

CITY OF SPOKANE STORMWATER MANAGEMENT PROGRAM (SWMP)

**NATIONAL POLLUTANT DISCHARGE
ELIMINATION SYSTEM (NPDES)
EASTERN WASHINGTON PHASE II
MUNICIPAL STORMWATER PERMIT**

Permit No. WAR04-6505

Prepared by:
Wastewater Management Department
909 E. Sprague Avenue
Spokane, WA 99202-2127

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February 16, 2007 - July 31, 2014
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1.0 INTRODUCTION

The National Pollutant Discharge Elimination System (NPDES) is a federal requirement that regulates stormwater and wastewater dischargers to waters of the United States. While it is a federal requirement, the regulatory authority in Washington State was granted to the Washington State Department of Ecology (Ecology). Ecology issued the NPDES Eastern Washington Phase II Municipal Stormwater Permit (Permit) to the City of Spokane on January of 2007, with an effective date of February 16, 2007. In 2012, a legislative change directed Ecology to reissue the permit unchanged for the period of September 1, 2012 to July 31, 2014. As a result, a second permit was revised and became effective for the period of August 1st, 2014 through July 31st, 2019.

The Permit requires permittees to develop and implement a Stormwater Management Program (SWMP) addressing six required program elements: (1) Public Education and Outreach, (2) Public Involvement and Participation, (3) Illicit Discharge Detection and Elimination, (4) Construction Site Stormwater Runoff Control, (5) Post-Construction Stormwater Management for New and Redevelopment, and (6) Municipal Operations and Maintenance.

The Permit authorizes municipalities to discharge stormwater runoff from municipal separate storm sewers (MS4s) to surface waters and ground waters of the state. This SWMP is a set of actions and activities adopted by the City comprising the six required program elements and any additional actions necessary to meet the requirements of applicable Total Maximum Daily Loads (TMDLs) pursuant to S7, Compliance with Total Maximum Daily Load Requirements, and Appendix 2.

1.1 Purpose

The purpose of this SWMP is to describe the programs, practices and responsibilities adopted by the City of Spokane to manage the MS4. Also, to formalize and highlight the work that the City of Spokane's Wastewater Management (WWM) Department, and other departments, have accomplished in stormwater management. This SWMP serves as a guide for coordination efforts among WWM and other departments. Coordination efforts are executed by multiple communication methods, including but not limited to meetings, phone calls, and email.

1.2 Relationship to the Stormwater Management Plan (SMP)

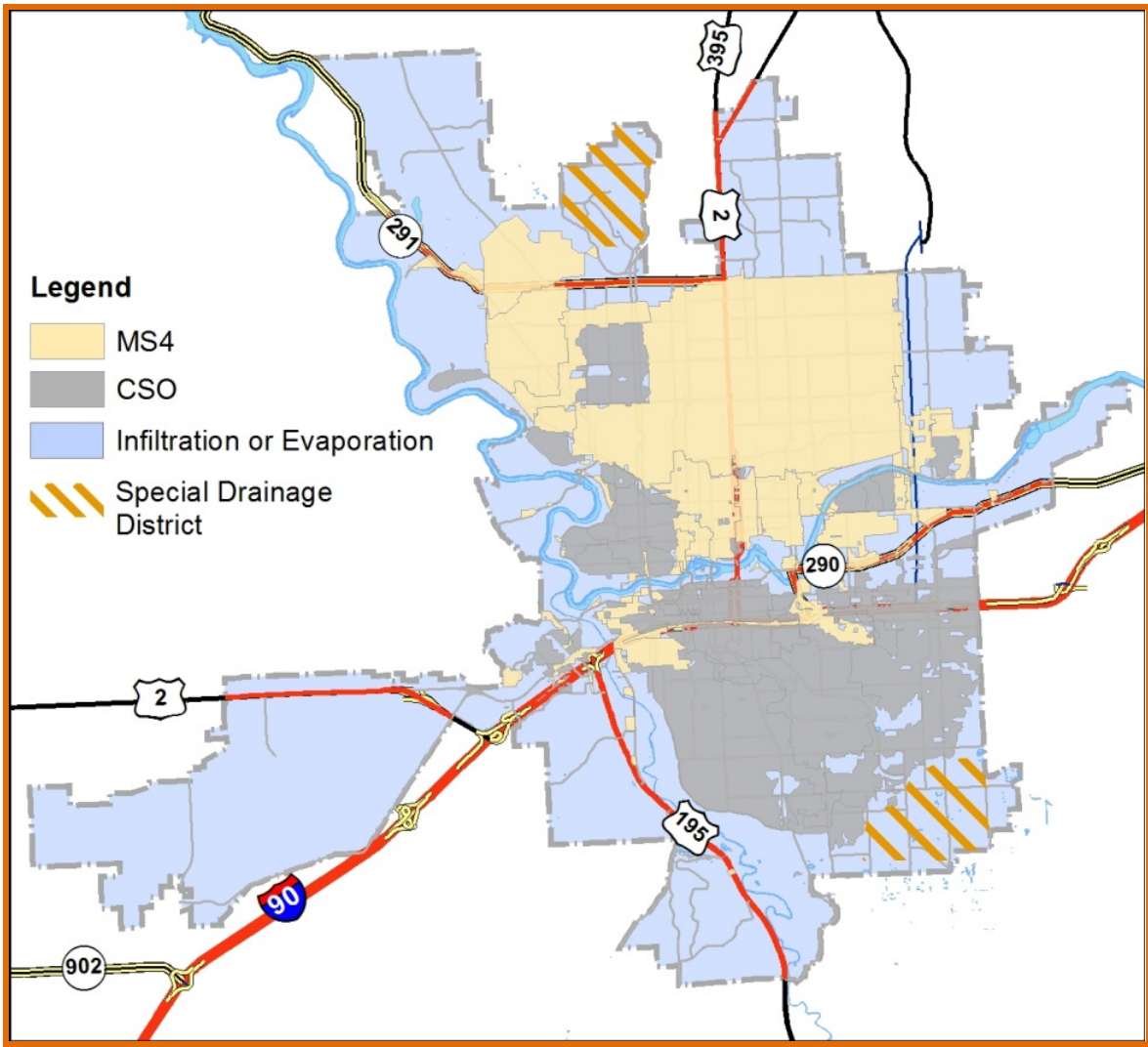
In 2004, the City wrote and adopted the first Stormwater Management Plan (SMP). The plan was written in anticipation of the Permit, which requires this Stormwater Management Program (SWMP). Following the issuance of the first year Permit in 2007, the City developed the required SWMP (2008). Further, over the years the City developed and implemented many water quality Best Management Practices (BMPs), but there was still a recognized need to establish a *task* driven program in order to guide and coordinate stormwater management activities, especially between departments. Therefore, we have both an SMP for tasks required by the Permit, as well as the SWMP which outlines the permit requirements and activities achieved to meet compliance. Both documents are written to complement each other.

1.3 Stormwater Infrastructure

The City of Spokane's stormwater infrastructure consists of an MS4, combined sewer overflow (CSO), infiltration including underground injection controls (UIC), and evaporation. Stormwater flows to the CSO system predominantly on the south side of the City, where geology does not readily allow infiltration, and is regulated under a separate NPDES Waste Discharge Permit managed by the Riverside Park Water Reclamation Facility (RPWRF).

Infiltration is the primary means of stormwater management on the margins of the City and is regulated under UIC regulations. Evaporation is used in the Moran Prairie and Five Mile Prairie Special Drainage Districts. The MS4 system is predominantly located on the north side of the City. Much of the MS4 serves residential areas, and receives limited runoff from commercial and industrial sites. Less than half of the City is served by the MS4. Figure 1 illustrates a generalized map of the City's stormwater infrastructure.

Figure 1. Map of stormwater infrastructure throughout the City of Spokane.



1.3.1 UIC Program

Underground injection controls (UICs) are structures that discharge stormwater underground rather than to a surface water body. Most UICs in Spokane are drywells. Some drywells are found in streets, and many others are used as overflow structures in grassed swales. The UIC Program is administered separately from the Permit. However, many of the BMPs found in the Permit elements may be applied to stormwater discharges to UICs. Therefore, pertinent elements of this SWMP are also applied to UIC areas.

