormwater Monitoring Report
In Compliance with Appendix 9
Of NPDES Phase I Permit
For Section S8.B.2 Monitoring

Clark County Department of Environmental Services
Clean Water Program

Prepared by
Bob Hutton, Natural Resource Specialist III

March 2015

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Introduction

The purpose of this narrative report is to address the water year 2014 reporting requirements for the special condition S8 monitoring components (specifically S8.B.2 Status and Trends Monitoring) of Clark County's 2013-2018 Phase I Municipal Stormwater Permit (here after referred to as "permit") and its Appendix 9. Much of the background information for this report is from the latest version of the S8.B.2 project's Quality Assurance Project Plan for Stormwater Characterization Monitoring.

This water year 2014 S8.B.2 Stormwater Status and Trends Monitoring report's sections summarize: location, land use, drainage area, and hydrology information; monitoring efforts and results; quality assurance / quality control; pollutant loading; and recent stormwater management activities. Additionally, S8.B water quality data and loading estimates are being submitted with this report in digital Excel spreadsheets and hardcopy form, along with hydrology data as part of a verified and validated data package. The water year 2014 finalized water quality and sediment sample results as well as summary hydrology data will be submitted to Ecology's Environmental Information Management (EIM) system prior to the upcoming June 15 deadline.

In summary, monitoring during water year 2014 has been very successful in augmenting results from the commercial and high density residential monitoring sites selected from those locations utilized under Clark County's previous permit. Overall, the monitoring systems' greater reliability, more extensive rainfall versus runoff information, and increasing staff experience have contributed to a high rate of successful sampling. Enough S8.B forecasted qualifying storms were sampled per monitoring station during water year 2014 to meet current permit requirements.

The S8.B results for water year 2014 are similar to those for the previous monitored water years. Therefore, the confidence in the pattern of measures of central tendency is increasing. Additionally, the fact that there appear to be no major outliers in the medians suggest that these monitoring sites have typical stormwater runoff values. Overall, the median values of several important stormwater pollutants monitored at our S8 sites are often lower than national medians.

S8.B.2 Stormwater Status and Trends Monitoring

Location, Land Use, Drainage Area, and Hydrology Summary

Location, Overall Land Uses, and Physical Setting

The stormwater status and trends study area includes primarily urban and commercial land in southwestern unincorporated Clark County. The study area drainages' land uses could be described as suburban for the high density residential site and typical older highway commercial for the commercial site. Urbanization during the late 20th Century and early 21st Century converted much of the farmland near Vancouver, Washington into residential subdivisions and small commercial areas along existing highways.

The two stormwater status and trends monitoring sites are located among the study area's gently rolling hills, about 200 to 300 feet above sea level (Status and Trends sites in Figure 1). These two sites were also monitored as stormwater characterization sites under the previous permit. The area's small streams drain north to Salmon Creek or west to Lake River. Late Ice Age Cataclysmic Flood deposits underlay the study area and provide a source for fine-grained sediment. The study area, like much of Clark County, is within the northern-most portion of the Willamette Valley Ecoregion.

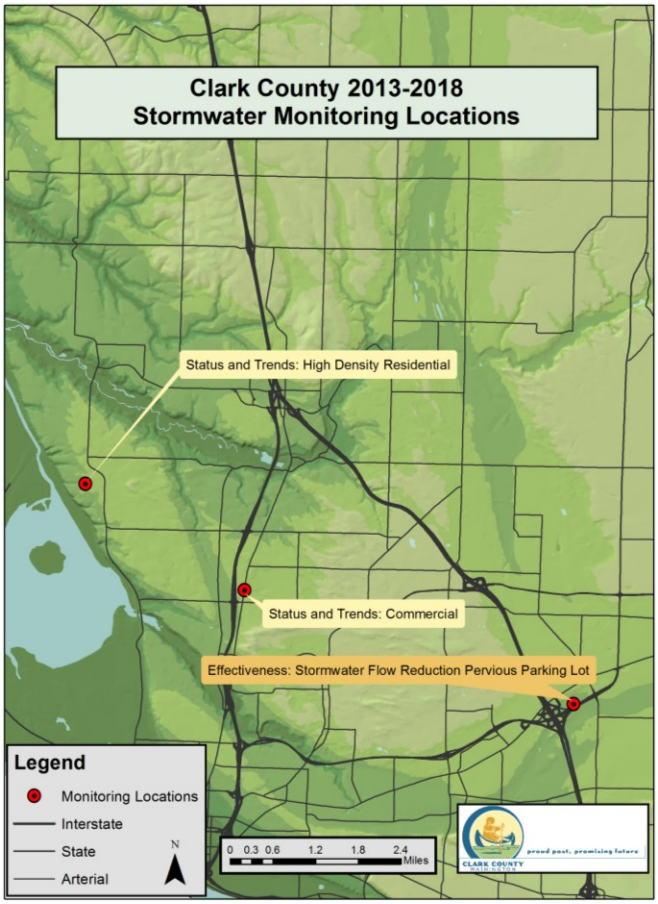


Figure 1 Monitoring sites within southwestern Clark County

Land Use, Drainage Area, and Hydrology

Commercial site

The commercial (COM) site represents a segment of Highway 99 and a group of older highway-oriented businesses such as auto repair shops and apartment buildings (Figure 2). The basin is located east of I-5, and drains an area of about 25 acres. Located in the southwest corner of the drainage, the outfall drains directly to a piped section of Cougar Creek. Monitoring access, just upstream from the outfall, is provided via an existing manhole on the sidewalk along the east side of Highway 99 just south of NE 82nd Street.

Figure 2 Commercial site drainage area

High-density residential site

The high-density residential (HDR) site drains multiple neighborhoods, with a drainage area of approximately 240 acres, located near the boundary between Felida and Lakeshore Neighborhoods north of Vancouver (Figure 3). The area is characterized by 1980's – 1990's era single family residences having an average lot size less than ¼ acre and generally lacking stormwater facilities. This location represents high density residential areas of Clark County in general. It is monitored from a manhole located on the central western border of the drainage, near 11100 NW 36th Avenue, accessing a 36-inch metal pipe that drains into Vancouver Lake.

Figure 3 High density residential site drainage area

Monitoring site selection and drainage area characteristics

Locations for stormwater monitoring were selected by evaluation of the following GIS maps and pertinent information:

- Stormwater sewer system
- Streets and right-of-way features
- Parcels, land use, and zoning
- Aerial photography and LIDAR imagery
- Representative of target land uses
- Ability to locate a sample site
- Relative quality as a sample site
- Access in perpetuity on County land or right of way

Field visits and GIS analyses were conducted to evaluate the prospective monitoring sites regarding basic hydrology and feasibility of monitoring (i.e. access, potential for vandalism, safety issues, equipment installation requirements, drainage area size and character). The results of this field investigation and office analyses for the selected monitoring sites are presented in Table 1. The table's land use and land cover percentages are based on GIS analyses in 2008 of the latest zoning maps and aerial photos. Per the current permit, the status and trends monitoring sites represent continuation of two of the three previous stormwater characterization sites under the previous permit (the low density residential monitoring site was discontinued).

Table 1 Stormwater monitoring site characteristics

CHARACTERISTIC	COMMERCIAL SITE	HIGH DENSITY RESIDENTIAL SITE
Monitoring Site Hydrology		
Name of monitoring site	GM 34921	MH 5171
Drainage area (acres)	26.77	238.65
Receiving waterbody	Cougar Creek	Vancouver Lake
Nearest county rain gage	On site	On site
Time of concentration	8 minutes	24 minutes
Land Use Distribution (percentages are estimated based on zoning information)*		
High-density residential	18%	99%
Low-density residential	0%	0%
Agricultural	0%	0%
Parks/Wildlife refuge	0%	1%
Commercial	82%	<1%
Land Cover Distribution (percentages are based on GIS analyses of aerial photos)*		
Buildings	22%	23%
Fields	14%	29%
Forest	10%	19%
Pavement	53%	29%

* Percentages may not sum to 100% due to rounding.

Changes in drainage area land uses, monitoring sites, sampling equipment, or staff

During water year 2014, no obvious changes that would substantially impact monitoring results occurred within the S8.B monitored areas. There were no significant changes in land cover resulting in land disturbing activities over 10 acres in size within each of the sampled drainage areas due to their relatively stable, built-out conditions. Each of the S8.B respective commercial and high density residential monitoring site locations remained the same as under the previous permit. There also have been no significant changes in the project's sampling equipment or implementation from those described in the project's latest Ecology approved QAPP (July 2014 version), and remain functionally equivalent to those originally proposed to Ecology. County staff continues in their lead role for stormwater monitoring.

Monitoring Efforts and Results

Data Submittal

All applicable S8.B water quality data are being submitted with this report in digital and hardcopy form with applicable hydrology summary statistics as part of a verified and validated data package. Water quality data will be submitted to Ecology's EIM prior to June 15, 2015. As allowed in the permit, several water quality parameters have been dropped from monitoring because all their results were below their respective Ecology target method reporting limits for at least two years. Unless specified otherwise for both the COM and HDR sites, the following analytes are no longer being monitored: dissolved and total mercury (both dropped at COM site only), dichlobenil (dropped at COM site only), chlorpyrifos, and TPH gasoline.

Storm Events Meeting Criteria and Project Sampling Status

Table 2 presents the results of WY2014 stormwater monitoring compared to qualifying seasonal storm event criteria. In the table, evaluations of forecasted events and actual qualifying storms are based on calendar day (24 hours from midnight to midnight) because this provides reasonable one-day field preparation time and consistent summary periods. However, captured or sampled storm counts use antecedent dry periods (ADP) measured in hours to more accurately reflect the time between actual rainfall events. Therefore, counts of qualifying storms captured may exceed those based on daily time steps (forecasts) since the hourly ADPs often crossed the midnight boundary.

During water year 2014 for both the high density residential and commercial monitoring locations, the minimum monitoring frequency per water year of eleven qualifying storm events was met for composite and grab samples along with adequate quality control samples. Since both monitoring locations had 9 wet and 3 dry season grab samples they met water year seasonal distribution goals of qualifying storms of 60-80% for the wet and 20-40% for the dry seasons. Both locations had identical seasonal counts of 10 wet and 1 dry season composite samples. While these seasonal counts did not strictly meet the permit's seasonal distribution goal they did approach it. In addition, after the first dry season composite samples the total water year goal of 11 had already been met and there was only one other actual qualifying dry season storm. All samples met minimum 0.2 inch precipitation depth and seasonal antecedent dry period criteria for qualifying storm events. Only a couple of forecasted and actually qualifying events were not successfully sampled due to actual rainfall substantially differing from forecasts, and equipment or software problems. Only one un-forecasted, but actually qualifying, wet season storm was sampled for both monitoring sites to help meet the annual count of eleven.

As of the end of water year 2014, composite sample counts since monitoring started have reached 47 and 46 for the commercial and high density residential sites, respectively. The routine composite sample counts through water year 2014 by water year, season, and sampling site are shown in Table 3. By the end of water year 2014, approximately 4.5 years of composite sample monitoring will have been completed for the commercial and high density residential monitoring locations.

Good faith efforts and professional practices continue to be implemented to maximize successful sampling throughout the water year. Finally, based on the S8.B project QAPP, adequate quality control samples were also collected and analyzed for water year 2014.

Table 2 Storm event criteria and monitoring tally for WY2014

SITE	SEASON AND WATER YEAR	FORECASTED		SAMPLED		
		# of Forecasted Storms w/ >75% Chance of > 0.25" & Meeting ADP*	# of Forecasted Storms Resulting in Actual Qualifying Storms**	Qualifying Storms Captured (seasonal % of WY total)	Captured # of Nonqualifying Storms < 0.2" (Date; Rain Depth)	Successfully Met Approximate Seasonal Distribution of Samples (Wet: 60-80% & Dry20-40%)
		Based on daily forecast or actual totals		ADP based on continuous hours		
Commercial	Wet	20	9	10 (91%)	0	Approached
	Dry	3	2	1 (9%)	0	Approached
	WY2014	23	11	11	0	Approached
High Density Residential	Wet	20	9	10 (91%)	0	Approached
	Dry	3	2	1 (9%)	0	Approached
	WY2014	23	11	11	0	Approached

* Seasonal antecedent dry period (ADP) is either a) 24 hours with $\leq$ 0.05"rain for the wet (October-April) season , OR b) 48 hours with $\leq$ 0.02" rain for the dry (May-September) season.
** Forecasted qualifying storms are next-day forecasted storms with at least 75% probability of greater than 0.25 inches (usually notified 24 hours in advance) resulting in actual rain events that meet or exceed seasonal ADP and 0.2 inches of precipitation but exclude Saturdays (due to lab closure).

Table 3 Composite sample count through WY2014

SITE	WATER YEAR	WET SEASON	DRY SEASON	WATER YEAR TOTAL SAMPLES	SITE TOTAL SAMPLES
Commercial	2010	3	4	7	47
	2011	10	2	12	
	2012	9	0	9	
	2013	5	3	8	
	2014	10	1	11	
High Density Residential	2010	3	1	4	46
	2011	9	4	13	
	2012	9	2	11	
	2013	5	2	7	
	2014	10	1	11	

Rainfall Hyetographs and Flow Hydrographs

Water year 2014 hyetographs and hydrographs showing the overall rainfall and runoff flow patterns for the monitored sites are presented in Figure 4 and Figure 5. Each site's hyetograph depicts accumulated five minute precipitation (inches) with red lines while its hydrograph depicts instantaneous flow rates (cfs) with blue lines.

The water year hyetographs and hydrographs depict how rainfall and runoff varies over time due to a range of environmental factors such as season and vegetation growth. As expected, the hyetographs and hydrographs generally show more precipitation and corresponding flow during the wet season months of October through April and less for the dry season months of May through September. Longer high flows generally correspond with periods of sustained rainfall and not necessarily with isolated intense rainfall. The direct association of flow with rainfall drops during the dry season's decreasing sustained rainfall as well as due to absorption by soils and uptake by growing plants from May through September.

Additionally, there are periods of no flow during smaller dry season rainfall events at both the commercial and high density residential sites. The flashier response of the commercial site's drainage basin reflects its higher percentage of impervious surfaces such as building and pavement land covers (75%) versus those for the high density residential (52%) site basin based on Clark County's 2008 estimates (Table 1).

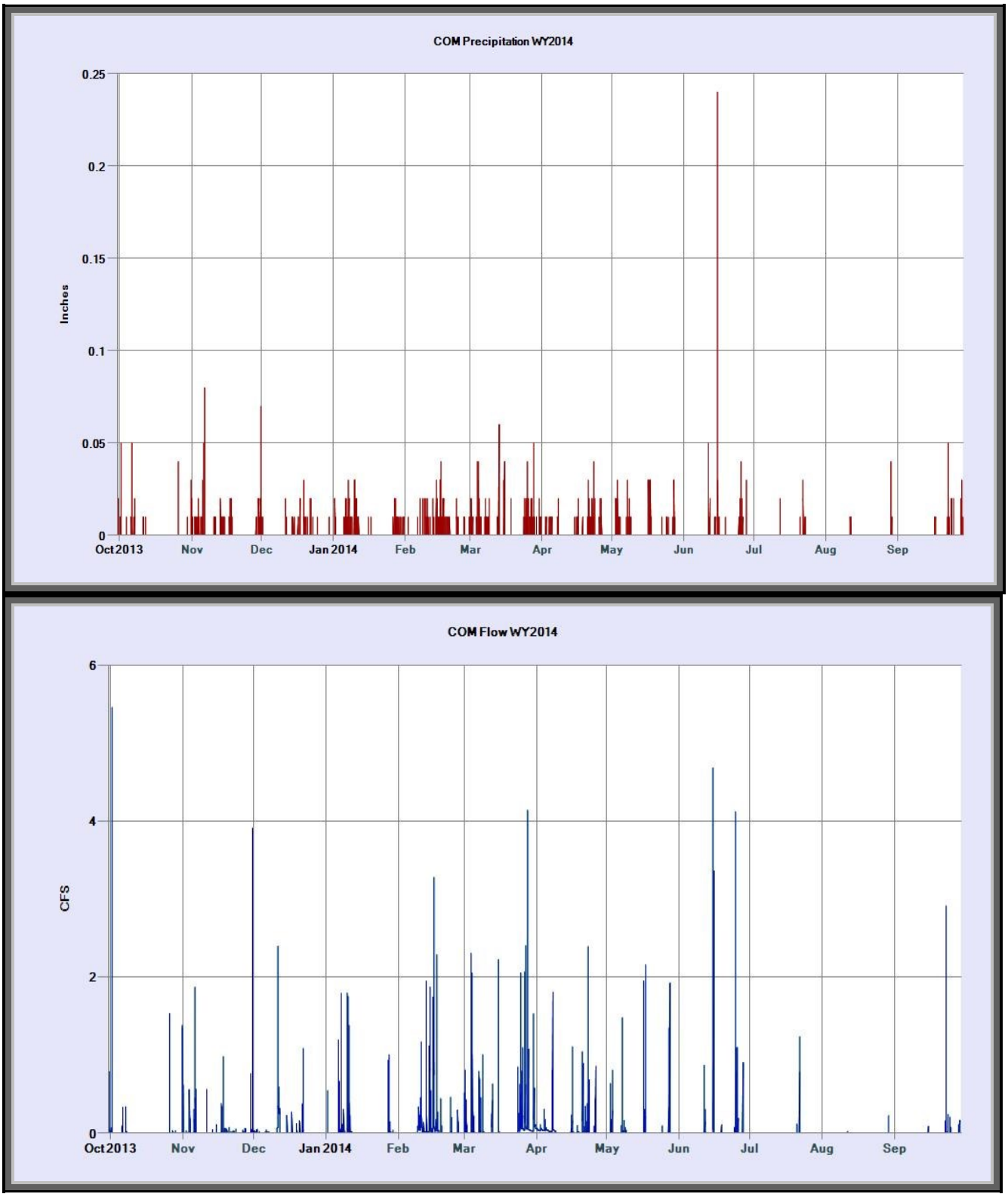


Figure 4 Commercial site rainfall and flow during water year 2014

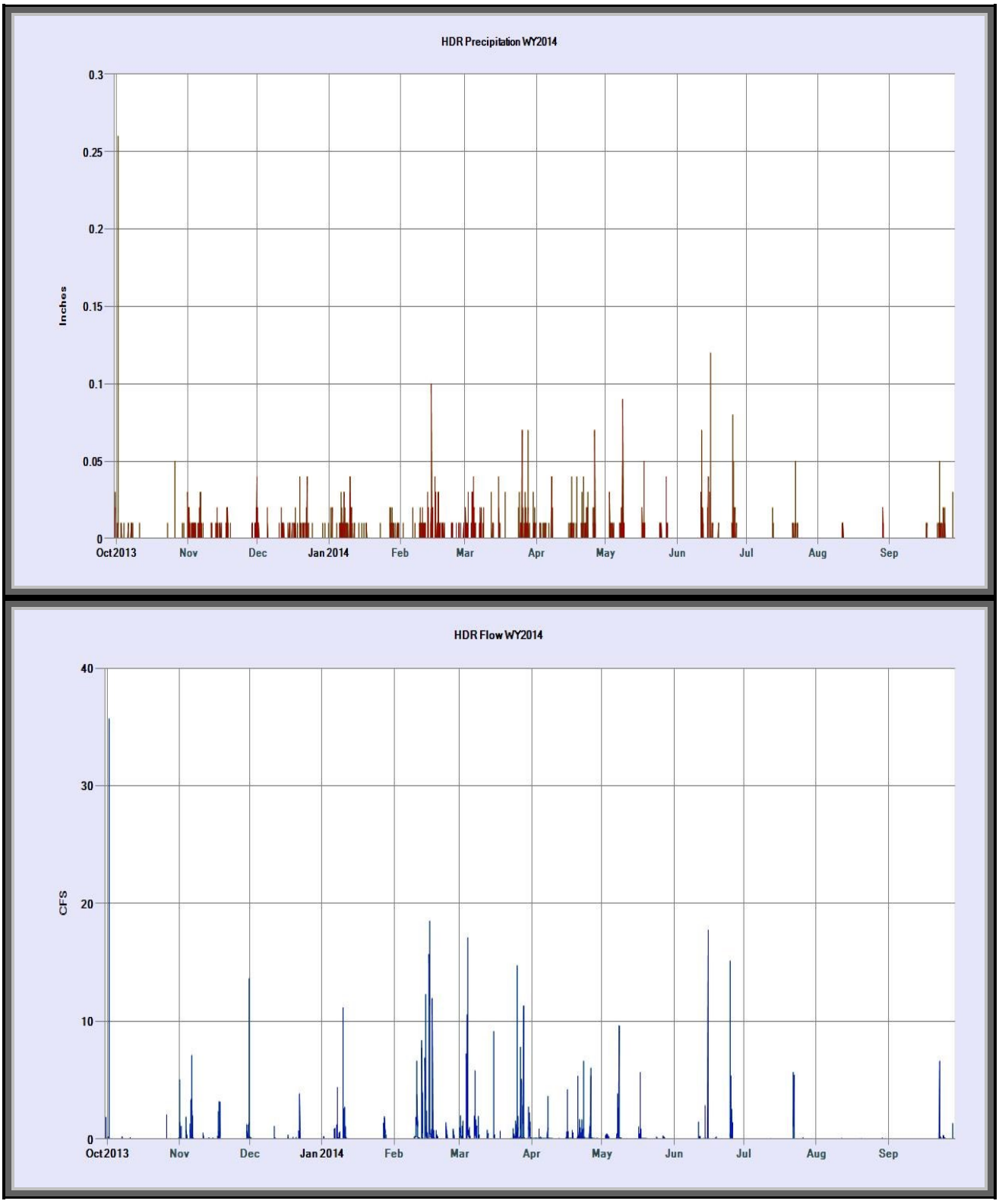


Figure 5 High density residential site rainfall and flow during water year 2014

Rainfall / Runoff Relationships

Rainfall / runoff relationships help provide the basis for successful stormwater monitoring efforts and a general insight to hydrologic responses of watershed land uses. Based on the hydrology monitoring data for the two S8.B monitoring sites during calendar years 2010 through 2014, Figure 6 and Figure 7 show the latest compilation of relationships for the most reliable total event rainfall depth versus runoff volume results. The data these relationships are based on are presented in Appendix 1. These relationships are used to predict runoff volume for pacing flow-weighted composite samples.

A visual examination of the plots and comparison of their squared correlation coefficients suggests strong positive linear relationships between the total event rainfall and runoff for both the commercial and high density residential sites' drainages, which are dominated by piped stormwater collection systems. The high R^2 for the commercial and high density residential sites indicates that more than 87% of the total variability in the event flows can be accounted for by their corresponding event precipitations, regardless of whether the values are broken down by season. In fact, the overlapping linear relationships depicted on the high density residential monitoring site's dry and wet season scatterplots with very similar linear regression equations strongly suggests there are no practical differences between this site's wet and dry season rainfall / runoff relationships. The seasonal similarity in the precipitation versus runoff volume relationships for either the commercial or high density residential site's wet and dry seasons can probably be attributed to their higher amount of impervious surfaces resulting in comparatively little infiltration into soils. The relatively small amount of pervious surfaces in both of these monitored drainages reduces potential confounding factors that would otherwise impact their rainfall / runoff relationships.

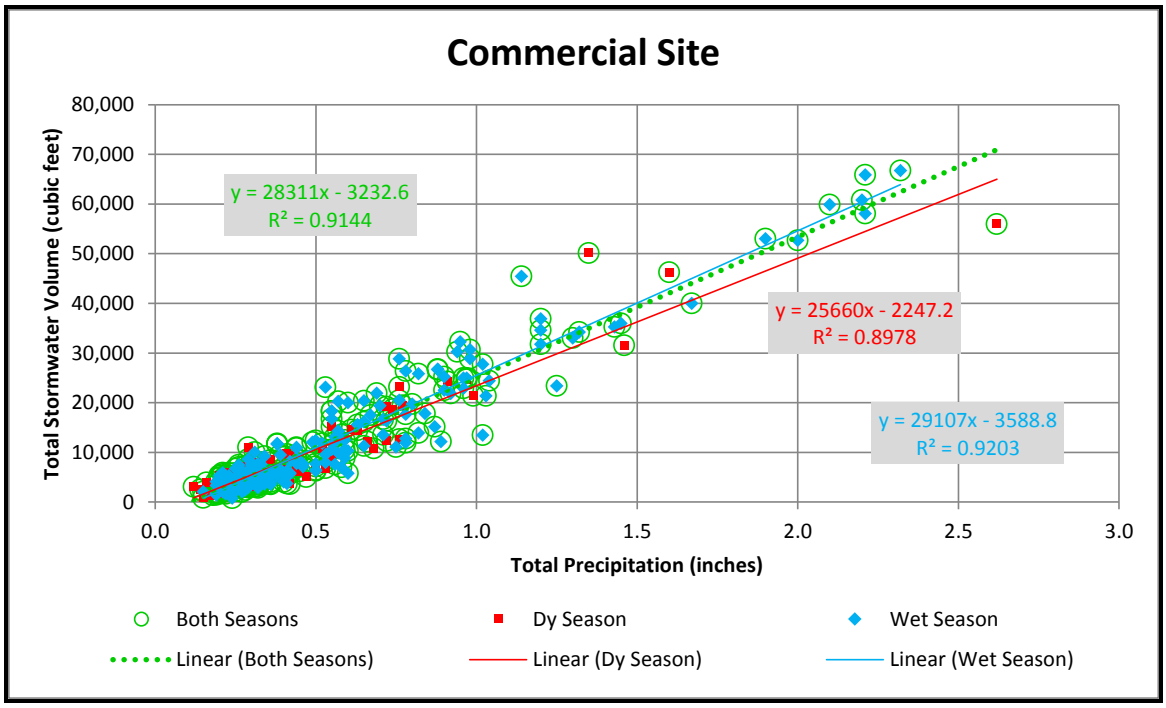


Figure 6 Commercial site rainfall versus runoff relationships through calendar year 2014

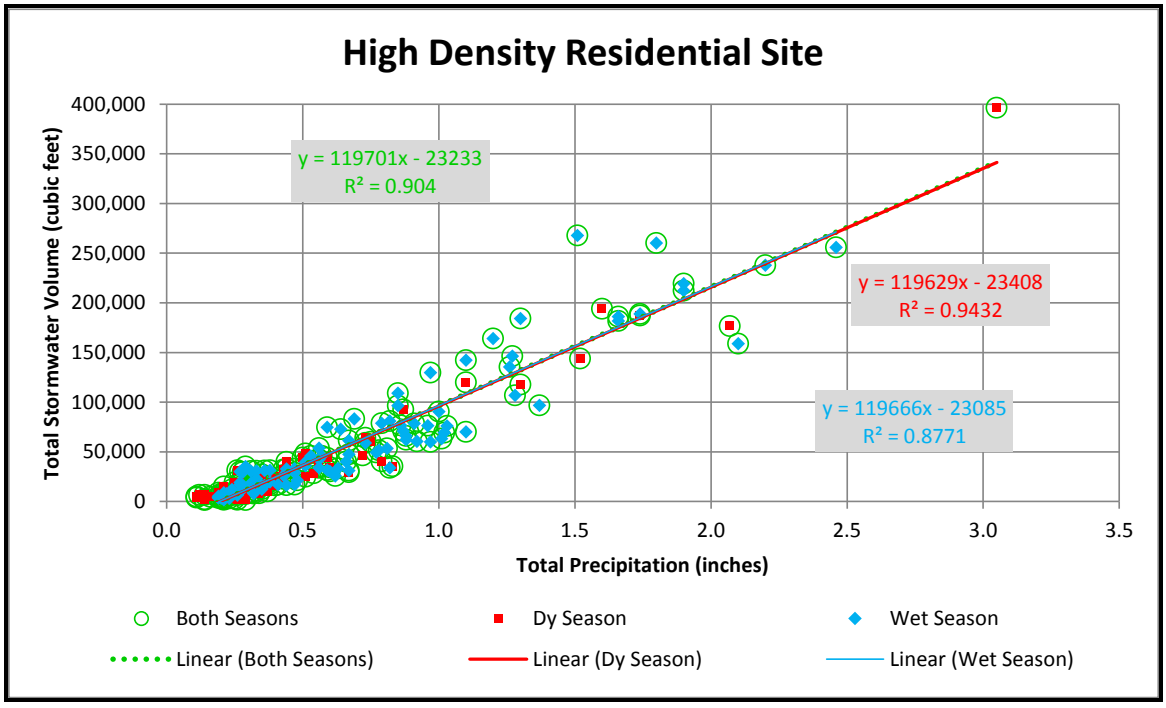


Figure 7 High density residential site rainfall versus runoff relationships through calendar year 2014

Individual Storm Reports and Important Parameters' Medians

Appendix 2 presents a series of Individual Storm Reports (ISR's) for water year 2014 sampled storms at each site (earlier water years ISR's are in previous annual reports) that address permit required information. Storm hyetographs and hydrographs at the top of each ISR depict aliquot collection times and the total storm event duration. Additionally, each ISR includes several tables of site, storm, and sample analytical result information. Site Information tables include site name, water year, storm number identifier and date, location information, and monitoring site's drainage area. Precipitation and Flow Information tables include for each sampled storm: antecedent dry period (hr.), precipitation total (in.), precipitation and stormwater flow start and end date/times, and storm flow volume (gallons). Sampling Information tables present: sample flow start and end date/times, sample event volume (gal.), number of flow-weighted sub-sample aliquots collected versus goal for composite storm sample, percent of storm sampled versus goal, and whether grab samples were taken. The Analytical Information tables present for each individual monitored analyte in the sampled storm: units of measurements, the event mean concentration results based on the flow-weighted composite sample, applicable result qualifiers, along with their respective method reporting limits and calculated storm loads.

Table 4 shows water year 2014 S8.B samples' calculated median values for selected important parameters monitored at the commercial (COM) and high density residential (HDR) sites compared to available updated National Stormwater Quality Database (NSQD) median values (Pitt, et. al., 2005) and typical stormwater ranges (Minton, 2002). The two county S8.B stormwater status and trends monitoring sites' medians are compared with their respective closest NSQD land use category medians. The NSQD median analyses excluded non-detect values. Clark County's analyses utilized one-half of non-detect values in the calculation of medians for total mercury at the HDR site that contained non-detects during water year 2014 (100% of mercury results). Therefore, the county's calculated medians values for mercury may be slightly biased low compared to their respective NSQD medians or observed typical stormwater ranges.

Most of the county's S8.B parameters' water year 2014 medians are less than the respective medians in the NSQD and less than or within the typical general stormwater ranges (Table 4). The only exceptions to this water year 2014 parameter pattern, of lower medians relative to the NSQD, are for three medians across the commercial (COM) and the high density residential (HDR) sites. The COM site has a slightly higher median for total copper and about double the median value for total suspended solids compared to respective NSQD medians. The HDR site has a substantially higher median for total zinc at approximately 4.5 times the NSQD median. The higher commercial site medians could reflect large traffic volumes and the activities of the older highway businesses along Highway 99 that drain to the monitoring site without treatment. The higher median zinc value for the high density residential site could reflect galvanized roof and gutter runoff from the many homes in its drainage area.

Both S8B sites' medians for cadmium, lead, fecal coliform, and turbidity as well as for the single HDR site total mercury median were all below their respective NSQD medians. Additionally, with the exception of fecal coliform, three of these same parameters were below the lower end of their typical ranges (both sites' fecal coliform medians were

toward the lower end of the very wide typical range for fecal coliform). HDR's median total mercury value (calculated as 0.01 ug/L based on one-half of all results as non-detects) was very low and below Ecology's permit target method reporting limit of 0.1.

The results for water year 2014 are similar to those for the previous monitored water years. Therefore, the confidence in the pattern of these measures of central tendency is increasing. Additionally, the fact that there appear to be no major outliers in the medians suggest that these monitoring sites have typical stormwater runoff values.

Table 4 S8D Water year 2014 sample medians

SITE	PARAMETER	UNITS	MDL / ECOLOGY MRL	S8 SAMPLE SIZE	S8 CALCU-LATED MEDIANS	NSQD MEDIANS *	OBSERVED TYPICAL STORMWATER RANGES ~
COM				11	0.15	0.96	
HDR	Total Cadmium	ug/L	0.005 / 0.1	11	0.03	0.5	0.5 – 10
COM				11	18.4	17	
HDR	Total Copper	ug/L	0.02 / 0.1	11	9.1	12	5 – 150
COM				11	9.4	18	
HDR	Total Lead	ug/L	0.005 / 0.1	11	1.4	12	20 – 500
HDR	Total Mercury	ug/L	0.02 / 0.1	11	0.01	0.2	0.2 – 0.5
COM				11	103	150	
HDR	Total Zinc	ug/L	0.2 / 5	11	316	73	15 – 600
COM				12	135	4600	
HDR	Fecal Coliform	MPN	NA / 2	12	1600	7000	0.2 – 2,000,000
COM	Total Suspended		1/ Depends	11	88	43	
HDR	Solids	mg/L	on Sample.	11	30	49	1 – 36,200
COM				11	37	NA	
HDR	Turbidity	NTU	0.04 / 0.2	11	10	NA	50 – 100

* National Stormwater Quality Database (Version 1.1, Updated 2005, Pitt, R., et al.)

~ G. Minton, "Stormwater Treatment, (pp. 11 and 28, 2002)

Sediment Monitoring

Annual sediment samples were collected from in-line sediment traps deployed from May 20, 2013 through May 14, 2014 for the ongoing commercial and high density residential monitoring sites as well as at the former low density residential monitoring site. This collection time coincides with the "month of May or June" timeframe specified in the County's current NPDES stormwater permit Appendix 9. Clark County's annual spring sediment collection targeted timeframe was previously approved by Ecology under the prior permit. Additionally, the beginning of the dry season aligns closest with the end of the typical sediment accumulation period and the annual anniversary of when Clark County began S8 sampling in February 2010.

Sediment sample analyses results included in this report are for the current permit's commercial (COM) and high density residential (HDR) monitoring sites as well as the last sediment sample for the previous permit's low density residential (LDR) site. The LDR sediment results are included in this report because the LDR site's annual sediment results represent the one-year period (representing May 2013 through May 14, 2014) preceding the collection date. This period spans from before the end of the previous permit to after the effective date of the current permit (August 1, 2013). For any of the three monitored sediment sites, no chemicals were removed from the list of sediment analyses due to two years of non-detect results.

The three S8 sites' sediment chemistry and grain size distribution (by percent of total weight recovered) results are presented in two tables in Appendix 3 S8 Water Year 2014 Sediment Analyses Results. Many of the sediment chemical results, especially for organic compounds, are below lab method detection limits (annotated with "U"). Three sediment parameters (total phosphorus, total volatile solids, and NWTPH-Dx) were not analyzed due to their not being specifically listed in the 2007 (modified 2009) permit's section S8.D.2.f. "Annual sediment monitoring" subsection "i" text body after "Sediment samples shall be analyzed for:" However, as applicable, these parameters will be analyzed for WY2015 based on the latest permit's Appendix 9.

The commercial and high density residential monitoring sites' sediment grain size distributions varied somewhat from each other but both are dominated by sand-sized particles. The HDR site has by far the highest proportion of gravel sized particles with approximately one third by weight of all particles but limited to fine to very fine gravel while the other two sites' gravel were less than 3%. The COM site tends to have the highest proportion of sand sized particles. Whereas, the low density residential site sediment was dominated by silt size particles with 75% falling in this category. More than 95% of the sediments' sizes were categorized into the following ranges: commercial – sand (~76%) and silt (~25%); high density residential – fine to very fine gravel (~36%), sand (~60%), and silt (~5%); and the low density residential – sand (~24%) and silt (~75%).

QA / QC

Field QA / QC procedures followed those described in the July 2014 version of the S8.B.2 Quality Assurance Project Plan. Field and laboratory procedures followed standard operating procedures.

Field QA / QC

Field and office activities followed documented standard operating procedures that were tailored to each monitoring site. Flow, precipitation, and sampling equipment were maintained according to manufacturers' recommendations.

During sampler set-up visits and sample retrieval, or as needed, a standardized check list of activities were followed and documented on field forms. Rain gages were checked for debris, levelness and proper functioning. Stage sensors readings were compared to actual water surface height and offsets adjusted as needed. Sampler lines were triple rinsed with lab grade water and known test volumes were used to calibrate sampler pump volumes. "Clean hands / dirty hands" procedures were followed as much as practically possible during sampler setup and sample retrieval. Sample composite volumes were compared to expected volumes based on the number of aliquots collected. Composite volumes, carboy counts, and other sample information or observations were documented on field forms. Regular maintenance was performed as needed, such as battery replacement.

Individual field forms were reviewed by the program manager for completeness and accuracy. Any observed issues were addressed as soon as possible. Additionally, the program manager or designee periodically participated in field work to review adherence to standard operating procedures. Procedural issues were addressed as needed.

Laboratory QA / QC

Sample transfer followed standard operating procedures and laboratory activities followed internal standard operating procedures consistent with applicable lab quality assurance programs. Samples bottles were clearly labeled, placed within ice-filled chests, and transferred to laboratory delivery personnel while documenting required information on laboratory supplied chain of custody forms. All analyses were performed under contract at the nearby Washington State accredited ALS Environmental lab (acquired Columbia Analytical Services) laboratory in Kelso, Washington (to help meet hold times), except for a few of the analytes at other accredited subcontracted labs. Composite samples were split in a laboratory clean room to minimize the possibility of field contamination.

The vast majority of lab analyses achieved QAPP specifications with any deviations flagged and noted in the laboratory supplied report's case narrative (as well as in the associated EDD) for each set of samples submitted. Almost all analyses were performed within prescribed hold times with rare exceptions documented and results addressed according to procedures in the QAPP. Each sample was analyzed according to Ecology approved methods and method reporting limits with any deviations documented in the laboratory report. Where applicable, internal laboratory quality control analyses results (e.g. method blanks, surrogate recoveries, laboratory duplicates, matrix spikes, laboratory

control samples, etc.) are also provided in the laboratory report along with potential issues described in the case narrative. Laboratory quality control samples met objectives the vast majority of times. As a result, there were relatively few changes needed for individual result's data qualifiers (such as indicating estimated values) and even fewer rejected results. No results were rejected during water year 2014 for either the commercial or high density residential monitoring sites.

QC Sample Results

Quality control samples were collected during the monitoring effort to help evaluate procedures for potential sources of contamination and to examine precision. As described in the project QAPP, transport, transfer, and field equipment rinsate blanks and split / replicate samples were each collected then analyzed using the same lab process as routine samples for all analytes monitored with additional steps taken to ensure representative subsamples for the splits.

Bias was evaluated using blank samples whereas precision was evaluated using split or replicate sample results. Each of these QC samples was examined for values that exceeded the QAPP's measurement quality objectives (MQO) criteria for each monitored analyte. If multiple types of blanks were collected during a water year, priority for evaluation was given to the blank with the highest result even though the equipment blanks theoretically would be the most inclusive and expected to be the most conservative of the three blank types. The permit's Appendix 9 Laboratory Methods targeted reporting limits were utilized when comparing blank analyte results to the MQO's. Nondetect results in any portion of a pair of split or replicate samples caused the exclusion of that analyte's pair of results from precision analyses due to their inherent higher variability. This QC sample analyses resulted in changing some of the analytes respective routine results' data qualifiers for the 2014 water year according to procedures described in the project's 2014 QAPP.

During water year 2014, a total of seven quality control stormwater samples were collected across the Clark County S8.B project's high density residential (HDR) and commercial (COM) sites. These seven samples were a mix of three composite blanks and one composite split as well as three field grab replicate samples. The three composite QC blank samples consisted of one each of transport, transfer, and field equipment (rinsate) blanks for bias analyses. The one composite split sample as well as the three field replicate samples were analyzed for precision. For this portion of the annual report's precision evaluation, a single split composite sample was collected from the HDR site (2/25/14) while the three field grab replicates were collected from the HDR (11/18/13 and 4/1/14) and COM (3/25/14) sites. Splitting was performed in the clean environment of the analytical lab to minimize the possibility of contamination. Overall, the four composite QC samples representing 18% of a total of 22 routine composite samples easily met the project QAPP's composite QC sample target minimum proportion of 5%. Given the S8.B project monitors just two sites under the current permit, these four QC samples really represent the bare minimum needed for composite QC analyses since fewer overall samples are now collected compared the ten sites monitored under the previous permit. Similarly, the three field grab replicates just exceeded the QAPP's minimum target of two.