The Permit does not fulfill all of the requirements of the UIC Program. The following elements are required for UICs in addition to the best management practices in this SWMP:

- UIC wells must be registered with the Department of Ecology.
- New UIC wells must be constructed according to the specifications in the UIC Guidance Manual (Ecology, 2006).
- A well assessment must be completed for all existing UICs.
- Existing UICs that are determined to be a high threat to groundwater must be retrofitted.

2.0 PROGRAM COMPONENTS

2.1 Public Education & Outreach

Permit Requirements (S5.B.1)

Implement an education and outreach program for businesses and the general public, including school-age children, regarding:

- The importance of improving water quality and protecting beneficial uses of waters of the state; potential impacts from stormwater discharges; methods for avoiding and minimizing, reducing, and/or eliminating the adverse impacts of stormwater discharges; and actions individuals can take to improve water quality, including encouraging participation in local environmental stewardship activities.
- Preventing illicit discharges, including what constitutes illicit discharges and their impact as well as promoting the proper management and disposal of toxic materials, and including all education and outreach activities pursuant to S5.B.3.d

Develop information for engineers, construction contractors, developers, development review staff, and land use planners about:

- Technical standards, the development of stormwater site plans and erosion control plans, low impact development (LID) and stormwater BMPs for reducing adverse impacts from stormwater runoff from development sites, including all education and outreach activities pursuant to S5.B.4.d and S5.B.5.e.

Track and maintain records of public education and outreach activities.

2.1.1 Stormwater Marketing Campaign Plan

The City began working on a Public Education and Outreach (PEO) program prior to the regulatory requirements of the Permit. To formalize our efforts WWM developed a *Stormwater Marketing Campaign Plan* for public education and involvement activities. The plan helped centralize our objectives, identify target audiences, and assess past and future promotion activities. The central mission of the plan is to inform the identified target audiences about the value in improving water quality by reducing stormwater pollution. To verify comprehension, Stormwater Marketing Campaign Plan activities encourage positive behavioral changes. When able, program achievement is measured and appropriate improvements are made. Our PEO program often works in concert with permit component Public Involvement and Participation (PIP), and therefore many overlapping themes occur.

To achieve Permit expectations, the Stormwater Marketing Campaign Plan includes the following objectives:

- *Measure* the community’s baseline stormwater knowledge before the second permit cycle (2014-2019), and measure an improvement during the second permit cycle with the implementation of the SMC Plan.
- *Inform* the general public about the importance of improving water quality by avoiding and minimizing adverse storm water discharges.

After extensive survey research and analysis of U.S. Census results, select target audiences were identified that would be receptive of stormwater education and productive with the knowledge. Each target audience has its own set of activities and programs designed to meet their communication channels and there varying levels of involvement. The target audiences are highlighted below:

- *Homeowners:* Owner occupied homes account for 65% of roughly 198,000 homes in Spokane County. Owner occupied homes tend to be better cared for than renter occupied homes because of the personal and financial investment involved. Our focus will be on homeowners with at least a high school diploma, where English is spoken in the home, and where 1-3 vehicles are used. 88.1% of Spokane County residents graduated from high school. 93% have English spoken in the home. 30% own one vehicle but we will especially target the 24% of households with three or more vehicles (Increased likelihood of vehicle pollution).
- *Local Business:*
 - Food and Restaurant: Food waste, grease, cleaning fluids, mop water and trash from restaurant operations often make their way into Spokane water bodies. WWM educates businesses and prevent illicit discharges by encouraging BMPs for recycling oil and grease, cleaning dumpster areas, improving maintenance operations, managing spills, and handling toxic chemicals.
 - Construction: Each year, hundreds of building permits may be granted in Spokane. This presents several opportunities for cement wash, sediment, vehicle fluids, dust and hazardous debris found from construction sites to worsen stormwater discharges. Local water bodies can improve, however, when construction businesses are better educated on how to best store materials, recycle waste, prevent erosion during construction, and clean up the work site. WWM encourages construction BMPs such as preventing soil erosion, sweeping sidewalks, having places for vehicle mud removal, and developing vegetative cover on sites.
 - Automotive: Automotive facilities can greatly reduce unwanted stormwater discharges with covered fuel stations, immediate cleaning of spills, the installation of oil/water separators, and proper containment of stored supplies and wastes.
- *Youth:* In grades 1-8 there are nearly 48,000 children in Spokane County. Comprehension level varies considerably from kindergarten to the 8th grade. To account for this, we have varying levels of complexity in our stormwater education programs. Young students want a hands-on approach that is heavily based in visual learning. With shorter attention spans and increased possibility of distraction, short lessons are useful that are inclusive and easy to understand. Statics taken from U.S. Census Bureau, 2005-2009 American Community Survey.

2.1.1.1 ACTIVITIES

Hazel’s Creek Regional Stormwater Facility and LID Demonstration Site: In Fall of 2012, construction was completed and the facility began receiving stormwater from properties within a specified up-gradient boundary. The site also contains publicly used walking trails. This system was utilized as an LID educational opportunity,

hosting various LID demonstrations throughout the trail system. Visitors can download a brochure from the WWM website and take a self-guided tour.

Integrated Clean Water Plan: The City of Spokane developed the Integrated Clean Water Plan to prioritize stormwater and wastewater projects based on positive environmental impact to the Spokane River. During development of the plan, the City endeavored to open and maintain communication channels with the public, stakeholders, and regulatory agencies. A communications action plan was developed and implemented, employing various approaches such as in-person presentations, meetings, local media, utility bill inserts, use of internet resources and social media to reach a wide audience. Details of the public outreach effort can be found in the public involvement chapter of the Integrated Clean Water Plan.

Storm Garden Outreach: Storm garden locations were planned in the Shadle Park area to reduce stormwater flows to the Spokane River. The City partnered with the Lands Council, who performed public outreach and education throughout the basin. The Lands Council went door-to-door, visiting nearly 1600 houses to find homeowners who would be interested in having a storm garden on or in front of their property. Nearly 95% of respondents liked the idea, indicating that storm gardens would be generally well-accepted in the community. While this outreach was performed in a combined sewer basin, the subject matter is applicable city-wide. Construction of three adjacent storm gardens on Garland Avenue began in fall 2014 and should be completed with plantings in spring 2015. The storm gardens should be monitored for water quality and also serve as a public education tool. It is anticipated that additional storm gardens will be constructed in this area in the future as funding allows.

Riverton Basin Stormwater: The City of Spokane partnered with The Lands Council, who performed public outreach and education throughout the Riverton Basin, located within an MS4 system. The goal was to educate residents about stormwater and its effects, raise awareness about LID, and provide residents the opportunity to plant trees at no cost to them. The Lands Council appeared as a guest on the KYRS's environmental "Down to Earth" radio show. They also went door-to-door, visiting nearly 375 residents to find homeowners who would be interested in having a storm garden and free tree.

Student workshops: The City of Spokane partnered with the local school district to complete hour long stormwater workshops. The goal was to visually educate students about how pollutants can be transported by water runoff via the pipe systems.

Student Projects: Several student groups are interested in learning about stormwater and how to reduce its impacts to the environment. The City assisted the following student groups:

WSU Saving the Spokane: The WSU Undergraduate Multidisciplinary Research Competition for the College of Arts and Sciences was themed Saving the Spokane. Students were taken on a tour of some of the City's wastewater and stormwater infrastructure and given an opportunity to ask questions during and after the tour. Furthermore, the students used this information to synthesize a solution to reduce stormwater and competed with other student groups for a scholarship.

Community School: A group of students from the Spokane Community School came to Wastewater Management for a water quality interview for a school project. Students learned about the physical system, various pollutants, and career skills needed for a water quality-related job.

Gonzaga Stormwater Engineering Class: The City formed a partnership with stormwater engineering professors at Gonzaga University. The City's stormwater permit coordinator was the guest speaker for a classroom session, teaching students about the storm sewer system, regulations, and the complexities of

stormwater monitoring. Gonzaga professors and students also partnered with the City on the Sharp Avenue pervious pavement project. Senior level student projects include the design of monitoring systems and monitoring procedures to test the effectiveness of pervious pavement in the Spokane climate and geology. Engineers from the City's Integrated Capital Management Department and Wastewater Management were advisors on the project.

Water on Wheels: Asotin County received a grant from Ecology to develop elementary school environmental education curriculum known as Water on Wheels with the Franklin Conservation District. The City of Spokane and other eastern Washington permittees assisted in development and review of the material in early 2014. The material was delivered to students throughout eastern Washington by conservation district staff, including over 500 students in Spokane.

Rain Barrel Workshops: The City partnered with the Spokane County Conservation District to host “do it yourself” rain barrel workshops. The goal was to educate the community regarding how rain barrels could reduce stormwater pollution. Furthermore, these workshops educated the community regarding how to construct and utilize rain barrels. Also, retrofit kits that are recycled, food-grade barrels were provided to participants.

Cable 5: Cable 5 rotated stormwater pollution prevention tips on the reader board. A different seasonally relevant tip was used each week. An EPA video entitled “After the Storm” was shown throughout the year, highlighting the importance of stormwater management and individual citizen responsibility to help prevent stormwater pollution.

Website: The City overhauled its multiple departmental websites into a singular, user-friendly, mobile-friendly site. Stormwater information was elevated one level on the new website to its own page in the Public Works and Utilities section rather than a sub-section of wastewater. Web users seeking stormwater information are now able to find it more quickly.

In response to the issuance of the second five year permit, the City posted an article on its website, ‘Managing stormwater, protecting the Spokane River.’ The article described the Permit and the City’s efforts to improve water quality in the river.

Public Events: Wastewater Management staffed stormwater-related booths at various events. Occasionally booths are shared with Spokane County Water Resources for coordinated educational outreach. Attendees receive various informational materials and promotional products regarding stormwater pollution prevention and low impact development. Games and mason jars filled with “pollution” are used as educational aids.

- Holmes Elementary School Science Night
- Earth Day at Riverfront Park
- Elementary science nights
- Community fairs
- Community farmer’s markets

Presentations: Various professional and educational groups are interested in learning about the City’s stormwater management system and its efforts to prevent and reduce stormwater pollution. Presentations are open to the public to attend. Presentations were given to the following groups or conferences:

- The Spokane River Forum
- Air and Waste Management Association, PNWIS Section
- The Seminar Group Legal and professional education

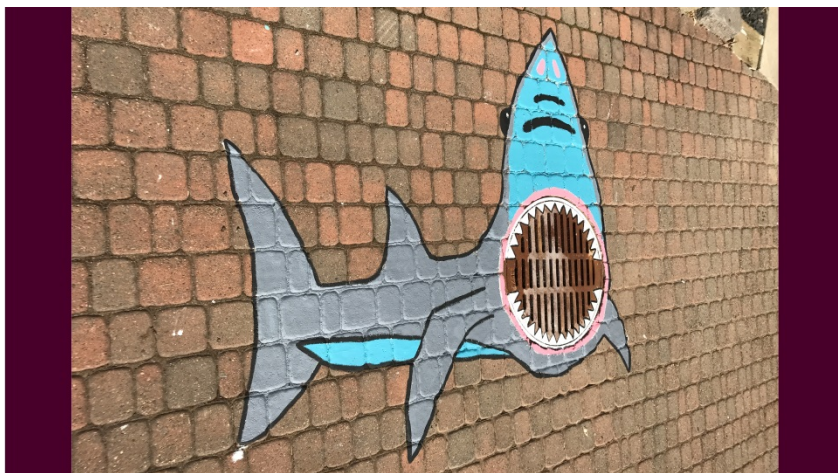
- Washington Municipal Stormwater Conference
- Coeur d'Alene Municipal stormwater group
- Spokane River Regional Toxics Task Force
- The Northwest Environmental Business Council
- Society of Inland Northwest Environmental Scientists
- StormCon

Low Impact Development/Green Infrastructure Educational Materials: A brochure was developed that describes the benefits of LID, recent projects completed by the City, and how to find more information. Also it includes additional detail about different LID practices and illustrates an example LID design. Brochures are provided in each building permit application package obtained at the City Hall Development Services Center. A page was added to the City's website with a PDF copy of the brochure and additional information such as a video from the Green Solutions Seminar and description of the storm garden partnership with the Lands Council:

Stormwater Permitting Educational Materials: The City partnered with the Spokane River Forum and Spokane Riverkeeper to develop "Understanding Stormwater Permitting in the City of Spokane." This guide addresses stormwater-related building permit requirements; erosion and sediment control, and also references Ecology's stormwater permit requirements. The guide is available on the Spokane River Forum website.

Educational Workshops: The City partnered with and collaborated with The Lands Council and the Spokane County Stormwater Utility to provide education to area schools. Outreach includes classroom lessons, field trips, and LID design and application.

Storm Drain Art Murals: The City partnered with MEAD Alternative High School and the Spokane County Stormwater Utility for a series of workshops focusing on the importance of stormwater pollution prevention and ultimately led to the student's designing and painting storm drains to raise awareness.



Stormwater Education Coalition: The City is an active member of the Washington Idaho Stormwater Education Coalition. This



2.2 Public Involvement & Participation

Permit Requirements (S5.B.2)

- Provide ongoing opportunities for public involvement through advisory councils, watershed committees, participation in developing rate-structures, stewardship programs, environmental activities or other similar activities. Develop and implement a process for consideration of public comments on the SWMP, including required ordinances and regulatory mechanisms.
- Make the SWMP document and the Annual Report available to the public by posting it on our website.

2.2.1 Stormwater Marketing Campaign Plan

Similar to our Public Outreach program, the City has long been active within the community. The Stormwater Marketing Campaign Plan, as outlined in Chapter 2.1, outlined many activities that reflect our ongoing commitment to involve the public in stormwater-related activities. Again, there exist many overlapping themes between public education and outreach and public involvement and participation.

The stormwater marketing campaign listed the following objectives for Public Involvement and Participation:

- *Encourage and support behavioral changes* in reducing individual's stormwater pollution contributions.
- Measure *objective achievement* in promotion activities and make appropriate improvements.
- Actively seek new ways to *get the public involved* and participating in improving Spokane waterways.



2.2.2 Activities

Manhole Cover Art Contest: The Spokane Arts Commission partnered with the WWM Department to congratulate a winner of the student-designed manhole cover contest. Seth Tibbs, a student at Chase Middle School, was selected from over 600 entries by members of the staff of Wastewater Management, Spokane Arts Commission, and community representatives. Fifty newly designed manhole covers will be strategically installed throughout Spokane starting in the Spring/Summer of 2016.

The Spokane Arts Commission and the WWM Department congratulated Clair Mattes, a seventh grader at Shaw Middle School who was a winner of the student designed manhole cover content. Claire's manhole cover design was selected from over 600 entries by members of the staff of WWM, Spokane Arts Commission, and community representatives.



Pledge Campaign: The pledge campaign was designed to encourage and support behavioral changes after an individual learns about stormwater issues. The pledge campaign was used at various public events such as Summer Parkways events, CCASL Science Fair, Leaf Fall Festival, neighborhood movie night, at various Public Library Displays, and other public events. The quality and wide variation of pledges illustrate that Spokane residents understand stormwater issues and are willing to be a part of the solution.

Ordinances: Public involvement is a required component of the ordinance process. Involvement of any interested member of the public is encouraged through workshops, open houses and a formal public comment period. Ordinances adopted as a requirement of the Permit include Spokane Municipal Code (SMC) Sections 17D.060 Stormwater Facilities and 17D.090 Erosion and Sediment Control.

PCB-free Purchasing Ordinance: Polychlorinated biphenyls (PCBs) are a man-made, carcinogenic chemical that has been detected in low concentrations across the globe, including City stormwater and wastewater. PCBs are entering the sewer systems through a multitude of products as well as legacy contamination. In an effort to reduce the sources of PCBs, the City adopted an ordinance requiring City departments to purchase products and packaging that do not contain PCBs unless it is not cost-effective or technically feasible to do so. Cost-effective means that the product does not increase the price by more than 25%.