From the bias analyses of QC blank stormwater samples, some of the water year 2014 field equipment rinsate, transport, and transfer blanks had a few analyte results that exceeded their respective measurement quality objectives (MQO) criteria. In order to help address the potential observed bias found in these blanks, these analytes' respective water year 2014 routine results have had "J" qualifiers added to their results (Table 5) according to procedures in the 2014 project QAPP. Other subsequent corrective actions included review of procedures to minimize potential sources of contamination.

Table 5 WY2014 Summary of stormwater bias analyses: impact on applicable analytes

ANALYTE (UNITS)	PERMIT TARGETED METHOD REPORTING LIMIT (MRL)	QA / QC BLANK TYPE & RESULT	CRITERIA VALUE (5X BLANK) USED TO ADD "J" QUALIFIERS TO NON-QUALIFIED LESSER VALUES	NUMBER OF WY RESULTS WITH "J" ESTIMATED QUALIFIER ADDED
Bis(2-Ethylhexyl) Phthalate (ug/L)	1.0	Equipment 17	85	18 of 22 (82%)
Dissolved Copper (ug/L)	0.1	Transfer 2.12	10.6	22 of 22 (100%)
Total Recoverable Copper (ug/L)	0.1	Transfer 2.42	12.1	11 of 22 (50%)
Total Kjeldahl Nitrogen (mg/L)	0.5	Transfer 1.6	8	22 of 22 (100%)
Dissolved Zinc (ug/L)	1.0	Transport 2.6	13	0 of 22 (0%)

Based on the analyses of water year 2014 QC split and field grab replicate stormwater samples, of the up to 47 composite and 8 grab sample analytes examined only a few exceeded their MQO's for precision during water year 2014 (Table 6). However, five analytes (Carbaryl, Naphthalene, Ortho-Phosphorus as P, Total Kjeldahl Nitrogen, and Total Suspended Solids) had calculated precisions based on a single pair of split results that did not meet the their respective MQO relative percent difference criteria of 25%. Thus, these analytes had their entire water year 2014 results evaluated for possible qualifiers with "J" estimates. Fecal coliform has a higher precision MQO of 50% due to the inherent higher variability in its laboratory analysis method. Many of the organic analytes' routine results were non-detects or had relatively low results already qualified with "J's" indicating that they were estimates between the method detection limit and method reporting limit so their original qualifiers were not changed.

Table 6 WY2014 Summary of stormwater precision analyses: impact on applicable analytes

Applicable Analyte (Units)	Permits Targeted Reporting Limit	Pooled Standard Deviation	Relative Standard Deviation Using Pooled SD (%)	Highest Duplic. Pr. Relative Percent Difference [RPD] vs MQO RPD of 25% ~	# of (relative %) Previously Un-qualified Water Year Routine Results Qualified with "J" due to Replicates Exceeding MQO RPD of 25% ~
Carbaryl Insecticide (ug/L)	0.05	0.00	19%	27%	1 of 22 (5%)
Diesel Range Organics (ug/L)	500	67.0	12%	55%	10 of 24 (42%)
Fecal coliform (MPN/100 ml)	2 col./ 100 ml	4.38	40%	57% ~	0 of 24 (0%)
Naphthalene (ug/L)	0.1	0.04	45%	64%	17 of 22 (77%)
Ortho-Phosphorus as P (mg/L)	0.01	0.01	22%	31%	16 of 22 (73%)
Residual Range Organics (ug/L)	500	67.1	8%	34%	8 of 24 (33%)
Total Kjeldahl Nitrogen (mg/L)	0.5	0.30	33%	46%	0 of 22 (0%)
Total Suspended Solids (mg/L)	1.0	1.77	26%	37%	22 of 22 (100%)

~ Note - not all duplicate pairs justified revising data qualifiers (non-detect values are inherently variable and excluded from precision analyses). The precision measurement quality objective (MQO) for fecal coliform is 50%.

There were no sediment blank or replicate samples collected during water 2014 to allow analyses of potential sources of bias or relative precision. The value of evaluating the relative precision for sediment results would be very limited anyway given the difficulty of capturing comparable replicate samples and the extremely small sample size of only one routine sediment sample collected at each monitoring site during the water year. However, laboratory quality control results for the sediment samples were deemed acceptable.

Data Review, Verification, and Validation

Procedures described in the project QAPP were followed for data review, verification, and validation. Field sheets and chain of custody documents were reviewed by the project manager for accuracy and completeness. Field sheet corrections are noted and initialed. All laboratory data are reviewed shortly after receipt of electronic reports for

obvious omissions or errors. The contracted ALS Environmental lab is notified of omissions or errors as soon as possible so that re-analyses can occur if holding times allow. Laboratory corrections or missing data are then sent to Clark County as revised reports. Electronic data (EDD) files are uploaded into Clark County's Water Quality Database (WQDB) for subsequent detailed review. Missing or erroneous digital data are evaluated and as applicable replaced, qualified, or rejected.

As part of the data verification and validation process and demonstrated in Table 5 and Table 6, evaluation of the blank and replicate / split QC sample results may lead to some changes in reported data qualifiers for applicable analytes. These changes are based on MQO criteria in the QAPP.

All water year 2014 S8 composite samples had sufficient volume for laboratory analysis of all listed parameters. Thus, there was no need to prioritize parameters for analyses because of insufficient stormwater sample volume.

During water year 2014, several stormwater analytes listed in 2013-18 permit's Appendix 9 were no longer monitored due to more than two years of values below both the method reporting limits and method detection limits. The following analytes were dropped from stormwater monitoring at the commercial site - dissolved and total mercury, dichlobenil, chlorpyrifos, and NWTPH-GX (gasoline); and for high density residential site – chlorpyrifos and NWTPH. During water year 2014, there were no sediment analytes dropped from monitoring at either monitoring station due to two years of non-detect results.

In summary, based on the results of the QA/QC procedures and the measurement quality objectives, the analytical and hydrological monitoring results package for the water year 2014 S8 data are considered acceptable, usable, and achieving the project's main monitoring goals and objectives.

Annual and Seasonal Pollutant Load

Water Year 2014 total annual as well as wet and dry season loading for each monitored parameter (except those having more than half their results as nondetects – per Ecology draft non-detect SOP) is presented in Appendix 4. Areal loads are based on drainage basin areas of 26.8 and 238.7 acres for the commercial and high density residential sites, respectively.

As expected, the commercial site typically has the highest areal loading rate (in pounds / acre) for many of the metals, particulates, and nutrients. In comparison to the high density residential (HDR) site, the commercial (COM) site's annual areal load for water year 2014 was much higher (see Appendix 4) for total cadmium (7 x HDR), total copper (4 x HDR), total lead (14 x HDR), and total suspended solids (6 x HDR). In contrast, the high density residential site's water year 2014 annual areal load for total zinc is 2.3 times higher than that for the commercial site. The higher total zinc load for the HDR site probably reflects substantial pollutant sources such as galvanized roof gutters.

Within each monitoring site, the wet season areal loads were always higher than those for the dry season, often at least an order of magnitude higher for most of the monitored parameters. For many of the important parameters, the wet season areal loads for all the

monitored total metals and the nutrients total phosphorus and nitrate-nitrite were at least 2.5 times those for the dry season during water year 2014.

Loading Methodology

The following loading and storm delineation methodology descriptions have been updated from information originally provided by Herrera Environmental Consultants who earlier performed water year loading estimates for the County and Washington State Department of Ecology's "Standard Operating Procedure for Calculating Pollutant Loads for Stormwater Discharges" (September 16, 2009). The same general methodology has been applied by Clark County staff for this latest water year annual report.

Pollutant loading was calculated for the two S8.B monitoring sites using the methodology outlined in Ecology's "Stormwater Monitoring Report Guidance: Phase I Municipal Stormwater Permit – Reporting Requirements for Special Condition S8" (Washington Department of Ecology, 2012, Publication 12-10-50). As required in the current permit, both annual and seasonal loadings have been calculated. Wet and dry season loading are based on Event Mean Concentration (EMC) values from sampled storm events from October 2013 through April 2014 and May 2014 through September 2014, respectively. Analyte loads for each site's sampled storms were calculated by multiplying individual sampled storm's analyte EMC by the total storm runoff volume (see Appendix 2 S8 Water Year 2014 Individual Storm Reports). Each analyte's unsampled seasonal load was calculated by multiplying its average seasonal EMC from all sampled storms (seasonal arithmetic mean EMC for each analyte) by the total runoff volume for all unsampled seasonal storm events. Each season's unsampled load was added to the total loads of each sampled event to generate a total seasonal load for each analyte. The total annual load for each parameter is simply the sum of the wet and dry total seasonal loads.

Seasonal loading was calculated for all analytes which had greater than 50 percent detected values. Loads were not calculated for those analytes with more than 50% non-detects (per Ecology's draft non-detect SOP) due to the low accuracy of calculating their loads. For those analytes with more than 50 percent detected results, non-detects were substituted with a value equal to one-half the detection limit before loading rates were calculated.

Storm Event Delineation Methodology

Storm event delineations were conducted utilizing multiple software programs including LoggerNet, Microsoft Excel, and Aquarius (Aquatics Informatics Inc.) time series data management software. Storm event delineation follows the permit's Appendix 9 requirements. Throughout the water year and especially prior to sample submission to the lab, precipitation start and stop times were examined using LoggerNet to scan each storm's hyetograph for gaps in rainfall (6 hours with no rain would signal the end of a storm). This allowed an evaluation of each storm for conformance to the permit's qualifying storm definitions. Flow start time for sampled storms is interpreted as the first reliably measured flow after the first rainfall of a predicted and sampled qualifying precipitation event. The storm flow stop time was demarcated usually as the time when flow reached pre-storm rates (stage) after precipitation ended. For storm flows less than 24 hours long, the sampling period starts with measureable storm flow and ends with the

last aliquot time before stage drops below the initial storm stage. Alternatively, if a storm flow event was greater than 24 hours and at least ten flow-weighted aliquots have been collected then its storm's sampling period end would be demarcated as after 24 hours have passed from the start of the storm flow. On a few occasions, the storm sampling period exceeded 24 hours until ten aliquots were collected. If another storm precipitation event began after a 6-hour intra-storm dry period, the earlier storm flow was artificially truncated at the precipitation start time of the subsequent event even if later flow rose above the prior event's initial flow rate.

After the end of the water year, numerous summary statistics were calculated for individual sampled storms using Aquarius and Excel including: antecedent dry period, total precipitation, precipitation and stormwater flow (and sampled flow) start and end times, storm and sampled volumes, percent of storm volume sampled, and number of aliquots. These statistics were included in Individual Storm Reports (ISRs) for both commercial and high density residential monitoring sites.

Study Area Stormwater Management Activities

During water year 2014, stormwater management activities are related to the level of development within the monitoring sites' respective drainage areas. Routine inspections and maintenance activities typically include annual facility inspections, vegetation maintenance and litter pickup within stormwater facilities, street sweeping and repair of pavement surfaces, catch basin cleaning, and roadside mowing.

During calendar year 2014 almost all public and private facilities were inspected and maintained but there were no major stormwater capital improvement projects in any of the monitored drainage areas. Inspections and maintenance of both private and public stormwater facilities within the drainage areas of each of the two stormwater characterization sites is summarized in Appendix 5. County stormwater facilities were inspected and maintained according to County standards.

During calendar year 2014, there were four and seven stormwater facility inspections within the commercial and high density residential monitoring sites drainages, respectively. Within the commercial site drainage, there are four private stormwater facilities: one bioswale, one facility containing two wet ponds, one in-line storage / biofiltration system, and one cartridge filter catch basin / underground detention facility. All four of these facilities were inspected during calendar year 2014. Within the high density residential drainage, there are seven public stormwater facilities owned by Clark County: three stand-alone biofiltration swales, three combination biofiltration swale / detention ponds, and one double detention pond facility. All high density residential drainage area stormwater facilities were inspected during calendar year 2014.

Routine maintenance also varied by drainage basin during water year 2014. The commercial drainage area's maintenance activities included: eight rounds of arterial street sweeping along Highway 99 and one round of catch basin inspection and cleaning. High density residential drainage maintenance activities included: three rounds of neighborhood street sweeping, one round of catch basin inspection and cleaning, and three rounds of vegetation maintenance of stormwater facilities (e.g., mowing / litter control).

Watershed-based source control activities typically include site visits and follow-ups actions for potential sources of stormwater pollution. During water year 2014, none of the targeted subwatersheds for source control inspections overlapped with the commercial or high density residential monitoring sites' drainages. During water year 2014, no water quality complaints were received from areas within the two monitoring sites' catchment areas.

Appendices

Appendix 1 S8B Sites Rainfall Versus Runoff Volumes

Seasonal Rainfall versus Runoff Volume Data, Pacing Estimates:

Commercial Site through WY 2014

Event Date	Precip. (in)	Storm Volume (cf)	Season	Est. Storm Aliquot # = Storm volume / Pacing Volume	Pacing Flow Volume (cf) per Aliquot based on Range in Rainfall / Runoff Relationship
10/21/2014	0.15	2039	Wet	11	**Wet Season**
2/21/2012	0.19	3344	Wet	19	180
11/5/2011	0.19	1392	Wet	8	300
3/24/2011	0.19	1658	Wet	9	400
12/1/2010	0.19	4104	Wet	23	600
2/20/2014	0.19	1910	Wet	11	800
12/27/2014	0.20	4861	Wet	27	900
3/29/2011	0.20	2524	Wet	14	1200
4/4/2010	0.20	4978	Wet	28	2100
12/18/2010	0.20	5355	Wet	30	**Dry Season**
4/27/2014	0.21	1988	Wet	11	130
2/9/2012	0.21	2701	Wet	15	200
4/15/2010	0.21	3614	Wet	20	400
12/12/2012	0.21	5601	Wet	31	1000
12/12/2010	0.21	5866	Wet	33	2000
2/27/2014	0.21	2252	Wet	13	
3/25/2014	0.22	4556	Wet	25	
3/17/2012	0.22	2116	Wet	12	
2/10/2010	0.22	5259	Wet	29	
10/24/2012	0.22	1609	Wet	9	
12/10/2010	0.22	5140	Wet	29	
1/23/2013	0.23	4538	Wet	25	
4/12/2012	0.23	4232	Wet	24	
11/20/2010	0.23	5291	Wet	29	
3/14/2014	0.23	2605	Wet	14	
11/22/2010	0.23	4186	Wet	23	
10/3/2011	0.24	768	Wet	4	
3/26/2010	0.24	3549	Wet	20	
3/5/2012	0.25	3534	Wet	20	
12/3/2012	0.25	2189	Wet	12	
4/4/2013	0.25	2968	Wet	16	
4/5/2013	0.25	3621	Wet	20	
4/6/2013	0.25	3902	Wet	22	
2/15/2010	0.25	6709	Wet	37	
3/9/2010	0.25	4838	Wet	27	

2/11/2010	0.26	7435	Wet	41
3/30/2010	0.26	7021	Wet	39
10/14/2014	0.26	4086	Wet	23
10/31/2011	0.27	1984	Wet	11
11/21/2010	0.27	5679	Wet	32
2/20/2012	0.27	2878	Wet	16
1/30/2012	0.28	4357	Wet	24
11/12/2011	0.28	4599	Wet	26
11/26/2010	0.28	4405	Wet	24
1/29/2012	0.28	3381	Wet	19
4/22/2014	0.28	2391	Wet	13
1/10/2012	0.29	4406	Wet	24
10/10/2011	0.29	4745	Wet	26
11/2/2012	0.29	2881	Wet	16
1/30/2013	0.29	3511	Wet	20
3/26/2011	0.29	8594	Wet	48
3/25/2011	0.29	5449	Wet	30
10/23/2014	0.29	6347	Wet	35
2/24/2014	0.29	3419	Wet	19
1/7/2013	0.30	7429	Wet	41
4/6/2012	0.30	4662	Wet	26
4/3/2012	0.30	4874	Wet	27
4/1/2011	0.30	7812	Wet	43
4/12/2010	0.30	5180	Wet	29
11/21/2012	0.31	5688	Wet	32
10/5/2011	0.31	5065	Wet	28
1/8/2014	0.31	3525	Wet	20
4/8/2014	0.31	10029	Wet	56
3/11/2012	0.32	2808	Wet	16
12/28/2014	0.32	7727	Wet	43
3/7/2013	0.32	3178	Wet	18
11/3/2012	0.32	3458	Wet	19
10/21/2012	0.33	5461	Wet	18
4/5/2010	0.33	6802	Wet	23
11/20/2012	0.33	7541	Wet	25
2/29/2012	0.34	5003	Wet	17
2/28/2013	0.34	3616	Wet	12
3/5/2011	0.34	9192	Wet	31
11/29/2012	0.34	4539	Wet	15
1/4/2015	0.35	5486	Wet	18
1/5/2012	0.36	6077	Wet	20

10/22/2012	0.36	4043	Wet	13
10/16/2012	0.36	5295	Wet	18
10/18/2014	0.36	3699	Wet	12
3/14/2014	0.36	3540	Wet	12
3/23/2012	0.38	5759	Wet	19
2/14/2010	0.38	11751	Wet	39
11/4/2013	0.38	5357	Wet	18
12/15/2012	0.38	11630	Wet	39
11/23/2014	0.38	11631	Wet	39
4/27/2012	0.39	6452	Wet	22
4/11/2012	0.39	6327	Wet	21
12/18/2014	0.39	9495	Wet	32
3/24/2010	0.40	4051	Wet	14
2/26/2012	0.41	6251	Wet	21
1/25/2013	0.41	3706	Wet	12
11/30/2012	0.41	5242	Wet	17
12/25/2010	0.42	8140	Wet	20
4/21/2014	0.42	5831	Wet	15
10/13/2014	0.42	5642	Wet	14
2/12/2011	0.44	11009	Wet	28
2/13/2011	0.44	8824	Wet	22
2/23/2010	0.44	8665	Wet	22
10/30/2010	0.44	10833	Wet	27
1/5/2011	0.44	7751	Wet	19
4/28/2010	0.46	7659	Wet	19
10/30/2012	0.46	7077	Wet	18
12/9/2014	0.49	12034	Wet	30
11/27/2011	0.50	12360	Wet	31
11/18/2013	0.50	6242	Wet	16
1/7/2014	0.50	7665	Wet	19
4/16/2014	0.50	6400	Wet	16
10/28/2010	0.52	11829	Wet	30
1/18/2012	0.53	7925	Wet	20
10/28/2012	0.53	9500	Wet	24
3/29/2014	0.53	23068	Wet	58
12/23/2014	0.55	16714	Wet	42
11/22/2011	0.55	10586	Wet	26
2/18/2014	0.55	18313	Wet	46
10/28/2012	0.56	7557	Wet	19
2/18/2014	0.55	18313	Wet	46
12/19/2010	0.56	13059	Wet	33

4/6/2013	0.56	12109	Wet	30
12/23/2012	0.57	20231	Wet	34
10/28/2014	0.57	9858	Wet	16
11/28/2014	0.57	14346	Wet	24
4/2/2010	0.58	13558	Wet	23
11/2/2013	0.58	6983	Wet	12
2/22/2013	0.59	12444	Wet	21
11/17/2012	0.59	10586	Wet	18
1/28/2014	0.59	8840	Wet	15
11/13/2010	0.60	10274	Wet	17
4/18/2013	0.60	5787	Wet	10
4/1/2014	0.60	20010	Wet	33
11/3/2011	0.63	15565	Wet	26
4/5/2011	0.65	11272	Wet	19
12/1/2012	0.65	16116	Wet	27
2/17/2014	0.65	20366	Wet	34
11/30/2012	0.67	17504	Wet	29
3/26/2014	0.69	21898	Wet	27
10/8/2010	0.70	19375	Wet	24
11/16/2011	0.71	16653	Wet	21
3/8/2014	0.71	13499	Wet	17
3/17/2014	0.72	16341	Wet	20
3/2/2014	0.75	11049	Wet	14
3/27/2014	0.76	28833	Wet	36
11/21/2014	0.76	20468	Wet	26
4/23/2014	0.78	11905	Wet	15
1/24/2012	0.78	17633	Wet	22
1/12/2014	0.78	12763	Wet	16
2/15/2014	0.78	26332	Wet	33
11/6/2010	0.80	19714	Wet	25
10/10/2010	0.82	25823	Wet	32
3/19/2013	0.82	13882	Wet	17
11/9/2010	0.84	17824	Wet	22
4/26/2010	0.87	15152	Wet	19
12/25/2012	0.88	26603	Wet	33
12/19/2014	0.88	26760	Wet	33
11/11/2012	0.89	12152	Wet	15
2/25/2010	0.90	25194	Wet	28
12/4/2014	0.90	22470	Wet	25
11/29/2010	0.92	21822	Wet	24
4/17/2011	0.94	30210	Wet	34

12/19/2012	0.95	32216	Wet	36
12/13/2010	0.96	24915	Wet	28
12/3/2012	0.96	22844	Wet	25
3/11/2011	0.97	24956	Wet	28
11/1/2010	0.98	28857	Wet	32
12/16/2012	0.98	30668	Wet	34
12/1/2013	1.02	13421	Wet	15
2/16/2011	1.02	27742	Wet	31
11/23/2012	1.03	21323	Wet	24
4/25/2011	1.04	24392	Wet	27
2/17/2014	1.14	45436	Wet	50
3/11/2010	1.20	34587	Wet	29
3/28/2010	1.20	31744	Wet	26
12/11/2010	1.20	36879	Wet	31
1/28/2013	1.25	23343	Wet	19
1/11/2011	1.30	33010	Wet	28
10/21/2014	1.32	34188	Wet	28
3/5/2014	1.43	35259	Wet	29
4/13/2011	1.45	35959	Wet	30
10/30/2014	1.67	39987	Wet	33
11/17/2010	1.90	52976	Wet	25
12/27/2010	2.00	52674	Wet	25
10/23/2010	2.10	59878	Wet	29
12/7/2010	2.20	60769	Wet	29
3/2/2011	2.21	65868	Wet	31
11/18/2012	2.21	58065	Wet	28
2/28/2011	2.32	66728	Wet	32
6/18/2012	0.12	3030	Dry	23
6/20/2010	0.14	2508	Dry	19
7/22/2014	0.15	826	Dry	6
8/30/2013	0.16	3898	Dry	30
8/29/2013	0.18	1379	Dry	11
9/7/2010	0.20	4104	Dry	32
9/21/2013	0.20	5263	Dry	40
9/22/2013	0.20	1642	Dry	13
6/22/2012	0.20	2504	Dry	19
5/28/2014	0.21	2695	Dry	21
5/4/2010	0.22	2951	Dry	23
9/26/2010	0.23	5800	Dry	45
5/25/2012	0.24	4720	Dry	36
7/12/2011	0.24	3063	Dry	24

6/18/2011	0.24	2331	Dry	18
5/3/2010	0.24	3740	Dry	29
5/9/2010	0.24	2801	Dry	22
9/7/2010	0.24	3577	Dry	28
5/24/2012	0.24	4139	Dry	32
6/12/2012	0.25	5835	Dry	29
6/13/2013	0.25	3533	Dry	18
5/1/2012	0.25	3960	Dry	20
5/23/2012	0.26	4736	Dry	24
9/15/2010	0.26	4797	Dry	24
5/22/2010	0.27	4605	Dry	23
5/30/2010	0.28	7161	Dry	36
6/13/2013	0.28	5091	Dry	25
5/19/2010	0.29	7090	Dry	35
9/24/2013	0.29	10982	Dry	55
10/10/2011	0.29	5030	Dry	25
5/28/2013	0.29	3134	Dry	16
5/17/2010	0.30	4268	Dry	21
5/22/2013	0.31	4829	Dry	24
5/7/2011	0.31	5942	Dry	30
5/20/2010	0.31	4767	Dry	24
6/15/2010	0.31	3052	Dry	15
7/1/2010	0.32	3937	Dry	20
9/17/2010	0.32	7846	Dry	39
11/3/2014	0.32	6702	Dry	34
5/29/2013	0.33	3785	Dry	19
6/8/2010	0.33	8012	Dry	40
6/10/2010	0.36	8441	Dry	21
6/13/2013	0.37	5496	Dry	14
8/26/2013	0.40	9061	Dry	23
5/12/2011	0.41	6511	Dry	16
5/25/2012	0.41	9636	Dry	24
8/31/2010	0.42	8803	Dry	22
6/12/2014	0.42	3589	Dry	9
5/21/2010	0.43	9283	Dry	23
7/23/2014	0.44	6890	Dry	17
5/8/2014	0.45	6139	Dry	15
6/25/2013	0.47	5011	Dry	13
11/2/2014	0.50	7128	Dry	18
5/21/2012	0.52	10710	Dry	27
5/27/2013	0.53	6781	Dry	17

6/23/2013	0.55	8801	Dry	22
6/7/2012	0.55	15157	Dry	38
6/25/2014	0.61	14529	Dry	15
6/23/2012	0.63	14445	Dry	14
5/23/2013	0.66	12160	Dry	12
5/19/2014	0.68	10771	Dry	11
5/15/2011	0.72	12226	Dry	12
6/3/2010	0.72	19165	Dry	19
5/28/2010	0.74	18688	Dry	19
6/4/2012	0.76	23162	Dry	23
6/16/2014	0.76	12649	Dry	13
6/1/2010	0.77	19425	Dry	19
5/2/2012	0.91	24247	Dry	24
5/25/2010	0.97	24648	Dry	25
9/18/2010	0.99	21322	Dry	21
9/5/2013	1.35	50078	Dry	50
5/22/2013	1.46	31555	Dry	32
6/6/2010	1.60	46222	Dry	23
9/30/2013	2.62	55922	Dry	28

Seasonal Rainfall versus Runoff Volume Data, Pacing Estimates:

High Density Residential Site through WY 2014

Event Date	Precip. (in)	Storm Volume (cf)	Season	Est. Storm Aliquot # = Storm volume / Pacing Volume	Pacing Flow Volume (cf) per Aliquot based on Range in Rainfall / Runoff Relationship
3/29/2011	0.19	5230	Wet	17	**Wet Season**
1/7/2012	0.19	3856	Wet	13	300
4/30/2012	0.19	3612	Wet	12	800
10/31/2011	0.2	3307	Wet	11	1600
12/12/2012	0.21	3889	Wet	13	2500
4/15/2010	0.21	8807	Wet	29	4000
10/29/2011	0.21	1663	Wet	6	6500
11/5/2011	0.21	2586	Wet	9	**Dry Season**
1/5/2012	0.22	7072	Wet	24	350
2/9/2012	0.22	7602	Wet	25	900
11/12/2013	0.23	2855	Wet	10	1700
3/14/2014	0.24	6986	Wet	23	4000
3/5/2012	0.24	11974	Wet	40	8000
2/21/2012	0.25	7912	Wet	26	
11/12/2011	0.26	6267	Wet	21	
3/14/2014	0.26	7596	Wet	25	
3/30/2011	0.27	19131	Wet	24	
4/8/2014	0.27	16964	Wet	21	
10/21/20014	0.27	29822	Wet	37	
3/30/2010	0.28	29404	Wet	37	
10/25/2014	0.28	12567	Wet	16	
4/8/2011	0.29	35188	Wet	44	
4/11/2010	0.3	14343	Wet	18	
4/28/2010	0.31	30414	Wet	38	
11/21/2010	0.31	16995	Wet	21	
11/3/2014	0.31	18097	Wet	23	
11/26/2010	0.32	7888	Wet	10	
3/25/2011	0.33	30741	Wet	38	
3/28/2010	0.33	22931	Wet	29	
2/24/2014	0.34	18102	Wet	23	
1/29/2012	0.35	12177	Wet	15	
3/5/2011	0.36	30965	Wet	39	
10/17/2014	0.36	16174	Wet	20	
3/4/2011	0.38	31312	Wet	39	

10/30/2010	0.38	19706	Wet	25
10/28/2010	0.41	16749	Wet	21
2/13/2011	0.43	25820	Wet	32
4/21/2014	0.43	26490	Wet	33
11/2/2014	0.44	16273	Wet	20
12/18/2014	0.44	32517	Wet	41
1/5/2011	0.47	16954	Wet	21
10/13/2014	0.47	28946	Wet	36
12/27/2014	0.47	32943	Wet	41
11/4/2013	0.48	21223	Wet	27
4/24/2014	0.51	39468	Wet	25
10/14/2014	0.51	35816	Wet	22
11/27/2011	0.53	45706	Wet	29
4/2/2010	0.56	53567	Wet	33
10/10/2010	0.56	42165	Wet	26
11/13/2010	0.56	33676	Wet	21
12/19/2010	0.57	45784	Wet	29
3/28/2011	0.59	74559	Wet	47
4/17/2014	0.59	31486	Wet	20
11/18/2013	0.6	30236	Wet	19
2/28/2012	0.62	25500	Wet	16
4/5/2011	0.63	33162	Wet	21
2/14/2014	0.64	72767	Wet	45
11/1/2013	0.66	40008	Wet	25
4/26/2011	0.67	61161	Wet	38
11/21/2011	0.67	30937	Wet	19
10/28/2014	0.67	47450	Wet	30
12/23/2014	0.69	82946	Wet	33
11/3/2011	0.73	58836	Wet	24
3/2/2014	0.77	49401	Wet	20
4/1/2014	0.78	51457	Wet	21
3/16/2014	0.79	78638	Wet	31
3/28/2010	0.81	53268	Wet	21
10/8/2010	0.82	33765	Wet	14
11/6/2010	0.82	80757	Wet	32
2/18/2014	0.85	108786	Wet	44
11/28/2014	0.85	96370	Wet	39
3/9/2014	0.86	76433	Wet	31
11/6/2013	0.87	70772	Wet	28
12/4/2014	0.88	65911	Wet	26
11/16/2011	0.88	62013	Wet	25

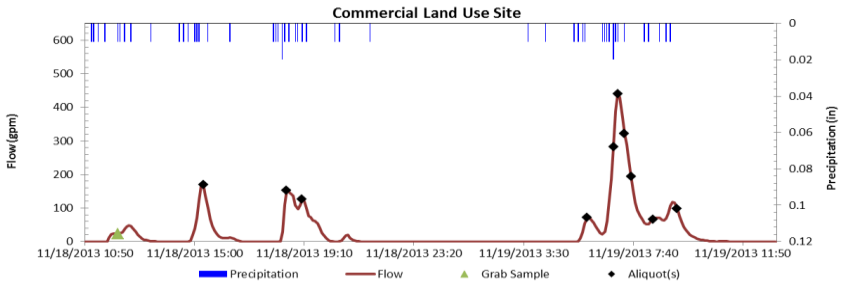
11/9/2010	0.91	78299	Wet	20
4/24/2011	0.92	60476	Wet	15
4/22/2014	0.96	76265	Wet	19
2/16/2011	0.97	129643	Wet	32
4/26/2010	0.97	59855	Wet	15
1/11/2014	1.01	63140	Wet	16
11/21/2014	1.02	69183	Wet	17
12/1/2013	1.03	75953	Wet	19
11/29/2010	1	90386	Wet	23
11/1/2010	1.1	142209	Wet	36
1/11/2011	1.1	69913	Wet	17
12/13/2010	1.2	163998	Wet	25
12/19/2014	1.26	135362	Wet	21
2/15/2014	1.27	146306	Wet	23
4/18/2011	1.28	106815	Wet	16
12/11/2010	1.3	184032	Wet	28
4/14/2011	1.37	96787	Wet	15
2/17/2014	1.51	267604	Wet	41
1/14/2011	1.66	185930	Wet	29
10/29/2014	1.66	181625	Wet	28
10/21/2014	1.74	188633	Wet	29
3/5/2014	1.8	259995	Wet	40
11/17/2010	1.9	219210	Wet	34
12/27/2010	1.9	212247	Wet	33
10/23/2010	2.1	158640	Wet	24
12/7/2010	2.2	237844	Wet	37
3/2/2011	2.46	255779	Wet	39
5/5/2010	0.11	4803	Dry	14
5/20/2010	0.11	3751	Dry	11
9/9/2010	0.12	6507	Dry	19
5/3/2010	0.14	6608	Dry	19
6/20/2010	0.14	1247	Dry	4
6/28/2011	0.14	2088	Dry	6
5/28/2014	0.16	4593	Dry	13
6/26/2014	0.19	8784	Dry	25
9/26/2010	0.2	7566	Dry	22
6/18/2012	0.2	6429	Dry	18
8/29/2013	0.21	2157	Dry	6
8/30/2013	0.21	14857	Dry	42
7/12/2011	0.23	5334	Dry	15
9/15/2010	0.25	2636	Dry	8

9/17/2010	0.25	19026	Dry	54
5/2/2011	0.26	31374	Dry	90
10/3/2011	0.26	1738	Dry	5
6/30/2012	0.26	12327	Dry	35
5/23/2010	0.27	18840	Dry	54
9/25/2011	0.27	14586	Dry	42
8/31/2010	0.29	1313	Dry	4
5/21/2013	0.29	7412	Dry	21
5/30/2010	0.31	15004	Dry	17
5/28/2013	0.31	14790	Dry	16
6/12/2014	0.31	8759	Dry	10
5/9/2010	0.33	10519	Dry	12
8/27/2013	0.34	8116	Dry	9
5/7/2011	0.35	27319	Dry	30
6/12/2013	0.37	18015	Dry	20
6/15/2010	0.37	10023	Dry	11
6/13/2013	0.38	17536	Dry	19
5/17/2010	0.39	22975	Dry	26
5/11/2011	0.4	16062	Dry	18
5/4/2010	0.42	24648	Dry	27
5/19/2010	0.43	32233	Dry	36
5/8/2014	0.43	22559	Dry	25
5/25/2010	0.44	39746	Dry	23
6/1/2014	0.5	44147	Dry	26
7/23/2014	0.51	24870	Dry	15
5/26/2010	0.51	48199	Dry	28
5/19/2014	0.54	28212	Dry	17
5/27/2013	0.56	35040	Dry	21
6/1/2010	0.59	43835	Dry	26
12/9/2014	0.6	34200	Dry	20
5/15/2011	0.67	29295	Dry	17
6/8/2010	0.72	46147	Dry	27
6/25/2014	0.73	64014	Dry	38
6/3/2010	0.75	59811	Dry	35
5/21/2010	0.79	40251	Dry	24
9/23/2014	0.83	35485	Dry	21
9/7/2010	0.87	92637	Dry	23
9/18/2010	1.1	119930	Dry	30
5/28/2010	1.3	117625	Dry	29
9/5/2013	1.52	143852	Dry	36
6/6/2010	1.6	193812	Dry	24

10/21/2014	1.74	186991	Dry	23
5/22/2013	2.07	176508	Dry	22
9/29/2013	3.05	396223	Dry	50

Appendix 2 S8B Water Year 2014 Individual Storm Reports

Appendix 2A Water Year 2014 Commercial Site Individual Storm Reports



COM WY2014 Storm #1: 11/18/2013

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1312702, K1312598

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	48.42		
Precipitation Total (in):	≥ 0.2	0.51		
Precipitation Start Date/Time:	NA	11/18/13 11:05		
Precipitation End Date/Time:	NA	11/19/13 15:05		
Stormwater Flow Start Date/Time:	NA	11/18/13 11:45		
Stormwater Flow End Date/Time:	NA	11/19/13 11:25		
Storm Volume (gal):	NA	46578.6		

Sampling Information

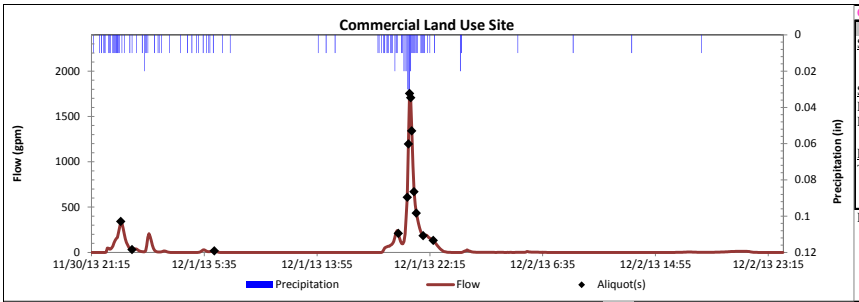
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	11/18/13 15:20		
Sample Flow End Date/Time:	NA	11/19/13 9:20		
Sample Event Volume (gal)	NA	44954.65		
Number of Aliquots:	≥ 7	10		
% Storm Sampled:	≥ 75	96.5		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	92	J	1		16221	J	
Turbidity	NTU	19.4		0.2		NA		
pH	NA	7.58		NA		NA		
Conductivity	umhos/cm	22.4		2.0		NA		
BOD	mg/L	5.5		2.0		969.8		
Surfactants (MBAS)	mg/L	0.116		0.025		20.45		
Chloride	mg/L	0.55		0.2		97		
Hardness	mg/L	16		1		2821		
Nutrients								
Total Phosphorus	mg/L	0.181		0.01		31.9		
Orthophosphate	mg/L	0.034	J	0.01		6.0	J	
Total Kjeldahl Nitrogen	mg/L	0.98	J	0.5		172.8	J	
Nitrate+Nitrite	mg/L	0.14		0.01		24.7		
Metals								
Total Cu	ug/L	18.8		0.1		3.31		
Dissolved Cu	ug/L	4.91	J	0.1		0.87	J	
Total Zn	ug/L	93.7		5		16.52		
Dissolved Zinc	ug/L	23		1.0		4.06		
Total Cadmium	ug/L	0.14		0.2		0.025		
Diss. Cadmium	ug/L	0.022		0.1		0.004		
Total Lead	ug/L	7.97		0.1		1.405		
Dissolved Lead	ug/L	0.096		0.1		0.017		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.1		1		0.018		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.000	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.054	J	0.1		0.010	J	
Acenaphthylene	ug/L	0.009		0.1		0.002		
Benzo(b)fluoranthene	ug/L	0.078		0.1		0.014		
Acenaphthene	ug/L	0.004	UJ	0.1		0.000	UJ	
Fluorene	ug/L	0.008		0.1		0.001		
Benzo(k)fluoranthene	ug/L	0.022		0.1		0.004		
Phenanthrene	ug/L	0.064		0.1		0.011		
Anthracene	ug/L	0.012		0.1		0.002		
Fluoranthene	ug/L	0.1		0.1		0.018		
Pyrene	ug/L	0.15		0.1		0.026		
Indeno(1,2,3-cd)pyrene	ug/L	0.05		0.1		0.009		
Benzo(a)anthracene	ug/L	0.036		0.1		0.006		
Chrysene	ug/L	0.1		0.1		0.018		
Dibenzo(a,h)anthracene	ug/L	0.011		0.1		0.002		
Benzo(ghi)perylene	ug/L	0.11		0.1		0.019		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	4.2		1		0.741		
Microbial								
Fecal Coliform	MPN	170		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Oeganics	ug/L	790.00		500.00		139.292		
Residual Range Organics	ug/L	1900		1100.00		335.007		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		0.005		
Toluene	ug/L	0.06		0.50		0.011		
Ethylbenzene	ug/L	0.05	UJ	0.50		0.004		
m,p-Xylenes	ug/L	0.11	UJ	0.50		0.010		
o-Xylene	ug/L	0.074	UJ	0.50		0.007		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #2: 12/1/2013

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1313065

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	24.08		
Precipitation Total (in):	≥ 0.2	1.06		
Precipitation Start Date/Time:	NA	11/30/13 21:25		
Precipitation End Date/Time:	NA	12/3/13 0:20		
Stormwater Flow Start Date/Time:	NA	11/30/13 22:20		
Stormwater Flow End Date/Time:	NA	12/2/13 22:40		
Storm Volume (gal):	NA	103045.5		