Idaho Washington Aquifer Collaborative: Is a non-profit organization that is made up of Idaho and Washington water purveyors and the City is a member of the organization. The purpose of IWAC is to work together to maintain and/or enhance water quality and quantity for present and future generations by developing management strategies which benefit the Spokane Valley Rathdrum Prairie Aquifer and the Spokane River region. IWAC will facilitate regional dialogues and studies that result in recommendations for policy directions and shared stewardship of the Aquifer and Spokane River in a collaborative manner. IWAC is working on developing an educational video for the public to understand the importance of stormwater pollution and water conservation. Also, the video will suggest ways to reduce stormwater pollution and conserve water. Once the video is finished with production the City will make it available to the public for viewing.

Fix Car Leaks Don' Drip and Drive Promotion: The City partnered with the local community college, and other organizations, for a free auto leaks workshop to help the public learn about their car and make sound choices for our region. Utility billing inserts were used as a method of advertisement to over 70,000 customers.

Is that leak harming more than your car?

Prevent stormwater pollution by getting a **FREE VISUAL OIL LEAK INSPECTION** and discount for repairs.

To find a shop near you, go to:
FixCarLeaks.org

DEPARTMENT OF ECOLOGY
State of Washington

ASA
Northwest

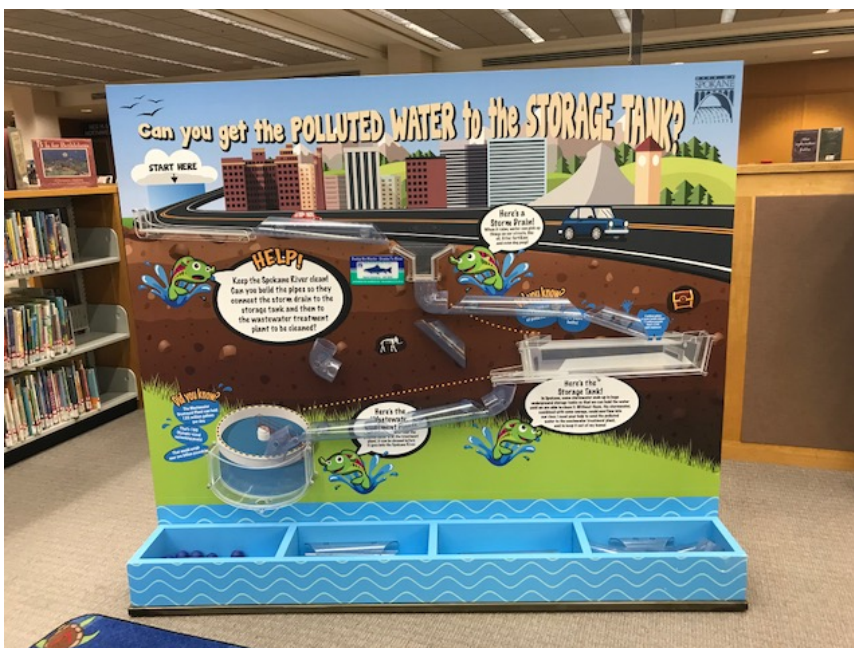
EMERGENCY SERVICES

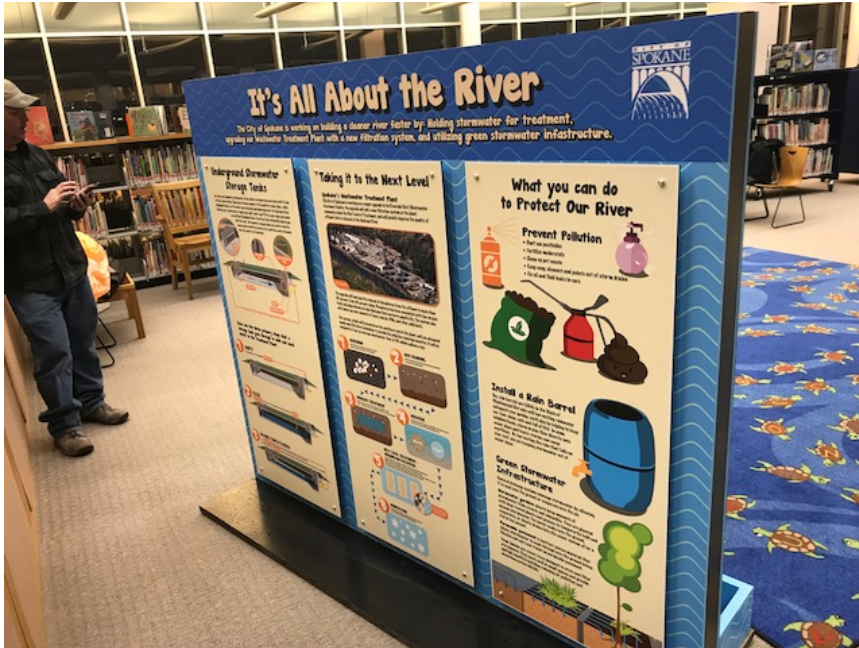
Don't Drip and Drive
Fix Car Leaks

\$50 off
oil leak repairs



Educational Interactive Display: The City designed and fabricated an educational display that is hosted at the Downtown Spokane Library. One side of the display wall is an interactive side that uses magnets to allow for the public to construct their own stormwater system. The goal is to connect the stormwater to a treatment facility. The other side of the wall promotes stormwater pollution prevention information.





Promotional Campaign: The City partnered with the Spokane Indians Baseball Club to champion a campaign designed to connect citizens to the Spokane River, educate about stormwater and work begin done to clean up the River, and support local organizations devoted to River protection. Advertisements included prints, radio, television, billboards, social media, and promotion during live baseball games.

2.3 Illicit Discharge Detection & Elimination

Permit Requirements (S5.B.3)

- Maintain a storm sewer system map of the MS4, showing the location of all known and new connections to the MS4 authorized or approved by the Permittee; all known outfalls; the names and locations of all waters of the state that receive discharges from those outfalls; and areas served by discharges to ground. Update the map information periodically as needed.
- Implement an ordinance or similar regulatory mechanism that effectively prohibits non-stormwater discharges into the MS4.
- Publicize a hotline for reporting of spills or other illicit discharges. Track illicit discharge reports and actions taken in response to calls.
- Implement an ongoing program to detect and remove illicit connections, discharges, and improper disposal, including any spills not under the purview of another responding authority, into municipal separate storm sewers (MS4s) owned or operated by the Permittee.
- Implement procedures for IDDE program evaluation and assessment, including tracking the number and type of spills or illicit discharges identified, inspections made and any feedback received from public education efforts.
- Provide appropriate training to staff on identification and reporting of illicit discharges.

2.3.1 Introduction

The City of Spokane's *Illicit Discharge Detection and Elimination (IDDE)* program is administered by the WWM Department. In addition to meeting the requirements established by Ecology, this describes how the City uses local knowledge and available resources in systematically identifying, responding, and removing illicit discharges. We also work to inform the public and municipal employees to take proactive measures in reducing, if not avoiding, illicit discharges. It is our aim to develop and continually improve our IDDE program in order to benefit and contribute to other community-wide water resources-based programs, such as public education, storm water management, stream restoration, and pollution prevention.

2.3.2 The Basics of Illicit Discharge

Federal regulations (40 CFR 122.26(b) (2)) define *Illicit discharge* as "... any discharge to an MS4 that is not composed entirely of stormwater..." with some exceptions. These exceptions include discharges from NPDES-permitted industrial sources and discharges from fire-fighting activities. Illicit discharges are considered "illicit" because MS4s are not designed to accept, process, or discharge such non-stormwater wastes. Municipalities can deal successfully with illicit non-stormwater discharge through adequate knowledge of the public drainage system in the form of maps, legal prohibition of such discharges, and informing key individuals about their responsibilities to properly dispose of wastes.

In most communities, the municipal separate storm drain systems discharges to receiving waters without treatment. Therefore, it is particularly important that only stormwater is discharged and to ensure that illicit discharges are eliminated from the system. The Permit requires an IDDE program be developed by the permittees. Several excellent IDDE guidance manuals were reviewed and referenced in developing our own program. See the references list located at the end of this document.