Sampling Information

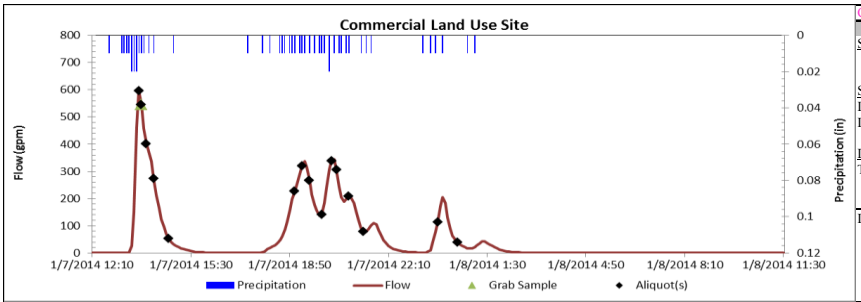
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	11/30/13 23:25		
Sample Flow End Date/Time:	NA	12/1/13 22:30		
Sample Event Volume (gal)	NA	97344.04		
Number of Aliquots:	≥ 7	13		
% Storm Sampled:	≥ 75	94.5		
Grab Sample Taken	Yes	no		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	191	J	1		74503	J	
Turbidity	NTU	25.1		0.2		NA		
pH	NA	7.45		NA		NA		
Conductivity	umhos/cm	17.1		2.0		NA		
BOD	mg/L	6.4		2.0		2496.4		
Surfactants (MBAS)	mg/L	0.08		0.025		31.21		
Chloride	mg/L	0.28		0.2		109		
Hardness	mg/L	10.8		1		4213		
Nutrients								
Total Phosphorus	mg/L	0.367		0.01		143.2		
Orthophosphate	mg/L	0.023	J	0.01		9.0	J	
Total Kjeldahl Nitrogen	mg/L	1.24	J	0.5		483.7	J	
Nitrate+Nitrite	mg/L	0.095		0.01		37.1		
Metals								
Total Cu	ug/L	23		0.1		8.97		
Dissolved Cu	ug/L	2.8	J	0.1		1.09	J	
Total Zn	ug/L	140		5		54.61		
Dissolved Zinc	ug/L	13.8		1.0		5.38		
Total Cadmium	ug/L	0.222		0.2		0.087		
Diss. Cadmium	ug/L	0.01		0.1		0.004		
Total Lead	ug/L	15.6		0.1		6.085		
Dissolved Lead	ug/L	0.041		0.1		0.016		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.052		1		0.020		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.001	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.056	J	0.1		0.022	J	
Acenaphthylene	ug/L	0.015		0.1		0.006		
Benzo(b)fluoranthene	ug/L	0.15		0.1		0.059		
Acenaphthene	ug/L	0.007		0.1		0.003		
Fluorene	ug/L	0.024		0.1		0.009		
Benzo(k)fluoranthene	ug/L	0.045		0.1		0.018		
Phenanthrene	ug/L	0.15		0.1		0.059		
Anthracene	ug/L	0.025		0.1		0.010		
Fluoranthene	ug/L	0.22		0.1		0.086		
Pyrene	ug/L	0.36		0.1		0.140		
Indeno(1,2,3-cd)pyrene	ug/L	0.096		0.1		0.037		
Benzo(a)anthracene	ug/L	0.076	UJ	0.1		0.015	UJ	
Chrysene	ug/L	0.21		0.1		0.082		
Dibenzo(a,h)anthracene	ug/L	0.026		0.1		0.010		
Benzo(ghi)perylene	ug/L	0.2		0.1		0.078		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	3.4		1		1.326		
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Oeganics	ug/L			500.00		NA		
Residual Range Organics	ug/L			1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #3: 1/7/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1400141, K1400192

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	104.83		
Precipitation Total (in):	≥ 0.2	0.5		
Precipitation Start Date/Time:	NA	1/7/14 12:45		
Precipitation End Date/Time:	NA	1/8/14 6:05		
Stormwater Flow Start Date/Time:	NA	1/7/14 13:25		
Stormwater Flow End Date/Time:	NA	1/8/14 12:25		
Storm Volume (gal):	NA	71472.83		

Sampling Information

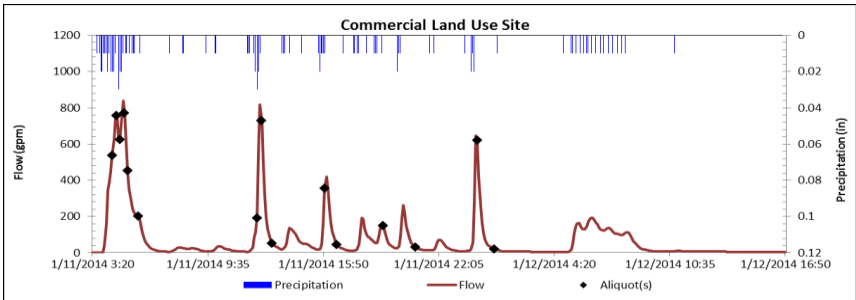
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	1/7/14 13:45		
Sample Flow End Date/Time:	NA	1/8/14 7:05		
Sample Event Volume (gal)	NA	71458.89		
Number of Aliquots:	≥ 7	16		
% Storm Sampled:	≥ 75	100.0		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	82.5	J	1		22321	J	
Turbidity	NTU	92.5		0.2		NA		
pH	NA	7.28		NA		NA		
Conductivity	umhos/cm	55.3		2.0		NA		
BOD	mg/L	8.6		2.0		2326.8		
Surfactants (MBAS)	mg/L	0.14		0.025		37.88		
Chloride	mg/L	7.57		0.2		2048		
Hardness	mg/L	16		1		4329		
Nutrients								
Total Phosphorus	mg/L	0.335		0.01		90.6		
Orthophosphate	mg/L	0.004	UJ	0.01		0.5	UJ	
Total Kjeldahl Nitrogen	mg/L	1.92	J	0.5		519.5	J	
Nitrate+Nitrite	mg/L	0.232		0.01		62.8		
Metals								
Total Cu	ug/L	26		0.1		7.03		
Dissolved Cu	ug/L	4.08	J	0.1		1.10	J	
Total Zn	ug/L	163		5		44.10		
Dissolved Zinc	ug/L	27.1		1.0		7.33		
Total Cadmium	ug/L	0.21		0.2		0.057		
Diss. Cadmium	ug/L	0.03		0.1		0.008		
Total Lead	ug/L	16		0.1		4.329		
Dissolved Lead	ug/L	0.048		0.1		0.013		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.18		1		0.049		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.001	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.085	J	0.1		0.023	J	
Acenaphthylene	ug/L	0.031		0.1		0.008		
Benzo(b)fluoranthene	ug/L	0.17		0.1		0.046		
Acenaphthene	ug/L	0.013		0.1		0.004		
Fluorene	ug/L	0.034		0.1		0.009		
Benzo(k)fluoranthene	ug/L	0.072		0.1		0.019		
Phenanthrene	ug/L	0.25		0.1		0.068		
Anthracene	ug/L	0.043		0.1		0.012		
Fluoranthene	ug/L	0.27		0.1		0.073		
Pyrene	ug/L	0.41		0.1		0.111		
Indeno(1,2,3-cd)pyrene	ug/L	0.12		0.1		0.032		
Benzo(a)anthracene	ug/L	0.06	UJ	0.1		0.008	UJ	
Chrysene	ug/L	0.3		0.1		0.081		
Dibenzo(a,h)anthracene	ug/L	0.013	UJ	0.1		0.002	UJ	
Benzo(ghi)perylene	ug/L	0.33		0.1		0.089		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	8.7	J	1		2.354	J	
Microbial								
Fecal Coliform	MPN	220		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	2500		500.00		NA		
Residual Range Organics	ug/L	11000		1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.32		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY 2014 Storm #4: 1/11/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1400351

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	35.15		
Precipitation Total (in):	≥ 0.2	0.96		
Precipitation Start Date/Time:	NA	1/11/14 3:35		
Precipitation End Date/Time:	NA	1/12/14 16:50		
Stormwater Flow Start Date/Time:	NA	1/11/14 3:55		
Stormwater Flow End Date/Time:	NA	1/12/14 15:30		
Storm Volume (gal):	NA	165578.0		

Sampling Information

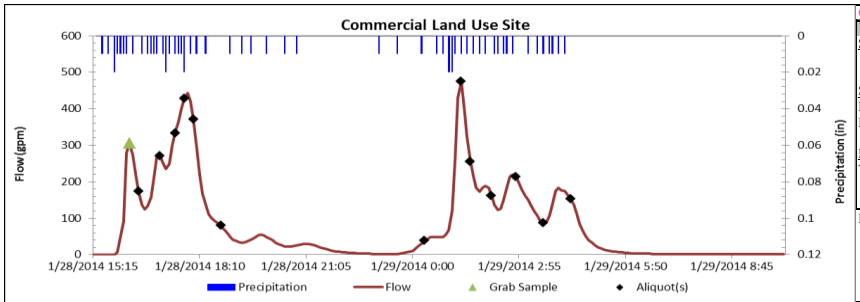
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	1/11/14 4:25		
Sample Flow End Date/Time:	NA	1/12/14 1:05		
Sample Event Volume (gal)	NA	134673		
Number of Aliquots:	≥ 7	15		
% Storm Sampled:	≥ 75	81.3		
Grab Sample Taken	Yes	no		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	140	J	1		87749	J	
Turbidity	NTU	36.6		0.2		NA		
pH	NA	7.26		NA		NA		
Conductivity	umhos/cm	46.5		2.0		NA		
BOD	mg/L	7.2		2.0		4512.8		
Surfactants (MBAS)	mg/L	0.136		0.025		85.24		
Chloride	mg/L	6.36		0.2		3986		
Hardness	mg/L	14		1		8775		
Nutrients								
Total Phosphorus	mg/L	0.266		0.01		166.7		
Orthophosphate	mg/L	0.004	UJ	0.01		1.3	UJ	
Total Kjeldahl Nitrogen	mg/L	0.87	J	0.5		545.3	J	
Nitrate+Nitrite	mg/L	0.068		0.01		42.6		
Metals								
Total Cu	ug/L	22.8		0.1		14.29		
Dissolved Cu	ug/L	3.7	J	0.1		2.32	J	
Total Zn	ug/L	128		5		80.23		
Dissolved Zinc	ug/L	27.6		1.0		17.30		
Total Cadmium	ug/L	0.189		0.2		0.118		
Diss. Cadmium	ug/L	0.019		0.1		0.012		
Total Lead	ug/L	13.2		0.1		8.274		
Dissolved Lead	ug/L	0.049		0.1		0.031		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.2		1		0.125		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.001	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.083	J	0.1		0.052	J	
Acenaphthylene	ug/L	0.017		0.1		0.011		
Benzo(b)fluoranthene	ug/L	0.18		0.1		0.113		
Acenaphthene	ug/L	0.009		0.1		0.005		
Fluorene	ug/L	0.02		0.1		0.013		
Benzo(k)fluoranthene	ug/L	0.052		0.1		0.033		
Phenanthrene	ug/L	0.17		0.1		0.107		
Anthracene	ug/L	0.032		0.1		0.020		
Fluoranthene	ug/L	0.22		0.1		0.138		
Pyrene	ug/L	0.33		0.1		0.207		
Indeno(1,2,3-cd)pyrene	ug/L	0.12		0.1		0.075		
Benzo(a)anthracene	ug/L	0.071		0.1		0.045		
Chrysene	ug/L	0.27		0.1		0.169		
Dibenzo(a,h)anthracene	ug/L	0.013	UJ	0.1		0.004	UJ	
Benzo(ghi)perylene	ug/L	0.25		0.1		0.157		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	6.9	J	1		4.325	J	
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L			500.00		NA		
Residual Range Organics	ug/L			1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #5: 1/28/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1400819, K1400861

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	369.08		
Precipitation Total (in):	≥ 0.2	0.59		
Precipitation Start Date/Time:	NA	1/28/14 15:30		
Precipitation End Date/Time:	NA	1/29/14 10:10		
Stormwater Flow Start Date/Time:	NA	1/28/14 15:55		
Stormwater Flow End Date/Time:	NA	1/29/14 10:10		
Storm Volume (gal):	NA	89485.0		

Sampling Information

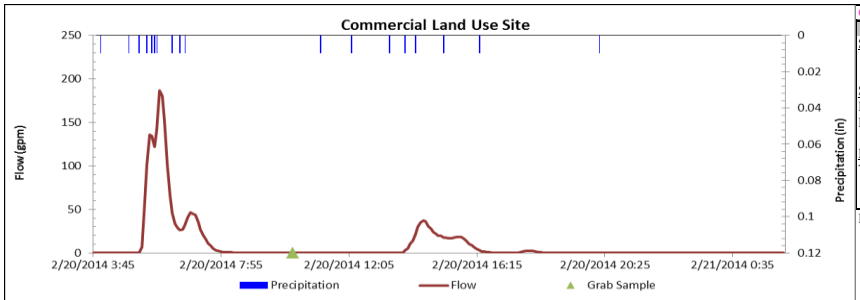
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	1/28/14 16:30		
Sample Flow End Date/Time:	NA	1/29/14 4:20		
Sample Event Volume (gal):	NA	85765.65		
Number of Aliquots:	≥ 7	13		
% Storm Sampled:	≥ 75	95.8		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	87.5	J	1		29640	J	
Turbidity	NTU	36.4		0.2		NA		
pH	NA	7.42		NA		NA		
Conductivity	umhos/cm	39.4		2.0		NA		
BOD	mg/L	6.8		2.0		2303.4		
Surfactants (MBAS)	mg/L	0.172		0.025		58.26		
Chloride	mg/L	2.58		0.2		874		
Hardness	mg/L	14		1		4742		
Nutrients								
Total Phosphorus	mg/L	0.202		0.01		68.4		
Orthophosphate	mg/L	0.013	J	0.01		4.4	J	
Total Kjeldahl Nitrogen	mg/L	1.26	J	0.5		426.8	J	
Nitrate+Nitrite	mg/L	0.208		0.01		70.5		
Metals								
Total Cu	ug/L	17.1		0.1		5.79		
Dissolved Cu	ug/L	4.3	J	0.1		1.46	J	
Total Zn	ug/L	109		5		36.92		
Dissolved Zinc	ug/L	26.4		1.0		8.94		
Total Cadmium	ug/L	0.148		0.2		0.050		
Diss. Cadmium	ug/L	0.021		0.1		0.007		
Total Lead	ug/L	9.42		0.1		3.191		
Dissolved Lead	ug/L	0.059		0.1		0.020		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.069		1		0.023		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.025	J	1		0.008	J	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.087	J	0.1		0.029	J	
Acenaphthylene	ug/L	0.031		0.1		0.011		
Benzo(b)fluoranthene	ug/L	0.1		0.1		0.034		
Acenaphthene	ug/L	0.012		0.1		0.004		
Fluorene	ug/L	0.024		0.1		0.008		
Benzo(k)fluoranthene	ug/L	0.03		0.1		0.010		
Phenanthrene	ug/L	0.16		0.1		0.054		
Anthracene	ug/L	0.024		0.1		0.008		
Fluoranthene	ug/L	0.17		0.1		0.058		
Pyrene	ug/L	0.23		0.1		0.078		
Indeno(1,2,3-cd)pyrene	ug/L	0.065		0.1		0.022		
Benzo(a)anthracene	ug/L	0.045	UJ	0.1		0.008	UJ	
Chrysene	ug/L	0.16		0.1		0.054		
Dibenzo(a,h)anthracene	ug/L	0.016		0.1		0.005		
Benzo(ghi)perylene	ug/L	0.15		0.1		0.051		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	8.7	J	1		2.947	J	
Microbial								
Fecal Coliform	MPN	130		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	600		500.00		NA		
Residual Range Organics	ug/L	1200		1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.21		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #6: 2/20/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1401720

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	24.75		
Precipitation Total (in):	≥ 0.2	0.18	j	
Precipitation Start Date/Time:	NA	2/20/14 4:00		
Precipitation End Date/Time:	NA	2/21/14 2:15		
Stormwater Flow Start Date/Time:	NA	2/20/14 5:20		
Stormwater Flow End Date/Time:	NA	2/20/14 21:55		
Storm Volume (gal):	NA	12304.0		

Sampling Information

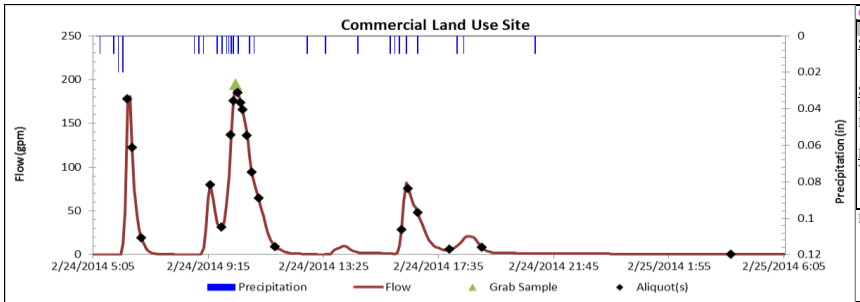
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥ 7	NA		
% Storm Sampled:	≥ 75	NA		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA			NA		NA		
Conductivity	umhos/cm			2.0		NA		
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	79		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	280		500.00		NA		
Residual Range Organics	ug/L	1200		1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.054	UJ	0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #7: 2/24/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1401810, K1401848

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	71.13		
Precipitation Total (in):	≥ 0.2	0.29		
Precipitation Start Date/Time:	NA	2/24/14 5:20		
Precipitation End Date/Time:	NA	2/25/14 3:05		
Stormwater Flow Start Date/Time:	NA	2/24/14 6:10		
Stormwater Flow End Date/Time:	NA	2/25/14 19:55		
Storm Volume (gal):	NA	22281.3		

Sampling Information

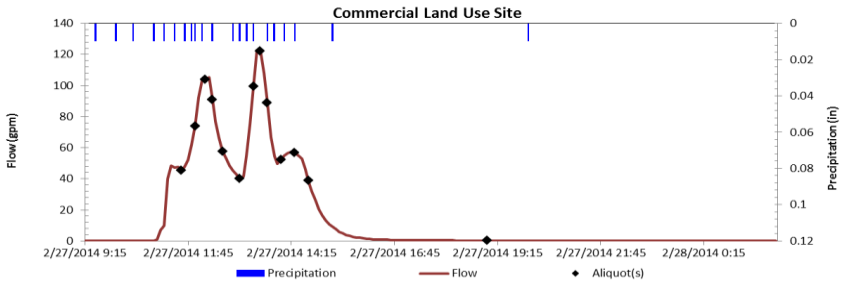
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	2/24/14 6:20		
Sample Flow End Date/Time:	NA	2/25/14 4:10		
Sample Event Volume (gal):	NA	22106.1		
Number of Aliquots:	≥ 7	20		
% Storm Sampled:	≥ 75	99.2		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	62	J	1		5229	J	
Turbidity	NTU	35.6		0.2		NA		
pH	NA	7.73		NA		NA		
Conductivity	umhos/cm	44.6		2.0		NA		
BOD	mg/L	3.3		2.0		278.3		
Surfactants (MBAS)	mg/L	0.148		0.025		12.48		
Chloride	mg/L	2.31		0.2		195		
Hardness	mg/L	13.6		1		1147		
Nutrients								
Total Phosphorus	mg/L	0.138		0.01		11.6		
Orthophosphate	mg/L	0.004	UJ	0.01		0.2	UJ	
Total Kjeldahl Nitrogen	mg/L	1.23	J	0.5		103.7	J	
Nitrate+Nitrite	mg/L	0.238		0.01		20.1		
Metals								
Total Cu	ug/L	15.6		0.1		1.32		
Dissolved Cu	ug/L	5.58	J	0.1		0.47	J	
Total Zn	ug/L	83.5		5		7.04		
Dissolved Zinc	ug/L	28.6		1.0		2.41		
Total Cadmium	ug/L	0.1		0.2		0.008		
Diss. Cadmium	ug/L	0.025		0.1		0.002		
Total Lead	ug/L	9.29		0.1		0.784		
Dissolved Lead	ug/L	0.063		0.1		0.005		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.2		1		0.017		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.000	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.2	J	0.1		0.017	J	
Acenaphthylene	ug/L	0.011		0.1		0.001		
Benzo(b)fluoranthene	ug/L	0.067		0.1		0.006		
Acenaphthene	ug/L	0.004	UJ	0.1		0.000	UJ	
Fluorene	ug/L	0.01		0.1		0.001		
Benzo(k)fluoranthene	ug/L	0.018		0.1		0.002		
Phenanthrene	ug/L	0.085		0.1		0.007		
Anthracene	ug/L	0.011		0.1		0.001		
Fluoranthene	ug/L	0.1		0.1		0.008		
Pyrene	ug/L	0.2		0.1		0.017		
Indeno(1,2,3-cd)pyrene	ug/L	0.041		0.1		0.003		
Benzo(a)anthracene	ug/L	0.034		0.1		0.003		
Chrysene	ug/L	0.1		0.1		0.008		
Dibenzo(a,h)anthracene	ug/L	0.01		0.1		0.001		
Benzo(ghi)perylene	ug/L	0.1		0.1		0.008		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	5.7	J	1		0.481	J	
Microbial								
Fecal Coliform	MPN	140		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	970		500.00		NA		
Residual Range Organics	ug/L	4700		1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.07		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #8: 2/27/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1401970

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	60.42		
Precipitation Total (in):	≥ 0.2	0.21		
Precipitation Start Date/Time:	NA	2/27/14 9:30		
Precipitation End Date/Time:	NA	2/28/14 2:00		
Stormwater Flow Start Date/Time:	NA	2/27/14 11:00		
Stormwater Flow End Date/Time:	NA	2/28/14 2:00		
Storm Volume (gal):	NA	14756.5		

Sampling Information

	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	2/27/14 11:35		
Sample Flow End Date/Time:	NA	2/27/14 19:00		
Sample Event Volume (gal):	NA	14718.84		
Number of Aliquots:	≥ 7	13		
% Storm Sampled:	≥ 75	99.7		
Grab Sample Taken	Yes	No		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	55	J	1		3072	J	
Turbidity	NTU	52.2		0.2		NA		
pH	NA	7.75		NA		NA		
Conductivity	umhos/cm	45.7		2.0		NA		
BOD	mg/L	7.8		2.0		435.7		
Surfactants (MBAS)	mg/L	0.19		0.025		10.61		
Chloride	mg/L	1.92		0.2		107		
Hardness	mg/L	15.2		1		849		
Nutrients								
Total Phosphorus	mg/L	0.155		0.01		8.7		
Orthophosphate	mg/L	0.006		0.01		0.3		
Total Kjeldahl Nitrogen	mg/L	1.29	J	0.5		72.1	J	
Nitrate+Nitrite	mg/L	0.329		0.01		18.4		
Metals								
Total Cu	ug/L	16		0.1		0.89		
Dissolved Cu	ug/L	5.85	J	0.1		0.33	J	
Total Zn	ug/L	86		5		4.80		
Dissolved Zinc	ug/L	32.6		1.0		1.82		
Total Cadmium	ug/L	0.118		0.2		0.007		
Diss. Cadmium	ug/L	0.036		0.1		0.002		
Total Lead	ug/L	8.68		0.1		0.485		
Dissolved Lead	ug/L	0.065		0.1		0.004		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.18	UJ	1		0.005	UJ	
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.007		1		0.000		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.026	J	0.1		0.001	J	
Acenaphthylene	ug/L	0.007		0.1		0.000		
Benzo(b)fluoranthene	ug/L	0.063		0.1		0.004		
Acenaphthene	ug/L	0.004	UJ	0.1		0.000	UJ	
Fluorene	ug/L	0.01		0.1		0.001		
Benzo(k)fluoranthene	ug/L	0.015		0.1		0.001		
Phenanthrene	ug/L	0.072		0.1		0.004		
Anthracene	ug/L	0.014		0.1		0.001		
Fluoranthene	ug/L	0.11		0.1		0.006		
Pyrene	ug/L	0.17		0.1		0.009		
Indeno(1,2,3-cd)pyrene	ug/L	0.036		0.1		0.002		
Benzo(a)anthracene	ug/L	0.026	UJ	0.1		0.001	UJ	
Chrysene	ug/L	0.062		0.1		0.003		
Dibenzo(a,h)anthracene	ug/L	0.008		0.1		0.000		
Benzo(ghi)perylene	ug/L	0.098		0.1		0.005		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	4.3	J	1		0.240	J	
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L			500.00		NA		
Residual Range Organics	ug/L			1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
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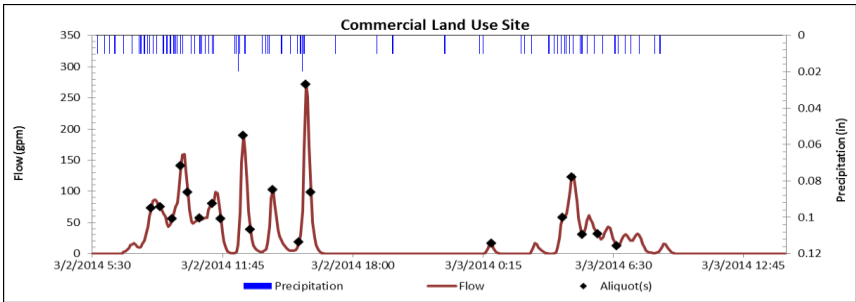


COM WY2014 Storm #9: 3/2/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1402048

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	63.67		
Precipitation Total (in):	≥ 0.2	0.75		
Precipitation Start Date/Time:	NA	3/2/14 5:45		
Precipitation End Date/Time:	NA	3/3/14 14:45		
Stormwater Flow Start Date/Time:	NA	3/2/14 7:00		
Stormwater Flow End Date/Time:	NA	3/3/14 9:30		
Storm Volume (gal):	NA	41987.0		

Sampling Information

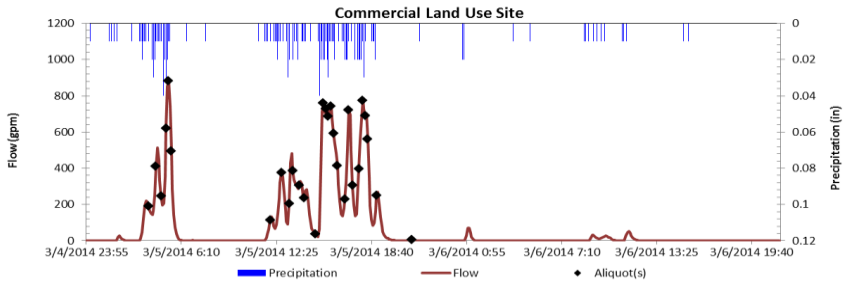
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	3/2/14 8:20		
Sample Flow End Date/Time:	NA	3/3/14 6:40		
Sample Event Volume (gal):	NA	39700.77		
Number of Aliquots:	≥ 7	20		
% Storm Sampled:	≥ 75	94.6		
Grab Sample Taken	Yes	No		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	63	J	1		10013	J	
Turbidity	NTU	37.7		0.2		NA		
pH	NA	7.61		NA		NA		
Conductivity	umhos/cm	26.7		2.0		NA		
BOD	mg/L	2	UJ	2.0		158.9	UJ	
Surfactants (MBAS)	mg/L	0.116		0.025		18.44		
Chloride	mg/L	0.79		0.2		126		
Hardness	mg/L	10.4		1		1653		
Nutrients								
Total Phosphorus	mg/L	0.145		0.01		23.0		
Orthophosphate	mg/L	0.016	J	0.01		2.5	J	
Total Kjeldahl Nitrogen	mg/L	0.94	J	0.5		149.4	J	
Nitrate+Nitrite	mg/L	0.154		0.01		24.5		
Metals								
Total Cu	ug/L	13.3		0.1		2.11		
Dissolved Cu	ug/L	3.39	J	0.1		0.54	J	
Total Zn	ug/L	71.4		5		11.35		
Dissolved Zinc	ug/L	19.4		1.0		3.08		
Total Cadmium	ug/L	0.088		0.2		0.014		
Diss. Cadmium	ug/L	0.016		0.1		0.003		
Total Lead	ug/L	8.13		0.1		1.292		
Dissolved Lead	ug/L	0.045		0.1		0.007		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.19		1		0.030		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.000	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.034	J	0.1		0.005	J	
Acenaphthylene	ug/L	0.019		0.1		0.003		
Benzo(b)fluoranthene	ug/L	0.092		0.1		0.015		
Acenaphthene	ug/L	0.005	UJ	0.1		0.000	UJ	
Fluorene	ug/L	0.017		0.1		0.003		
Benzo(k)fluoranthene	ug/L	0.019		0.1		0.003		
Phenanthrene	ug/L	0.11		0.1		0.017		
Anthracene	ug/L	0.018		0.1		0.003		
Fluoranthene	ug/L	0.14		0.1		0.022		
Pyrene	ug/L	0.2		0.1		0.032		
Indeno(1,2,3-cd)pyrene	ug/L	0.053		0.1		0.008		
Benzo(a)anthracene	ug/L	0.039	UJ	0.1		0.003	UJ	
Chrysene	ug/L	0.086		0.1		0.014		
Dibenzo(a,h)anthracene	ug/L	0.011		0.1		0.002		
Benzo(ghi)perylene	ug/L	0.13		0.1		0.021		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	6	J	1		0.954	J	
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L			500.00		NA		
Residual Range Organics	ug/L			1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #10: 3/5/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1402276

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	39.4		
Precipitation Total (in):	≥ 0.2	1.45		
Precipitation Start Date/Time:	NA	3/5/14 0:10		
Precipitation End Date/Time:	NA	3/6/14 21:30		
Stormwater Flow Start Date/Time:	NA	3/5/14 1:50		
Stormwater Flow End Date/Time:	NA	3/6/14 12:25		
Storm Volume (gal):	NA	194781.4		

Sampling Information

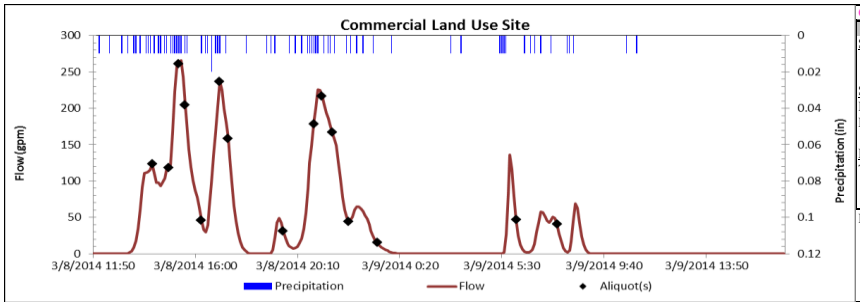
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	3/5/14 4:00		
Sample Flow End Date/Time:	NA	3/5/14 21:20		
Sample Event Volume (gal):	NA	190571.47		
Number of Aliquots:	≥ 7	28		
% Storm Sampled:	≥ 75	97.8		
Grab Sample Taken	Yes	no		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	139	J	1		102489	J	
Turbidity	NTU	37.9		0.2		NA		
pH	NA	7.3		NA		NA		
Conductivity	umhos/cm	18.2		2.0		NA		
BOD	mg/L	3.5		2.0		2580.6		
Surfactants (MBAS)	mg/L	0.084		0.025		61.94		
Chloride	mg/L	0.29		0.2		214		
Hardness	mg/L	14.8		1		10912		
Nutrients								
Total Phosphorus	mg/L	0.234		0.01		172.5		
Orthophosphate	mg/L	0.009		0.01		6.6		
Total Kjeldahl Nitrogen	mg/L	1.06	J	0.5		781.6	J	
Nitrate+Nitrite	mg/L	0.091		0.01		67.1		
Metals								
Total Cu	ug/L	18.4		0.1		13.57		
Dissolved Cu	ug/L	2.54	J	0.1		1.87	J	
Total Zn	ug/L	103		5		75.94		
Dissolved Zinc	ug/L	20.1		1.0		14.82		
Total Cadmium	ug/L	0.164		0.2		0.121		
Diss. Cadmium	ug/L	0.024		0.1		0.018		
Total Lead	ug/L	17.2		0.1		12.682		
Dissolved Lead	ug/L	0.042		0.1		0.031		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.092		1		0.068		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.001	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.031	J	0.1		0.023	J	
Acenaphthylene	ug/L	0.008		0.1		0.006		
Benzo(b)fluoranthene	ug/L	0.11		0.1		0.081		
Acenaphthene	ug/L	0.005		0.1		0.004		
Fluorene	ug/L	0.012		0.1		0.009		
Benzo(k)fluoranthene	ug/L	0.036		0.1		0.027		
Phenanthrene	ug/L	0.09		0.1		0.066		
Anthracene	ug/L	0.016		0.1		0.012		
Fluoranthene	ug/L	0.16		0.1		0.118		
Pyrene	ug/L	0.21		0.1		0.155		
Indeno(1,2,3-cd)pyrene	ug/L	0.071		0.1		0.052		
Benzo(a)anthracene	ug/L	0.048		0.1		0.035		
Chrysene	ug/L	0.16		0.1		0.118		
Dibenzo(a,h)anthracene	ug/L	0.016		0.1		0.012		
Benzo(ghi)perylene	ug/L	0.15		0.1		0.111		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	4.3		1		3.171		
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L			500.00		NA		
Residual Range Organics	ug/L			1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #11: 3/9/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1402379

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	44.6		
Precipitation Total (in):	≥ 0.2	0.71		
Precipitation Start Date/Time:	NA	3/8/14 12:05		
Precipitation End Date/Time:	NA	3/9/14 17:00		
Stormwater Flow Start Date/Time:	NA	3/8/14 13:15		
Stormwater Flow End Date/Time:	NA	3/9/14 11:15		
Storm Volume (gal):	NA	59799.8		

Sampling Information

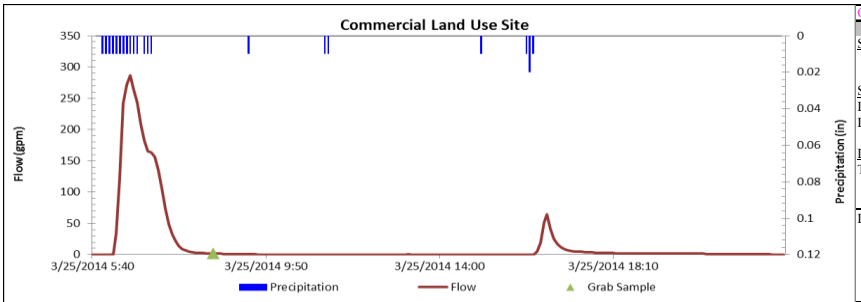
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	3/8/14 14:15		
Sample Flow End Date/Time:	NA	3/9/14 7:45		
Sample Event Volume (gal):	NA	58079.61		
Number of Aliquots:	≥ 7	15		
% Storm Sampled:	≥ 75	97.1		
Grab Sample Taken	Yes	no		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	50.5	J	1		11432	J	
Turbidity	NTU	21.4		0.2		NA		
pH	NA	7.54		NA		NA		
Conductivity	umhos/cm	22.9		2.0		NA		
BOD	mg/L	2	UJ	2.0		226.4	UJ	
Surfactants (MBAS)	mg/L	0.06		0.025		13.58		
Chloride	mg/L	0.45		0.2		102		
Hardness	mg/L	10.4		1		2354		
Nutrients								
Total Phosphorus	mg/L	0.125		0.01		28.3		
Orthophosphate	mg/L	0.004	UJ	0.01		0.5	UJ	
Total Kjeldahl Nitrogen	mg/L	1.18	J	0.5		267.1	J	
Nitrate+Nitrite	mg/L	0.106		0.01		24.0		
Metals								
Total Cu	ug/L	12.1	J	0.1		2.74	J	
Dissolved Cu	ug/L	4.24	J	0.1		0.96	J	
Total Zn	ug/L	55.3		5		12.52		
Dissolved Zinc	ug/L	21.1		1.0		4.78		
Total Cadmium	ug/L	0.079		0.2		0.018		
Diss. Cadmium	ug/L	0.02		0.1		0.005		
Total Lead	ug/L	6.83		0.1		1.546		
Dissolved Lead	ug/L	0.058		0.1		0.013		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.078	UJ	1		0.009	UJ	
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.000	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.05	J	0.1		0.011	J	
Acenaphthylene	ug/L	0.008		0.1		0.002		
Benzo(b)fluoranthene	ug/L	0.052		0.1		0.012		
Acenaphthene	ug/L	0.008		0.1		0.002		
Fluorene	ug/L	0.018		0.1		0.004		
Benzo(k)fluoranthene	ug/L	0.015		0.1		0.003		
Phenanthrene	ug/L	0.078		0.1		0.018		
Anthracene	ug/L	0.007		0.1		0.002		
Fluoranthene	ug/L	0.085		0.1		0.019		
Pyrene	ug/L	0.13		0.1		0.029		
Indeno(1,2,3-cd)pyrene	ug/L	0.034		0.1		0.008		
Benzo(a)anthracene	ug/L	0.023	UJ	0.1		0.003	UJ	
Chrysene	ug/L	0.079		0.1		0.018		
Dibenzo(a,h)anthracene	ug/L	0.007		0.1		0.002		
Benzo(ghi)perylene	ug/L	0.083		0.1		0.019		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	6.4	J	1		1.449	J	
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L			500.00		NA		
Residual Range Organics	ug/L			1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #12: 3/25/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1402929

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	131.17		
Precipitation Total (in):	≥ 0.2	0.22		
Precipitation Start Date/Time:	NA	3/25/14 5:55		
Precipitation End Date/Time:	NA	3/25/14 22:15		
Stormwater Flow Start Date/Time:	NA	3/25/14 6:10		
Stormwater Flow End Date/Time:	NA	3/25/14 22:50		
Storm Volume (gal):	NA	16041.3		

Sampling Information

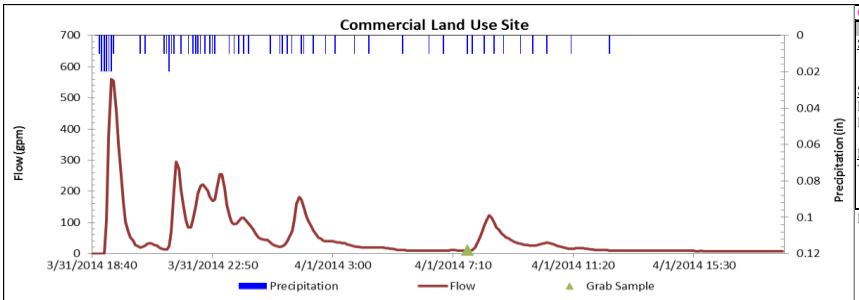
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥ 7	NA		
% Storm Sampled:	≥ 75	NA		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA			NA		NA		
Conductivity	umhos/cm			2.0		NA		
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	14		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	1100		500.00		NA		
Residual Range Organics	ug/L	1600		1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.054	UJ	0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #13: 4/1/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1403208

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	29		
Precipitation Total (in):	≥ 0.2	0.6		
Precipitation Start Date/Time:	NA	3/31/14 18:55		
Precipitation End Date/Time:	NA	4/1/14 18:35		
Stormwater Flow Start Date/Time:	NA	3/31/14 19:10		
Stormwater Flow End Date/Time:	NA	4/1/14 18:35		
Storm Volume (gal):	NA	73464.0		

Sampling Information

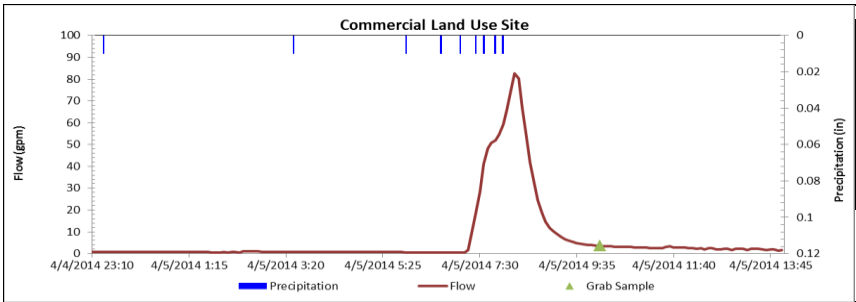
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥ 7	NA		
% Storm Sampled:	≥ 75	NA		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA			NA		NA		
Conductivity	umhos/cm			2.0		NA		
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	17		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	340	**J**	500.00		NA		
Residual Range Organics	ug/L	960	**J**	1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	**UJ**	0.50		NA		
Toluene	ug/L	1.1		0.50		NA		
Ethylbenzene	ug/L	0.8		0.50		NA		
m,p-Xylenes	ug/L	3.3		0.50		NA		
o-Xylene	ug/L	1.3		0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #14: 4/5/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1403431

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	26.72		
Precipitation Total (in):	≥ 0.2	0.09	j	
Precipitation Start Date/Time:	NA	4/4/14 23:25		
Precipitation End Date/Time:	NA	4/5/14 14:00		
Stormwater Flow Start Date/Time:	NA	4/5/14 2:25		
Stormwater Flow End Date/Time:	NA	4/5/14 14:00		
Storm Volume (gal):	NA	5928.5		