Table 1. Common Stormwater Pollutants, Sources, and Impacts

Pollutant	Sources	Impacts
Sediment	Construction Sites Winter sand and salt applications Vehicle/boat washing	Destruction of plant and fish habitat Transportation of attached oils, nutrients and other pollutants Increased maintenance costs
Nutrients (phosphorus, nitrogen)	Fertilizers Livestock, bird and pet waste Vehicle/boat washing Decaying grass and leaves Leaking trash containers	Nuisance or toxic algal blooms Hypoxia/anoxia (low levels of dissolved oxygen which can kill aquatic organisms)
Hydrocarbons	Vehicle and equipment leaks Vehicle and equipment emissions Pesticides Fuel spills Equipment cleaning Improper fuel storage and disposal	Toxic at low levels
Pathogens	Livestock, bird and pet waste	Risk to human health leading to closure of swimming areas
Toxic Chemicals (heavy metals, PAHs, pesticides, dioxins, PCBs)	Vehicle wear Spills and leaks Illegal discharges Sediments Pesticide application Deicing and dust control	Toxic at low levels
Debris/Litter	Improper waste disposal and storage Fishing gear Leaking trash containers	Potential risk to human and aquatic life

Source: modified from (CBEP)

2.3.3 Mapping the System (S5.B.3.a)

The first major component of the City's illicit discharge program is mapping the municipal stormwater drainage system. Maintaining an accurate and up-to-date map of the stormwater drainage system enables the City to track and locate the source(s) of suspected illicit discharges. The Permit outlines minimum information that should be included in the City's municipal storm sewer system map:

- Location of all known municipal storm sewer outfalls, receiving waters, and structural BMPs owned, operated, or maintained by the City;
- Tributary conveyances (type, material, size) leading to outfalls that are 24-inches or larger (or have an equivalent cross-sectional area);
- Drainage areas and land use for the drainage basins contributing to outfalls that are 24-inches or larger (or have an equivalent cross-sectional area);
- Locations of new connections to the City's stormwater drainage system; and
- Drainage areas within the City that do not discharge to surface water (aka closed depressions).

The Wastewater Management Department completed a map of the stormwater MS4 utilizing the Global Information System (GIS) by esri computer software program. GIS layers are updated periodically to reflect changes to the system and additional information.

2.3.5 Ordinance (S5.B.3.b)

The City adopted Ordinance ORD C34564 Section 17. Section 17D.060.190 addresses illicit discharges in accordance with requirements in the Permit. The ordinance defines allowable discharges to the MS4, unlawful discharges, and enforcement actions. The ordinance is available on the Spokane Municipal Code website.

2.3.6 Illicit Discharge Detection & Elimination Program (S5.B.3.c)

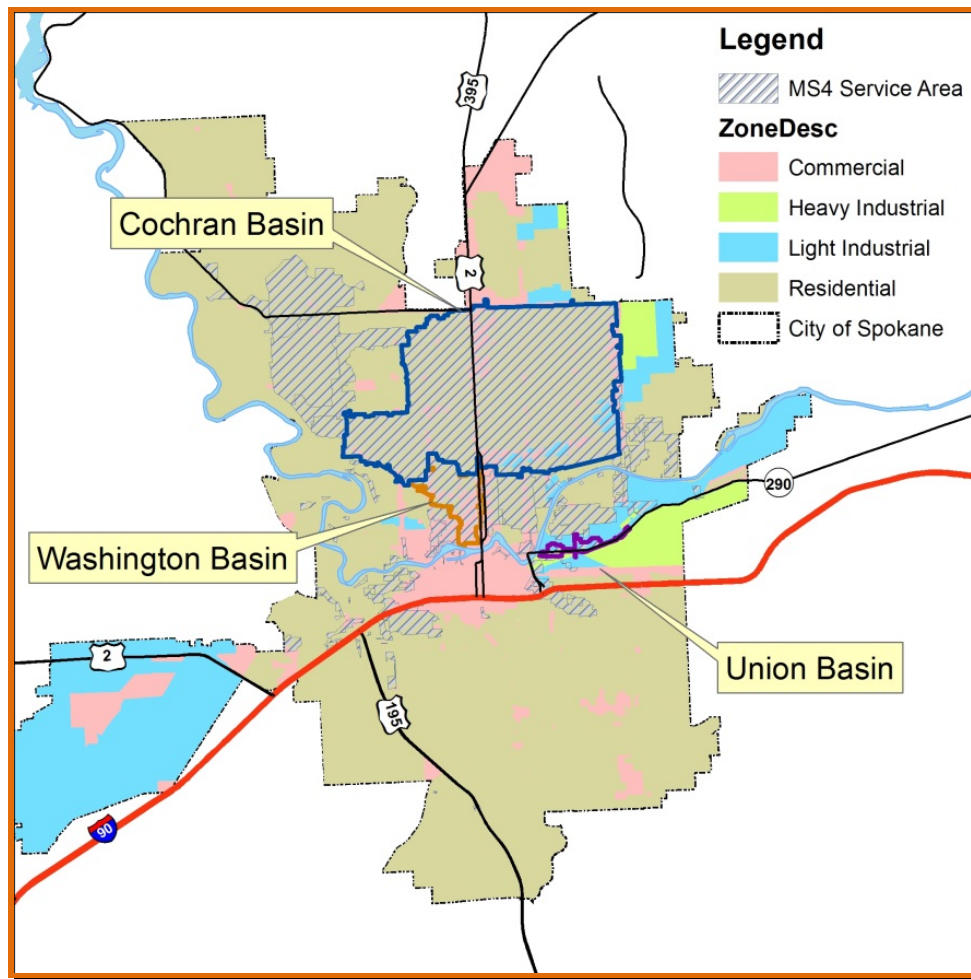
Most illicit discharges are detected when the City receives a call on the Stormwater Hotline. Calls may also be received on WWM's primary phone number. The hotline is publicized on storm drain markers throughout the City, on the WWM website, and in brochures. A call to the hotline is routed to one of the WWM Stormwater Inspectors, who inspects and reports the complaint. WWM maintains a protocol for investigating stormwater complaints and keeping records. In addition to the stormwater hotline, WWM staff continually checks for illicit discharges as a part of normal day to day operations. Staff and maintenance crews frequently in route to job sites throughout the City report any noticed illicit discharges to the Stormwater Inspectors. In many cases, the staff and maintenance crews inform the public about proper disposal and appropriate BMPs at the time of seeing the illicit discharge.

2.3.6.1 PRIORITY AREAS

IDDE priority investigation areas have been defined according to the receiving water body, past illicit discharge complaints, land use and known sources of contamination. The Spokane River flows through the City, and is the main priority water body. Past illicit discharge complaints do not indicate that any one sub-basin within the MS4 had substantially more complaints than another. Figure 2 illustrates a map of zoning and MS4 sub-basins. Industrial zoning areas are assumed to have the greatest potential for storage of large quantities of materials which may potentially produce illicit discharges. Only one stormwater basin within the City is located in a heavy industrial area. The Union Basin is located between I-90 and the Spokane River, east of the Hamilton Street Bridge as shown in Figure 2, and is located in heavy industrial and light industrial zoned areas. Stormwater runoff from the Union Basin was sampled by the Department of Ecology and detections of PCBs were present. PCBs are a contaminant of concern in the Spokane River. Therefore, the priority areas of investigation are located in this vicinity.

Our investigation efforts expanded to additional areas. The Cochran stormwater basin is the largest basin in the City, encompassing nearly 5,300 acres of primarily residential area with relatively smaller areas of commercial and light industrial land use. The Cochran basin is considered to have 'typical' stormwater pollutant concentrations for the City. The Washington stormwater basin, whose outfall is on the north end of the Washington Street Bridge, is a much smaller stormwater basin (about 450 acres). However, land use is predominantly commercial. PCB samples were collected near the outfall of both basins to compare concentrations of PCBs in various areas and land uses.

Figure 2. Map of zoning and MS4 sub-basins.



2.3.6.2 FIELD INSPECTIONS, CHARACTERIZING AND TRACING ILLICIT DISCHARGES

Wastewater Management incorporated field inspections into routine maintenance. Multiple assets, including outfalls, are inspected throughout the years. A software database, maintained by Wastewater Management, was recently purchased to assist with documenting field inspections. Wastewater Management continues the process of transferring existing data into this new database software system; while, simultaneously, inputting current data as field inspections are completed. Current inspection percentages of completion will flux as Wastewater Management continuously transfers data into the new database software.

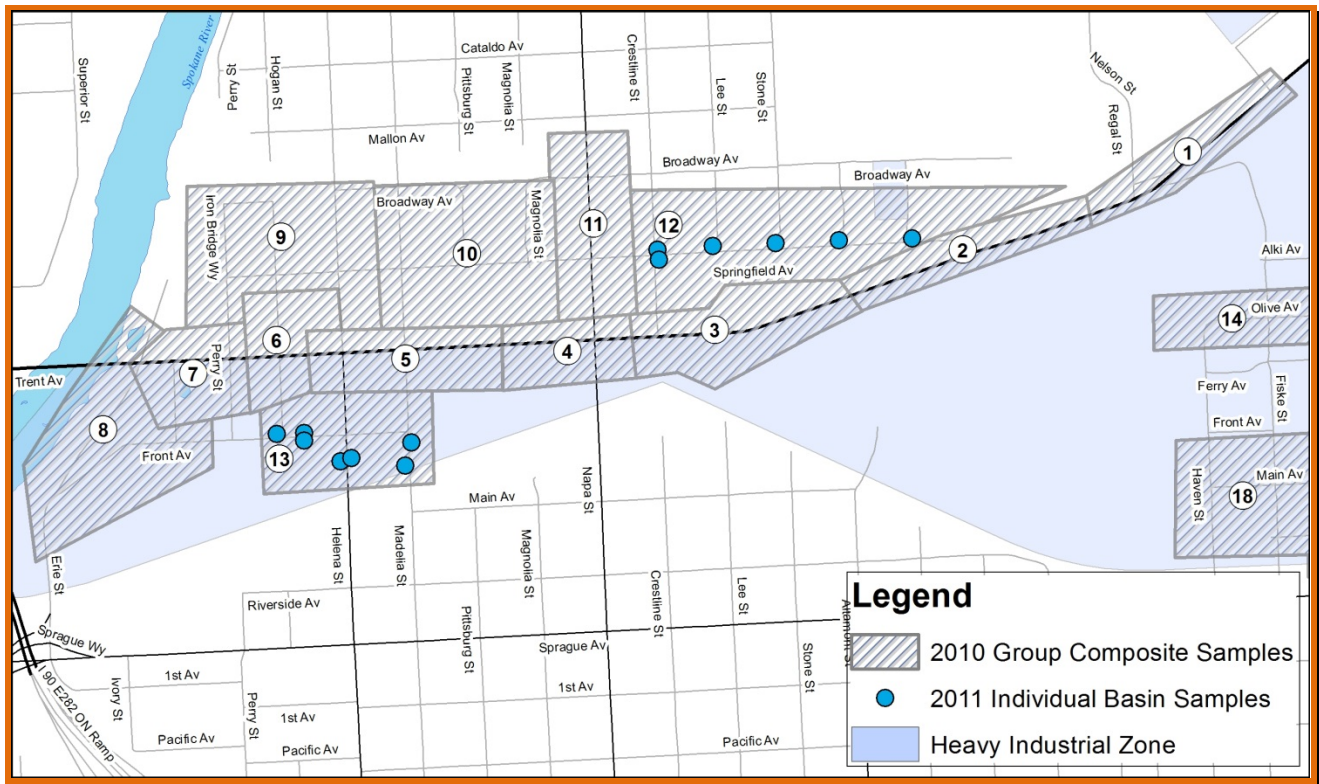
The specific illicit discharge of concern was PCBs, which can be found both in sediment and in stormwater. PCBs can be found within other classifications of illicit discharges, such as motor oil, paint, and suspended solids. Detecting and eliminating sources of PCBs may in turn eliminate other illicit discharge sources. Catch basin sediments throughout in the Union Basin were sampled for PCBs. This basin was divided into 13 sample areas. After sampling, remedial maintenance was performed on each catch basin. Sediment were removed using a Vactor truck and disposed at the North Side Landfill after confirmation that PCB concentrations were low enough to dispose sediments at this location. This effort was part of a larger study that also sampled catch basins in other MS4 sub-basins throughout the City.

Remedial maintenance and sampling efforts were initially completed in the Union Basin. This basin was categorized into 13 priority areas for investigation (Figure 3). Samples from each group were composited and analyzed for Aroclors. Sample analytical results concluded that PCB concentrations did not exceed the MTCA residential cleanup standard of 1 mg/kg for the Aroclor analysis. Laboratory analytical results were submitted to the City’s Solid Waste Management Department for approve disposal at the Northside Landfill facility. In addition, samples were then submitted, under chain-of-custody, to Pacific Rim Laboratories Inc., located in Surrey, British Columbia Canada, for further detailed analysis, including lower detection limits, and analyzed for 209 congeners.

Re-testing was completed on 13 individual catch basins of groups 12 and 13. These basins are located in the groups with highest PCB concentrations. Re-testing individual catch basin sediments was helpful with tracing sources of PCBs, which aided in detection and elimination of the illicit discharge.

Furthermore, additional catch basin sampling and analysis was completed in the Union Basin to help quantify ongoing PCB sources. Composite samples were collected in Groups 1, 2, 8, 11, and 12. Individual catch basin samples were collected in Groups 3, 4, 5, 6, 10, and 13 where sufficient sediment depth had accumulated. There was a reduction in PCB concentrations compared to previous samples. However, PCB concentrations were still detected in all catch basin samples, indicating an ongoing and diffuse source.

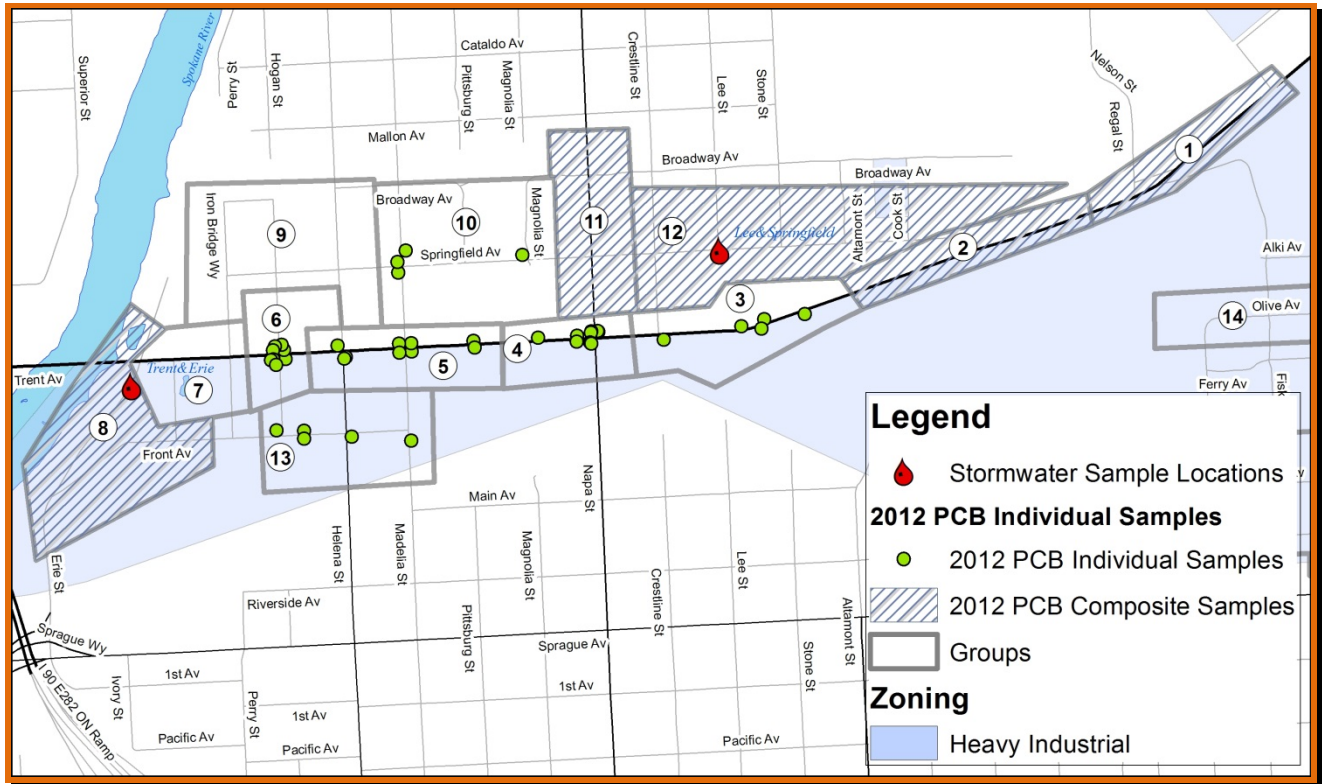
Figure 3. Map of priority area sample location with the Union Basin, 2010 and 2011.