Sampling Information

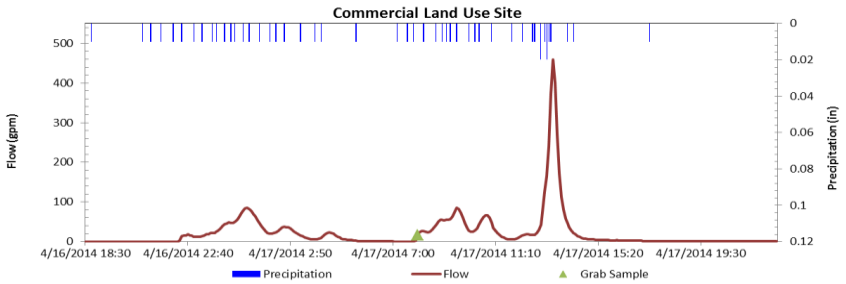
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥ 7	NA		
% Storm Sampled:	≥ 75	NA		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA			NA		NA		
Conductivity	umhos/cm			2.0		NA		
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	49		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	540	J	500.00		NA		
Residual Range Organics	ug/L	1300	J	1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.08		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.15		0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #15: 4/17/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1403817

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	209.9		
Precipitation Total (in):	≥ 0.2	0.5		
Precipitation Start Date/Time:	NA	4/16/14 18:45		
Precipitation End Date/Time:	NA	4/17/14 22:25		
Stormwater Flow Start Date/Time:	NA	4/16/14 22:20		
Stormwater Flow End Date/Time:	NA	4/17/14 21:00		
Storm Volume (gal):	NA	36523.8		

Sampling Information

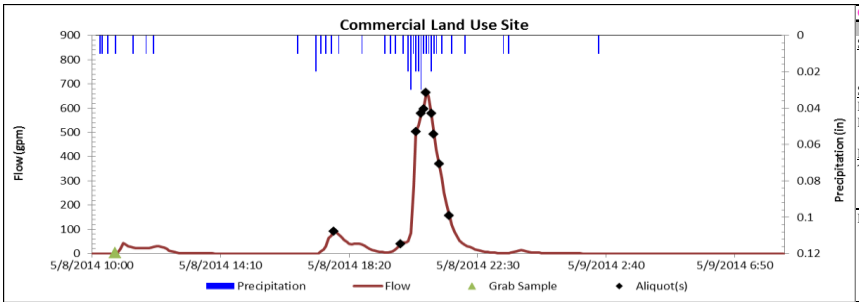
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥ 7	NA		
% Storm Sampled:	≥ 75	NA		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA			NA		NA		
Conductivity	umhos/cm			2.0		NA		
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	130		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	640	J	500.00		NA		
Residual Range Organics	ug/L	2300	J	1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.054	UJ	0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #16: 5/8/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1404622, K1404674

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	69.17		
Precipitation Total (in):	≥ 0.2	0.45		
Precipitation Start Date/Time:	NA	5/8/14 10:15		
Precipitation End Date/Time:	NA	5/9/14 8:25		
Stormwater Flow Start Date/Time:	NA	5/8/14 10:45		
Stormwater Flow End Date/Time:	NA	5/9/14 3:10		
Storm Volume (gal):	NA	45811.2		

Sampling Information

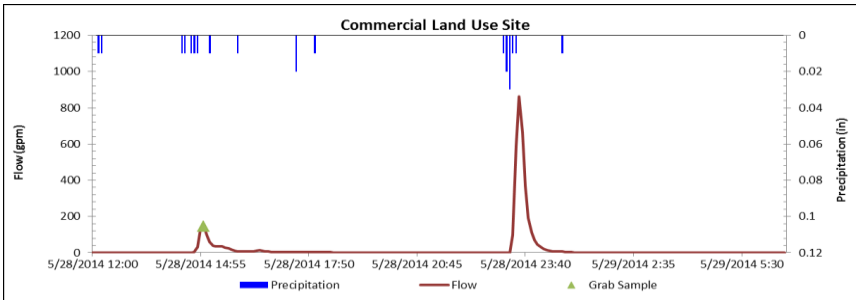
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	5/8/14 17:50		
Sample Flow End Date/Time:	NA	5/8/14 21:35		
Sample Event Volume (gal):	NA	42399.42		
Number of Aliquots:	≥ 7	10		
% Storm Sampled:	≥ 75	92.6		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

		EMC Concentration				Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	172	J	1		29827	J	
Turbidity	NTU	91		0.2		NA		
pH	NA	7.45		NA		NA		
Conductivity	umhos/cm	27.6		2.0		NA		
BOD	mg/L	13.2		2.0		2289.1		
Surfactants (MBAS)	mg/L	0.26		0.025		45.09		
Chloride	mg/L	0.64		0.2		111		
Hardness	mg/L	20		1		3468		
Nutrients								
Total Phosphorus	mg/L	0.333		0.01		57.7		
Orthophosphate	mg/L	0.012	J	0.01		2.1	J	
Total Kjeldahl Nitrogen	mg/L	5.8	J	0.5		1005.8	J	
Nitrate+Nitrite	mg/L	0.154		0.01		26.7		
Metals								
Total Cu	ug/L	26.3		0.1		4.56		
Dissolved Cu	ug/L	5.73	J	0.1		0.99	J	
Total Zn	ug/L	147		5		25.49		
Dissolved Zinc	ug/L	29.3		1.0		5.08		
Total Cadmium	ug/L	0.241		0.2		0.042		
Diss. Cadmium	ug/L	0.022		0.1		0.004		
Total Lead	ug/L	17.9		0.1		3.104		
Dissolved Lead	ug/L	0.072		0.1		0.012		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L	0.15	UJ	1		0.013	UJ	
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L	0.008		1		0.001		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.063	J	0.1		0.011	J	
Acenaphthylene	ug/L	0.025		0.1		0.004		
Benzo(b)fluoranthene	ug/L	0.087		0.1		0.015		
Acenaphthene	ug/L	0.009		0.1		0.002		
Fluorene	ug/L	0.01		0.1		0.002		
Benzo(k)fluoranthene	ug/L	0.025		0.1		0.004		
Phenanthrene	ug/L	0.094		0.1		0.016		
Anthracene	ug/L	0.021		0.1		0.004		
Fluoranthene	ug/L	0.12		0.1		0.021		
Pyrene	ug/L	0.21		0.1		0.036		
Indeno(1,2,3-cd)pyrene	ug/L	0.065		0.1		0.011		
Benzo(a)anthracene	ug/L	0.043		0.1		0.007		
Chrysene	ug/L	0.075		0.1		0.013		
Dibenzo(a,h)anthracene	ug/L	0.016		0.1		0.003		
Benzo(ghi)perylene	ug/L	0.14		0.1		0.024		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	5	J	1		0.867	J	
Microbial								
Fecal Coliform	MPN	350		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	1800	J	500.00		NA		
Residual Range Organics	ug/L	3000	J	1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.09		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #17: 5/28/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1405295

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	46.75		
Precipitation Total (in):	≥ 0.2	0.21		
Precipitation Start Date/Time:	NA	5/28/14 12:10		
Precipitation End Date/Time:	NA	5/29/14 6:40		
Stormwater Flow Start Date/Time:	NA	5/28/14 14:45		
Stormwater Flow End Date/Time:	NA	5/29/14 4:50		
Storm Volume (gal):	NA	19928.1		

Sampling Information

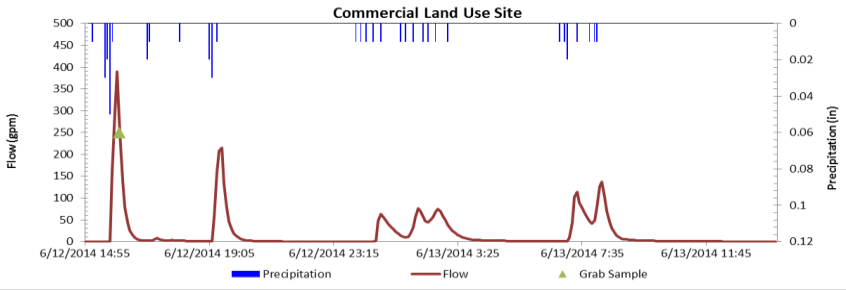
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥ 7	NA		
% Storm Sampled:	≥ 75	NA		
Grab Sample Taken	Yes	Yes		

QA Narrative associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA			NA		NA		
Conductivity	umhos/cm			2.0		NA		
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	1600		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	2400	**J**	500.00		NA		
Residual Range Organics	ug/L	4100	**J**	1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	**UJ**	0.50		NA		
Toluene	ug/L	2.3		0.50		NA		
Ethylbenzene	ug/L	0.05	**UJ**	0.50		NA		
m,p-Xylenes	ug/L	0.11	**UJ**	0.50		NA		
o-Xylene	ug/L	0.074	**UJ**	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data



COM WY2014 Storm #18: 6/12/2014

Site Information

Site Name: COM

Site Location
Latitude (DMS): 45° 40' 51.54"
Longitude (DMS): -122° 39' 41.14'

Drainage Area
Total (ac): 26.77

Lab Service Request Number: K1405939

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥ 24	350.5		
Precipitation Total (in):	≥ 0.2	0.42		
Precipitation Start Date/Time:	NA	6/12/14 15:10		
Precipitation End Date/Time:	NA	6/13/14 14:05		
Stormwater Flow Start Date/Time:	NA	6/12/14 15:45		
Stormwater Flow End Date/Time:	NA	6/13/14 14:00		
Storm Volume (gal):	NA	26596.0		

Sampling Information

	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥ 7	NA		
% Storm Sampled:	≥ 75	NA		
Grab Sample Taken	Yes	Yes		

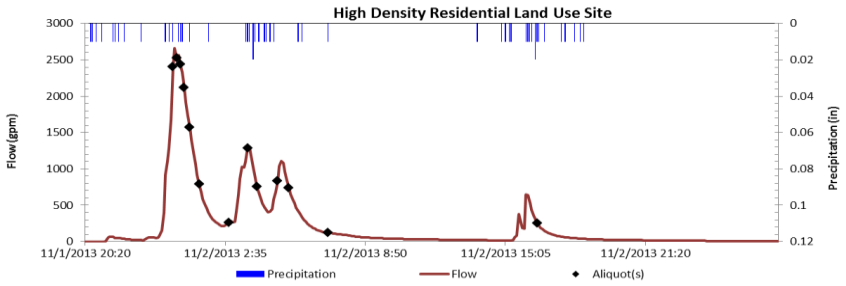
QA Narrative associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA			NA		NA		
Conductivity	umhos/cm			2.0		NA		
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Dissolved Mercury	ug/L	NA	**Dropped**	0.1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	220		2.0		NA		
Petroleum Hydrocarbons								
Diesel Range Organics	ug/L	3200	J	500.00		NA		
Residual Range Organics	ug/L	4900		1100.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	7.3		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable;
Dropped = Analyte dropped from list of anaalyses due to two (+) years of non-detect data

Appendix 2B Water Year 2014 High Density Residential Site Individual Storm Reports



HDR WY2014 Storm #1: 11/1/2013

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1311973

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	35.8		
Precipitation Total (in):	≥0.2	0.66		
Precipitation Start Date/Time:	NA	11/1/13 20:35		
Precipitation End Date/Time:	NA	11/3/13 3:15		
Stormwater Flow Start Date/Time:	NA	11/1/13 21:15		
Stormwater Flow End Date/Time:	NA	11/3/13 4:45		
Storm Volume (gal):	NA	410264.8		

Sampling Information

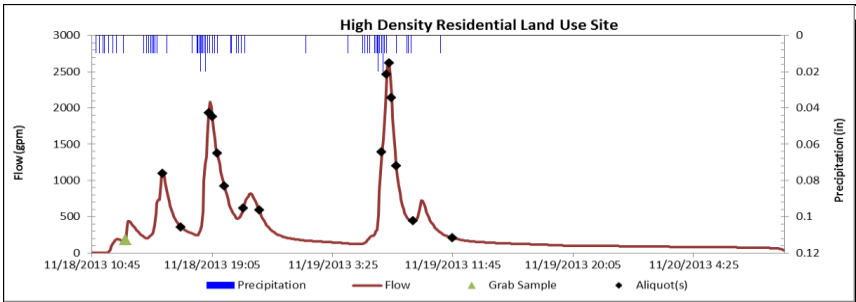
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	11/2/13 0:15		
Sample Flow End Date/Time:	NA	11/2/13 16:30		
Sample Event Volume (gal):	NA	410310.04		
Number of Aliquots:	≥7	13		
% Storm Sampled:	≥75	95.5		
Grab Sample Taken	Yes	no		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	30	J	1		46591	J	
Turbidity	NTU	7.73		0.2		NA		
pH	NA	7.89						
Conductivity	umhos/cm	36.1						
BOD	mg/L	5.1		2.0		7920.4		
Surfactants (MBAS)	mg/L	0.084		0.025		130.45		
Chloride	mg/L	1.92		0.2		2982		
Hardness	mg/L	14.8		1		22985		
Nutrients								
Total Phosphorus	mg/L	0.185		0.01		287.3		
Orthophosphate	mg/L	0.116	J	0.01		180.2	J	
Total Kjeldahl Nitrogen	mg/L	1.04	J	0.5		1615.1	J	
Nitrate+Nitrite	mg/L	0.032		0.01		49.7		
Metals								
Total Cu	ug/L	10.2	J	0.1		15.84	J	
Dissolved Cu	ug/L	5.2	J	0.1		8.08	J	
Total Zn	ug/L	1570		5		2438.24		
Dissolved Zinc	ug/L	1260		1.0		1956.81		
Total Cadmium	ug/L	0.05		0.2		0.078		
Diss. Cadmium	ug/L	0.025		0.1		0.039		
Total Lead	ug/L	1.41		0.1		2.190		
Dissolved Lead	ug/L	0.116		0.1		0.180		
Total Mercury	ug/L	0.02	UJ	0.1		0.031	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.031	UJ	
Herbicides								
2,4-D	ug/L	1.51		1		2.345		
Dichlobenil	ug/L	0.07	UJ	1		0.109	UJ	
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.006	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.047		0.1		0.073		
Acenaphthylene	ug/L	0.015	UJ	0.1		0.023	UJ	
Benzo(b)fluoranthene	ug/L	0.017	UJ	0.1		0.026	UJ	
Acenaphthene	ug/L	0.026	UJ	0.1		0.040	UJ	
Fluorene	ug/L	0.027	UJ	0.1		0.042	UJ	
Benzo(k)fluoranthene	ug/L	0.024	UJ	0.1		0.037	UJ	
Phenanthrene	ug/L	0.022	UJ	0.1		0.034	UJ	
Anthracene	ug/L	0.024	UJ	0.1		0.037	UJ	
Fluoranthene	ug/L	0.02	UJ	0.1		0.031	UJ	
Pyrene	ug/L	0.025		0.1		0.039		
Indeno(1,2,3-cd)pyrene	ug/L	0.021	UJ	0.1		0.033	UJ	
Benzo(a)anthracene	ug/L	0.018	UJ	0.1		0.028	UJ	
Chrysene	ug/L	0.028	UJ	0.1		0.043	UJ	
Dibenzo(a,h)anthracene	ug/L	0.017	UJ	0.1		0.026	UJ	
Benzo(ghi)perylene	ug/L	0.019	UJ	0.1		0.030	UJ	
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	3.3	J	1		5.125	J	
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L			500.00		NA		
TPH - Oil	ug/L			500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #2: 11/18/2013

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1312599, K1312675

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	48.5		
Precipitation Total (in):	≥0.2	0.61		
Precipitation Start Date/Time:	NA	11/18/13 11:00		
Precipitation End Date/Time:	NA	11/19/13 16:55		
Stormwater Flow Start Date/Time:	NA	11/18/13 11:50		
Stormwater Flow End Date/Time:	NA	11/20/13 10:40		
Storm Volume (gal):	NA	858460.3		

Sampling Information

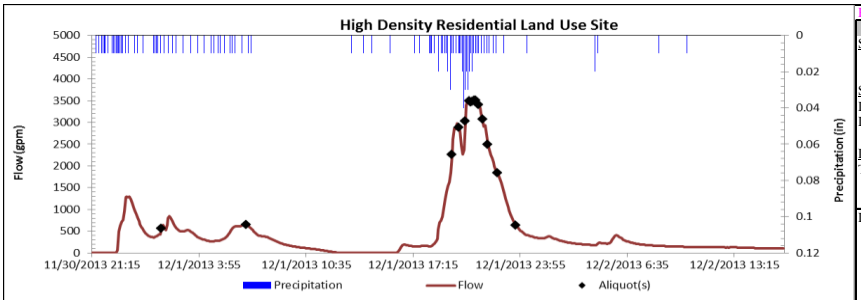
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	11/18/13 15:40		
Sample Flow End Date/Time:	NA	11/19/13 11:45		
Sample Event Volume (gal):	NA	718785.14		
Number of Aliquots:	≥7	15		
% Storm Sampled:	≥75	83.7		
Grab Sample Taken	Yes	Yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	20.5	J	1		66617	J	
Turbidity	NTU	5.38		0.2		NA		
pH	NA	7.2				NA		
Conductivity	umhos/cm	29.3				NA		
BOD	mg/L	2	UJ	2.0		6499.3	UJ	
Surfactants (MBAS)	mg/L	0.05		0.025		162.48		
Chloride	mg/L	0.82		0.2		2665		
Hardness	mg/L	12.4		1		40295		
Nutrients								
Total Phosphorus	mg/L	0.175		0.01		568.7		
Orthophosphate	mg/L	0.108	J	0.01		351.0	J	
Total Kjeldahl Nitrogen	mg/L	0.59	J	0.5		1917.3	J	
Nitrate+Nitrite	mg/L	0.068		0.01		221.0		
Metals								
Total Cu	ug/L	9.93	J	0.1		32.27	J	
Dissolved Cu	ug/L	5.9	J	0.1		19.17	J	
Total Zn	ug/L	659		5		2141.50		
Dissolved Zinc	ug/L	559		1.0		1816.54		
Total Cadmium	ug/L	0.034		0.2		0.110		
Diss. Cadmium	ug/L	0.023		0.1		0.075		
Total Lead	ug/L	1.09		0.1		3.542		
Dissolved Lead	ug/L	0.084		0.1		0.273		
Total Mercury	ug/L	0.02	UJ	0.1		0.065	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.065	UJ	
Herbicides								
2,4-D	ug/L	0.12		1		0.390		
Dichlobenil	ug/L	0.016		1		0.052		
Insecticides								
Carbaryl	ug/L	0.004		1		0.014		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.041		0.1		0.133		
Acenaphthylene	ug/L	0.015	UJ	0.1		0.049	UJ	
Benzo(b)fluoranthene	ug/L	0.017	UJ	0.1		0.055	UJ	
Acenaphthene	ug/L	0.026	UJ	0.1		0.084	UJ	
Fluorene	ug/L	0.027	UJ	0.1		0.088	UJ	
Benzo(k)fluoranthene	ug/L	0.024	UJ	0.1		0.078	UJ	
Phenanthrene	ug/L	0.022	UJ	0.1		0.071	UJ	
Anthracene	ug/L	0.024	UJ	0.1		0.078	UJ	
Fluoranthene	ug/L	0.02	UJ	0.1		0.065	UJ	
Pyrene	ug/L	0.02		0.1		0.065		
Indeno(1,2,3-cd)pyrene	ug/L	0.021	UJ	0.1		0.068	UJ	
Benzo(a)anthracene	ug/L	0.018	UJ	0.1		0.058	UJ	
Chrysene	ug/L	0.028	UJ	0.1		0.091	UJ	
Dibenzo(a,h)anthracene	ug/L	0.017	UJ	0.1		0.055	UJ	
Benzo(ghi)perylene	ug/L	0.019	UJ	0.1		0.062	UJ	
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	3.6	J	1		11.699	J	
Microbial								
Fecal Coliform	MPN	350		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	340		500.00		NA		
TPH - Oil	ug/L	530		500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.18		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #3: 12/1/2013

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1313064

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	24.1		
Precipitation Total (in):	≥0.2	1.08		
Precipitation Start Date/Time:	NA	11/30/13 21:30		
Precipitation End Date/Time:	NA	12/2/13 16:20		
Stormwater Flow Start Date/Time:	NA	11/30/13 22:45		
Stormwater Flow End Date/Time:	NA	12/2/13 18:05		
Storm Volume (gal):	NA	1219062.4		

Sampling Information

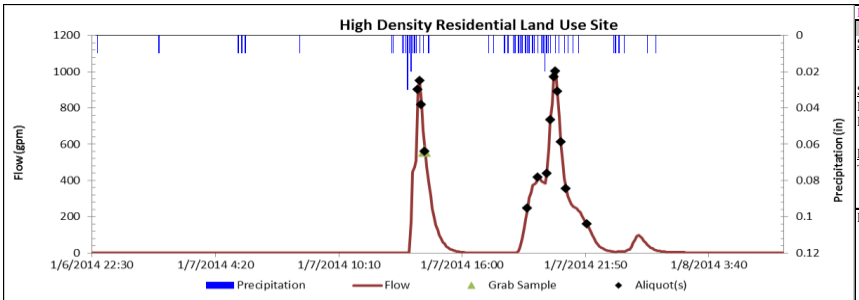
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	12/1/13 1:30		
Sample Flow End Date/Time:	NA	12/1/13 23:40		
Sample Event Volume (gal):	NA	1000509.8		
Number of Aliquots:	≥7	15		
% Storm Sampled:	≥75	82.1		
Grab Sample Taken	Yes	No		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	45	J	1		207659	J	
Turbidity	NTU	9.64		0.2		NA		
pH	NA	7.29				NA		
Conductivity	umhos/cm	22.6				NA		
BOD	mg/L	2	UJ	2.0		9229.3	UJ	
Surfactants (MBAS)	mg/L	0.05	UJ	0.025		230.73	UJ	
Chloride	mg/L	0.55		0.2		2538		
Hardness	mg/L	12		1		55376		
Nutrients								
Total Phosphorus	mg/L	0.173		0.01		798.3		
Orthophosphate	mg/L	0.064	J	0.01		295.3	J	
Total Kjeldahl Nitrogen	mg/L	0.75	J	0.5		3461.0	J	
Nitrate+Nitrite	mg/L	0.097		0.01		447.6		
Metals								
Total Cu	ug/L	10.4	J	0.1		47.99	J	
Dissolved Cu	ug/L	3.92	J	0.1		18.09	J	
Total Zn	ug/L	475		5		2191.96		
Dissolved Zinc	ug/L	254		1.0		1172.12		
Total Cadmium	ug/L	0.051		0.2		0.235		
Diss. Cadmium	ug/L	0.008		0.1		0.037		
Total Lead	ug/L	2.01		0.1		9.275		
Dissolved Lead	ug/L	0.031		0.1		0.143		
Total Mercury	ug/L	0.02	UJ	0.1		0.092	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.092	UJ	
Herbicides								
2,4-D	ug/L	0.15		1		0.692		
Dichlobenil	ug/L	0.023		1		0.106		
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.018	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.01		0.1		0.045		
Acenaphthylene	ug/L	0.005		0.1		0.021		
Benzo(b)fluoranthene	ug/L	0.016		0.1		0.074		
Acenaphthene	ug/L	0.005	UJ	0.1		0.024	UJ	
Fluorene	ug/L	0.005		0.1		0.023		
Benzo(k)fluoranthene	ug/L	0.005		0.1		0.021		
Phenanthrene	ug/L	0.022		0.1		0.102		
Anthracene	ug/L	0.004	UJ	0.1		0.019	UJ	
Fluoranthene	ug/L	0.021		0.1		0.097		
Pyrene	ug/L	0.024		0.1		0.111		
Indeno(1,2,3-cd)pyrene	ug/L	0.008		0.1		0.039		
Benzo(a)anthracene	ug/L	0.007	UJ	0.1		0.032	UJ	
Chrysene	ug/L	0.02		0.1		0.092		
Dibenzo(a,h)anthracene	ug/L	0.003		0.1		0.015		
Benzo(ghi)perylene	ug/L	0.017		0.1		0.078		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	2.5	J	1		11.537	J	
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L			500.00		NA		
TPH - Oil	ug/L			500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #4: 1/7/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1400196, K1400142

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	33.2		
Precipitation Total (in):	≥0.2	0.57		
Precipitation Start Date/Time:	NA	1/6/14 22:45		
Precipitation End Date/Time:	NA	1/8/14 7:10		
Stormwater Flow Start Date/Time:	NA	1/7/14 13:35		
Stormwater Flow End Date/Time:	NA	1/8/14 4:10		
Storm Volume (gal):	NA	124555.1		

Sampling Information

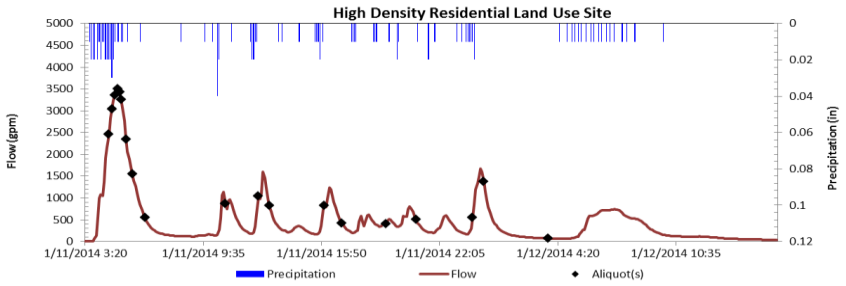
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	1/7/14 13:55		
Sample Flow End Date/Time:	NA	1/7/14 21:55		
Sample Event Volume (gal):	NA	115929.71		
Number of Aliquots:	≥7	14		
% Storm Sampled:	≥75	93.1		
Grab Sample Taken	Yes	yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	41.5	J	1		19567	J	
Turbidity	NTU	16.1		0.2		NA		
pH	NA	7.22						
Conductivity	umhos/cm	30.5						
BOD	mg/L	4.2		2.0		1980.3		
Surfactants (MBAS)	mg/L	0.092		0.025		43.38		
Chloride	mg/L	1.44		0.2		679		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L	0.146		0.01		68.8		
Orthophosphate	mg/L	0.022	J	0.01		10.4	J	
Total Kjeldahl Nitrogen	mg/L	0.75	J	0.5		353.6	J	
Nitrate+Nitrite	mg/L	0.134		0.01		63.2		
Metals								
Total Cu	ug/L	8.92	J	0.1		4.21	J	
Dissolved Cu	ug/L	3.17	J	0.1		1.49	J	
Total Zn	ug/L	840		5		396.05		
Dissolved Zinc	ug/L	665		1.0		313.54		
Total Cadmium	ug/L	0.057		0.2		0.027		
Diss. Cadmium	ug/L	0.022		0.1		0.010		
Total Lead	ug/L	2.09		0.1		0.985		
Dissolved Lead	ug/L	0.027		0.1		0.013		
Total Mercury	ug/L	0.02	UJ	0.1		0.009	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.009	UJ	
Herbicides								
2,4-D	ug/L	0.31		1		0.146		
Dichlobenil	ug/L	0.07	UJ	1		0.033	UJ	
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.002	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.083	J	0.1		0.039	J	
Acenaphthylene	ug/L	0.01		0.1		0.005		
Benzo(b)fluoranthene	ug/L	0.045		0.1		0.021		
Acenaphthene	ug/L	0.005		0.1		0.002		
Fluorene	ug/L	0.007		0.1		0.003		
Benzo(k)fluoranthene	ug/L	0.013		0.1		0.006		
Phenanthrene	ug/L	0.054		0.1		0.025		
Anthracene	ug/L	0.011		0.1		0.005		
Fluoranthene	ug/L	0.072		0.1		0.034		
Pyrene	ug/L	0.083		0.1		0.039		
Indeno(1,2,3-cd)pyrene	ug/L	0.024		0.1		0.011		
Benzo(a)anthracene	ug/L	0.025		0.1		0.012		
Chrysene	ug/L	0.04		0.1		0.019		
Dibenzo(a,h)anthracene	ug/L	0.003	UJ	0.1		0.001	UJ	
Benzo(ghi)perylene	ug/L	0.046		0.1		0.022		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	2.3	J	1		1.084	J	
Microbial								
Fecal Coliform	MPN	350		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	360		500.00		NA		
TPH - Oil	ug/L	1200		500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.18		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #5: 1/11/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1400352

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	32.8		
Precipitation Total (in):	≥0.2	1.01		
Precipitation Start Date/Time:	NA	1/11/14 3:35		
Precipitation End Date/Time:	NA	1/12/14 15:55		
Stormwater Flow Start Date/Time:	NA	1/11/14 3:45		
Stormwater Flow End Date/Time:	NA	1/13/14 2:35		
Storm Volume (gal):	NA	1004780.4		

Sampling Information

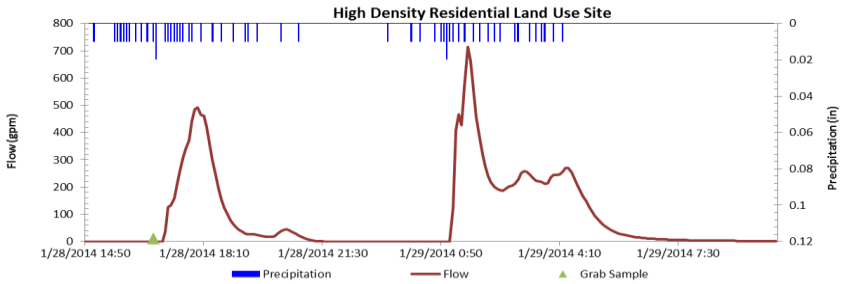
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	1/11/14 3:50		
Sample Flow End Date/Time:	NA	1/12/14 3:50		
Sample Event Volume (gal):	NA	814039.67		
Number of Aliquots:	≥7	19		
% Storm Sampled:	≥75	81.0		
Grab Sample Taken	Yes	no		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	43.5	J	1		165453	J	
Turbidity	NTU	10.8		0.2		NA		
pH	NA	7.46						
Conductivity	umhos/cm	36.9						
BOD	mg/L	2	UJ	2.0		7607.0	UJ	
Surfactants (MBAS)	mg/L	0.108		0.025		410.78		
Chloride	mg/L	4.1		0.2		15594		
Hardness	mg/L	10		1		38035		
Nutrients								
Total Phosphorus	mg/L	0.116		0.01		441.2		
Orthophosphate	mg/L	0.012	J	0.01		45.6	J	
Total Kjeldahl Nitrogen	mg/L	0.64	J	0.5		2434.2	J	
Nitrate+Nitrite	mg/L	0.06		0.01		228.2		
Metals								
Total Cu	ug/L	9.77	J	0.1		37.16	J	
Dissolved Cu	ug/L	4.16	J	0.1		15.82	J	
Total Zn	ug/L	194		5		737.88		
Dissolved Zinc	ug/L	131		1.0		498.26		
Total Cadmium	ug/L	0.046		0.2		0.175		
Diss. Cadmium	ug/L	0.016		0.1		0.061		
Total Lead	ug/L	1.91		0.1		7.265		
Dissolved Lead	ug/L	0.039		0.1		0.148		
Total Mercury	ug/L	0.02	UJ	0.1		0.076	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.076	UJ	
Herbicides								
2,4-D	ug/L	0.29		1		1.103		
Dichlobenil	ug/L	0.07	UJ	1		0.266	UJ	
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.015	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.2	J	0.1		0.761	J	
Acenaphthylene	ug/L	0.004	UJ	0.1		0.014	UJ	
Benzo(b)fluoranthene	ug/L	0.02		0.1		0.076		
Acenaphthene	ug/L	0.005	UJ	0.1		0.017	UJ	
Fluorene	ug/L	0.004	UJ	0.1		0.015	UJ	
Benzo(k)fluoranthene	ug/L	0.003	UJ	0.1		0.012	UJ	
Phenanthrene	ug/L	0.028		0.1		0.106		
Anthracene	ug/L	0.005		0.1		0.020		
Fluoranthene	ug/L	0.027		0.1		0.103		
Pyrene	ug/L	0.036		0.1		0.137		
Indeno(1,2,3-cd)pyrene	ug/L	0.012		0.1		0.046		
Benzo(a)anthracene	ug/L	0.009	UJ	0.1		0.035	UJ	
Chrysene	ug/L	0.028		0.1		0.106		
Dibenzo(a,h)anthracene	ug/L	0.003	UJ	0.1		0.010	UJ	
Benzo(ghi)perylene	ug/L	0.027		0.1		0.103		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	4.7		1		17.876		
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L			500.00		NA		
TPH - Oil	ug/L			500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #6: 1/28/2014

Site Information

Site Name

HDR

Site Location

Latitude (DMS): 45° 42' 5.96"

Longitude (DMS): -122° 42' 30.70"

Drainage Area

Total (ac): 238.65

Lab Service Request Number: K1400818

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	98.1		
Precipitation Total (in):	≥0.2	0.56		
Precipitation Start Date/Time:	NA	1/28/14 15:05		
Precipitation End Date/Time:	NA	1/29/14 10:15		
Stormwater Flow Start Date/Time:	NA	1/28/14 17:05		
Stormwater Flow End Date/Time:	NA	1/29/14 12:05		
Storm Volume (gal):	NA	105283.5		

Sampling Information

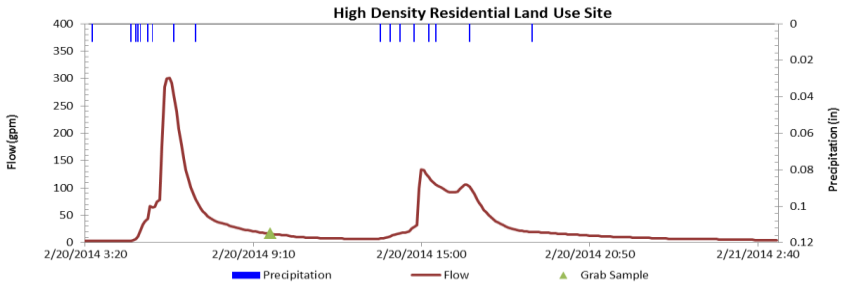
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥7	NA		
% Storm Sampled:	≥75	NA		
Grab Sample Taken	Yes	Yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA							
Conductivity	umhos/cm							
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L			0.1		NA		
Dissolved Mercury	ug/L			0.1		NA		
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L			1		NA		
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	1600		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	710		500.00		NA		
TPH - Oil	ug/L	1600		500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	**UJ**	0.50		NA		
Toluene	ug/L	0.18		0.50		NA		
Ethylbenzene	ug/L	0.05	**UJ**	0.50		NA		
m,p-Xylenes	ug/L	0.11	**UJ**	0.50		NA		
o-Xylene	ug/L	0.074	**UJ**	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #7: 2/20/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1401721

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	24.7		
Precipitation Total (in):	≥0.2	0.17	j	
Precipitation Start Date/Time:	NA	2/20/14 3:35		
Precipitation End Date/Time:	NA	2/21/14 2:50		
Stormwater Flow Start Date/Time:	NA	2/20/14 5:05		
Stormwater Flow End Date/Time:	NA	2/21/14 3:20		
Storm Volume (gal):	NA	49354.7		

Sampling Information

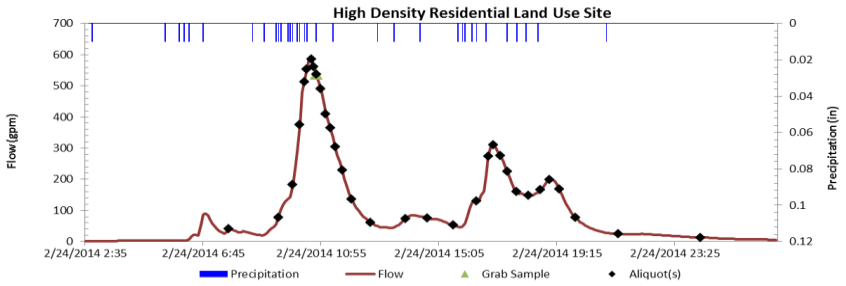
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥7	NA		
% Storm Sampled:	≥75	NA		
Grab Sample Taken	Yes	Yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA							
Conductivity	umhos/cm							
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L			0.1		NA		
Dissolved Mercury	ug/L			0.1		NA		
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L			1		NA		
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	1600		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	110		500.00		NA		
TPH - Oil	ug/L	350		500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.054	UJ	0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #8: 2/24/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1401847, K1401811

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	69.7		
Precipitation Total (in):	≥0.2	0.34		
Precipitation Start Date/Time:	NA	2/24/14 2:50		
Precipitation End Date/Time:	NA	2/25/14 3:00		
Stormwater Flow Start Date/Time:	NA	2/24/14 6:10		
Stormwater Flow End Date/Time:	NA	2/25/14 4:30		
Storm Volume (gal):	NA	124692.8		

Sampling Information

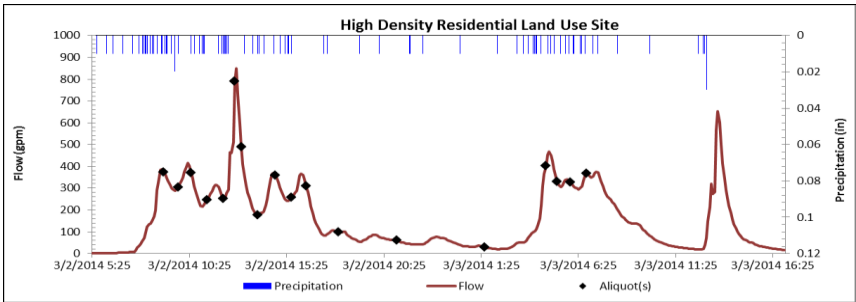
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	2/24/14 7:40		
Sample Flow End Date/Time:	NA	2/25/14 0:20		
Sample Event Volume (gal):	NA	122869.21		
Number of Aliquots:	≥7	32		
% Storm Sampled:	≥75	98.5		
Grab Sample Taken	Yes	yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	5.5	J	1		2596	J	
Turbidity	NTU	8.02		0.2		NA		
pH	NA	7.67						
Conductivity	umhos/cm	33.8						
BOD	mg/L	2		2.0		944.0		
Surfactants (MBAS)	mg/L	0.12		0.025		56.64		
Chloride	mg/L	0.84		0.2		396		
Hardness	mg/L	10.4		1		4909		
Nutrients								
Total Phosphorus	mg/L	0.061		0.01		28.8		
Orthophosphate	mg/L	0.03	J	0.01		14.2	J	
Total Kjeldahl Nitrogen	mg/L	0.71	J	0.5		335.1	J	
Nitrate+Nitrite	mg/L	0.174		0.01		82.1		
Metals								
Total Cu	ug/L	7.22	J	0.1		3.41	J	
Dissolved Cu	ug/L	4.33	J	0.1		2.04	J	
Total Zn	ug/L	87.8		5		41.44		
Dissolved Zinc	ug/L	71.7		1.0		33.84		
Total Cadmium	ug/L	0.024		0.2		0.011		
Diss. Cadmium	ug/L	0.013		0.1		0.006		
Total Lead	ug/L	0.724		0.1		0.342		
Dissolved Lead	ug/L	0.031		0.1		0.015		
Total Mercury	ug/L	0.02	UJ	0.1		0.009	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.009	UJ	
Herbicides								
2,4-D	ug/L	0.12		1		0.057		
Dichlobenil	ug/L	0.075		1		0.035		
Insecticides								
Carbaryl	ug/L	0.006		1		0.003		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.12	J	0.1		0.057	J	
Acenaphthylene	ug/L	0.003	UJ	0.1		0.002	UJ	
Benzo(b)fluoranthene	ug/L	0.006		0.1		0.003		
Acenaphthene	ug/L	0.004	UJ	0.1		0.002	UJ	
Fluorene	ug/L	0.004	UJ	0.1		0.002	UJ	
Benzo(k)fluoranthene	ug/L	0.003	UJ	0.1		0.001	UJ	
Phenanthrene	ug/L	0.013		0.1		0.006		
Anthracene	ug/L	0.004	UJ	0.1		0.002	UJ	
Fluoranthene	ug/L	0.011		0.1		0.005		
Pyrene	ug/L	0.015		0.1		0.007		
Indeno(1,2,3-cd)pyrene	ug/L	0.004		0.1		0.002		
Benzo(a)anthracene	ug/L	0.009		0.1		0.004		
Chrysene	ug/L	0.005		0.1		0.002		
Dibenzo(a,h)anthracene	ug/L	0.003	UJ	0.1		0.001	UJ	
Benzo(ghi)perylene	ug/L	0.009		0.1		0.004		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	3	J	1		1.416	J	
Microbial								
Fecal Coliform	MPN	1600		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	250		500.00		NA		
TPH - Oil	ug/L	590		500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.054	UJ	0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #9: 3/2/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1402049

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	44.0		
Precipitation Total (in):	≥0.2	0.77		
Precipitation Start Date/Time:	NA	3/2/14 5:40		
Precipitation End Date/Time:	NA	3/3/14 19:00		
Stormwater Flow Start Date/Time:	NA	3/2/14 6:40		
Stormwater Flow End Date/Time:	NA	3/4/14 2:00		
Storm Volume (gal):	NA	340939.3		

Sampling Information

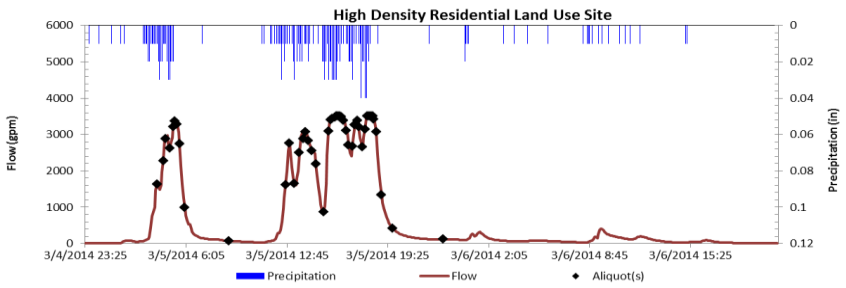
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	3/2/14 9:05		
Sample Flow End Date/Time:	NA	3/3/14 6:50		
Sample Event Volume (gal):	NA	253673.28		
Number of Aliquots:	≥7	18		
% Storm Sampled:	≥75	74.4	j	captured 100% of first 24hr
Grab Sample Taken	Yes	no		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	9	J	1		11615	J	
Turbidity	NTU	7.85		0.2		NA		
pH	NA	7.59						
Conductivity	umhos/cm	25.7						
BOD	mg/L	4.1		2.0		5291.4		
Surfactants (MBAS)	mg/L	0.05	UJ	0.025		64.53	UJ	
Chloride	mg/L	0.61		0.2		787		
Hardness	mg/L	8.4		1		10841		
Nutrients								
Total Phosphorus	mg/L	0.073		0.01		94.2		
Orthophosphate	mg/L	0.027	J	0.01		34.8	J	
Total Kjeldahl Nitrogen	mg/L	0.62	J	0.5		800.2	J	
Nitrate+Nitrite	mg/L	0.167		0.01		215.5		
Metals								
Total Cu	ug/L	6.48	J	0.1		8.36	J	
Dissolved Cu	ug/L	3.95	J	0.1		5.10	J	
Total Zn	ug/L	108		5		139.38		
Dissolved Zinc	ug/L	87.3		1.0		112.67		
Total Cadmium	ug/L	0.022		0.2		0.028		
Diss. Cadmium	ug/L	0.01		0.1		0.013		
Total Lead	ug/L	0.754		0.1		0.973		
Dissolved Lead	ug/L	0.021		0.1		0.027		
Total Mercury	ug/L	0.02	UJ	0.1		0.026	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.026	UJ	
Herbicides								
2,4-D	ug/L	0.14		1		0.181		
Dichlobenil	ug/L	0.23		1		0.297		
Insecticides								
Carbaryl	ug/L	0.004	UJ	1		0.005	UJ	
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.044	J	0.1		0.057	J	
Acenaphthylene	ug/L	0.005		0.1		0.007		
Benzo(b)fluoranthene	ug/L	0.007		0.1		0.009		
Acenaphthene	ug/L	0.004	UJ	0.1		0.006	UJ	
Fluorene	ug/L	0.004	UJ	0.1		0.005	UJ	
Benzo(k)fluoranthene	ug/L	0.003	UJ	0.1		0.004	UJ	
Phenanthrene	ug/L	0.015		0.1		0.019		
Anthracene	ug/L	0.004	UJ	0.1		0.005	UJ	
Fluoranthene	ug/L	0.013		0.1		0.017		
Pyrene	ug/L	0.016		0.1		0.021		
Indeno(1,2,3-cd)pyrene	ug/L	0.003	UJ	0.1		0.003	UJ	
Benzo(a)anthracene	ug/L	0.005	UJ	0.1		0.006	UJ	
Chrysene	ug/L	0.011		0.1		0.014		
Dibenzo(a,h)anthracene	ug/L	0.003	UJ	0.1		0.003	UJ	
Benzo(ghi)perylene	ug/L	0.008		0.1		0.010		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	2	J	1		2.581	J	
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L			500.00		NA		
TPH - Oil	ug/L			500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #10: 3/5/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1402280

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	34.7		
Precipitation Total (in):	≥0.2	1.82		
Precipitation Start Date/Time:	NA	3/4/14 23:40		
Precipitation End Date/Time:	NA	3/6/14 21:20		
Stormwater Flow Start Date/Time:	NA	3/5/14 1:45		
Stormwater Flow End Date/Time:	NA	3/7/14 0:50		
Storm Volume (gal):	NA	1593198.9		

Sampling Information

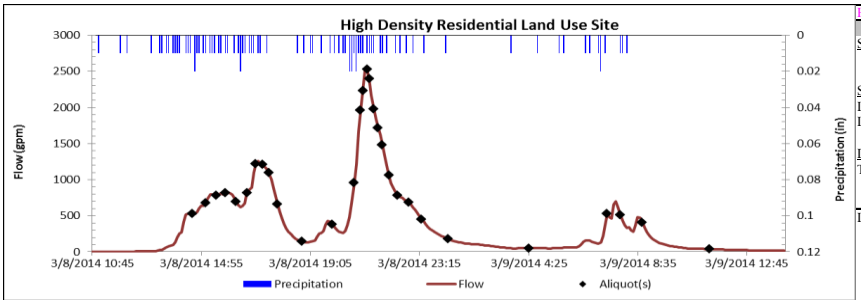
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	3/5/14 4:10		
Sample Flow End Date/Time:	NA	3/5/14 23:05		
Sample Event Volume (gal):	NA	1472087.59		
Number of Aliquots:	≥7	49		
% Storm Sampled:	≥75	92.4		
Grab Sample Taken	Yes	no		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	38	J	1		229175	J	
Turbidity	NTU	19.5		0.2		NA		
pH	NA	7.4						
Conductivity	umhos/cm	18.5						
BOD	mg/L	2.1		2.0		12664.9		
Surfactants (MBAS)	mg/L	0.052		0.025		313.61		
Chloride	mg/L	0.22		0.2		1327		
Hardness	mg/L	9.2		1		55484		
Nutrients								
Total Phosphorus	mg/L	0.162		0.01		977.0		
Orthophosphate	mg/L	0.055	J	0.01		331.7	J	
Total Kjeldahl Nitrogen	mg/L	0.81	J	0.5		4885.0	J	
Nitrate+Nitrite	mg/L	0.104		0.01		627.2		
Metals								
Total Cu	ug/L	9.08	J	0.1		54.76	J	
Dissolved Cu	ug/L	3.84	J	0.1		23.16	J	
Total Zn	ug/L	153		5		922.73		
Dissolved Zinc	ug/L	99.5		1.0		600.08		
Total Cadmium	ug/L	0.032		0.2		0.193		
Diss. Cadmium	ug/L	0.011		0.1		0.066		
Total Lead	ug/L	2.04		0.1		12.303		
Dissolved Lead	ug/L	0.088		0.1		0.531		
Total Mercury	ug/L	0.02	UJ	0.1		0.121	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.121	UJ	
Herbicides								
2,4-D	ug/L	0.14		1		0.844		
Dichlobenil	ug/L	0.19		1		1.146		
Insecticides								
Carbaryl	ug/L	0.013		1		0.078		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.009		0.1		0.052		
Acenaphthylene	ug/L	0.003	UJ	0.1		0.021	UJ	
Benzo(b)fluoranthene	ug/L	0.011		0.1		0.066		
Acenaphthene	ug/L	0.004	UJ	0.1		0.027	UJ	
Fluorene	ug/L	0.004	UJ	0.1		0.023	UJ	
Benzo(k)fluoranthene	ug/L	0.003		0.1		0.019		
Phenanthrene	ug/L	0.015		0.1		0.090		
Anthracene	ug/L	0.004	UJ	0.1		0.022	UJ	
Fluoranthene	ug/L	0.016		0.1		0.096		
Pyrene	ug/L	0.016		0.1		0.096		
Indeno(1,2,3-cd)pyrene	ug/L	0.006		0.1		0.037		
Benzo(a)anthracene	ug/L	0.004	UJ	0.1		0.024	UJ	
Chrysene	ug/L	0.015		0.1		0.090		
Dibenzo(a,h)anthracene	ug/L	0.003	UJ	0.1		0.015	UJ	
Benzo(ghi)perylene	ug/L	0.014		0.1		0.084		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	2	J	1		12.062	J	
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L			500.00		NA		
TPH - Oil	ug/L			500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #11: 3/9/2014

Site Information

Site Name
HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1402378

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	37.7		
Precipitation Total (in):	≥0.2	0.86		
Precipitation Start Date/Time:	NA	3/8/14 11:00		
Precipitation End Date/Time:	NA	3/9/14 14:10		
Stormwater Flow Start Date/Time:	NA	3/8/14 12:20		
Stormwater Flow End Date/Time:	NA	3/9/14 22:05		
Storm Volume (gal):	NA	542196.2		

Sampling Information

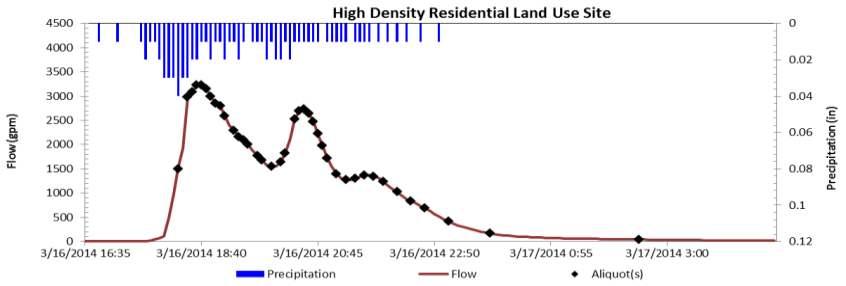
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	3/8/14 14:35		
Sample Flow End Date/Time:	NA	3/9/14 11:20		
Sample Event Volume (gal):	NA	535116.86		
Number of Aliquots:	≥7	30		
% Storm Sampled:	≥75	98.7		
Grab Sample Taken	Yes	no		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	10	J	1		20524	J	
Turbidity	NTU	9.26		0.2		NA		
pH	NA	7.41						
Conductivity	umhos/cm	24.2						
BOD	mg/L	2	UJ	2.0		4104.9	UJ	
Surfactants (MBAS)	mg/L	0.05	UJ	0.025		102.62	UJ	
Chloride	mg/L	0.44		0.2		903		
Hardness	mg/L	9.2		1		18882		
Nutrients								
Total Phosphorus	mg/L	0.083		0.01		170.4		
Orthophosphate	mg/L	0.028	J	0.01		57.5	J	
Total Kjeldahl Nitrogen	mg/L	0.9	J	0.5		1847.2	J	
Nitrate+Nitrite	mg/L	0.109		0.01		223.7		
Metals								
Total Cu	ug/L	7.48	J	0.1		15.35	J	
Dissolved Cu	ug/L	4.91	J	0.1		10.08	J	
Total Zn	ug/L	135		5		277.08		
Dissolved Zinc	ug/L	112		1.0		229.87		
Total Cadmium	ug/L	0.017		0.2		0.035		
Diss. Cadmium	ug/L	0.016		0.1		0.033		
Total Lead	ug/L	0.728		0.1		1.494		
Dissolved Lead	ug/L	0.035		0.1		0.072		
Total Mercury	ug/L	0.02	UJ	0.1		0.041	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.041	UJ	
Herbicides								
2,4-D	ug/L	0.15		1		0.308		
Dichlobenil	ug/L	0.14		1		0.287		
Insecticides								
Carbaryl	ug/L	0.008		1		0.015		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.034	J	0.1		0.070	J	
Acenaphthylene	ug/L	0.003	UJ	0.1		0.007	UJ	
Benzo(b)fluoranthene	ug/L	0.004	UJ	0.1		0.008	UJ	
Acenaphthene	ug/L	0.004	UJ	0.1		0.009	UJ	
Fluorene	ug/L	0.004	UJ	0.1		0.008	UJ	
Benzo(k)fluoranthene	ug/L	0.003	UJ	0.1		0.006	UJ	
Phenanthrene	ug/L	0.01		0.1		0.019		
Anthracene	ug/L	0.004	UJ	0.1		0.007	UJ	
Fluoranthene	ug/L	0.01	UJ	0.1		0.021	UJ	
Pyrene	ug/L	0.007		0.1		0.014		
Indeno(1,2,3-cd)pyrene	ug/L	0.003	UJ	0.1		0.005	UJ	
Benzo(a)anthracene	ug/L	0.003	UJ	0.1		0.005	UJ	
Chrysene	ug/L	0.005		0.1		0.010		
Dibenzo(a,h)anthracene	ug/L	0.003		0.1		0.005		
Benzo(ghi)perylene	ug/L	0.004		0.1		0.008		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	3	J	1		6.157	J	
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L			500.00		NA		
TPH - Oil	ug/L			500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #12: 3/17/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1402614

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	54.5		
Precipitation Total (in):	≥0.2	0.79		
Precipitation Start Date/Time:	NA	3/16/14 16:50		
Precipitation End Date/Time:	NA	3/17/14 4:55		
Stormwater Flow Start Date/Time:	NA	3/16/14 17:20		
Stormwater Flow End Date/Time:	NA	3/17/14 9:50		
Storm Volume (gal):	NA	553015.4		

Sampling Information

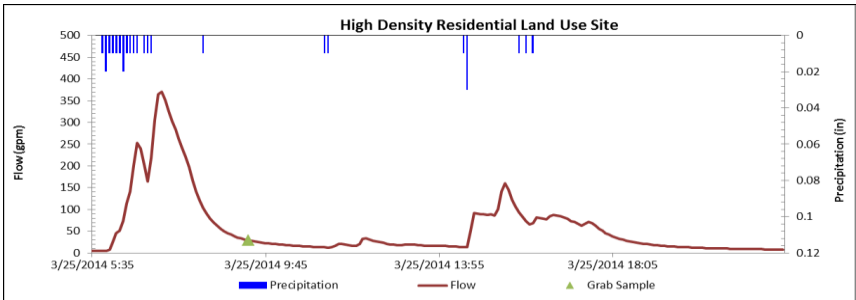
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	3/16/14 18:15		
Sample Flow End Date/Time:	NA	3/17/14 2:30		
Sample Event Volume (gal):	NA	546233.82		
Number of Aliquots:	≥7	42		
% Storm Sampled:	≥75	98.8		
Grab Sample Taken	Yes	no		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	14	J	1		29307	J	
Turbidity	NTU	11.5		0.2		NA		
pH	NA	7.31						
Conductivity	umhos/cm	24.9						
BOD	mg/L	3.5		2.0		7326.9		
Surfactants (MBAS)	mg/L	0.05	UJ	0.025		104.67	UJ	
Chloride	mg/L	0.59		0.2		1235		
Hardness	mg/L	8.8		1		18422		
Nutrients								
Total Phosphorus	mg/L	0.108		0.01		226.1		
Orthophosphate	mg/L	0.033	J	0.01		69.1	J	
Total Kjeldahl Nitrogen	mg/L	0.71	J	0.5		1486.3	J	
Nitrate+Nitrite	mg/L	0.108		0.01		226.1		
Metals								
Total Cu	ug/L	7.25	J	0.1		15.18	J	
Dissolved Cu	ug/L	4.15	J	0.1		8.69	J	
Total Zn	ug/L	698		5		1461.19		
Dissolved Zinc	ug/L	620		1.0		1297.90		
Total Cadmium	ug/L	0.031		0.2		0.065		
Diss. Cadmium	ug/L	0.017		0.1		0.036		
Total Lead	ug/L	1.25		0.1		2.617		
Dissolved Lead	ug/L	0.022		0.1		0.046		
Total Mercury	ug/L	0.02	UJ	0.1		0.042	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.042	UJ	
Herbicides								
2,4-D	ug/L	0.56		1		1.172		
Dichlobenil	ug/L	2.2		1		4.605		
Insecticides								
Carbaryl	ug/L	0.004		1		0.009		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.12	J	0.1		0.251	J	
Acenaphthylene	ug/L	0.003	UJ	0.1		0.007	UJ	
Benzo(b)fluoranthene	ug/L	0.011		0.1		0.023		
Acenaphthene	ug/L	0.004	UJ	0.1		0.009	UJ	
Fluorene	ug/L	0.004	UJ	0.1		0.008	UJ	
Benzo(k)fluoranthene	ug/L	0.006		0.1		0.012		
Phenanthrene	ug/L	0.014		0.1		0.029		
Anthracene	ug/L	0.004	UJ	0.1		0.008	UJ	
Fluoranthene	ug/L	0.012		0.1		0.025		
Pyrene	ug/L	0.014		0.1		0.029		
Indeno(1,2,3-cd)pyrene	ug/L	0.008		0.1		0.016		
Benzo(a)anthracene	ug/L	0.006		0.1		0.012		
Chrysene	ug/L	0.008		0.1		0.016		
Dibenzo(a,h)anthracene	ug/L	0.005		0.1		0.011		
Benzo(ghi)perylene	ug/L	0.014		0.1		0.029		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	2.8	J	1		5.861	J	
Microbial								
Fecal Coliform	MPN			2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L			500.00		NA		
TPH - Oil	ug/L			500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L			0.50		NA		
Toluene	ug/L			0.50		NA		
Ethylbenzene	ug/L			0.50		NA		
m,p-Xylenes	ug/L			0.50		NA		
o-Xylene	ug/L			0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #13: 3/25/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1402930

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	131.9		
Precipitation Total (in):	≥0.2	0.26		
Precipitation Start Date/Time:	NA	3/25/14 5:50		
Precipitation End Date/Time:	NA	3/25/14 22:10		
Stormwater Flow Start Date/Time:	NA	3/25/14 6:00		
Stormwater Flow End Date/Time:	NA	3/25/14 22:10		
Storm Volume (gal):	NA	59926.6		

Sampling Information

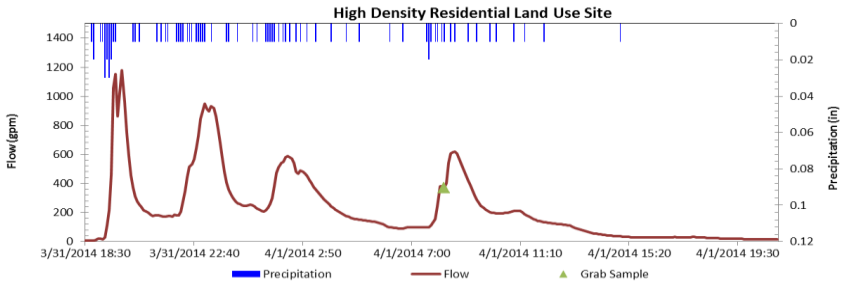
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥7	NA		
% Storm Sampled:	≥75	NA		
Grab Sample Taken	Yes	yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA							
Conductivity	umhos/cm							
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L			0.1		NA		
Dissolved Mercury	ug/L			0.1		NA		
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L			1		NA		
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	1600		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	1400		500.00		NA		
TPH - Oil	ug/L	600		500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.2		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #14: 4/1/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1403206

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	37.2		
Precipitation Total (in):	≥0.2	0.78		
Precipitation Start Date/Time:	NA	3/31/14 18:45		
Precipitation End Date/Time:	NA	4/1/14 21:00		
Stormwater Flow Start Date/Time:	NA	3/31/14 18:55		
Stormwater Flow End Date/Time:	NA	4/1/14 21:00		
Storm Volume (gal):	NA	351981.4		

Sampling Information

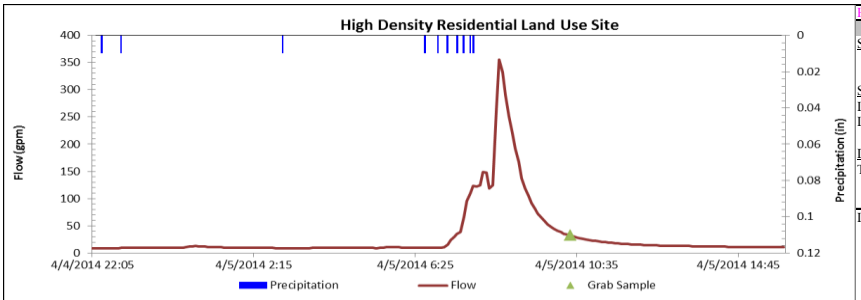
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥7	NA		
% Storm Sampled:	≥75	NA		
Grab Sample Taken	Yes	yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA							
Conductivity	umhos/cm							
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L			0.1		NA		
Dissolved Mercury	ug/L			0.1		NA		
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L			1		NA		
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	1600		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	300	J	500.00		NA		
TPH - Oil	ug/L	450		500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.07		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #15: 4/5/2014

Site Information

Site Name

HDR

Site Location

Latitude (DMS): 45° 42' 5.96"

Longitude (DMS): -122° 42' 30.70"

Drainage Area

Total (ac): 238.65

Lab Service Request Number: K1403430

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	28.4		
Precipitation Total (in):	≥0.2	0.10	j	
Precipitation Start Date/Time:	NA	4/4/14 22:20		
Precipitation End Date/Time:	NA	4/5/14 13:55		
Stormwater Flow Start Date/Time:	NA	4/4/14 22:55		
Stormwater Flow End Date/Time:	NA	4/5/14 13:55		
Storm Volume (gal):	NA	32038.8		

Sampling Information

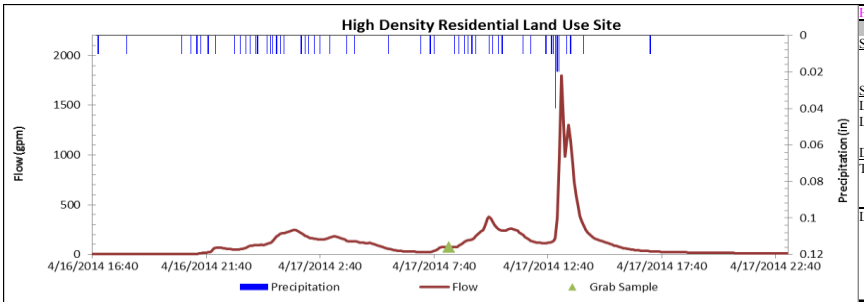
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥7	NA		
% Storm Sampled:	≥75	NA		
Grab Sample Taken	Yes	yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA							
Conductivity	umhos/cm							
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L			0.1		NA		
Dissolved Mercury	ug/L			0.1		NA		
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L			1		NA		
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	1600		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	120		500.00		NA		
TPH - Oil	ug/L	250		500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	0.06		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #16: 4/17/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1403815

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	184.6		
Precipitation Total (in):	≥0.2	0.59		
Precipitation Start Date/Time:	NA	4/16/14 16:55		
Precipitation End Date/Time:	NA	4/17/14 23:10		
Stormwater Flow Start Date/Time:	NA	4/16/14 21:10		
Stormwater Flow End Date/Time:	NA	4/18/14 6:50		
Storm Volume (gal):	NA	210271.0		

Sampling Information

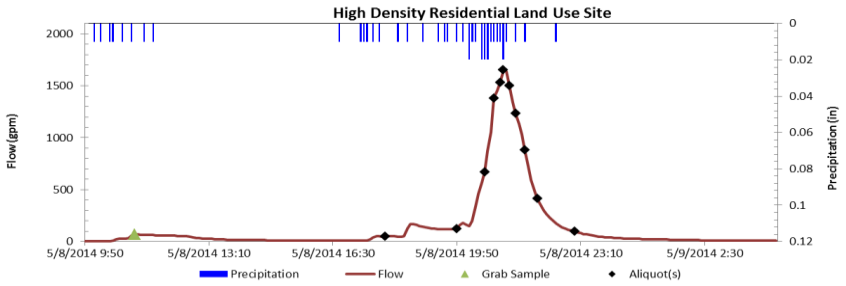
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥7	NA		
% Storm Sampled:	≥75	NA		
Grab Sample Taken	Yes	Yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA							
Conductivity	umhos/cm							
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L			0.1		NA		
Dissolved Mercury	ug/L			0.1		NA		
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L			1		NA		
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	920		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	230		500.00		NA		
TPH - Oil	ug/L	440		500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	**UJ**	0.50		NA		
Toluene	ug/L	0.4		0.50		NA		
Ethylbenzene	ug/L	0.05	**UJ**	0.50		NA		
m,p-Xylenes	ug/L	0.11	**UJ**	0.50		NA		
o-Xylene	ug/L	0.074	**UJ**	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #17: 5/8/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1404623, K1404677

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	69.3		
Precipitation Total (in):	≥0.2	0.42		
Precipitation Start Date/Time:	NA	5/8/14 10:05		
Precipitation End Date/Time:	NA	5/9/14 4:25		
Stormwater Flow Start Date/Time:	NA	5/8/14 10:35		
Stormwater Flow End Date/Time:	NA	5/9/14 4:25		
Storm Volume (gal):	NA	152994.8		

Sampling Information

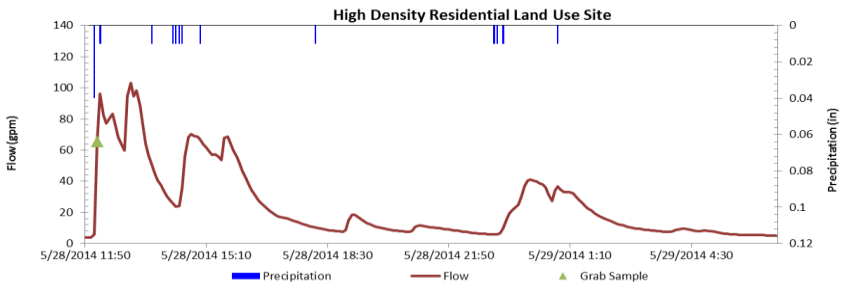
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	5/8/14 17:55		
Sample Flow End Date/Time:	NA	5/8/14 23:00		
Sample Event Volume (gal):	NA	145416.79		
Number of Aliquots:	≥7	11		
% Storm Sampled:	≥75	95.0		
Grab Sample Taken	Yes	yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L	63.5	J	1		36776	J	
Turbidity	NTU	23.8		0.2		NA		
pH	NA	7.47						
Conductivity	umhos/cm	31.7						
BOD	mg/L	8.3		2.0		4806.9		
Surfactants (MBAS)	mg/L	0.15		0.025		86.87		
Chloride	mg/L	0.62		0.2		359		
Hardness	mg/L	16.8		1		9730		
Nutrients								
Total Phosphorus	mg/L	0.27		0.01		156.4		
Orthophosphate	mg/L	0.043	J	0.01		24.9	J	
Total Kjeldahl Nitrogen	mg/L	0.45	J	0.5		260.6	J	
Nitrate+Nitrite	mg/L	0.21		0.01		121.6		
Metals								
Total Cu	ug/L	13.4		0.1		7.76		
Dissolved Cu	ug/L	4.3	J	0.1		2.49	J	
Total Zn	ug/L	316		5		183.01		
Dissolved Zinc	ug/L	158		1.0		91.51		
Total Cadmium	ug/L	0.106		0.2		0.061		
Diss. Cadmium	ug/L	0.019		0.1		0.011		
Total Lead	ug/L	2.65		0.1		1.535		
Dissolved Lead	ug/L	0.068		0.1		0.039		
Total Mercury	ug/L	0.02	UJ	0.1		0.012	UJ	
Dissolved Mercury	ug/L	0.02	UJ	0.1		0.012	UJ	
Herbicides								
2,4-D	ug/L	0.62		1		0.359		
Dichlobenil	ug/L	0.1		1		0.058		
Insecticides								
Carbaryl	ug/L	0.008		1		0.005		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L	0.008		0.1		0.004		
Acenaphthylene	ug/L	0.003	UJ	0.1		0.002	UJ	
Benzo(b)fluoranthene	ug/L	0.013		0.1		0.008		
Acenaphthene	ug/L	0.004	UJ	0.1		0.003	UJ	
Fluorene	ug/L	0.004	UJ	0.1		0.002	UJ	
Benzo(k)fluoranthene	ug/L	0.005		0.1		0.003		
Phenanthrene	ug/L	0.012		0.1		0.007		
Anthracene	ug/L	0.004	UJ	0.1		0.002	UJ	
Fluoranthene	ug/L	0.015		0.1		0.009		
Pyrene	ug/L	0.018		0.1		0.010		
Indeno(1,2,3-cd)pyrene	ug/L	0.01		0.1		0.006		
Benzo(a)anthracene	ug/L	0.01		0.1		0.006		
Chrysene	ug/L	0.012		0.1		0.007		
Dibenzo(a,h)anthracene	ug/L	0.003	UJ	0.1		0.001	UJ	
Benzo(ghi)perylene	ug/L	0.014		0.1		0.008		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L	2.1	J	1		1.216	J	
Microbial								
Fecal Coliform	MPN	1600		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	800	J	500.00		NA		
TPH - Oil	ug/L	770	J	500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	3.9		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #18: 5/28/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1405294

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	52.0		
Precipitation Total (in):	≥0.2	0.16	j	
Precipitation Start Date/Time:	NA	5/28/14 12:05		
Precipitation End Date/Time:	NA	5/29/14 6:50		
Stormwater Flow Start Date/Time:	NA	5/28/14 12:10		
Stormwater Flow End Date/Time:	NA	5/29/14 8:55		
Storm Volume (gal):	NA	28272.6		

Sampling Information

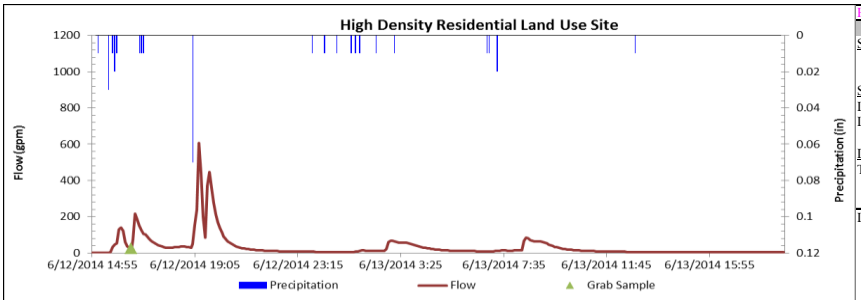
	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥7	NA		
% Storm Sampled:	≥75	NA		
Grab Sample Taken	Yes	yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA							
Conductivity	umhos/cm							
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L			0.1		NA		
Dissolved Mercury	ug/L			0.1		NA		
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L			1		NA		
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	130		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	1000	J	500.00		NA		
TPH - Oil	ug/L	1300	J	500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	11		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable



HDR WY2014 Storm #19: 6/12/2014

Site Information

Site Name: HDR

Site Location
Latitude (DMS): 45° 42' 5.96"
Longitude (DMS): -122° 42' 30.70"

Drainage Area
Total (ac): 238.65

Lab Service Request Number: K1405938

Precipitation and Flow Information

	Goal	Result	QA	Notes
Antecedent Dry Period (hr):	≥24	350.3		
Precipitation Total (in):	≥0.2	0.31		
Precipitation Start Date/Time:	NA	6/12/14 15:10		
Precipitation End Date/Time:	NA	6/13/14 18:55		
Stormwater Flow Start Date/Time:	NA	6/12/14 15:40		
Stormwater Flow End Date/Time:	NA	6/13/14 18:55		
Storm Volume (gal):	NA	54429.8		

Sampling Information

	Goal	Result	QA	Notes
Sample Flow Start Date/Time:	NA	NA		
Sample Flow End Date/Time:	NA	NA		
Sample Event Volume (gal):	NA	NA		
Number of Aliquots:	≥7	NA		
% Storm Sampled:	≥75	NA		
Grab Sample Taken	Yes	yes		

QA Narrative for logistical problems associated with storm event criterion:

Analytical Information

	EMC Concentration					Load (grams or millions of MPN)		
	Units	Result	QA	MRL	notes	Result	QA	notes
General								
TSS	mg/L			1		NA		
Turbidity	NTU			0.2		NA		
pH	NA							
Conductivity	umhos/cm							
BOD	mg/L			2.0		NA		
Surfactants (MBAS)	mg/L			0.025		NA		
Chloride	mg/L			0.2		NA		
Hardness	mg/L			1		NA		
Nutrients								
Total Phosphorus	mg/L			0.01		NA		
Orthophosphate	mg/L			0.01		NA		
Total Kjeldahl Nitrogen	mg/L			0.5		NA		
Nitrate+Nitrite	mg/L			0.01		NA		
Metals								
Total Cu	ug/L			0.1		NA		
Dissolved Cu	ug/L			0.1		NA		
Total Zn	ug/L			5		NA		
Dissolved Zinc	ug/L			1.0		NA		
Total Cadmium	ug/L			0.2		NA		
Diss. Cadmium	ug/L			0.1		NA		
Total Lead	ug/L			0.1		NA		
Dissolved Lead	ug/L			0.1		NA		
Total Mercury	ug/L			0.1		NA		
Dissolved Mercury	ug/L			0.1		NA		
Herbicides								
2,4-D	ug/L			1		NA		
Dichlobenil	ug/L			1		NA		
Insecticides								
Carbaryl	ug/L			1		NA		
Chlorpyrifos	ug/L	NA	**Dropped**	1		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
PAHs								
Naphthalene	ug/L			0.1		NA		
Acenaphthylene	ug/L			0.1		NA		
Benzo(b)fluoranthene	ug/L			0.1		NA		
Acenaphthene	ug/L			0.1		NA		
Fluorene	ug/L			0.1		NA		
Benzo(k)fluoranthene	ug/L			0.1		NA		
Phenanthrene	ug/L			0.1		NA		
Anthracene	ug/L			0.1		NA		
Fluoranthene	ug/L			0.1		NA		
Pyrene	ug/L			0.1		NA		
Indeno(1,2,3-cd)pyrene	ug/L			0.1		NA		
Benzo(a)anthracene	ug/L			0.1		NA		
Chrysene	ug/L			0.1		NA		
Dibenzo(a,h)anthracene	ug/L			0.1		NA		
Benzo(ghi)perylene	ug/L			0.1		NA		
Phthalates								
Bis(2-ethylhexyl) phthalate	ug/L			1		NA		
Microbial								
Fecal Coliform	MPN	16000		2.0		NA		
Petroleum Hydrocarbons								
TPH - Diesel	ug/L	2700	J	500.00		NA		
TPH - Oil	ug/L	2000	J	500.00		NA		
TPH - Gasoline	ug/L	NA	**Dropped**	250.00		NA		Dropped paramenter due to 2(+) years of "Non-Detects"
Benzene	ug/L	0.062	UJ	0.50		NA		
Toluene	ug/L	4.9		0.50		NA		
Ethylbenzene	ug/L	0.05	UJ	0.50		NA		
m,p-Xylenes	ug/L	0.11	UJ	0.50		NA		
o-Xylene	ug/L	0.074	UJ	0.50		NA		

notes: j = conditional use (storm/sampling criteria); J = conditional use (chemical analysis criteria); r = rejected (storm/sampling criteria)
R = rejected (chemical analysis criteria); UJ = at or below detection limit; G = value greater than max. detection limit; NA = not applicable

Appendix 3 S8 Water Year 2014 Sediment Analyses Results

S8 Water Year 2014 Sediment Chemical Analysis Results for COM, HDR, and LDR sites

SITE	SAMPLE RETRIEVAL	ANALYTE	RESULT	UNITS	ANOTE	DETECTION LIMIT	REPORTING LIMIT
COM	5/14/2014 8:30	2,4-Dimethylphenol	ND	ug/KG	U	540	4300
HDR	5/14/2014 9:30	2,4-Dimethylphenol	ND	ug/KG	U	320	2000
LDR	5/14/2014 11:00	2,4-Dimethylphenol	ND	ug/KG	U	32	230
COM	5/14/2014 8:30	2-Methylnaphthalene	ND	ug/KG	U	240	850
HDR	5/14/2014 9:30	2-Methylnaphthalene	ND	ug/KG	U	140	400
LDR	5/14/2014 11:00	2-Methylnaphthalene	ND	ug/KG	U	14	45
COM	5/14/2014 8:30	Acenaphthene	ND	ug/KG	U	280	850
HDR	5/14/2014 9:30	Acenaphthene	ND	ug/KG	U	160	400
LDR	5/14/2014 11:00	Acenaphthene	ND	ug/KG	U	16	45
COM	5/14/2014 8:30	Acenaphthylene	ND	ug/KG	U	230	850
HDR	5/14/2014 9:30	Acenaphthylene	ND	ug/KG	U	130	400
LDR	5/14/2014 11:00	Acenaphthylene	ND	ug/KG	U	13	45
COM	5/14/2014 8:30	Anthracene	ND	ug/KG	U	280	850
HDR	5/14/2014 9:30	Anthracene	ND	ug/KG	U	160	400
LDR	5/14/2014 11:00	Anthracene	ND	ug/KG	U	16	45
COM	5/14/2014 8:30	Benzo(a)anthracene	ND	ug/KG	U	310	850
HDR	5/14/2014 9:30	Benzo(a)anthracene	ND	ug/KG	U	180	400
LDR	5/14/2014 11:00	Benzo(a)anthracene	ND	ug/KG	U	18	45
COM	5/14/2014 8:30	Benzo(a)pyrene	ND	ug/KG	U	310	850
HDR	5/14/2014 9:30	Benzo(a)pyrene	ND	ug/KG	U	180	400
LDR	5/14/2014 11:00	Benzo(a)pyrene	ND	ug/KG	U	18	45
COM	5/14/2014 8:30	Benzo(b)fluoranthene	370	ug/KG	J	290	850
HDR	5/14/2014 9:30	Benzo(b)fluoranthene	ND	ug/KG	U	170	400
LDR	5/14/2014 11:00	Benzo(b)fluoranthene	ND	ug/KG	U	17	45
COM	5/14/2014 8:30	Benzo(ghi)perylene	510	ug/KG	J	320	850
HDR	5/14/2014 9:30	Benzo(ghi)perylene	ND	ug/KG	U	190	400
LDR	5/14/2014 11:00	Benzo(ghi)perylene	ND	ug/KG	U	19	45
COM	5/14/2014 8:30	Benzo(k)fluoranthene	ND	ug/KG	U	340	850
HDR	5/14/2014 9:30	Benzo(k)fluoranthene	ND	ug/KG	U	200	400
LDR	5/14/2014 11:00	Benzo(k)fluoranthene	ND	ug/KG	U	20	45
COM	5/14/2014 8:30	Bis(2-ethylhexyl) phthalate	10000	ug/KG		760	8500
HDR	5/14/2014 9:30	Bis(2-ethylhexyl) phthalate	1200	ug/KG	J	450	4000
LDR	5/14/2014 11:00	Bis(2-ethylhexyl) phthalate	ND	ug/KG	U	45	450
COM	5/14/2014 8:30	Butyl benzyl phthalate	1600	ug/KG		320	850
HDR	5/14/2014 9:30	Butyl benzyl phthalate	ND	ug/KG	U	190	400
LDR	5/14/2014 11:00	Butyl benzyl phthalate	ND	ug/KG	U	19	45
COM	5/14/2014 8:30	Cadmium	0.841	mg/kg		0.008	0.022
HDR	5/14/2014 9:30	Cadmium	0.213	mg/kg		0.006	0.018
LDR	5/14/2014 11:00	Cadmium	0.382	mg/kg		0.012	0.034
COM	5/14/2014 8:30	Chlorpyrifos	ND	mg/kg	U	0.14	9.4
HDR	5/14/2014 9:30	Chlorpyrifos	ND	mg/kg	U	0.13	8.7
LDR	5/14/2014 11:00	Chlorpyrifos	ND	mg/kg	U	0.0072	0.5
COM	5/14/2014 8:30	Chrysene	ND	ug/KG	U	350	850
HDR	5/14/2014 9:30	Chrysene	ND	ug/KG	U	210	400
LDR	5/14/2014 11:00	Chrysene	ND	ug/KG	U	21	45
COM	5/14/2014 8:30	Copper	77	mg/kg		0.04	0.11
HDR	5/14/2014 9:30	Copper	52.1	mg/kg		0.04	0.09
LDR	5/14/2014 11:00	Copper	25	mg/kg		0.07	0.17