Furthermore, stormwater monitoring began within the Union Basin. Two samplers were installed as illustrated in Figure 4. Samples were collected during the wet season to determine event mean concentration of PCBs in stormwater. Two additional priority areas for stormwater sampling were expanded into the Cochran and Washington basins. Continued sample collection occurred to determine mean PCB concentrations.

PCB concentrations were the highest in the industrial Union stormwater basin, especially in the upstream sample location located near a PCB cleanup site. PCB concentrations in the commercial Washington stormwater basin were over four times lower than the Union basin. Cochran basin PCB samples were slightly lower than in the Washington basin. Detailed sampling and analysis report information is available on the City’s website.

Figure 4. Map of priority area sample locations within the Union Basin, 2012.



2.3.6.3 ENDING ILLICIT DISCHARGES

Windshield Investigations and Curb Markers

Windshield investigations were performed throughout the priority investigation areas. Wastewater Management staff performed visual inspections of each parcel within the Union Basin groups. Potential for stormwater to run from the property to City right of way was assessed, and any preliminary potential sources of sediment and PCBs were noted. This information was collected to determine potential illicit discharge contributions to catch basins within the priority areas and therefore aid in illicit discharge elimination.

Curb markers were installed on all catch basin inlets throughout the Basin Groups and the locations recorded during the sediment sampling process. Markers were not placed on sumps located in the middle of the street. After markers were installed, a larger effort was undertaken throughout the City. Areas with high pedestrian traffic, downtown, and around schools were targeted first. Installation of curb markers are now incorporated into regular maintenance activities throughout the City.

Spokane River Regional Toxics Task Force

The City is actively engaged in a regional effort to address PCBs and dioxins in the Spokane River watershed, referred to as the Spokane River Regional



Toxics Task Force (SRRTTF). The Toxics Task Force is currently working to identify the unknown sources of PCBs in the Spokane River and develop a cleanup plan aimed at meeting applicable water quality standards. Background information and current activities are available on the SRRTTF's website. The SRRTTF contracted with an independent community technical advisor to assist in tracking sources of PCBs and developing control methods.

The SRRTTF performed a low-flow synoptic sampling survey to assess contributions to the river from groundwater and dry weather wastewater discharges, and to identify unknown sources reaching the river through groundwater. Wet weather sampling was tentatively planned to assess contributions from stormwater, snowmelt, and other wet weather contributions. Future studies include filling the data gaps from other sources such as air and dust particles and understanding the potential complications from fish stocking activities. The knowledge gained from these studies will aid in identification of sources of PCBs; and, therefore the most effective control methods. Future implementation of the Comprehensive Plan will also aim to focus efforts of identifying and cleaning up sources of PCBs.

Local Source Control

Local source control efforts are an effective means of pollution prevention by reaching out to businesses and the general public to make them aware of their environmental impacts and how to mitigate them. In Spokane much of the work is performed by the Urban Waters Initiative, a cooperation between the Department of Ecology and the Spokane Regional Health District. The City worked with the Urban Waters initiative to define a target area for business inspections. Initially, the Union stormwater basin was targeted for a voluntary business inspection and technical assistance visit. After the Union stormwater basin was complete, the team moved onto the Cochran stormwater basin. Since the Cochran basin is so large, the most concentrated commercial areas were given first priority, such as the area along Division Street.

EnviroStars Waste Directory

The Spokane River Forum administers the EnviroStars program in Spokane, a small business certification program to provide assistance and incentives for reducing hazardous materials and waste. The Spokane EnviroStars Waste Directory website was developed and is available on their website. Businesses and households can use this resource to understand their waste and learn how to properly dispose of it.



Union Basin Disconnection Grant

The City of Spokane was awarded a grant from the Department of Ecology to reduce or eliminate PCB discharges from the Union basin to the Spokane River. Detailed engineering design of the stormwater system began as the concept was to collect, treat, and infiltrate stormwater runoff in the basin using LID techniques such as tree filter boxes and vegetated infiltration swales.

PCB Product Sampling Grant

The City was awarded an additional PCB-related grant from the Department of Ecology. This Grant of Regional or Statewide Significance was aimed at defining the true sources of PCBs to stormwater from products purchased and used by municipalities. Products that may come into contact with stormwater, such as road paint, deicer, and dust suppressants, were sampled and analyzed for PCBs.

Approximately 40 different products were sampled and nearly each product contained significant amounts of PCB in comparison to water quality standards. A PCB page is continually being developed to house this and other PCB reports, and will include public information such as why PCBs are an issue and tips on how to reduce exposure to PCBs.

Products with the highest overall PCB loading, such as hydroseed, motor oil, and magnesium chloride deicer and dust suppressant, are the initial target focus pollution prevention efforts. The City is working with the SRRTTF, Washington State Department of Transportation (WSDOT), Ecology, and other interested parties around the state to further understand PCB sources in these products and identify management practices to reduce them.

2.4 Construction Site Stormwater Runoff Control

Permit Requirements (S5.B.4)

- Implement an ordinance or other regulatory mechanism to require ESCs, and other construction-phase stormwater pollution controls at new development and redevelopment projects. The ordinance shall require construction operators to prepare and adhere to a *Construction Stormwater Pollution Prevention Plan* (Construction SWPPP) and application of BMPs to protect water quality.
- Include a permitting process with *Stormwater Site Plan* review, site inspection and enforcement capability to meet the required standards.
- Implement a procedure for keeping records of inspections and enforcement actions by staff, including inspection reports, warning letters, notices of violations and other enforcement records.
- Provide training for all staff involved in plan review, field inspection, and enforcement to carry out the provisions of this SWMP. Keep training records including dates, course or activity descriptions, names and positions of attended staff.
- Provide information to construction site operators about training available on how to install and maintain effective erosion and sediment controls.

2.4.1 Introduction

Development projects in urban areas generally result in the replacement of open land with impervious surfaces that prevent infiltration. This creates changes in the patterns of stormwater runoff, which can lead to flooding problems at the project site and on properties downstream. Further, this can affect water quality as sediment and pollutants are transported into streams, wetlands, lakes, and groundwater.

The *Spokane Regional Stormwater Manual (SRSM)* was developed in joint cooperation by the Cities of Spokane and Spokane Valley and Spokane County. The manual establishes standards for stormwater design and management to protect water quality, natural drainage systems and down-gradient properties as urban development (and redevelopment) occurs. The Manual meets or exceeds applicable criteria from the Washington State Department of Ecology's *Stormwater Management Manual for Eastern Washington (SWMMEW)*. Portions of the manual relevant to meeting Permit requirements are highlighted in this document.

2.4.2 Activities

The SRSM outlines Erosion and Sediment Control (ESC) requirements, which are equivalent to Core Element #2, Construction Stormwater Pollution Prevention, in Appendix 1 of the Permit. An ESC plan is a requirement of the construction permit process and is equivalent to the Permit's Construction Stormwater Pollution Prevention Plan (Construction SWPPP). Controlling erosion and preventing sediment and other pollutants from leaving the project site during the construction phase is achievable through implementation and selection of BMPs that are appropriate both to the site and to the season during which construction occurs.