COM	5/14/2014 8:30	Diazinon	ND	mg/kg	U	0.34	9.4
HDR	5/14/2014 9:30	Diazinon	ND	mg/kg	U	0.32	8.7
LDR	5/14/2014 11:00	Diazinon	ND	mg/kg	U	0.018	0.5
COM	5/14/2014 8:30	Dibenzo(a,h)anthracene	ND	ug/KG	U	260	850
HDR	5/14/2014 9:30	Dibenzo(a,h)anthracene	ND	ug/KG	U	150	400
LDR	5/14/2014 11:00	Dibenzo(a,h)anthracene	ND	ug/KG	U	15	45
COM	5/14/2014 8:30	Dibutyl phthalate	ND	ug/KG	U	410	1700
HDR	5/14/2014 9:30	Dibutyl phthalate	ND	ug/KG	U	240	790
LDR	5/14/2014 11:00	Dibutyl phthalate	ND	ug/KG	U	24	89
COM	5/14/2014 8:30	Diethyl phthalate	ND	ug/KG	U	320	850
HDR	5/14/2014 9:30	Diethyl phthalate	ND	ug/KG	U	190	400
LDR	5/14/2014 11:00	Diethyl phthalate	ND	ug/KG	U	19	45
COM	5/14/2014 8:30	Dimethyl phthalate	ND	ug/KG	U	340	850
HDR	5/14/2014 9:30	Dimethyl phthalate	ND	ug/KG	U	200	400
LDR	5/14/2014 11:00	Dimethyl phthalate	ND	ug/KG	U	20	45
COM	5/14/2014 8:30	Di-n-octyl phthalate	930	ug/KG		280	850
HDR	5/14/2014 9:30	Di-n-octyl phthalate	190	ug/KG	J	160	400
LDR	5/14/2014 11:00	Di-n-octyl phthalate	ND	ug/KG	U	16	45
COM	5/14/2014 8:30	Fluoranthene	510	ug/KG	J	320	850
HDR	5/14/2014 9:30	Fluoranthene	ND	ug/KG	U	190	400
LDR	5/14/2014 11:00	Fluoranthene	ND	ug/KG	U	19	45
COM	5/14/2014 8:30	Fluorene	ND	ug/KG	U	280	850
HDR	5/14/2014 9:30	Fluorene	ND	ug/KG	U	170	400
LDR	5/14/2014 11:00	Fluorene	ND	ug/KG	U	17	45
COM	5/14/2014 8:30	Indeno(1,2,3-cd)pyrene	300	ug/KG	J	280	850
HDR	5/14/2014 9:30	Indeno(1,2,3-cd)pyrene	ND	ug/KG	U	160	400
LDR	5/14/2014 11:00	Indeno(1,2,3-cd)pyrene	ND	ug/KG	U	16	45
COM	5/14/2014 8:30	Lead	61.8	mg/kg		0.02	0.06
HDR	5/14/2014 9:30	Lead	12.7	mg/kg		0.02	0.05
LDR	5/14/2014 11:00	Lead	24.2	mg/kg		0.03	0.09
COM	5/14/2014 8:30	Malathion	ND	mg/kg	U	0.21	9.4
HDR	5/14/2014 9:30	Malathion	ND	mg/kg	U	0.2	8.7
LDR	5/14/2014 11:00	Malathion	ND	mg/kg	U	0.011	0.5
COM	5/14/2014 8:30	Mercury	0.027	mg/kg		0.001	0.014
HDR	5/14/2014 9:30	Mercury	0.012	mg/kg		0.001	0.009
LDR	5/14/2014 11:00	Mercury	0.072	mg/kg		0.003	0.027
COM	5/14/2014 8:30	Naphthalene	ND	ug/KG	U	250	850
HDR	5/14/2014 9:30	Naphthalene	ND	ug/KG	U	150	400
LDR	5/14/2014 11:00	Naphthalene	ND	ug/KG	U	15	45
COM	5/14/2014 8:30	o-Cresol	ND	ug/KG	U	350	850
HDR	5/14/2014 9:30	o-Cresol	ND	ug/KG	U	210	400
LDR	5/14/2014 11:00	o-Cresol	ND	ug/KG	U	21	45
COM	5/14/2014 8:30	PCB-aroclor 1016	ND	ug/KG	U	4.5	22
HDR	5/14/2014 9:30	PCB-aroclor 1016	ND	ug/KG	U	4.1	20
LDR	5/14/2014 11:00	PCB-aroclor 1016	ND	ug/KG	U	4.7	23
COM	5/14/2014 8:30	PCB-aroclor 1221	ND	ug/KG	U	8.9	43
HDR	5/14/2014 9:30	PCB-aroclor 1221	ND	ug/KG	U	4.1	39
LDR	5/14/2014 11:00	PCB-aroclor 1221	ND	ug/KG	U	4.7	45
COM	5/14/2014 8:30	PCB-aroclor 1232	ND	ug/KG	U	8.8	22
HDR	5/14/2014 9:30	PCB-aroclor 1232	ND	ug/KG	U	4.1	20
LDR	5/14/2014 11:00	PCB-aroclor 1232	ND	ug/KG	U	4.7	23
COM	5/14/2014 8:30	PCB-aroclor 1242	ND	ug/KG	U	8.5	22
HDR	5/14/2014 9:30	PCB-aroclor 1242	6.3	ug/KG	J	4.1	20
LDR	5/14/2014 11:00	PCB-aroclor 1242	ND	ug/KG	U	4.7	23
COM	5/14/2014 8:30	PCB-aroclor 1248	ND	ug/KG	U	5.5	22
HDR	5/14/2014 9:30	PCB-aroclor 1248	ND	ug/KG	U	4.1	20
LDR	5/14/2014 11:00	PCB-aroclor 1248	ND	ug/KG	U	4.7	23
COM	5/14/2014 8:30	PCB-aroclor 1254	ND	ug/KG	U	5.1	22
HDR	5/14/2014 9:30	PCB-aroclor 1254	ND	ug/KG	U	4.1	20

LDR	5/14/2014 11:00	PCB-aroclor 1254	ND	ug/KG	U	4.7	23
COM	5/14/2014 8:30	PCB-aroclor 1260	ND	ug/KG	U	6.7	22
HDR	5/14/2014 9:30	PCB-aroclor 1260	ND	ug/KG	U	4.1	20
LDR	5/14/2014 11:00	PCB-aroclor 1260	ND	ug/KG	U	4.7	23
COM	5/14/2014 8:30	p-Cresol	720	ug/KG	J	390	850
HDR	5/14/2014 9:30	p-Cresol	370	ug/KG	J	230	400
LDR	5/14/2014 11:00	p-Cresol	130	ug/KG		23	45
COM	5/14/2014 8:30	Pentachlorophenol	130	ug/KG		2.1	8
HDR	5/14/2014 9:30	Pentachlorophenol	ND	ug/KG	U	3.6	7.7
LDR	5/14/2014 11:00	Pentachlorophenol	10	ug/KG		2.5	9.4
COM	5/14/2014 8:30	Phenanthrene	ND	ug/KG	U	310	850
HDR	5/14/2014 9:30	Phenanthrene	ND	ug/KG	U	180	400
LDR	5/14/2014 11:00	Phenanthrene	ND	ug/KG	U	18	45
COM	5/14/2014 8:30	Phenol	ND	ug/KG	U	270	2600
HDR	5/14/2014 9:30	Phenol	1200	ug/KG		160	1200
LDR	5/14/2014 11:00	Phenol	ND	ug/KG	U	16	140
COM	5/14/2014 8:30	Pyrene	610	ug/KG	J	320	850
HDR	5/14/2014 9:30	Pyrene	ND	ug/KG	U	190	400
LDR	5/14/2014 11:00	Pyrene	ND	ug/KG	U	19	45
COM	5/14/2014 8:30	Total Organic Carbon	9.13	N/A (%)		0.02	0.05
HDR	5/14/2014 9:30	Total Organic Carbon	5.68	N/A (%)		0.02	0.05
LDR	5/14/2014 11:00	Total Organic Carbon	6.57	N/A (%)		0.02	0.05
COM	5/14/2014 8:30	Total Solids	58.9	N/A (%)			
HDR	5/14/2014 9:30	Total Solids	63.8	N/A (%)			
LDR	5/14/2014 11:00	Total Solids	41.2	N/A (%)			
COM	5/14/2014 8:30	Zinc	450	mg/kg		0.2	0.5
HDR	5/14/2014 9:30	Zinc	617	mg/kg		0.2	0.5
LDR	5/14/2014 11:00	Zinc	169	mg/kg		0.3	0.8

S8D WY2014 Sediment Grain Size Analysis – % of Total Weight Recovered by Particle Size

SITE	SAMPLE RETRIEVAL	ANALYTE	RESULT	UNITS OR SIZE GROUP SUBTOTAL % (TOTAL %)*
COM	5/14/2014 8:30	Particle/Grain Size, Boulder (Phi Scale < -8)	0	%
COM	5/14/2014 8:30	Particle/Grain Size, Cobble (Phi Scale -8 to -6)	0	%
COM	5/14/2014 8:30	Particle/Grain Size, Very Coarse Gravel (Phi Scale -6 to -5)	0	%
COM	5/14/2014 8:30	Particle/Grain Size, Coarse Gravel (Phi Scale -5 to -4)	0	%
COM	5/14/2014 8:30	Particle/Grain Size, Medium Gravel (Phi Scale -4 to -3)	0	%
COM	5/14/2014 8:30	Particle/Grain Size, Fine Gravel (Phi Scale -3 to -2)	0	%
COM	5/14/2014 8:30	Particle/Grain Size, Very Fine Gravel (Phi Scale -2 to -1)	2.14	2.14%
COM	5/14/2014 8:30	Particle/Grain Size, Very Coarse Sand (Phi Scale -1 to 0)	4.73	%
COM	5/14/2014 8:30	Particle/Grain Size, Coarse Sand (Phi Scale 0 to 1)	20.84	%
COM	5/14/2014 8:30	Particle/Grain size, Medium Sand (Phi Scale 1 to 2)	23.96	%
COM	5/14/2014 8:30	Particle/Grain Size, Fine Sand (Phi Scale 2 to 3)	15.06	%
COM	5/14/2014 8:30	Particle/Grain Size, Very Fine Sand (Phi Scale 3 to 4)	11.04	75.63%
COM	5/14/2014 8:30	Particle/Grain Size, Coarse Silt 31.3 to 62.5 µm (Phi Scale 4 to 5)	8.19	%
COM	5/14/2014 8:30	Particle/Grain Size, Medium Silt 16 to 31.3 µm (Phi Scale 5 to 6)	6.5	%
COM	5/14/2014 8:30	Particle/Grain size, Fine Silt 7.8 to 15.6 µm (Phi Scale 6 to 7)	6.88	%
COM	5/14/2014 8:30	Particle/Grain Size, Very Fine Silt 3.9 to 7.8 µm (Phi Scale 7 to 8)	3.39	24.96%
COM	5/14/2014 8:30	Particle/Grain Size, Clay 1.95 to 3.9 µm (Phi Scale 8 to 9)	0.08	%
COM	5/14/2014 8:30	Particle/Grain Size, Clay 0.98 to 1.95 µm (Phi Scale 9 to 10)	0.72	%
COM	5/14/2014 8:30	Particle/Grain Size, Colloid up to 0.98 µm (Phi Scale > 10)	0.73	(104.26%)
HDR	5/14/2014 9:30	Particle/Grain Size, Boulder (Phi Scale < -8)	0	%
HDR	5/14/2014 9:30	Particle/Grain Size, Cobble (Phi Scale -8 to -6)	0	%
HDR	5/14/2014 9:30	Particle/Grain Size, Very Coarse Gravel (Phi Scale -6 to -5)	0	%
HDR	5/14/2014 9:30	Particle/Grain Size, Coarse Gravel (Phi Scale -5 to -4)	0	%
HDR	5/14/2014 9:30	Particle/Grain Size, Medium Gravel (Phi Scale -4 to -3)	0	%
HDR	5/14/2014 9:30	Particle/Grain Size, Fine Gravel (Phi Scale -3 to -2)	14.92	%
HDR	5/14/2014 9:30	Particle/Grain Size, Very Fine Gravel (Phi Scale -2 to -1)	20.8	35.72%
HDR	5/14/2014 9:30	Particle/Grain Size, Very Coarse Sand (Phi Scale -1 to 0)	18.45	%
HDR	5/14/2014 9:30	Particle/Grain Size, Coarse Sand (Phi Scale 0 to 1)	17.34	%
HDR	5/14/2014 9:30	Particle/Grain size, Medium Sand (Phi Scale 1 to 2)	15.67	%
HDR	5/14/2014 9:30	Particle/Grain Size, Fine Sand (Phi Scale 2 to 3)	5.74	%
HDR	5/14/2014 9:30	Particle/Grain Size, Very Fine Sand (Phi Scale 3 to 4)	2.5	59.7%
HDR	5/14/2014 9:30	Particle/Grain Size, Coarse Silt 31.3 to 62.5 µm (Phi Scale 4 to 5)	1.23	%
HDR	5/14/2014 9:30	Particle/Grain Size, Medium Silt 16 to 31.3 µm (Phi Scale 5 to 6)	1.44	%
HDR	5/14/2014 9:30	Particle/Grain size, Fine Silt 7.8 to 15.6 µm (Phi Scale 6 to 7)	1.29	%
HDR	5/14/2014 9:30	Particle/Grain Size, Very Fine Silt 3.9 to 7.8 µm (Phi Scale 7 to 8)	1.02	4.98%
HDR	5/14/2014 9:30	Particle/Grain Size, Clay 1.95 to 3.9 µm (Phi Scale 8 to 9)	0.09	%
HDR	5/14/2014 9:30	Particle/Grain Size, Clay 0.98 to 1.95 µm (Phi Scale 9 to 10)	0.32	%
HDR	5/14/2014 9:30	Particle/Grain Size, Colloid up to 0.98 µm (Phi Scale > 10)	0.24	(101.05%)
LDR	5/14/2014 11:00	Particle/Grain Size, Boulder (Phi Scale < -8)	0	%
LDR	5/14/2014 11:00	Particle/Grain Size, Cobble (Phi Scale -8 to -6)	0	%
LDR	5/14/2014 11:00	Particle/Grain Size, Very Coarse Gravel (Phi Scale -6 to -5)	0	%
LDR	5/14/2014 11:00	Particle/Grain Size, Coarse Gravel (Phi Scale -5 to -4)	0	%
LDR	5/14/2014 11:00	Particle/Grain Size, Medium Gravel (Phi Scale -4 to -3)	0.77	%
LDR	5/14/2014 11:00	Particle/Grain Size, Fine Gravel (Phi Scale -3 to -2)	0	%
LDR	5/14/2014 11:00	Particle/Grain Size, Very Fine Gravel (Phi Scale -2 to -1)	1.21	1.98%
LDR	5/14/2014 11:00	Particle/Grain Size, Very Coarse Sand (Phi Scale -1 to 0)	1.08	%
LDR	5/14/2014 11:00	Particle/Grain Size, Coarse Sand (Phi Scale 0 to 1)	2.04	%
LDR	5/14/2014 11:00	Particle/Grain size, Medium Sand (Phi Scale 1 to 2)	4.81	%
LDR	5/14/2014 11:00	Particle/Grain Size, Fine Sand (Phi Scale 2 to 3)	8.09	%
LDR	5/14/2014 11:00	Particle/Grain Size, Very Fine Sand (Phi Scale 3 to 4)	7.68	23.7%
LDR	5/14/2014 11:00	Particle/Grain Size, Coarse Silt 31.3 to 62.5 µm (Phi Scale 4 to 5)	10.5	%
LDR	5/14/2014 11:00	Particle/Grain Size, Medium Silt 16 to 31.3 µm (Phi Scale 5 to 6)	27.44	%
LDR	5/14/2014 11:00	Particle/Grain size, Fine Silt 7.8 to 15.6 µm (Phi Scale 6 to 7)	21.61	%
LDR	5/14/2014 11:00	Particle/Grain Size, Very Fine Silt 3.9 to 7.8 µm (Phi Scale 7 to 8)	15.48	75.03%
LDR	5/14/2014 11:00	Particle/Grain Size, Clay 1.95 to 3.9 µm (Phi Scale 8 to 9)	7.54	%
LDR	5/14/2014 11:00	Particle/Grain Size, Clay 0.98 to 1.95 µm (Phi Scale 9 to 10)	2.97	%
LDR	5/14/2014 11:00	Particle/Grain Size, Colloid up to 0.98 µm (Phi Scale > 10)	3.39	(114.61%)

* The totals of the individual particle size category percentages may differ from 100% due to overall laboratory expected recoveries being between 90 and 110%.

Appendix 4 S8B Water Year 2014 Seasonal and Annual Loads

Water Year 2014 Commercial Site Seasonal and Annual Loading Summary

Parameter *	Dry Season			Wet Season			Total Annual Load		
	Load (g)	Load (lbs)	Areal Load (lbs/acre)	Load (g)	Load (lbs)	Areal Load (lbs/acre)	Load (g)	Load (lbs)	Areal Load (lbs/acre)
2,4-D	2.98E-01	6.56E-04	2.45E-05	1.79E+00	3.93E-03	1.47E-04	2.09E+00	4.59E-03	1.71E-04
Acenaphthene	1.89E-02	4.15E-05	1.55E-06	9.95E-02	2.19E-04	8.18E-06	1.18E-01	2.61E-04	9.73E-06
Acenaphthylene	5.18E-02	1.14E-04	4.26E-06	2.14E-01	4.71E-04	1.76E-05	2.66E-01	5.85E-04	2.19E-05
Anthracene	4.35E-02	9.58E-05	3.58E-06	2.84E-01	6.26E-04	2.34E-05	3.28E-01	7.22E-04	2.70E-05
Benzo(a)anthracene*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Benzo(b)fluoranthene	1.80E-01	3.97E-04	1.48E-05	1.51E+00	3.32E-03	1.24E-04	1.69E+00	3.72E-03	1.39E-04
Benzo(ghi)perylene	2.90E-01	6.39E-04	2.39E-05	2.26E+00	4.97E-03	1.86E-04	2.55E+00	5.60E-03	2.09E-04
Benzo(k)fluoranthene	5.18E-02	1.14E-04	4.26E-06	4.63E-01	1.02E-03	3.80E-05	5.15E-01	1.13E-03	4.23E-05
Bis(2-ethylhexyl) phthalate	1.04E+01	2.28E-02	8.52E-04	8.02E+01	1.76E-01	6.59E-03	9.06E+01	1.99E-01	7.44E-03
BOD	2.74E+04	6.02E+01	2.25E+00	7.26E+04	1.60E+02	5.97E+00	1.00E+05	2.20E+02	8.22E+00
Carbaryl*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Chloride	1.33E+03	2.92E+00	1.09E-01	3.24E+04	7.12E+01	2.66E+00	3.37E+04	7.41E+01	2.77E+00
Chlorpyrifos	Discontinued this analyte monitoring due to more than 2 years of results below Ecology method reporting limit								
Chrysene	1.56E-01	3.42E-04	1.28E-05	2.19E+00	4.81E-03	1.80E-04	2.34E+00	5.15E-03	1.92E-04
Dibenzo(a,h)anthracene	3.32E-02	7.30E-05	2.73E-06	1.80E-01	3.95E-04	1.48E-05	2.13E-01	4.68E-04	1.75E-05
Dichlobenil	Discontinued this analyte monitoring due to more than 2 years of results below Ecology method reporting limit								
Dissolved Cadmium	4.56E-02	1.00E-04	3.75E-06	3.00E-01	6.61E-04	2.47E-05	3.46E-01	7.61E-04	2.84E-05
Dissolved Copper	1.19E+01	2.61E-02	9.77E-04	5.49E+01	1.21E-01	4.51E-03	6.68E+01	1.47E-01	5.49E-03
Dissolved Lead	1.49E-01	3.28E-04	1.23E-05	7.58E-01	1.67E-03	6.23E-05	9.07E-01	2.00E-03	7.45E-05
Dissolved Zinc	6.08E+01	1.34E-01	4.99E-03	3.24E+02	7.14E-01	2.67E-02	3.85E+02	8.47E-01	3.16E-02
Fluoranthene	2.49E-01	5.47E-04	2.05E-05	2.22E+00	4.88E-03	1.82E-04	2.47E+00	5.43E-03	2.03E-04
Fluorene	2.01E-02	4.43E-05	1.65E-06	2.46E-01	5.41E-04	2.02E-05	2.66E-01	5.85E-04	2.19E-05
Hardness	4.15E+04	9.12E+01	3.41E+00	1.85E+05	4.08E+02	1.52E+01	2.27E+05	4.99E+02	1.86E+01
Indeno(1,2,3-cd)pyrene	1.35E-01	2.97E-04	1.11E-05	9.78E-01	2.15E-03	8.04E-05	1.11E+00	2.45E-03	9.15E-05
Naphthalene	1.31E-01	2.87E-04	1.07E-05	9.43E-01	2.07E-03	7.75E-05	1.07E+00	2.36E-03	8.82E-05
Nitrate+Nitrite	3.19E+02	7.03E-01	2.62E-02	2.15E+03	4.74E+00	1.77E-01	2.47E+03	5.44E+00	2.03E-01
Orthophosphate	2.49E+01	5.47E-02	2.05E-03	1.55E+02	3.42E-01	1.28E-02	1.80E+02	3.97E-01	1.48E-02
Phenanthrene	1.95E-01	4.29E-04	1.60E-05	1.72E+00	3.77E-03	1.41E-04	1.91E+00	4.20E-03	1.57E-04
Pyrene	4.35E-01	9.58E-04	3.58E-05	3.34E+00	7.35E-03	2.75E-04	3.78E+00	8.31E-03	3.10E-04
Surfactants (MBAS)	5.39E+02	1.19E+00	4.43E-02	1.67E+03	3.67E+00	1.37E-01	2.21E+03	4.86E+00	1.81E-01
Total Cadmium	5.00E-01	1.10E-03	4.11E-05	2.05E+00	4.51E-03	1.69E-04	2.55E+00	5.61E-03	2.10E-04
Total Copper	5.45E+01	1.20E-01	4.48E-03	2.54E+02	5.60E-01	2.09E-02	3.09E+02	6.80E-01	2.54E-02
Total Kjeldahl Nitrogen	1.20E+04	2.65E+01	9.88E-01	1.62E+04	3.57E+01	1.33E+00	2.83E+04	6.22E+01	2.32E+00
Total Lead	3.71E+01	8.17E-02	3.05E-03	1.59E+02	3.50E-01	1.31E-02	1.96E+02	4.32E-01	1.61E-02
Total Phosphorus	6.91E+02	1.52E+00	5.68E-02	3.02E+03	6.65E+00	2.49E-01	3.72E+03	8.17E+00	3.05E-01
Total Zinc	3.05E+02	6.71E-01	2.51E-02	1.44E+03	3.17E+00	1.18E-01	1.75E+03	3.84E+00	1.43E-01
Total Suspended Solids	3.57E+05	7.85E+02	2.93E+01	1.38E+06	3.05E+03	1.14E+02	1.74E+06	3.83E+03	1.43E+02

*Parameters with more than half of their analytical results reported as non-detects are not included in the loading calculations.

WY 2014 High Density Residential Site Seasonal and Annual Loading Summary

Parameter *	Dry Season			Wet Season			Total Annual Load		
	Load (g)	Load (lbs)	Areal Load (lbs/acre)	Load (g)	Load (lbs)	Areal Load (lbs/acre)	Load (g)	Load (lbs)	Areal Load (lbs/acre)
2,4-D	5.46E+00	1.20E-02	5.03E-05	2.23E+01	4.90E-02	2.05E-04	2.77E+01	6.10E-02	2.56E-04
Acenaphthene*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Acenaphthylene*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Anthracene*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Benzo(a)anthracene*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Benzo(b)fluoranthene	1.15E-01	2.52E-04	1.06E-06	1.03E+00	2.26E-03	9.48E-06	1.14E+00	2.52E-03	1.05E-05
Benzo(ghi)perylene	1.23E-01	2.71E-04	1.14E-06	1.19E+00	2.62E-03	1.10E-05	1.31E+00	2.89E-03	1.21E-05
Benzo(k)fluoranthene*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Bis(2-ethylhexyl) phthalate	1.85E+01	4.07E-02	1.71E-04	2.01E+02	4.42E-01	1.85E-03	2.20E+02	4.83E-01	2.02E-03
BOD	7.31E+04	1.61E+02	6.74E-01	1.88E+05	4.14E+02	1.74E+00	2.62E+05	5.75E+02	2.41E+00
Carbaryl	7.05E-02	1.55E-04	6.50E-07	4.03E-01	8.86E-04	3.71E-06	4.73E-01	1.04E-03	4.36E-06
Chloride	5.46E+03	1.20E+01	5.03E-02	7.87E+04	1.73E+02	7.26E-01	8.42E+04	1.85E+02	7.76E-01
Chlorpyrifos*	Discontinued this analyte monitoring due to more than 2 years of results below Ecology method reporting limit								
Chrysene	1.06E-01	2.33E-04	9.74E-07	1.29E+00	2.84E-03	1.19E-05	1.40E+00	3.08E-03	1.29E-05
Dibenzo(a,h)anthracene*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Dichlobenil	8.81E-01	1.94E-03	8.12E-06	2.02E+01	4.45E-02	1.86E-04	2.11E+01	4.64E-02	1.94E-04
Dissolved Cadmium	1.67E-01	3.68E-04	1.54E-06	1.07E+00	2.35E-03	9.85E-06	1.24E+00	2.72E-03	1.14E-05
Dissolved Copper	3.79E+01	8.33E-02	3.49E-04	2.99E+02	6.58E-01	2.76E-03	3.37E+02	7.41E-01	3.11E-03
Dissolved Lead	5.99E-01	1.32E-03	5.52E-06	3.57E+00	7.86E-03	3.29E-05	4.17E+00	9.18E-03	3.85E-05
Dissolved Mercury*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Dissolved Zinc	1.39E+03	3.06E+00	1.28E-02	2.46E+04	5.42E+01	2.27E-01	2.60E+04	5.73E+01	2.40E-01
Fluoranthene	1.32E-01	2.91E-04	1.22E-06	1.45E+00	3.19E-03	1.34E-05	1.58E+00	3.48E-03	1.46E-05
Fluorene*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Hardness	1.48E+05	3.26E+02	1.36E+00	7.21E+05	1.59E+03	6.64E+00	8.69E+05	1.91E+03	8.01E+00
Indeno(1,2,3-cd)pyrene	8.46E-02	1.86E-04	7.79E-07	7.33E-01	1.61E-03	6.75E-06	8.17E-01	1.80E-03	7.53E-06
Naphthalene	6.78E-02	1.49E-04	6.25E-07	4.58E+00	1.01E-02	4.22E-05	4.65E+00	1.02E-02	4.29E-05
Nitrate+Nitrite	1.85E+03	4.07E+00	1.71E-02	6.92E+03	1.52E+01	6.38E-02	8.77E+03	1.93E+01	8.08E-02
Orthophosphate	3.79E+02	8.33E-01	3.49E-03	3.52E+03	7.75E+00	3.25E-02	3.90E+03	8.58E+00	3.59E-02
Phenanthrene	1.06E-01	2.33E-04	9.74E-07	1.43E+00	3.14E-03	1.32E-05	1.53E+00	3.37E-03	1.41E-05
Pyrene	1.59E-01	3.49E-04	1.46E-06	1.66E+00	3.65E-03	1.53E-05	1.82E+00	4.00E-03	1.68E-05
Surfactants (MBAS)	1.32E+03	2.91E+00	1.22E-02	4.66E+03	1.02E+01	4.29E-02	5.98E+03	1.32E+01	5.51E-02
Total Cadmium	9.34E-01	2.05E-03	8.61E-06	2.52E+00	5.55E-03	2.33E-05	3.46E+00	7.61E-03	3.19E-05
Total Copper	1.18E+02	2.60E-01	1.09E-03	6.08E+02	1.34E+00	5.60E-03	7.26E+02	1.60E+00	6.69E-03
Total Kjeldahl Nitrogen	3.96E+03	8.72E+00	3.65E-02	5.15E+04	1.13E+02	4.75E-01	5.55E+04	1.22E+02	5.11E-01
Total Lead	2.33E+01	5.14E-02	2.15E-04	1.01E+02	2.23E-01	9.34E-04	1.25E+02	2.74E-01	1.15E-03
Total Mercury*	* More than 50% of this analytes' results were non-detects so loading not calculated for this analyte								
Total Phosphorus	2.38E+03	5.23E+00	2.19E-02	9.18E+03	2.02E+01	8.46E-02	1.16E+04	2.54E+01	1.07E-01
Total Zinc	2.78E+03	6.12E+00	2.57E-02	3.19E+04	7.02E+01	2.94E-01	3.47E+04	7.64E+01	3.20E-01
Total Suspended Solids	5.59E+05	1.23E+03	5.16E+00	1.91E+06	4.19E+03	1.76E+01	2.46E+06	5.42E+03	2.27E+01

*Parameters with more than half of their analytical results reported as non-detects are not included in the loading calculations.

Appendix 5 Calendar Year 2014 Stormwater Facility Inspections and Maintenance Upstream from two S8.B.2 Monitoring Sites

Facility ID	Facility Type	Private or Public Owner	Facility Name	Street Address	Installation Date	Recent Inspection Date(s)	Maintenance Action	In Compliance vs. Defects
Commercial								
FA417	Biofiltration Swale	Private	Avalon Condos	NE 88th St	7/9/1992	2/13/2014	Owner Notified	No. Bioswale sediment depth exceeds 2 inches.
FA1479	Wet Pond	Private	Big 5 Hazel Dell	NE 13th Ave	3/3/2006	4/3/2014	NA	Yes
FA1578	Inline Storage & Biofilt. Swale	Private	Hazel Dell Brew Pub	NE Highway 99	11/23/1999	4/3/2014	NA	Yes
FA2411	Cartridge Filter Catch Basin & Undrgrd. Detent.	Private	88th Street Development	NE 88th St	8/6/2008	3/25/2014	NA	Yes
High Density Residential								
FA8	Biofiltration Swale and Detention Pond	Clark County Public Works	Felida Village	NW 33rd Ave	2/1/1999	11/6/2014	NA	Yes
FA73	Biofiltration Swale	Clark County Public Works	Mar-Clare Estates	NW 26th Ave	10/21/1992	10/29/2014	Owner Notified	No. Bioswale sediment depth exceeds 2 inches.
FA98	Biofiltration Swale and Detention Pond	Clark County Public Works	Felida View	NW 27th Ct	12/1/2000	10/29/2014	NA	Yes
FA796	Biofiltration Swale and Detention Pond	Clark County Public Works	Lake River Terrace	NW 35th Ave	2/1/1999	11/6/2014	NA	Yes
FA1222	Wet Pond	Clark County Public Works	Felida Green	NW 29th Ct	3/23/2005	10/29/2014	Maintenance / Ops. notified	No. Flow control manhole cover cannot be lifted.
FA1223	Biofiltration Swale	Clark County Public Works	Tiare Hills IV	NW 27th Ct	12/29/1994	10/29/2014	NA	Yes
FA1871	Biofiltration Swale	Clark County Public Works	Westmoor Short Plat-swale	NW 11th	9/25/1998	11/6/2014	NA	Yes

COM WY2014

Parameter	Units	Storm 1 18-Nov-13 Wet EMC	LOAD	QA	Storm 2 1-Dec-13 Wet EMC	LOAD	QA	Storm 3 7-Jan-14 Wet EMC	LOAD	QA	Storm 4 11-Jan-14 Wet EMC	LOAD	QA	Storm 5 28-Jan-14 Wet EMC	LOAD	QA	Storm 6 20-Feb-14 Grab only Wet EMC	LOAD	QA	Storm 7 24-Feb-14 Wet EMC	LOAD	QA	Storm 8 27-Feb-14 Wet EMC	LOAD	QA	Storm 9 2-Mar-14 Wet EMC	LOAD	QA	Storm 10 5-Mar-14 Wet EMC	LOAD	QA	Storm 11 9-Mar-14 Wet EMC	LOAD	QA	Storm 12 25-Mar-14 Wet EMC	LOAD	QA	Storm 13 1-Apr-14 Wet EMC	LOAD	QA	Storm 14 5-Apr-14 Wet EMC	LOAD	QA
General																																										
TSS	mg/L	92	16221.373		191	74503.33		82.5	22320.71		140	87749.33		87.5	29639.54					62	5229.3309		55	3072.2695		63	10013.1		139	102488.58		50.5	11431.526			NA			NA			NA	
Turbidity	NTU	19.4	NA		25.1	NA		92.5	NA		36.6	NA		36.4	NA					35.6	NA		52.2	NA		37.7	NA		37.9	NA		21.4	NA			NA			NA			NA	
pH	NA	7.58	NA		7.45	NA		7.28	NA		7.26	NA		7.42	NA					7.73	NA		7.75	NA		7.61	NA		7.3	NA		7.54	NA			NA			NA			NA	
Conductivity	umhos/cm	22.4	NA		17.1	NA		55.3	NA		46.5	NA		39.4	NA					44.6	NA		45.7	NA		26.7	NA		18.2	NA		22.9	NA			NA			NA			NA	
BOD	mg/L	5.5	969.75597		6.4	2496.447		8.6	2326.765		7.2	4512.823		6.8	2303.415					3.3	278.33536		7.8	435.70368		2	158.938	UJ	3.5	2580.6477		2	226.36684	UJ		NA			NA			NA	
Surfactants (MBAS)	mg/L	0.116	20.453035		0.08	31.20558		0.14	37.87757		0.136	85.24221		0.172	58.26286					0.148	12.482919		0.19	10.613295		0.116	18.43681		0.084	61.935545		0.06	13.582011			NA			NA			NA	
Chloride	mg/L	0.55	96.975597		0.28	109.2195		7.57	2048.094		6.36	3986.327		2.58	873.9429					2.31	194.83475		1.92	107.25014		0.79	125.561		0.29	213.82509		0.45	101.86508			NA			NA			NA	
Hardness	mg/L	16	2821.1083		10.8	4212.754		16	4328.865		14	8774.933		14	4742.326					13.6	1147.079		15.2	849.06358		10.4	1652.956		14.8	10912.453		10.4	2354.2152			NA			NA			NA	
Nutrients																																											
Total Phosphorus	mg/L	0.181	31.913787		0.367	143.1556		0.335	90.63562		0.266	166.7237		0.202	68.42499					0.138	11.639479		0.155	8.6582141		0.145	23.04601		0.234	172.53473		0.125	28.295855			NA			NA			NA	
Orthophosphate	mg/L	0.034	5.9948551		0.023	8.971606		0.004	0.541108	UJ	0.004	1.253562	UJ	0.013	4.403588					0.004	0.1686881	UJ	0.006	0.3351567		0.016	2.543008		0.009	6.6359512		0.004	0.4527337	UJ		NA			NA			NA	
Total Kjeldahl Nitrogen	mg/L	0.98	172.79288		1.24	483.6866		1.92	519.4639		0.87	545.2994		1.26	426.8093					1.23	103.74318		1.29	72.058685		0.94	149.4017		1.06	781.56759		1.18	267.11288			NA			NA			NA	
Nitrate+Nitrite	mg/L	0.14	24.684697		0.095	37.05663		0.232	62.76855		0.068	42.6211		0.208	70.45741					0.238	20.073883		0.329	18.377758		0.154	24.47646		0.091	67.09684		0.106	23.994885			NA			NA			NA	
Metals																																											
Total Cu	ug/L	18.8	3.3148022		23	8.971606		26	7.034406		22.8	14.29061		17.1	5.792412					15.6	1.3157671		16	0.8937511		13.3	2.113876		18.4	13.566834		12.1	2.7390388			NA			NA			NA	
Dissolved Cu	ug/L	4.91	0.8657276		2.8	1.092195		4.08	1.103861		3.7	2.319089		4.3	1.456572					5.58	0.4706398		5.85	0.3267778		3.39	0.5388		2.54	1.8728129		4.24	0.9597954			NA			NA			NA	
Total Zn	ug/L	93.7	16.521115		140	54.60977		163	44.10032		128	80.22796		109	36.92239					83.5	7.042728		86	4.8039123		71.4	11.34818		103	75.944775		55.3	12.518086			NA			NA			NA	
Dissolved Zinc	ug/L	23	4.0553431		13.8	5.382963		27.1	7.332016		27.6	17.29915		26.4	8.942672					28.6	2.4122398		32.6	1.8210179		19.4	3.083398		20.1	14.820291		21.1	4.7763404			NA			NA			NA	
Total Cadmium	ug/L	0.14	0.0246847		0.222	0.086595		0.21	0.056816		0.189	0.118462		0.148	0.050133					0.1	0.0084344		0.118	0.0065914		0.088	0.013987		0.164	0.1209218		0.079	0.017883			NA			NA			NA	
Diss. Cadmium	ug/L	0.022	0.003879		0.01	0.003901		0.03	0.008117		0.019	0.011909		0.021	0.007113					0.025	0.0021086		0.036	0.0020109		0.016	0.002543		0.024	0.0176959		0.02	0.0045273			NA			NA			NA	
Total Lead	ug/L	7.97	1.4052646		15.6	6.085089		16	4.328865		13.2	8.273508		9.42	3.190908					9.29	0.7835562		8.68	0.48486		8.13	1.292166		17.2	12.68204		6.83	1.5460855			NA			NA			NA	
Dissolved Lead	ug/L	0.096	0.0169266		0.041	0.015993		0.048	0.012987		0.049	0.030712		0.059	0.019986					0.063	0.0053137		0.065	0.0036309		0.045	0.007152		0.042	0.0309678		0.058	0.0131293			NA			NA			NA	
Total Mercury	ug/L	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped				NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped
Dissolved Mercury	ug/L	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped				NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped
Herbicides																																											
2,4-D	ug/L	0.1	0.0176319		0.052	0.020284		0.18	0.049		0.2	0.125356		0.069	0.023373					0.2	0.0168688		0.18	0.0050274	UJ	0.19	0.030198		0.092	0.0678342		0.078	0.0088283	UJ		NA			NA			NA	
Dichlobenil	ug/L	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped				NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped
Insecticides																																											
Carbaryl	ug/L	0.004	0.0003526	UJ	0.004	0.00078	UJ	0.004	0.001	UJ	0.004	0.001254	UJ	0.025	0.008468					0.004	0.0001687	UJ	0.0072	0.0004022		0.004	0.000318	UJ	0.004	0.0014747	UJ	0.004	0.0004527	UJ		0.000			NA			NA	
Chlorpyrifos	ug/L	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped				NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped
PAHs																																											
Naphthalene	ug/L	0.054	0.0095212		0.056	0.021844		0.085	0.023		0.083	0.052023		0.087	0.02947					0.2	0.0168688		0.026	0.0014523		0.034	0.005404		0.031	0.0228572		0.05	0.0113183			0.000			NA			NA	
Acenaphthylene	ug/L	0.0088	0.0015516		0.015	0.005851		0.031	0.008		0.017	0.010655		0.031	0.010501					0.011	0.0009278		0.0074	0.0004134		0.019	0.00302		0.0079	0.0058249		0.0076	0.0017204			0.000			NA			NA	
Benzo(b)fluoranthene	ug/L	0.078	0.0137529		0.15	0.05851		0.17	0.046		0.18	0.112821		0.1	0.033874					0.067	0.0056511		0.063	0.0035191		0.092	0.014622		0.11	0.0811061		0.052	0.0117711			0.000			NA			NA	
Acenaphthene	ug/L	0.0044	0.0003879	UJ	0.0074	0.002887		0.013	0.004		0.0087	0.005453		0.012	0.004065					0.0044	0.0001856	UJ	0.0044	0.0001229	UJ	0.0046	0.000366	UJ	0.0052	0.0038341		0.0083	0.0018788			0.000			NA			NA	
Fluorene	ug/L	0.0083	0.0014634		0.024	0.009362		0.034	0.009		0.02	0.012536		0.024	0.00813					0.01	0.0008434		0.01	0.0005586		0.017	0.002702		0.012	0.0088479		0.018	0.0040746			0.000			NA			NA	
Benzo(k)fluoranthene	ug/L	0.022	0.003879		0.045	0.017553		0.072	0.019		0.052	0.032593		0.03	0.010162					0.018	0.0015182		0.015	0.0008379		0.019	0.00302		0.036	0.0265438		0.015	0.0033955			0.000			NA			NA	
Phenanthrene	ug/L	0.064	0.0112844		0.15	0.05851		0.25	0.068		0.17	0.106553		0.16	0.054198					0.085	0.0071692		0.072	0.0040219		0.11	0.017483		0.09	0.0663595		0.078	0.0176566			0.000			NA			NA	
Anthracene	ug/L	0.012	0.0021158		0.025	0.009752		0.043	0.012		0.032	0.020057		0.024	0.00813					0.011	0.0009278		0.014	0.000782		0.018	0.002861		0.016	0.0117972		0.0073	0.0016525			0.000			NA			NA	
Fluoranthene	ug/L	0.1	0.0176319		0.22	0.085815		0.27	0.073		0.22	0.137892		0.17	0.057585					0.1	0.0084344		0.11	0.0061445		0.14	0.022251		0.16	0.1179725		0.085	0.0192412			0.000			NA			NA	
Pyrene	ug/L	0.15	0.0264479		0.36	0.140425		0.41	0.111		0.33	0.206838		0.23	0.07791					0.2	0.0168688		0.17	0.0094961		0.2	0.031788		0.21	0.1548389		0.13	0.0294277			0.000			NA			NA	
Indeno(1,2,3-cd)pyrene	ug/L	0.05	0.008816		0.096	0.037447		0.12	0.032		0.12	0.075214		0.065	0.022018					0.041	0.0034581		0.036	0.0020109		0.053	0.008424		0.071	0.0523503		0.034	0.0076965			0.000			NA			NA	
Benzo(a)anthracene	ug/L	0.036	0.0063475		0.076	0.014823	UJ	0.06	0.008	UJ	0.071	0.044501		0.045	0.007622	UJ				0.034	0.0028677		0.026	0.0007262	UJ	0.039	0.003099	UJ	0.048	0.0353917		0.023	0.0026032	UJ		0.000			NA			NA	
Chrysene	ug/L	0.1	0.0176319		0.21	0.081915		0.3	0.081		0.27	0.169231		0.16	0.054198					0.1	0.0084344		0.062	0.0034633		0.086	0.013669		0.16	0.1179725		0.079	0.017883			0.000			NA			NA	
Dibenzo(a,h)anthracene	ug/L	0.011	0.0019395		0.026	0.010142		0.013	0.002	UJ	0.013	0.004074	UJ	0.016	0.00542					0.01	0.0008434		0.0083	0.0004636		0.011	0.001748		0.016	0.0117972		0.0074	0.0016751			0.000			NA			NA	
Benzo(ghi)perylene	ug/L	0.11	0.0193951		0.2	0.078014		0.33	0.089		0.25	0.156695		0.15	0.050811					0.1	0.0084344		0.098	0.0054742		0.13	0.020662		0.15	0.1105992		0.083	0.0187884			0.000			NA			NA	
Phthalates																																											
Bis(2-ethylhexyl) phthalate	ug/L	4.2	0.7405409		3.4	1.326237		8.7	2.354		6.9	4.324788		8.7	2.947017					5.7	0.4807611		4.3	0.2401956		6	0.953628		4.3	3.17051		6.4	1.4487478			0.003			NA			NA	
Microbial																																											
Fecal Coliform	MPN	170	NA			NA		220	NA			NA		130	NA		79			140	NA			NA			NA			NA			NA		14	NA		17	NA		49	NA	
Petroleum Hydrocarbons																																											
Diesel Range Oeganics	ug/L	790.00	139.29222			NA		2500	NA			NA		600	NA		280			970	NA			NA			NA			NA			NA		1100	NA		340	NA		540	NA	
Residual Range Organics	ug/L	1900	335.00661			NA		11000	NA			NA		1200	NA		1200			4700	NA			NA			NA			NA			NA		1600	NA		960	NA		1300	NA	
TPH - Gasoline	ug/L	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA		Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped
Benzene	ug/L	0.062	0.0054659	UJ		NA		0.062	NA	UJ		NA		0.062	NA	UJ	0.062		UJ	0.062	NA	UJ		NA			NA			NA			NA		0.062	NA	UJ	0.062	NA	UJ	0.062	NA	UJ
Toluene	ug/L	0.06	0.0105792			NA		0.32	NA			NA		0.21	NA		0.054		UJ	0.07	NA			NA			NA			NA			NA		0.054	NA	UJ	1.1	NA		0.08	NA	
Ethylbenzene	ug/L	0.05	0.004408	UJ		NA		0.05	NA	UJ		NA		0.05	NA	UJ	0.05		UJ	0.05	NA	UJ		NA			NA			NA			NA		0.05	NA	UJ	0.8	NA		0.05	NA	UJ
m,p-Xylenes	ug/L	0.11	0.0096976	UJ		NA		0.11	NA	UJ		NA		0.11	NA	UJ	0.11		UJ	0.11	NA	UJ		NA			NA			NA			NA		0.11	NA	UJ	3.3	NA		0.15	NA	
o-Xylene	ug/L	0.074	0.0065238	UJ		NA		0.074	NA	UJ		NA		0.074	NA	UJ	0.074		UJ	0.074	NA	UJ		NA			NA			NA			NA		0.074	NA	UJ	1.3	NA		0.074	NA	UJ
Storm Volume (gal):		46578.6			103045.5			71472.83			165578.0			89485.0			12304.0			22281.3			14756.5			41987.0			194781.4			59799.8			16041.3			73464.0			5928.5	

	Tota (gal)	Sampled	Unsampled		
Annual Flow	4161390.8			556294.7	12.82968
Wet Season Flow	3613560.6	809766.1	2803794.5		
Dry Season Flow	547830.2	45811.2	502018.9		

WET SEASON																														Dry Season			Wet Season			Total Annual Load		
Storm 15 17-Apr-14 Wet EMC	LOAD	QA	AVE EMC AVE EMC	AVE Load AVE LOAD	AVE Sampled Wet storm Volume gal	Sampled Wet Season Flow gal	Unsampled wet flow volume gal	Total Wet flow volume gal	Unsampled Wet season load (gm)	Sampled wet season load (gm)	Total Wet season load (gm)	Storm 16 8-May-14 Dry EMC	LOAD	QA	Storm 17 28-May-14 Dry EMC	LOAD	QA	Storm 18 12-Jun-14 Dry EMC	LOAD	QA	AVE EMC AVE EMC	AVE Load AVE LOAD	AVE Sampled Dry storm	Sampled Dry Season	Unsampled Dry flow volume (gal)	Total Dry flow volume gal	Unsampled Dry season load (gm)	Sampled Dry season load (gm)	Total Dry season load (gm)	Load (g)	Load (lbs)	Areal Load (lbs per acre)	Load (g)	Load (lbs)	Areal Load (lbs per acre)	Load (g)	Load (lbs)	Areal Load (lbs per acre)
	NA		96.2500	36266.9088	80977	809766	2803795	3613561	1021550.999	362669.0883	1384220.088	172	29827.26			NA			NA		172	29827.26	45811.2	45811.2	502018.9	547830.2	326859.93	29827.26	356687.20	356687.2	784.7118	29.31311	1384220	3045.284	113.7573	1740907	3829.996	143.0705
	NA		39.4800	NA	80977	809766	2803795	3613561	NA	NA	NA	91	NA			NA			NA		91	NA	45811.2	45811.2	502018.9	547830.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	NA		7.4920	NA	80977	809766	2803795	3613561	NA	NA	NA	7.45	NA			NA			NA		7.45	NA	45811.2	45811.2	502018.9	547830.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	NA		33.8800	NA	80977	809766	2803795	3613561	NA	NA	NA	27.6	NA			NA			NA		27.6	NA	45811.2	45811.2	502018.9	547830.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	NA		5.3100	1628.9198	80977	809766	2803795	3613561	56357.77462	16289.19771	72646.97234	13.2	2289.069			NA			NA		13.2	2289.069	45811.2	45811.2	502018.9	547830.2	25084.60	2289.07	27373.67	27373.67	60.22207	2.24961	72646.97	159.8233	5.970241	100020.6	220.0454	8.219851
	NA		0.1242	35.0092	80977	809766	2803795	3613561	1318.198796	350.0918415	1668.290638	0.26	45.08772			NA			NA		0.26	45.08772	45811.2	45811.2	502018.9	547830.2	494.09	45.09	539.18	539.1783	1.186192	0.044311	1668.291	3.670239	0.137103	2207.469	4.856432	0.181413
	NA		2.3100	785.7895	80977	809766	2803795	3613561	24517.22399	7857.895365	32375.11935	0.64	110.9852			NA			NA		0.64	110.9852	45811.2	45811.2	502018.9	547830.2	1216.22	110.99	1327.21	1327.208	2.919858	0.109072	32375.12	71.22526	2.660637	33702.33	74.14512	2.769709
	NA		13.5200	4179.5753	80977	809766	2803795	3613561	143494.7482	41795.7531	185290.5013	20	3468.286			NA			NA		20	3468.286	45811.2	45811.2	502018.9	547830.2	38006.97	3468.29	41475.26	41475.26	91.24556	3.408501	185290.5	407.6391	15.22746	226765.8	498.8847	18.63596
	NA		0.2148	74.5028	80977	809766	2803795	3613561	2279.783425	745.0280392	3024.811465	0.333	57.74697			NA			NA		0.333	57.74697	45811.2	45811.2	502018.947	547830.2	632.82	57.75	690.56	690.563	1.519239	0.056752	3024.811	6.654585	0.248584	3715.374	8.173824	0.305335
	NA		0.0117	3.1300	80977	809766	2803795	3613561	124.1781475	31.30025733	155.4784048	0.012	2.080972			NA			NA		0.012	2.080972	45811.2	45811.2	502018.947	547830.2	22.80	2.08	24.89	24.88515	0.054747	0.002045	155.4784	0.342052	0.012777	180.3636	0.3968	0.014823
	NA		1.1970	352.1936	80977	809766	2803795	3613561	12704.3797	3521.936125	16226.31583	5.8	1005.803			NA			NA		5.8	1005.803	45811.2	45811.2	502018.947	547830.2	11022.02	1005.80	12027.82	12027.82	26.46121	0.988465	16226.32	35.69789	1.333504	28254.14	62.15911	2.321969
	NA		0.1661	39.1608	80977	809766	2803795	3613561	1762.905153	391.6082195	2154.513373	0.154	26.70581			NA			NA		0.154	26.70581	45811.2	45811.2	502018.947	547830.2	292.65	26.71	319.36	319.3595	0.702591	0.026245	2154.513	4.739929	0.177061	2473.873	5.44252	0.203307
	NA		18.3100	6.0033	80977	809766	2803795	3613561	194.333494	60.03309837	254.3665924	26.3	4.560797			NA			NA		26.3	4.560797	45811.2	45811.2	502018.947	547830.2	49.98	4.56	54.54	54.53996	0.119988	0.004482	254.3666	0.559607	0.020904	308.9066	0.679594	0.025386
	NA		4.1390	1.1006	80977	809766	2803795	3613561	43.92934636	11.00627053	54.93561689	5.73	0.993664			NA			NA		5.73	0.993664	45811.2	45811.2	502018.947	547830.2	10.89	0.99	11.88	11.88266	0.026142	0.000977	54.93562	0.120858	0.004515	66.81828	0.147	0.005491
	NA		103.2900	34.4039	80977	809766	2803795	3613561	1096.270158	344.039237	1440.309395	147	25.49191			NA			NA		147	25.49191	45811.2	45811.2	502018.947	547830.2	279.35	25.49	304.84	304.8431	0.670655	0.025052	1440.309	3.168681	0.118367	1745.153	3.839336	0.143419
	NA		23.9700	6.9925	80977	809766	2803795	3613561	254.4059996	69.92543483	324.3314344	29.3	5.08104			NA			NA		29.3	5.08104	45811.2	45811.2	502018.947	547830.2	55.68	5.08	60.76	60.76125	0.133675	0.004993	324.3314	0.713529	0.026654	385.0927	0.847204	0.031648
	NA		0.1458	0.0505	80977	809766	2803795	3613561	1.547450761	0.504508435	2.051959196	0.241	0.041793			NA			NA		0.241	0.041793	45811.2	45811.2	502018.947	547830.2	0.46	0.04	0.50	0.499777	0.0011	4.11E-05	2.051959	0.004514	0.000169	2.551736	0.005614	0.00021
	NA		0.0223	0.0064	80977	809766	2803795	3613561	0.236681426	0.063804428	0.300485854	0.022	0.003815			NA			NA		0.022	0.003815	45811.2	45811.2	502018.947	547830.2	0.04	0.00	0.05	0.045623	0.0001	3.75E-06	0.300486	0.000661	2.47E-05	0.346109	0.000761	2.84E-05
	NA		11.2320	4.0072	80977	809766	2803795	3613561	119.2110216	40.07234327	159.2833648	17.9	3.104116			NA			NA		17.9	3.104116	45811.2	45811.2	502018.947	547830.2	34.02	3.10	37.12	37.12035	0.081665	0.003051	159.2834	0.350423	0.01309	196.4037	0.432088	0.016141
	NA		0.0566	0.0157	80977	809766	2803795	3613561	0.600725055	0.15679769	0.757522745	0.072	0.012486			NA			NA		0.072	0.012486	45811.2	45811.2	502018.947	547830.2	0.14	0.01	0.15	0.149311	0.000328	1.23E-05	0.757523	0.001667	6.23E-05	0.906834	0.001995	7.45E-05
NA	NA	Dropped										NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	45811.2	45811.2	502018.947	547830.2	NA	NA										
NA	NA	Dropped										NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	45811.2	45811.2	502018.947	547830.2	NA	NA										
	NA		0.1341	0.0364	80977	809766	2803795	3613561	1.423272613	0.364101232	1.787373845	0.15	0.013006	UJ		NA			NA		0.15	0.013006	45811.2	45811.2	502018.947	547830.2	0.29	0.01	0.30	0.298058	0.000656	2.45E-05	1.787374	0.003932	0.000147	2.085432	0.004588	0.000171
NA	NA	Dropped										NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA						NA										
	NA		0.0064	0.0014	80977	809766	2803795	3613561	0.068138778	0.014212029	0.082350807	0.0078	0.001353			NA			NA		0.0078	0.001353	45811.2	45811.2	502018.947	547830.2	0.01	0.00	0.02	0.016175	3.56E-05	1.33E-06	0.082351	0.000181	6.77E-06	0.098526	0.000217	8.1E-06
NA	NA	Dropped										NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA						NA										
	NA		0.0706	0.0194	80977	809766	2803795	3613561	0.749314292	0.193755789	0.94307008	0.063	0.010925			NA			NA		0.063	0.010925	45811.2	45811.2	502018.947	547830.2	0.12	0.01	0.13	0.130647	0.000287	1.07E-05	0.94307	0.002075	7.75E-05	1.073717	0.002362	8.82E-05
	NA		0.0156	0.0049	80977	809766	2803795	3613561	0.165252458	0.04885222	0.214104677	0.025	0.004335			NA			NA		0.025	0.004335	45811.2	45811.2	502018.947	547830.2	0.05	0.00	0.05	0.051844	0.000114	4.26E-06	0.214105	0.000471	1.76E-05	0.265949	0.000585	2.19E-05
	NA		0.1062	0.0382	80977	809766	2803795	3613561	1.127155492	0.381621536	1.508777028	0.087	0.015087			NA			NA		0.087	0.015087	45811.2	45811.2	502018.947	547830.2	0.17	0.02	0.18	0.180417	0.000397	1.48E-05	1.508777	0.003319	0.000124	1.689194	0.003716	0.000139
	NA		0.0072	0.0023	80977	809766	2803795	3613561	0.076841862	0.022696422	0.099538284	0.0091	0.001578			NA			NA		0.0091	0.001578	45811.2	45811.2	502018.947	547830.2	0.02	0.00	0.02	0.018871	4.15E-05	1.55E-06	0.099538	0.000219	8.18E-06	0.11841	0.000261	9.73E-06
	NA		0.0177	0.0058	80977	809766	2803795	3613561	0.188177654	0.057715804	0.245893459	0.0097	0.001682			NA			NA		0.0097	0.001682	45811.2	45811.2	502018.947	547830.2	0.02	0.00	0.02	0.020115	4.43E-05	1.65E-06	0.245893	0.000541	2.02E-05	0.266009	0.000585	2.19E-05
	NA		0.0324	0.0119	80977	809766	2803795	3613561	0.343877947	0.11898201	0.462859957	0.025	0.004335			NA			NA		0.025	0.004335	45811.2	45811.2	502018.947	547830.2	0.05	0.00	0.05	0.051844	0.000114	4.26E-06	0.46286	0.001018	3.8E-05	0.514704	0.001132	4.23E-05
	NA		0.1229	0.0411	80977	809766	2803795	3613561	1.304401224	0.41087463	1.715275855	0.094	0.016301			NA			NA		0.094	0.016301	45811.2	45811.2	502018.947	547830.2	0.18	0.02	0.19	0.194934	0.000429	1.6E-05	1.715276	0.003774	0.000141	1.91021	0.004202	0.000157
	NA		0.0202	0.0070	80977	809766	2803795	3613561	0.214711446	0.06970852	0.284419966	0.021	0.003642			NA			NA		0.021	0.003642	45811.2	45811.2	502018.947	547830.2	0.04	0.00	0.04	0.043549	9.58E-05	3.58E-06	0.28442	0.000626	2.34E-05	0.327969	0.000722	2.7E-05
	NA		0.1575	0.0546	80977	809766	2803795	3613561	1.671628908	0.546017997	2.217646905	0.12	0.02081			NA			NA		0.12	0.02081	45811.2	45811.2	502018.947	547830.2	0.23	0.02	0.25	0.248852	0.000547	2.05E-05	2.217647	0.004879	0.000182	2.466498	0.005426	0.000203
	NA		0.2390	0.0805	80977	809766	2803795	3613561	2.536630534	0.80496662	3.341597154	0.21	0.036417			NA			NA		0.21	0.036417	45811.2	45811.2	502018.947	547830.2	0.40	0.04	0.44	0.43549	0.000958	3.58E-05	3.341597	0.007352	0.000275	3.777087	0.00831	0.00031
	NA		0.0686	0.0250	80977	809766	2803795	3613561	0.728087258	0.249900326	0.977987584	0.065	0.011272			NA			NA		0.065	0.011272	45811.2	45811.2	502018.947	547830.2	0.12	0.01	0.13	0.134795	0.000297	1.11E-05	0.977988	0.002152	8.04E-05	1.112782	0.002448	9.15E-05
	NA		0.0458	0.0126	80977	809766	2803795	3613561	0.486099073	0.126097931	0.612197004	0.043	0.007457			NA			NA		0.043	0.007457	45811.2	45811.2	502018.947	547830.2	0.08	0.01	0.09	0.089172	0.000196	7.33E-06	0.612197	0.001347	5.03E-05	0.701369	0.001543	5.76E-05
	NA		0.1527	0.0566	80977	809766	2803795	3613561	1.620684027	0.565563484	2.186247512	0.075	0.013006			NA			NA		0.075	0.013006	45811.2	45811.2	502018.947	547830.2	0.14	0.01	0.16	0.155532	0.000342	1.28E-05	2.186248	0.00481	0.00018	2.34178	0.005152	0.000192
	NA		0.0132	0.0040	80977	809766	2803795	3613561	0.139780017	0.039861559	0.179641577	0.016	0.002775			NA			NA		0.016	0.002775	45811.2	45811.2	502018.947	547830.2	0.03	0.00	0.03	0.03318	7.3E-05	2.73E-06	0.179642	0.000395	1.48E-05	0.212822	0.000468	1.75E-05
	NA		0.1601	0.0558	80977	809766	2803795	3613561	1.699224052	0.558156009	2.257380061	0.14	0.024278			NA			NA		0.14	0.024278	45811.2	45811.2	502018.947	547830.2	0.27	0.02	0.29	0.290327	0.000639	2.39E-05	2.25738	0.004966	0.000186	2.547707	0.005605	0.000209
	NA		5.8600	1.7986	80977	809766	2803795	3613561	62.1952089	17.98624684	80.18145574	5	0.867072			NA			NA		5	0.867072	45811.2	45811.2	502018.947	547830.2	9.50	0.87	10.37	10.36881	0.022811	0.000852	80.18146	0.176399	0.006589	90.55027	0.199211	0.007442
130	NA		108.7500	NA	NA	NA	NA	NA	NA	NA	NA	350	NA		1600	NA		220	NA		723.3333	NA	45811.2	45811.2	502018.947	547830.2	NA	NA	NA	NA			NA					
640	NA		935.0000	NA	NA	NA	NA	NA	NA	NA	NA	1800	NA		2400	NA		3200	NA		2466.667	NA	45811.2	45811.2	502018.947	547830.2	NA	NA	NA	NA			NA					
2300	NA		3120.0000	NA	NA	NA	NA	NA	NA	NA	NA	3000	NA		4100	NA		4900	NA		4000	NA	45811.2	45811.2	502018.947	547830.2	NA	NA	NA	NA			NA					
NA	NA	Dropped										NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped		NA	45811.2	45811.2	502018.947	547830.2	NA	NA	NA	NA								
0.062	NA	UJ	0.0620	NA	NA	NA	NA	NA	NA	NA	NA	0.062	NA	UJ	0.062	NA	UJ	0.062	NA	UJ	0.062	NA	45811.2	45811.2	502018.947	547830.2	NA	NA	NA	NA			NA					
0.054	NA	UJ	0.2435	NA	NA	NA	NA	NA	NA	NA	NA	0.09	NA		2.3	NA		7.3	NA		3.23	NA	45811.2	45811.2	502018.947	547830.2	NA	NA	NA	NA			NA					
0.05	NA	UJ	0.1438	NA	NA	NA	NA	NA	NA	NA	NA	0.05	NA	UJ	0.05	NA	UJ	0.05	NA	UJ	0.05	NA	45811.2	45811.2	502018.947	547830.2	NA	NA	NA	NA			NA					
0.11	NA	UJ	0.5138	NA	NA	NA	NA	NA	NA	NA	NA	0.11	NA	UJ	0.11	NA	UJ	0.11	NA	UJ	0.11	NA	45811.2	45811.2	502018.947	547830.2	NA	NA	NA	NA			NA					
0.074	NA	UJ	0.2273	NA	NA	NA	NA	NA	NA	NA	NA	0.074	NA	UJ	0.074	NA	UJ	0.074	NA	UJ	0.074	NA	45811.2	45811.2	502018.947	547830.2	NA	NA	NA	NA			NA					
	36523.81												45811.2			19928.1			26596.0																			

COM WY2014	Dry Season			Wet Season			Total Annual Load			
	Load (g)	Load (lbs)	Areal Load	Load (g)	Load (lbs)	Areal Load	Load (g)	Load (lbs)	Areal Load (lbs per acre)	
TSS	3.57E+05	7.85E+02	2.93E+01	1.38E+06	3.05E+03	1.14E+02	1.74E+06	3.83E+03	1.43E+02	
BOD	2.74E+04	6.02E+01	2.25E+00	7.26E+04	1.60E+02	5.97E+00	1.00E+05	2.20E+02	8.22E+00	
Surfactants (MBAS)	5.39E+02	1.19E+00	4.43E-02	1.67E+03	3.67E+00	1.37E-01	2.21E+03	4.86E+00	1.81E-01	
Chloride	1.33E+03	2.92E+00	1.09E-01	3.24E+04	7.12E+01	2.66E+00	3.37E+04	7.41E+01	2.77E+00	
Hardness	4.15E+04	9.12E+01	3.41E+00	1.85E+05	4.08E+02	1.52E+01	2.27E+05	4.99E+02	1.86E+01	
Total Phosphorus	6.91E+02	1.52E+00	5.68E-02	3.02E+03	6.65E+00	2.49E-01	3.72E+03	8.17E+00	3.05E-01	
Orthophosphate	2.49E+01	5.47E-02	2.05E-03	1.55E+02	3.42E-01	1.28E-02	1.80E+02	3.97E-01	1.48E-02	
Total Kjeldahl Nitrogen	1.20E+04	2.65E+01	9.88E-01	1.62E+04	3.57E+01	1.33E+00	2.83E+04	6.22E+01	2.32E+00	
Nitrate+Nitrite	3.19E+02	7.03E-01	2.62E-02	2.15E+03	4.74E+00	1.77E-01	2.47E+03	5.44E+00	2.03E-01	
Total Cu	5.45E+01	1.20E-01	4.48E-03	2.54E+02	5.60E-01	2.09E-02	3.09E+02	6.80E-01	2.54E-02	
Dissolved Cu	1.19E+01	2.61E-02	9.77E-04	5.49E+01	1.21E-01	4.51E-03	6.68E+01	1.47E-01	5.49E-03	
Total Zn	3.05E+02	6.71E-01	2.51E-02	1.44E+03	3.17E+00	1.18E-01	1.75E+03	3.84E+00	1.43E-01	
Dissolved Zinc	6.08E+01	1.34E-01	4.99E-03	3.24E+02	7.14E-01	2.67E-02	3.85E+02	8.47E-01	3.16E-02	
Total Cadmium	5.00E-01	1.10E-03	4.11E-05	2.05E+00	4.51E-03	1.69E-04	2.55E+00	5.61E-03	2.10E-04	
Diss. Cadmium	4.56E-02	1.00E-04	3.75E-06	3.00E-01	6.61E-04	2.47E-05	3.46E-01	7.61E-04	2.84E-05	
Total Lead	3.71E+01	8.17E-02	3.05E-03	1.59E+02	3.50E-01	1.31E-02	1.96E+02	4.32E-01	1.61E-02	
Dissolved Lead	1.49E-01	3.28E-04	1.23E-05	7.58E-01	1.67E-03	6.23E-05	9.07E-01	2.00E-03	7.45E-05	
2,4-D	2.98E-01	6.56E-04	2.45E-05	1.79E+00	3.93E-03	1.47E-04	2.09E+00	4.59E-03	1.71E-04	
Dichlobenil										
Carbaryl	1.62E-02	3.56E-05	1.33E-06	8.24E-02	1.81E-04	6.77E-06	9.85E-02	2.17E-04	8.10E-06	Over 50% ND
Chlorpyrifos										
Naphthalene	1.31E-01	2.87E-04	1.07E-05	9.43E-01	2.07E-03	7.75E-05	1.07E+00	2.36E-03	8.82E-05	
Acenaphthylene	5.18E-02	1.14E-04	4.26E-06	2.14E-01	4.71E-04	1.76E-05	2.66E-01	5.85E-04	2.19E-05	
Benzo(b)fluoranthene	1.80E-01	3.97E-04	1.48E-05	1.51E+00	3.32E-03	1.24E-04	1.69E+00	3.72E-03	1.39E-04	
Acenaphthene	1.89E-02	4.15E-05	1.55E-06	9.95E-02	2.19E-04	8.18E-06	1.18E-01	2.61E-04	9.73E-06	
Fluorene	2.01E-02	4.43E-05	1.65E-06	2.46E-01	5.41E-04	2.02E-05	2.66E-01	5.85E-04	2.19E-05	
Benzo(k)fluoranthene	5.18E-02	1.14E-04	4.26E-06	4.63E-01	1.02E-03	3.80E-05	5.15E-01	1.13E-03	4.23E-05	
Phenanthrene	1.95E-01	4.29E-04	1.60E-05	1.72E+00	3.77E-03	1.41E-04	1.91E+00	4.20E-03	1.57E-04	
Anthracene	4.35E-02	9.58E-05	3.58E-06	2.84E-01	6.26E-04	2.34E-05	3.28E-01	7.22E-04	2.70E-05	
Fluoranthene	2.49E-01	5.47E-04	2.05E-05	2.22E+00	4.88E-03	1.82E-04	2.47E+00	5.43E-03	2.03E-04	
Pyrene	4.35E-01	9.58E-04	3.58E-05	3.34E+00	7.35E-03	2.75E-04	3.78E+00	8.31E-03	3.10E-04	
Indeno(1,2,3-cd)pyrene	1.35E-01	2.97E-04	1.11E-05	9.78E-01	2.15E-03	8.04E-05	1.11E+00	2.45E-03	9.15E-05	
Benzo(a)anthracene	8.92E-02	1.96E-04	7.33E-06	6.12E-01	1.35E-03	5.03E-05	7.01E-01	1.54E-03	5.76E-05	Over 50% ND
Chrysene	1.56E-01	3.42E-04	1.28E-05	2.19E+00	4.81E-03	1.80E-04	2.34E+00	5.15E-03	1.92E-04	
Dibenzo(a,h)anthracene	3.32E-02	7.30E-05	2.73E-06	1.80E-01	3.95E-04	1.48E-05	2.13E-01	4.68E-04	1.75E-05	
Benzo(ghi)perylene	2.90E-01	6.39E-04	2.39E-05	2.26E+00	4.97E-03	1.86E-04	2.55E+00	5.60E-03	2.09E-04	
Bis(2-ethylhexyl) phthalate	1.04E+01	2.28E-02	8.52E-04	8.02E+01	1.76E-01	6.59E-03	9.06E+01	1.99E-01	7.44E-03	

COM WY2014	Dry Season			Wet Season			Total Annual Load			
	Load (g)	Load (lbs)	Areal Load	Load (g)	Load (lbs)	Areal Load	Load (g)	Load (lbs)	Areal Load (lbs per acre)	
2,4-D	2.98E-01	6.56E-04	2.45E-05	1.79E+00	3.93E-03	1.47E-04	2.09E+00	4.59E-03	1.71E-04	
Acenaphthene	1.89E-02	4.15E-05	1.55E-06	9.95E-02	2.19E-04	8.18E-06	1.18E-01	2.61E-04	9.73E-06	
Acenaphthylene	5.18E-02	1.14E-04	4.26E-06	2.14E-01	4.71E-04	1.76E-05	2.66E-01	5.85E-04	2.19E-05	
Anthracene	4.35E-02	9.58E-05	3.58E-06	2.84E-01	6.26E-04	2.34E-05	3.28E-01	7.22E-04	2.70E-05	
Benzo(a)anthracene	8.92E-02	1.96E-04	7.33E-06	6.12E-01	1.35E-03	5.03E-05	7.01E-01	1.54E-03	5.76E-05	Over 50% ND
Benzo(b)fluoranthene	1.80E-01	3.97E-04	1.48E-05	1.51E+00	3.32E-03	1.24E-04	1.69E+00	3.72E-03	1.39E-04	
Benzo(ghi)perylene	2.90E-01	6.39E-04	2.39E-05	2.26E+00	4.97E-03	1.86E-04	2.55E+00	5.60E-03	2.09E-04	
Benzo(k)fluoranthene	5.18E-02	1.14E-04	4.26E-06	4.63E-01	1.02E-03	3.80E-05	5.15E-01	1.13E-03	4.23E-05	
Bis(2-ethylhexyl) phthalate	1.04E+01	2.28E-02	8.52E-04	8.02E+01	1.76E-01	6.59E-03	9.06E+01	1.99E-01	7.44E-03	
BOD	2.74E+04	6.02E+01	2.25E+00	7.26E+04	1.60E+02	5.97E+00	1.00E+05	2.20E+02	8.22E+00	
Carbaryl	1.62E-02	3.56E-05	1.33E-06	8.24E-02	1.81E-04	6.77E-06	9.85E-02	2.17E-04	8.10E-06	Over 50% ND
Chloride	1.33E+03	2.92E+00	1.09E-01	3.24E+04	7.12E+01	2.66E+00	3.37E+04	7.41E+01	2.77E+00	
Chlorpyrifos										
Chrysene	1.56E-01	3.42E-04	1.28E-05	2.19E+00	4.81E-03	1.80E-04	2.34E+00	5.15E-03	1.92E-04	
Dibenzo(a,h)anthracene	3.32E-02	7.30E-05	2.73E-06	1.80E-01	3.95E-04	1.48E-05	2.13E-01	4.68E-04	1.75E-05	
Dichlobenil										
Diss. Cadmium	4.56E-02	1.00E-04	3.75E-06	3.00E-01	6.61E-04	2.47E-05	3.46E-01	7.61E-04	2.84E-05	
Dissolved Cu	1.19E+01	2.61E-02	9.77E-04	5.49E+01	1.21E-01	4.51E-03	6.68E+01	1.47E-01	5.49E-03	
Dissolved Lead	1.49E-01	3.28E-04	1.23E-05	7.58E-01	1.67E-03	6.23E-05	9.07E-01	2.00E-03	7.45E-05	
Dissolved Zinc	6.08E+01	1.34E-01	4.99E-03	3.24E+02	7.14E-01	2.67E-02	3.85E+02	8.47E-01	3.16E-02	
Fluoranthene	2.49E-01	5.47E-04	2.05E-05	2.22E+00	4.88E-03	1.82E-04	2.47E+00	5.43E-03	2.03E-04	
Fluorene	2.01E-02	4.43E-05	1.65E-06	2.46E-01	5.41E-04	2.02E-05	2.66E-01	5.85E-04	2.19E-05	
Hardness	4.15E+04	9.12E+01	3.41E+00	1.85E+05	4.08E+02	1.52E+01	2.27E+05	4.99E+02	1.86E+01	
Indeno(1,2,3-cd)pyrene	1.35E-01	2.97E-04	1.11E-05	9.78E-01	2.15E-03	8.04E-05	1.11E+00	2.45E-03	9.15E-05	
Naphthalene	1.31E-01	2.87E-04	1.07E-05	9.43E-01	2.07E-03	7.75E-05	1.07E+00	2.36E-03	8.82E-05	
Nitrate+Nitrite	3.19E+02	7.03E-01	2.62E-02	2.15E+03	4.74E+00	1.77E-01	2.47E+03	5.44E+00	2.03E-01	
Orthophosphate	2.49E+01	5.47E-02	2.05E-03	1.55E+02	3.42E-01	1.28E-02	1.80E+02	3.97E-01	1.48E-02	
Phenanthrene	1.95E-01	4.29E-04	1.60E-05	1.72E+00	3.77E-03	1.41E-04	1.91E+00	4.20E-03	1.57E-04	
Pyrene	4.35E-01	9.58E-04	3.58E-05	3.34E+00	7.35E-03	2.75E-04	3.78E+00	8.31E-03	3.10E-04	
Surfactants (MBAS)	5.39E+02	1.19E+00	4.43E-02	1.67E+03	3.67E+00	1.37E-01	2.21E+03	4.86E+00	1.81E-01	
Total Cadmium	5.00E-01	1.10E-03	4.11E-05	2.05E+00	4.51E-03	1.69E-04	2.55E+00	5.61E-03	2.10E-04	
Total Cu	5.45E+01	1.20E-01	4.48E-03	2.54E+02	5.60E-01	2.09E-02	3.09E+02	6.80E-01	2.54E-02	
Total Kjeldahl Nitrogen	1.20E+04	2.65E+01	9.88E-01	1.62E+04	3.57E+01	1.33E+00	2.83E+04	6.22E+01	2.32E+00	
Total Lead	3.71E+01	8.17E-02	3.05E-03	1.59E+02	3.50E-01	1.31E-02	1.96E+02	4.32E-01	1.61E-02	
Total Phosphorus	6.91E+02	1.52E+00	5.68E-02	3.02E+03	6.65E+00	2.49E-01	3.72E+03	8.17E+00	3.05E-01	
Total Zn	3.05E+02	6.71E-01	2.51E-02	1.44E+03	3.17E+00	1.18E-01	1.75E+03	3.84E+00	1.43E-01	
TSS	3.57E+05	7.85E+02	2.93E+01	1.38E+06	3.05E+03	1.14E+02	1.74E+06	3.83E+03	1.43E+02	

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Parameter	Units	Storm 1 1-Nov-13 Wet			Storm 2 8-Nov-13 Wet			Storm 3 1-Dec-13 Wet			Storm 4 7-Jan-14 Wet			Storm 5 11-Jan-14 Wet			Storm 6 28-Jan-14 Wet			Storm 7 20-Feb-14 Wet			Storm 8 24-Feb-14 Wet			Storm 9 2-Mar-14 Wet			Storm 10 5-Mar-14 Wet			Storm 11 9-Mar-14 Wet			Storm 12 17-Mar-14 Wet			Storm 13 25-Mar-14 Wet			Storm 14 1-Apr-14 Wet			Storm 15 5-Apr-14 Wet	
		EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD	QA	EMC	LOAD
General																																													
TSS	mg/L	30	46590.64075		20.5	66617.33		45	207659.4		41.5	19566.93		43.5	165452.6								5.5	2596.0753		9	11615.36		38	229174.7		10	20524.36		14	29307.4729										
Turbidity	NTU	7.73	NA		5.38	NA		9.64	NA		16.1	NA		10.8	NA								8.02	NA		7.85	NA		19.5	NA		9.26	NA		11.5	NA										
pH	NA	7.89	NA		7.2	NA		7.29	NA		7.22	NA		7.46	NA								7.67	NA		7.59	NA		7.4	NA		7.41	NA		7.31	NA										
Conductivity	umhos/cm	36.1	NA		29.3	NA		22.6	NA		30.5	NA		36.9	NA								33.8	NA		25.7	NA		18.5	NA		24.2	NA		24.9	NA										
BOD	mg/L	5.1	7920.408927		2	6499.251	UJ	2	9229.306	UJ	4.2	1980.268		2	7607.015	UJ							2	944.02739		4.1	5291.442		2.1	12664.92		2	4104.872	UJ	3.5	7326.86823										
Surfactants (MBAS)	mg/L	0.084	130.4537941		0.05	162.4813		0.05	230.7327	UJ	0.092	43.3773		0.108	410.7788								0.12	56.641644		0.05	64.52978	UJ	0.052	313.6075		0.05	102.6218	UJ	0.05	104.669546	UJ										
Chloride	mg/L	1.92	2981.801008		0.82	2664.693		0.55	2538.059		1.44	678.949		4.1	15594.38								0.84	396.49151		0.61	787.2633		0.22	1326.801		0.44	903.0718		0.59	1235.10064										
Hardness	mg/L	14.8	22984.7161		12.4	40295.36		12	55375.84		NA			10	38035.08								10.4	4908.9424		8.4	10841		9.2	55484.41		9.2	18882.41		8.8	18421.8401										
Nutrients																																														
Total Phosphorus	mg/L	0.185	287.3089513		0.175	568.6845		0.173	798.335		0.146	68.83789		0.116	441.2069								0.061	28.792836		0.073	94.21348		0.162	977.008		0.083	170.3522		0.108	226.08622										
Orthophosphate	mg/L	0.116	180.1504776		0.108	350.9596		0.064	295.3378		0.022	10.37283		0.012	45.64209								0.03	14.160411		0.027	34.84608		0.055	331.7003		0.028	57.4682		0.033	69.0819004										
Total Kjeldahl Nitrogen	mg/L	1.04	1615.142213		0.59	1917.279		0.75	3460.99		0.75	353.6193		0.64	2434.245								0.71	335.12972		0.62	800.1693		0.81	4885.04		0.9	1847.192		0.71	1486.30755										
Nitrate+Nitrite	mg/L	0.032	49.69668347		0.068	220.9745		0.097	447.6213		0.134	63.17998		0.06	228.2105								0.174	82.130383		0.167	215.5295		0.104	627.215		0.109	223.7155		0.108	226.08622										
Metals																																														
Total Cu	ug/L	10.2	15.84081785		9.93	32.26878		10.4	47.99239		8.92	4.205712		9.77	37.16027								7.22	3.4079389		6.48	8.363059		9.08	54.7607		7.48	15.35222		7.25	15.1770842										
Dissolved Cu	ug/L	5.2	8.075711063		5.9	19.17279		3.92	18.08944		3.17	1.494631		4.16	15.82259								4.33	2.0438193		3.95	5.097853		3.84	23.15871		4.91	10.07746		4.15	8.68757233										
Total Zn	ug/L	1570	2438.243533		659	2141.503		475	2191.96		840	396.0536		194	737.8805								87.8	41.442803		108	139.3843		153	922.7298		135	277.0788		698	1461.18686										
Dissolved Zinc	ug/L	1260	1956.806911		559	1816.541		254	1172.122		665	313.5424		131	498.2595								71.7	33.843382		87.3	112.669		99.5	600.0759		112	229.8728		620	1297.90237										
Total Cadmium	ug/L	0.05	0.077651068		0.034	0.110487		0.051	0.235347		0.057	0.026875		0.046	0.174961								0.024	0.0113283		0.022	0.028393		0.032	0.192989		0.017	0.034891		0.031	0.06489512										
Diss. Cadmium	ug/L	0.025	0.038825534		0.023	0.074741		0.008	0.036917		0.022	0.010373		0.016	0.060856								0.013	0.0061362		0.01	0.012906		0.011	0.06634		0.016	0.032839		0.017	0.03558765										
Total Lead	ug/L	1.41	2.189760115		1.09	3.542092		2.01	9.275453		2.09	0.985419		1.91	7.2647								0.724	0.3417379		0.754	0.973109		2.04	12.30306		0.728	1.494173		1.25	2.61673865										
Dissolved Lead	ug/L	0.116	0.180150478		0.084	0.272969		0.031	0.143054		0.027	0.01273		0.039	0.148337								0.031	0.0146324		0.021	0.027103		0.088	0.53072		0.035	0.071835		0.022	0.0460546										
Total Mercury	ug/L	0.02	0.031060427	UJ	0.02	0.064993	UJ	0.02	0.092293	UJ	0.02	0.00943	UJ	0.02	0.07607	UJ							0.02	0.0094403	UJ	0.02	0.025812	UJ	0.02	0.120618	UJ	0.02	0.041049	UJ	0.02	0.04186782	UJ										
Dissolved Mercury	ug/L	0.02	0.031060427	UJ	0.02	0.064993	UJ	0.02	0.092293	UJ	0.02	0.00943	UJ	0.02	0.07607	UJ							0.02	0.0094403	UJ	0.02	0.025812	UJ	0.02	0.120618	UJ	0.02	0.041049	UJ	0.02	0.04186782	UJ										
Herbicides																																														
2,4-D	ug/L	1.51	2.345062251		0.12	0.389955		0.15	0.692198		0.31	0.146163		0.29	1.103017								0.12	0.0566416		0.14	0.180683		0.14	0.844328		0.15	0.307865		0.56	1.17229892										
Dichlobenil	ug/L	0.07	0.108711495	UJ	0.016	0.051994		0.023	0.106137		0.07	0.033004	UJ	0.07	0.266246	UJ							0.075	0.035401		0.23	0.296837		0.19	1.145874		0.14	0.287341		2.2	4.60546003										
Insecticides																																														
Carbaryl	ug/L	0.004	0.006212085	UJ	0.0043	0.013973		0.004	0.018459	UJ	0.004	0.001886	UJ	0.004	0.015214	UJ							0.0058	0.0027377		0.004	0.005162	UJ	0.013	0.078402		0.0075	0.015393		0.0043	0.00900158										
Chlorpyrifos	ug/L	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped							NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped										
PAHs																																														
Naphthalene	ug/L	0.047	0.072992004		0.041	0.133235		0.0097	0.044762		0.083	0.039134		0.2	0.760702								0.12	0.0566416		0.044	0.056786		0.0086	0.051866		0.034	0.069783		0.12	0.25120691										
Acenaphthylene	ug/L	0.015	0.02329532	UJ	0.015	0.048744	UJ	0.0046	0.021227		0.01	0.004715		0.0036	0.013693	UJ							0.0034	0.0016048	UJ	0.0053	0.00684		0.0034	0.020505	UJ	0.0034	0.006978	UJ	0.0034	0.00711753	UJ										
Benzo(b)fluoranthene	ug/L	0.017	0.026401363	UJ	0.017	0.055244	UJ	0.016	0.073834		0.045	0.021217		0.02	0.07607								0.0063	0.0029737		0.0073	0.009421		0.011	0.06634		0.0041	0.008415	UJ	0.011	0.0230273										
Acenaphthene	ug/L	0.026	0.040378555	UJ	0.026	0.08449	UJ	0.0051	0.023535	UJ	0.0045	0.002122		0.0046	0.017496	UJ							0.0044	0.0020769	UJ	0.0044	0.005679	UJ	0.0044	0.026536	UJ	0.0044	0.009031	UJ	0.0044	0.00921092	UJ										
Fluorene	ug/L	0.027	0.041931577	UJ	0.027	0.08774	UJ	0.0049	0.022612		0.0074	0.003489		0.004	0.015214	UJ							0.0038	0.0017937	UJ	0.0038	0.004904	UJ	0.0038	0.022917	UJ	0.0038	0.007799	UJ	0.0038	0.00795489	UJ										
Benzo(k)fluoranthene	ug/L	0.024	0.037272513	UJ	0.024	0.077991	UJ	0.0046	0.021227		0.013	0.006129		0.0032	0.012171	UJ							0.003	0.001416	UJ	0.003	0.003872	UJ	0.0032	0.019299		0.003	0.006157	UJ	0.0055	0.01151365										
Phenanthrene	ug/L	0.022	0.03416647	UJ	0.022	0.071492	UJ	0.022	0.101522		0.054	0.025461		0.028	0.106498								0.013	0.0061362		0.015	0.019359		0.015	0.090464		0.0095	0.019498		0.014	0.02930747										
Anthracene	ug/L	0.024	0.037272513	UJ	0.024	0.077991	UJ	0.0041	0.01892	UJ	0.011	0.005186		0.0053	0.020159								0.0036	0.0016992	UJ	0.0036	0.004646	UJ	0.0036	0.021711	UJ	0.0036	0.007389	UJ	0.0036	0.00753621	UJ										
Fluoranthene	ug/L	0.02	0.031060427	UJ	0.02	0.064993	UJ	0.021	0.096908		0.072	0.033947		0.027	0.102695								0.011	0.0051922		0.013	0.016778		0.016	0.096495		0.01	0.020524	UJ	0.012	0.02512069										
Pyrene	ug/L	0.025	0.038825534		0.02	0.064993		0.024	0.110752		0.083	0.039134		0.036	0.136926								0.015	0.0070802		0.016	0.02065		0.016	0.096495		0.0068	0.013957		0.014	0.02930747										
Indeno(1,2,3-cd)pyrene	ug/L	0.021	0.032613449	UJ	0.021	0.068242	UJ	0.0084	0.038763		0.024	0.011316		0.012	0.045642								0.0041	0.0019353		0.0026	0.003356	UJ	0.0062	0.037392		0.0026	0.005336	UJ	0.0077	0.01611911										
Benzo(a)anthracene	ug/L	0.018	0.027954384	UJ	0.018	0.058493	UJ	0.0069	0.031841	UJ	0.025	0.011787		0.0093	0.035373	UJ							0.0085	0.0040121		0.0045	0.005808	UJ	0.004	0.024124	UJ	0.0026	0.005336	UJ	0.0058	0.01214167										
Chrysene	ug/L	0.028	0.043484598	UJ	0.028	0.09099	UJ	0.02	0.092293		0.04	0.01886		0.028	0.106498								0.005	0.0023601		0.011	0.014197		0.015	0.090464		0.0048	0.009852		0.0077	0.01611911										
Dibenzo(a,h)anthracene	ug/L	0.017	0.026401363	UJ	0.017	0.055244	UJ	0.0033	0.015228		0.0026	0.001226	UJ	0.0027	0.010269	UJ							0.0025	0.00118	UJ	0.0025	0.003226	UJ	0.0025	0.015077	UJ	0.0025	0.005131		0.0052	0.01088563										
Benzo(ghi)perylene	ug/L	0.019	0.029507406	UJ	0.019	0.061743	UJ	0.017	0.078449		0.046	0.021689		0.027	0.102695								0.009	0.0042481		0.0076	0.009809		0.014	0.084433		0.0039	0.008004		0.014	0.02930747										
Phthalates																																														
Bis(2-ethylhexyl) phthalate	ug/L	3.3	5.124970482		3.6	11.69865		2.5	11.53663		2.3	1.084432		4.7	17.87649								3	1.4160411		2	2.581191		2	12.06183		3	6.157308		2.8	5.86149458										
Microbial																																														
Fecal Coliform	MPN		NA		350	NA			NA		350	NA			NA		1600	NA		1600	NA		1600	NA			NA			NA			NA		1600	NA		1600	NA		1600	NA			
Petroleum Hydrocarbons																																														
TPH - Diesel	ug/L		NA		340	NA			NA		360	NA			NA		710	NA		110	NA		250	NA			NA			NA			NA		1400	NA		300	NA		120	NA			
TPH - Oil	ug/L		NA		530	NA			NA		1200	NA			NA		1600	NA		350	NA		590	NA			NA			NA			NA		600	NA		450	NA		250	NA			
TPH - Gasoline	ug/L	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA		
Benzene	ug/L		NA		0.062	0	UJ		NA		0.062	0	UJ		NA		0.062	0	UJ	0.062	0	UJ	0.062	0	UJ		NA			NA			NA		0.062	0	UJ	0.062	0	UJ	0.062	0		
Toluene	ug/L		NA		0.18	0			NA		0.18	0			NA		0.18	0		0.054	0	UJ	0.054	0	UJ		NA			NA			NA		0.2	0		0.07	0		0.06	0		
Ethylbenzene	ug/L		NA		0.05	0	UJ		NA		0.05	0	UJ		NA		0.05	0	UJ	0.05	0	UJ	0.05	0	UJ		NA			NA			NA		0.05	0	UJ	0.05	0	UJ	0.05	0		
m,p-Xylenes	ug/L		NA		0.11	0	UJ		NA		0.11	0	UJ		NA		0.11	0	UJ	0.11	0	UJ	0.11	0	UJ		NA			NA			NA		0.11	0	UJ	0.11	0	UJ	0.11	0		
o-Xylene	ug/L		NA		0.074	0	UJ		NA		0.074	0	UJ		NA		0.074	0	UJ	0.074	0	UJ	0.074	0	UJ		NA			NA			NA		0.074	0	UJ	0.074	0	UJ	0.074	0		
Storm Volume (gal):			410264.8396			858460.3			1219062			124555.1			1004780			105283.5			49354.675			124692.83			340939.3			1593199			542196.2			553015.376			59926.607			351981.4			32038.78	

		Total (gal)	Sampled	Unsampled
Annual Flow		18142965.26	6771165.559	11371799.7
Wet Season Flow		2326813.134	152994.8298	2173818.304
Dry Season Flow				

QA	Storm 16 17-Apr-12 Wet EMC	LOAD	QA	AVE EMC	AVE Load	AVE Sampled Wet storm	Sampled Wet Season Flow gal	Unsampled wet flow volume gal	Total Wet flow volume gal	Unsampled Wet season load (gm)	Sampled wet season load (gm)	Total Wet season load (gm)
				25.7	79910.49	677116.556	6771165.56	11371799.7	18142965.3	1106306.48	799104.86	1905411.34
				10.578	NA	677116.556	6771165.56	11371799.7	18142965.3	455350.58	NA	NA
				7.444	NA	677116.556	6771165.56	11371799.7	18142965.3	320441.455	NA	NA
				28.25	NA	677116.556	6771165.56	11371799.7	18142965.3	1216076.18	NA	NA
				2.9	6356.838	677116.556	6771165.56	11371799.7	18142965.3	124836.139	63568.3777	188404.517
				0.0706	161.9894	677116.556	6771165.56	11371799.7	18142965.3	3039.11429	1619.89413	4659.00842
				1.153	2910.661	677116.556	6771165.56	11371799.7	18142965.3	49633.1271	29106.6119	78739.739
				10.57778	29469.95	677116.556	6771165.56	11371799.7	18142965.3	455341.014	265229.589	720570.603
				0.1282	366.0826	677116.556	6771165.56	11371799.7	18142965.3	5518.6183	3660.82593	9179.44422
				0.0495	138.972	677116.556	6771165.56	11371799.7	18142965.3	2130.82376	1389.71962	3520.54338
				0.752	1913.511	677116.556	6771165.56	11371799.7	18142965.3	32371.3023	19135.1143	51506.4166
				0.1053	238.436	677116.556	6771165.56	11371799.7	18142965.3	4532.84326	2384.35961	6917.20288
				8.673	23.4529	677116.556	6771165.56	11371799.7	18142965.3	373.34615	234.528974	607.875124
				4.353	11.17206	677116.556	6771165.56	11371799.7	18142965.3	187.38335	111.720578	299.103928
				491.98	1074.746	677116.556	6771165.56	11371799.7	18142965.3	21178.2358	10747.4637	31925.6995
				385.95	803.1635	677116.556	6771165.56	11371799.7	18142965.3	16613.9683	8031.63494	24645.6032
				0.0364	0.095782	677116.556	6771165.56	11371799.7	18142965.3	1.56690878	0.95781926	2.52472805
				0.0161	0.037552	677116.556	6771165.56	11371799.7	18142965.3	0.69305581	0.37552191	1.06857772
				1.4006	4.098625	677116.556	6771165.56	11371799.7	18142965.3	60.2915506	40.9862464	101.277797
				0.0494	0.144759	677116.556	6771165.56	11371799.7	18142965.3	2.12651906	1.44758556	3.57410463
				0.02	0.051263	677116.556	6771165.56	11371799.7	18142965.3	0.86093889	0.512633	1.37357189
				0.02	0.051263	677116.556	6771165.56	11371799.7	18142965.3	0.86093889	0.512633	1.37357189
				0.349	0.723821	677116.556	6771165.56	11371799.7	18142965.3	15.0233837	7.23821239	22.261596
				0.3084	0.693701	677116.556	6771165.56	11371799.7	18142965.3	13.2756777	6.9370052	20.2126829
				0.00549	0.016644	677116.556	6771165.56	11371799.7	18142965.3	0.23632773	0.16644088	0.4027686
				0.07073	0.153711	677116.556	6771165.56	11371799.7	18142965.3	3.04471039	1.53710763	4.58181802
				0.00671	0.015472	677116.556	6771165.56	11371799.7	18142965.3	0.288845	0.15472058	0.44356558
				0.01547	0.036294	677116.556	6771165.56	11371799.7	18142965.3	0.66593623	0.36294413	1.02888036
				0.00882	0.022055	677116.556	6771165.56	11371799.7	18142965.3	0.37967405	0.22055454	0.60022859
				0.00893	0.021636	677116.556	6771165.56	11371799.7	18142965.3	0.38440922	0.21635587	0.60076509
				0.00865	0.019705	677116.556	6771165.56	11371799.7	18142965.3	0.37235607	0.19704927	0.56940534
				0.02145	0.05039	677116.556	6771165.56	11371799.7	18142965.3	0.92335696	0.50390384	1.4272608
				0.00864	0.020251	677116.556	6771165.56	11371799.7	18142965.3	0.3719256	0.20251027	0.57443587
				0.0222	0.049371	677116.556	6771165.56	11371799.7	18142965.3	0.95564217	0.49371237	1.44935454
				0.02558	0.055812	677116.556	6771165.56	11371799.7	18142965.3	1.10114084	0.55811825	1.6592591
				0.01096	0.026071	677116.556	6771165.56	11371799.7	18142965.3	0.47179451	0.26071449	0.73250901
				0.01026	0.021687	677116.556	6771165.56	11371799.7	18142965.3	0.44166165	0.21687013	0.65853179
				0.01875	0.048512	677116.556	6771165.56	11371799.7	18142965.3	0.80713021	0.48511621	1.29224643
				0.00578	0.014387	677116.556	6771165.56	11371799.7	18142965.3	0.24881134	0.14386923	0.39268057
				0.01765	0.042988	677116.556	6771165.56	11371799.7	18142965.3	0.75977857	0.42988417	1.18966274
				2.92	7.539904	677116.556	6771165.56	11371799.7	18142965.3	125.697078	75.3990358	201.096114
	920	NA		1246.667								
	230	NA		424.4444								
	440	NA		667.7778								
Dropped	NA	NA	Dropped									
UJ	0.062	0	UJ	0.062								
	0.4	0		0.153111								
UJ	0.05	0	UJ	0.05								
UJ	0.11	0	UJ	0.11								
UJ	0.074	0	UJ	0.074								
		210271										

Storm 17 8-May-14 Dry EMC	LOAD	QA	Storm 18 28-May-14 Dry EMC	LOAD	QA	Storm 19 12-Jun-14 Dry EMC	LOAD	QA	AVE EMC	AVE LOAD	AVE Sampled Dry storm Volume (gal)	Sampled Dry Season Flow gal	Unsampled Dry flow volume (gal)	Total Dry flow volume gal	Unsampled Dry season load (gm)	Sampled Dry season load (gm)	Total Dry season load (gm)
63.5	36775.93								63.5	36775.93	152994.8298	152994.8298	2173818.304	2326813.134	522528.6365	36775.92541	559304.5619
23.8	NA								23.8	NA	152994.8298	152994.8298	2173818.304	2326813.134	195845.3787	NA	NA
7.47	NA								7.47	NA	152994.8298	152994.8298	2173818.304	2326813.134	61469.11677	NA	NA
31.7	NA								31.7	NA	152994.8298	152994.8298	2173818.304	2326813.134	260852.8784	NA	NA
8.3	4806.932								8.3	4806.932	152994.8298	152994.8298	2173818.304	2326813.134	68299.01863	4806.931983	73105.95061
0.15	86.87226								0.15	86.87226	152994.8298	152994.8298	2173818.304	2326813.134	1234.319614	86.87226475	1321.191879
0.62	359.072								0.62	359.072	152994.8298	152994.8298	2173818.304	2326813.134	5101.854404	359.0720277	5460.926431
16.8	9729.694								16.8	9729.694	152994.8298	152994.8298	2173818.304	2326813.134	138243.7967	9729.693653	147973.4904
0.27	156.3701								0.27	156.3701	152994.8298	152994.8298	2173818.304	2326813.134	2221.775305	156.3700766	2378.145381
0.043	24.90338								0.043	24.90338	152994.8298	152994.8298	2173818.304	2326813.134	353.8382893	24.90338256	378.7416719
0.45	260.6168								0.45	260.6168	152994.8298	152994.8298	2173818.304	2326813.134	3702.958841	260.6167943	3963.575636
0.21	121.6212								0.21	121.6212	152994.8298	152994.8298	2173818.304	2326813.134	1728.047459	121.6211707	1849.66863
13.4	7.760589								13.4	7.760589	152994.8298	152994.8298	2173818.304	2326813.134	110.2658855	7.760588985	118.0264745
4.3	2.490338								4.3	2.490338	152994.8298	152994.8298	2173818.304	2326813.134	35.38382893	2.490338256	37.87416719
316	183.0109								316	183.0109	152994.8298	152994.8298	2173818.304	2326813.134	2600.299986	183.0109044	2783.310891
158	91.50545								158	91.50545	152994.8298	152994.8298	2173818.304	2326813.134	1300.149993	91.50545221	1391.655445
0.106	0.06139								0.106	0.06139	152994.8298	152994.8298	2173818.304	2326813.134	0.872252527	0.061389734	0.933642261
0.019	0.011004								0.019	0.011004	152994.8298	152994.8298	2173818.304	2326813.134	0.156347151	0.01100382	0.167350971
2.65	1.534743								2.65	1.534743	152994.8298	152994.8298	2173818.304	2326813.134	21.80631318	1.534743344	23.34105652
0.068	0.039382								0.068	0.039382	152994.8298	152994.8298	2173818.304	2326813.134	0.559558225	0.039382093	0.598940318
0.02	0.011583	UJ							0.02	0.011583	152994.8298	152994.8298	2173818.304	2326813.134	0.164575949	0.011582969	0.176158917
0.02	0.011583	UJ							0.02	0.011583	152994.8298	152994.8298	2173818.304	2326813.134	0.164575949	0.011582969	0.176158917
0.62	0.359072								0.62	0.359072	152994.8298	152994.8298	2173818.304	2326813.134	5.101854404	0.359072028	5.460926431
0.1	0.057915								0.1	0.057915	152994.8298	152994.8298	2173818.304	2326813.134	0.822879743	0.057914843	0.880794586
0.008	0.004633								0.008	0.004633	152994.8298	152994.8298	2173818.304	2326813.134	0.065830379	0.004633187	0.070463567
NA	NA	Dropped															
0.0077	0.004459								0.0077	0.004459	152994.8298	152994.8298	2173818.304	2326813.134	0.06336174	0.004459443	0.067821183
0.0034	0.001969	UJ							0.0034	0.001969	152994.8298	152994.8298	2173818.304	2326813.134	0.027977911	0.001969105	0.029947016
0.013	0.007529								0.013	0.007529	152994.8298	152994.8298	2173818.304	2326813.134	0.106974367	0.00752893	0.114503296
0.0044	0.002548	UJ							0.0044	0.002548	152994.8298	152994.8298	2173818.304	2326813.134	0.036206709	0.002548253	0.038754962
0.0038	0.002201	UJ							0.0038	0.002201	152994.8298	152994.8298	2173818.304	2326813.134	0.03126943	0.002200764	0.033470194
0.0047	0.002722								0.0047	0.002722	152994.8298	152994.8298	2173818.304	2326813.134	0.038675348	0.002721998	0.041397346
0.012	0.00695								0.012	0.00695	152994.8298	152994.8298	2173818.304	2326813.134	0.098745569	0.006949781	0.10569535
0.0036	0.002085	UJ							0.0036	0.002085	152994.8298	152994.8298	2173818.304	2326813.134	0.029623671	0.002084934	0.031708605
0.015	0.008687								0.015	0.008687	152994.8298	152994.8298	2173818.304	2326813.134	0.123431961	0.008687226	0.132119188
0.018	0.010425								0.018	0.010425	152994.8298	152994.8298	2173818.304	2326813.134	0.148118354	0.010424672	0.158543025
0.0096	0.00556								0.0096	0.00556	152994.8298	152994.8298	2173818.304	2326813.134	0.078996455	0.005559825	0.08455628
0.0095	0.005502								0.0095	0.005502	152994.8298	152994.8298	2173818.304	2326813.134	0.078173576	0.00550191	0.083675486
0.012	0.00695								0.012	0.00695	152994.8298	152994.8298	2173818.304	2326813.134	0.098745569	0.006949781	0.10569535
0.0025	0.001448	UJ							0.0025	0.001448	152994.8298	152994.8298	2173818.304	2326813.134	0.020571994	0.001447871	0.022019865
0.014	0.008108								0.014	0.008108	152994.8298	152994.8298	2173818.304	2326813.134	0.115203164	0.008108078	0.123311242
2.1	1.216212								2.1	1.216212	152994.8298	152994.8298	2173818.304	2326813.134	17.28047459	1.216211707	18.4966863
1600	NA		130	NA		16000	NA		1600	NA	152994.8298	152994.8298	2173818.304	2326813.134			
800	NA		1000	NA		2700	NA		800	NA	152994.8298	152994.8298	2173818.304	2326813.134			
770	NA		1300	NA		2000	NA		770	NA	152994.8298	152994.8298	2173818.304	2326813.134			
NA	NA	Dropped	NA	NA	Dropped	NA	NA	Dropped	NA	NA	152994.8298	152994.8298	2173818.304	2326813.134			
0.062	0	UJ	0.062	0	UJ	0.062	0	UJ	0.062	0	152994.8298	152994.8298	2173818.304	2326813.134			
3.9	0		11	0		4.9	0		3.9	0	152994.8298	152994.8298	2173818.304	2326813.134			
0.05	0	UJ	0.05	0	UJ	0.05	0	UJ	0.05	0	152994.8298	152994.8298	2173818.304	2326813.134			
0.11	0	UJ	0.11	0	UJ	0.11	0	UJ	0.11	0	152994.8298	152994.8298	2173818.304	2326813.134			
0.074	0	UJ	0.074	0	UJ	0.074	0	UJ	0.074	0	152994.8298	152994.8298	2173818.304	2326813.134			
	152994.8			28272.649			54429.83										

Dry Season Load (g)	Dry Season Load (lbs)	Dry Season Areal Load (lbs per acre)	Wet Season Load (g)	Wet Season Load (lbs)	Wet Season Areal Load (lbs per acre)	Total Annual Load Load (g)	Total Annual Load Load (lbs)	Total Annual Load Areal Load (lbs per acre)
559304.6	1230.47	5.155961	1905411	4191.905	17.56507	2464716	5422.375	22.72103
NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
73105.95	160.8331	0.673929	188404.5	414.4899	1.736811	261510.5	575.323	2.41074
1321.192	2.906622	0.012179	4659.008	10.24982	0.042949	5980.2	13.15644	0.055129
5460.926	12.01404	0.050342	78739.74	173.2274	0.725864	84200.67	185.2415	0.776206
147973.5	325.5417	1.364097	720570.6	1585.255	6.642595	868544.1	1910.797	8.006692
2378.145	5.23192	0.021923	9179.444	20.19478	0.084621	11557.59	25.4267	0.106544
378.7417	0.833232	0.003491	3520.543	7.745195	0.032454	3899.285	8.578427	0.035946
3963.576	8.719866	0.036538	51506.42	113.3141	0.474813	55469.99	122.034	0.511351
1849.669	4.069271	0.017051	6917.203	15.21785	0.063766	8766.872	19.28712	0.080818
118.0265	0.259658	0.001088	607.8751	1.337325	0.005604	725.9016	1.596984	0.006692
37.87417	0.083323	0.000349	299.1039	0.658029	0.002757	336.9781	0.741352	0.003106
2783.311	6.123284	0.025658	31925.7	70.23654	0.294308	34709.01	76.35982	0.319966
1391.655	3.061642	0.012829	24645.6	54.22033	0.227196	26037.26	57.28197	0.240025
0.933642	0.002054	8.61E-06	2.524728	0.005554	2.33E-05	3.45837	0.007608	3.19E-05
0.167351	0.000368	1.54E-06	1.068578	0.002351	9.85E-06	1.235929	0.002719	1.14E-05
23.34106	0.05135	0.000215	101.2778	0.222811	0.000934	124.6189	0.274161	0.001149
0.59894	0.001318	5.52E-06	3.574105	0.007863	3.29E-05	4.173045	0.009181	3.85E-05
0.176159	0.000388	1.62E-06	1.373572	0.003022	1.27E-05	1.549731	0.003409	1.43E-05
0.176159	0.000388	1.62E-06	1.373572	0.003022	1.27E-05	1.549731	0.003409	1.43E-05
5.460926	0.012014	5.03E-05	22.2616	0.048976	0.000205	27.72252	0.06099	0.000256
0.880795	0.001938	8.12E-06	20.21268	0.044468	0.000186	21.09348	0.046406	0.000194
0.070464	0.000155	6.5E-07	0.402769	0.000886	3.71E-06	0.473232	0.001041	4.36E-06
0.067821	0.000149	6.25E-07	4.581818	0.01008	4.22E-05	4.649639	0.010229	4.29E-05
0.029947	6.59E-05	2.76E-07	0.443566	0.000976	4.09E-06	0.473513	0.001042	4.37E-06
0.114503	0.000252	1.06E-06	1.02888	0.002264	9.48E-06	1.143384	0.002515	1.05E-05
0.038755	8.53E-05	3.57E-07	0.600229	0.001321	5.53E-06	0.638984	0.001406	5.89E-06
0.03347	7.36E-05	3.09E-07	0.600765	0.001322	5.54E-06	0.634235	0.001395	5.85E-06
0.041397	9.11E-05	3.82E-07	0.569405	0.001253	5.25E-06	0.610803	0.001344	5.63E-06
0.105695	0.000233	9.74E-07	1.427261	0.00314	1.32E-05	1.532956	0.003373	1.41E-05
0.031709	6.98E-05	2.92E-07	0.574436	0.001264	5.3E-06	0.606144	0.001334	5.59E-06
0.132119	0.000291	1.22E-06	1.449355	0.003189	1.34E-05	1.581474	0.003479	1.46E-05
0.158543	0.000349	1.46E-06	1.659259	0.00365	1.53E-05	1.817802	0.003999	1.68E-05
0.084556	0.000186	7.79E-07	0.732509	0.001612	6.75E-06	0.817065	0.001798	7.53E-06
0.083675	0.000184	7.71E-07	0.658532	0.001449	6.07E-06	0.742207	0.001633	6.84E-06
0.105695	0.000233	9.74E-07	1.292246	0.002843	1.19E-05	1.397942	0.003075	1.29E-05
0.02202	4.84E-05	2.03E-07	0.392681	0.000864	3.62E-06	0.4147	0.000912	3.82E-06
0.123311	0.000271	1.14E-06	1.189663	0.002617	1.1E-05	1.312974	0.002889	1.21E-05
18.49669	0.040693	0.000171	201.0961	0.442411	0.001854	219.5928	0.483104	0.002024

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	Dry Season			Wet Season			Total Annual Load			
Parameter	Load (g)	Load (lbs)	Areal Load	Load (g)	Load (lbs)	Areal Load	Load (g)	Load (lbs)	Areal Load (lbs per acre)	
General										
TSS	559304.6	1230.47	5.155961	1905411	4191.905	17.56507	2464716	5422.375	22.72103	
Turbidity	NA	NA	NA	NA	NA	NA	NA	NA	NA	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Conductivity	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BOD	73105.95	160.8331	0.673929	188404.5	414.4899	1.736811	261510.5	575.323	2.41074	
Surfactants (MBAS)	1321.192	2.906622	0.012179	4659.008	10.24982	0.042949	5980.2	13.15644	0.055129	
Chloride	5460.926	12.01404	0.050342	78739.74	173.2274	0.725864	84200.67	185.2415	0.776206	
Hardness	147973.5	325.5417	1.364097	720570.6	1585.255	6.642595	868544.1	1910.797	8.006692	
Nutrients										
Total Phosphorus	2378.145	5.23192	0.021923	9179.444	20.19478	0.084621	11557.59	25.4267	0.106544	
Orthophosphate	378.7417	0.833232	0.003491	3520.543	7.745195	0.032454	3899.285	8.578427	0.035946	
Total Kjeldahl Nitrogen	3963.576	8.719866	0.036538	51506.42	113.3141	0.474813	55469.99	122.034	0.511351	
Nitrate+Nitrite	1849.669	4.069271	0.017051	6917.203	15.21785	0.063766	8766.872	19.28712	0.080818	
Metals										
Total Cu	118.0265	0.259658	0.001088	607.8751	1.337325	0.005604	725.9016	1.596984	0.006692	
Dissolved Cu	37.87417	0.083323	0.000349	299.1039	0.658029	0.002757	336.9781	0.741352	0.003106	
Total Zn	2783.311	6.123284	0.025658	31925.7	70.23654	0.294308	34709.01	76.35982	0.319966	
Dissolved Zinc	1391.655	3.061642	0.012829	24645.6	54.22033	0.227196	26037.26	57.28197	0.240025	
Total Cadmium	0.933642	0.002054	8.61E-06	2.524728	0.005554	2.33E-05	3.45837	0.007608	3.19E-05	
Diss. Cadmium	0.167351	0.000368	1.54E-06	1.068578	0.002351	9.85E-06	1.235929	0.002719	1.14E-05	
Total Lead	23.34106	0.05135	0.000215	101.2778	0.222811	0.000934	124.6189	0.274161	0.001149	
Dissolved Lead	0.59894	0.001318	5.52E-06	3.574105	0.007863	3.29E-05	4.173045	0.009181	3.85E-05	
Total Mercury	0.176159	0.000388	1.62E-06	1.373572	0.003022	1.27E-05	1.549731	0.003409	1.43E-05	Over 50% Non detects
Dissolved Mercury	0.176159	0.000388	1.62E-06	1.373572	0.003022	1.27E-05	1.549731	0.003409	1.43E-05	Over 50% Non detects
Herbicides										
2,4-D	5.460926	0.012014	5.03E-05	22.2616	0.048976	0.000205	27.72252	0.06099	0.000256	
Dichlobenil	0.880795	0.001938	8.12E-06	20.21268	0.044468	0.000186	21.09348	0.046406	0.000194	
Insecticides										
Carbaryl	0.070464	0.000155	6.5E-07	0.402769	0.000886	3.71E-06	0.473232	0.001041	4.36E-06	
Chlorpyrifos										
PAHs										
Naphthalene	0.067821	0.000149	6.25E-07	4.581818	0.01008	4.22E-05	4.649639	0.010229	4.29E-05	
Acenaphthylene	0.029947	6.59E-05	2.76E-07	0.443566	0.000976	4.09E-06	0.473513	0.001042	4.37E-06	Over 50% Non detects
Benzo(b)fluoranthene	0.114503	0.000252	1.06E-06	1.02888	0.002264	9.48E-06	1.143384	0.002515	1.05E-05	
Acenaphthene	0.038755	8.53E-05	3.57E-07	0.600229	0.001321	5.53E-06	0.638984	0.001406	5.89E-06	Over 50% Non detects
Fluorene	0.03347	7.36E-05	3.09E-07	0.600765	0.001322	5.54E-06	0.634235	0.001395	5.85E-06	Over 50% Non detects
Benzo(k)fluoranthene	0.041397	9.11E-05	3.82E-07	0.569405	0.001253	5.25E-06	0.610803	0.001344	5.63E-06	Over 50% Non detects
Phenanthrene	0.105695	0.000233	9.74E-07	1.427261	0.00314	1.32E-05	1.532956	0.003373	1.41E-05	
Anthracene	0.031709	6.98E-05	2.92E-07	0.574436	0.001264	5.3E-06	0.606144	0.001334	5.59E-06	Over 50% Non detects
Fluoranthene	0.132119	0.000291	1.22E-06	1.449355	0.003189	1.34E-05	1.581474	0.003479	1.46E-05	
Pyrene	0.158543	0.000349	1.46E-06	1.659259	0.00365	1.53E-05	1.817802	0.003999	1.68E-05	
Indeno(1,2,3-cd)pyrene	0.084556	0.000186	7.79E-07	0.732509	0.001612	6.75E-06	0.817065	0.001798	7.53E-06	
Benzo(a)anthracene	0.083675	0.000184	7.71E-07	0.658532	0.001449	6.07E-06	0.742207	0.001633	6.84E-06	Over 50% Non detects
Chrysene	0.105695	0.000233	9.74E-07	1.292246	0.002843	1.19E-05	1.397942	0.003075	1.29E-05	
Dibenzo(a,h)anthracene	0.02202	4.84E-05	2.03E-07	0.392681	0.000864	3.62E-06	0.4147	0.000912	3.82E-06	Over 50% Non detects
Benzo(ghi)perylene	0.123311	0.000271	1.14E-06	1.189663	0.002617	1.1E-05	1.312974	0.002889	1.21E-05	
Phthalates										
Bis(2-ethylhexyl) phthalate	18.49669	0.040693	0.000171	201.0961	0.442411	0.001854	219.5928	0.483104	0.002024	

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	Dry Season			Wet Season			Total Annual Load			
	Load (g)	Load (lbs)	Areal Load	Load (g)	Load (lbs)	Areal Load	Load (g)	Load (lbs)	Areal Load (lbs per acre)	
2,4-D	5.46E+00	1.20E-02	5.03E-05	2.23E+01	4.90E-02	2.05E-04	2.77E+01	6.10E-02	2.56E-04	
Acenaphthene	3.88E-02	8.53E-05	3.57E-07	6.00E-01	1.32E-03	5.53E-06	6.39E-01	1.41E-03	5.89E-06	Over 50% Non detects
Acenaphthylene	2.99E-02	6.59E-05	2.76E-07	4.44E-01	9.76E-04	4.09E-06	4.74E-01	1.04E-03	4.37E-06	Over 50% Non detects
Anthracene	3.17E-02	6.98E-05	2.92E-07	5.74E-01	1.26E-03	5.30E-06	6.06E-01	1.33E-03	5.59E-06	Over 50% Non detects
Benzo(a)anthracene	8.37E-02	1.84E-04	7.71E-07	6.59E-01	1.45E-03	6.07E-06	7.42E-01	1.63E-03	6.84E-06	Over 50% Non detects
Benzo(b)fluoranthene	1.15E-01	2.52E-04	1.06E-06	1.03E+00	2.26E-03	9.48E-06	1.14E+00	2.52E-03	1.05E-05	
Benzo(ghi)perylene	1.23E-01	2.71E-04	1.14E-06	1.19E+00	2.62E-03	1.10E-05	1.31E+00	2.89E-03	1.21E-05	
Benzo(k)fluoranthene	4.14E-02	9.11E-05	3.82E-07	5.69E-01	1.25E-03	5.25E-06	6.11E-01	1.34E-03	5.63E-06	Over 50% Non detects
Bis(2-ethylhexyl) phthalate	1.85E+01	4.07E-02	1.71E-04	2.01E+02	4.42E-01	1.85E-03	2.20E+02	4.83E-01	2.02E-03	
BOD	7.31E+04	1.61E+02	6.74E-01	1.88E+05	4.14E+02	1.74E+00	2.62E+05	5.75E+02	2.41E+00	
Carbaryl	7.05E-02	1.55E-04	6.50E-07	4.03E-01	8.86E-04	3.71E-06	4.73E-01	1.04E-03	4.36E-06	
Chloride	5.46E+03	1.20E+01	5.03E-02	7.87E+04	1.73E+02	7.26E-01	8.42E+04	1.85E+02	7.76E-01	
Chlorpyrifos										
Chrysene	1.06E-01	2.33E-04	9.74E-07	1.29E+00	2.84E-03	1.19E-05	1.40E+00	3.08E-03	1.29E-05	
Conductivity	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Dibenzo(a,h)anthracene	2.20E-02	4.84E-05	2.03E-07	3.93E-01	8.64E-04	3.62E-06	4.15E-01	9.12E-04	3.82E-06	Over 50% Non detects
Dichlobenil	8.81E-01	1.94E-03	8.12E-06	2.02E+01	4.45E-02	1.86E-04	2.11E+01	4.64E-02	1.94E-04	
Diss. Cadmium	1.67E-01	3.68E-04	1.54E-06	1.07E+00	2.35E-03	9.85E-06	1.24E+00	2.72E-03	1.14E-05	
Dissolved Cu	3.79E+01	8.33E-02	3.49E-04	2.99E+02	6.58E-01	2.76E-03	3.37E+02	7.41E-01	3.11E-03	
Dissolved Lead	5.99E-01	1.32E-03	5.52E-06	3.57E+00	7.86E-03	3.29E-05	4.17E+00	9.18E-03	3.85E-05	
Dissolved Mercury	1.76E-01	3.88E-04	1.62E-06	1.37E+00	3.02E-03	1.27E-05	1.55E+00	3.41E-03	1.43E-05	Over 50% Non detects
Dissolved Zinc	1.39E+03	3.06E+00	1.28E-02	2.46E+04	5.42E+01	2.27E-01	2.60E+04	5.73E+01	2.40E-01	
Fluoranthene	1.32E-01	2.91E-04	1.22E-06	1.45E+00	3.19E-03	1.34E-05	1.58E+00	3.48E-03	1.46E-05	
Fluorene	3.35E-02	7.36E-05	3.09E-07	6.01E-01	1.32E-03	5.54E-06	6.34E-01	1.40E-03	5.85E-06	Over 50% Non detects
Hardness	1.48E+05	3.26E+02	1.36E+00	7.21E+05	1.59E+03	6.64E+00	8.69E+05	1.91E+03	8.01E+00	
Indeno(1,2,3-cd)pyrene	8.46E-02	1.86E-04	7.79E-07	7.33E-01	1.61E-03	6.75E-06	8.17E-01	1.80E-03	7.53E-06	
Naphthalene	6.78E-02	1.49E-04	6.25E-07	4.58E+00	1.01E-02	4.22E-05	4.65E+00	1.02E-02	4.29E-05	
Nitrate+Nitrite	1.85E+03	4.07E+00	1.71E-02	6.92E+03	1.52E+01	6.38E-02	8.77E+03	1.93E+01	8.08E-02	
Orthophosphate	3.79E+02	8.33E-01	3.49E-03	3.52E+03	7.75E+00	3.25E-02	3.90E+03	8.58E+00	3.59E-02	
Parameter										
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Phenanthrene	1.06E-01	2.33E-04	9.74E-07	1.43E+00	3.14E-03	1.32E-05	1.53E+00	3.37E-03	1.41E-05	
Pyrene	1.59E-01	3.49E-04	1.46E-06	1.66E+00	3.65E-03	1.53E-05	1.82E+00	4.00E-03	1.68E-05	
Surfactants (MBAS)	1.32E+03	2.91E+00	1.22E-02	4.66E+03	1.02E+01	4.29E-02	5.98E+03	1.32E+01	5.51E-02	
Total Cadmium	9.34E-01	2.05E-03	8.61E-06	2.52E+00	5.55E-03	2.33E-05	3.46E+00	7.61E-03	3.19E-05	
Total Cu	1.18E+02	2.60E-01	1.09E-03	6.08E+02	1.34E+00	5.60E-03	7.26E+02	1.60E+00	6.69E-03	
Total Kjeldahl Nitrogen	3.96E+03	8.72E+00	3.65E-02	5.15E+04	1.13E+02	4.75E-01	5.55E+04	1.22E+02	5.11E-01	
Total Lead	2.33E+01	5.14E-02	2.15E-04	1.01E+02	2.23E-01	9.34E-04	1.25E+02	2.74E-01	1.15E-03	
Total Mercury	1.76E-01	3.88E-04	1.62E-06	1.37E+00	3.02E-03	1.27E-05	1.55E+00	3.41E-03	1.43E-05	Over 50% Non detects
Total Phosphorus	2.38E+03	5.23E+00	2.19E-02	9.18E+03	2.02E+01	8.46E-02	1.16E+04	2.54E+01	1.07E-01	
Total Zn	2.78E+03	6.12E+00	2.57E-02	3.19E+04	7.02E+01	2.94E-01	3.47E+04	7.64E+01	3.20E-01	
TSS	5.59E+05	1.23E+03	5.16E+00	1.91E+06	4.19E+03	1.76E+01	2.46E+06	5.42E+03	2.27E+01	
Turbidity	NA	NA	NA	NA	NA	NA	NA	NA	NA	