The SRSM highlights four objectives of the ESC Plan:

- Protect existing or proposed stormwater management infrastructure;
- Minimize the impacts of erosion, sedimentation and increased runoff caused by land-disturbing activities on private property, public roads and rights-of-way, and water bodies;
- Protect the health, safety and welfare of the general public;
- Protect water quality.

An ESC Plan is required for land disturbing activities 5,000 square feet or greater and projects identified as special sites of any size. Special sites are defined in SMC 17D.090.080 and may include sites with greater than 10 percent slope, highly erosive soils, slope lengths greater than 300 feet, or disturbance of natural vegetative buffer within 50 feet of a wetland or water body. If an ESC Plan is not required, the proponent would still be responsible to control erosion and sediment during construction.

2.4.2.1 ORDINANCE (S5.B.4.A.)

The ESC Ordinance, available on the Spokane Municipal Code 17D.909 website, was adopted and is relevant documents such as the SRSM and SWMMEW; require drainage plans and submittals, maintenance and performance standards in compliance with the Permit.

2.4.2.2 PROCEDURES FOR SITE PLAN REVIEW (S5.B.4.B.)

Erosion and sediment control (ESC) plans are reviewed by the Development Services Center to ensure the proposed controls prevent erosion and keep pollutants from leaving the project site during construction. Commercial application submittal requirements are available on the City's website. An ESC Plan is required as one of the minimum site plan elements.

2.4.2.3 SITE INSPECTION AND ENFORCEMENT (S5.B.4.C.)

Inspectors and field engineers from the Development Services Center inspect privately constructed infrastructure. The City of Spokane also has two stormwater inspectors located at the Wastewater Management Department who inspect development sites during construction and when illicit discharge calls are received by the general public. Engineering Services provides construction oversight for public capital improvement projects on City-owned land. The Engineering Services inspectors verify proper installation and maintenance of required erosion and sediment controls for NPDES Construction Stormwater General permitted development sites and capital improvement projects during construction.

Records of inspections and enforcement actions by Wastewater Management staff are maintained concurrently with the Illicit Discharge program. Many of the erosion and sediment control violations, such as track-off of sediments

from the construction site to the street, are considered illicit discharges. These are logged in a database (Complaint Tracker) and on employee time sheets. WWM also maintains records of inspection reports and notices of violations.

Records of inspections and enforcement actions completed by Engineering Services and the Development Services Center are maintained in daily inspection logs as well as digitally in the Accela computer software program.

2.4.2.4 TRAINING AND INFORMATIONAL MATERIALS (S5.B.4.D.)

Informational materials regarding erosion and sediment control are available to construction site operators, design professionals, and other members of the public in the Development Services Center lobby at City Hall. In addition to highlighting erosion and sediment control requirements, brochures direct the target audience to the SRSM. The SRSM details erosion and sediment control requirements equivalent to Appendix 1 of the Permit and BMPs in Department of Ecology's SWMMEW.

2.5 Post-construction Stormwater Management

Permit Requirements (S5.B.5)

- Implement an ordinance that requires post-construction stormwater controls at new development and redevelopment projects.
- Implement procedures for site plan review.
- Implement procedures for site inspection and enforcement of post-construction stormwater control measures.
- Provide training for staff involved in post-construction stormwater management.
- Provide information to design professionals about available training and compliance with BMPs described in the Spokane Regional Stormwater Manual.
- Establish record-keeping methods.

2.5.1 Introduction

This section identifies post-construction stormwater requirements, including adoption of the Stormwater Facilities Ordinance, site plan review, site inspection and enforcement of control measures, training, and record keeping. The SRSM, introduced in section 2.4, is used to implement the post-construction stormwater runoff program. The Manual meets or exceeds applicable criteria from the Washington State Department of Ecology's SWMMEW.

2.5.2 Activities

The SRSM outlines the post-construction stormwater program. Chapter 2, Basic Requirements, defines the eight basic requirements for stormwater management for new development and redevelopment projects. Within the City, the threshold for requiring compliance with the Basic Requirements is the "addition or replacement of any impervious surfaces."

Basic Requirements include:

- No. 1 – Drainage Submittal;
- No. 2 – Geotechnical Site Characterization;
- No. 3 – Water Quality Treatment;
- No. 4 – Flow Control;

- No. 5 – Natural and Constructed Conveyance Systems;
- No. 6 – Erosion and Sediment Control;
- No. 7 – Source Control; and
- No. 8 – Operation and Maintenance.

The Stormwater Site Plan referenced in the municipal stormwater permit (S5.B.5.b) is analogous to the Drainage Submittal in the SRSM (2.2.1 Basic Requirement No. 1). A Concept Drainage Report, a requirement of a Drainage Submittal, is generally required for large projects or those located in environmentally sensitive areas to preliminarily assess drainage requirements and potential impacts. A Drainage Report, another requirement of a Drainage Submittal, is required for most projects and is used to identify drainage impacts from the project as well as determine necessary stormwater runoff treatment and controls. The Drainage Report also assesses operation and maintenance requirements, inspection requirements, and erosion and sediment control.

2.5.2.1 STORMWATER FACILITIES ORDINANCE (S5.B.5.A.)

The Stormwater Facilities Ordinance, [SMC Chapter 17D.060](#), was adopted and effective in March of 2010. The ordinance references relevant design documents such as the SRSM and the City of Spokane design standards and specifications, enforcement authority, runoff and infiltration controls, and natural location of drainage requirements.

2.5.2.2 PROCEDURES FOR SITE PLAN REVIEW (S5.B.5.B.)

Drainage submittals are reviewed by the Planning department for code requirements such as critical areas of management, buffers, impervious area creation, building and landscape design and building setbacks. Then, Development Services Center reviews Drainage Submittals for civil plan requirements as described in City Engineering Design Standards and the SRSM.

Engineering Services reviews plans for City Capital Improvement Projects and stormwater plans for the public right-of-way to ensure consistency with Design Standards.

The Development Services Center reviews and approves drainage submittals for private commercial and residential developments. A Stormwater Intake Checklist was added to the City's Engineering Services website to ease the review process. The drainage submittal requires a Drainage Report, Drainage Plan, Grading Plan, Swale Details, and Erosion and Sediment Control Plans and Details. The City requires developers to submit a maintenance plan for all facilities during the plan review. A draft copy of the Conditions, Covenants and Restrictions (CC&Rs) for the homeowners' association in charge of operating and maintaining the drainage facilities is required.

The developer must address any comments resulting from City staff review and submit revised plans to the City. After confirming that staff comments have been adequately addressed, the Development Services Center will send the developer a letter accepting the design and permitting construction.

2.5.2.3 SITE INSPECTION AND ENFORCEMENT (S5.B.5.C.)

There are three inspectors and a field engineer from the Development Services Center who inspect privately constructed infrastructure. Two stormwater inspectors from the Wastewater Management Department inspect privately constructed stormwater controls. Engineering Services provides construction oversight for public capital improvement projects on City-owned land.

Private development sites are inspected upon completion of construction. If there are deficiencies, a punch list is created by the Engineering Services inspectors to be completed by the developer. Final acceptance does not occur until all deficiencies have been remedied.

2.5.2.4 TRAINING FOR STAFF AND PROFESSIONALS (S5.B.5.D., S5.B.5.E.)

The Development Services Center is responsible for providing information to construction site operators and design professionals about training available regarding how to (1) install and maintain effective erosion and sediment controls, (2) comply with the requirements of Appendix 1 of the Permit and (3) apply the BMPs described in the SRSM. Copies of information provided to construction site operators are kept. If information is distributed to a large number of design professionals at once, the dates of the mailings and lists of recipients should also be kept.

Staff and professional training is provided for employees and design professionals to aid in reaching water quality goals, ensure permit compliance, and reduce pollution to stormwater runoff. Five training modules were developed, including NPDES Overview, Operations and Maintenance, Facility Inspections, Site Plan Review, and Illicit Discharge. Training was provided for LID and records should be kept including training materials, the date of training, and attendees.

2.5.2.5 EASTERN WASHINGTON LID GUIDANCE MANUAL

The Eastern Washington Low Impact Development (LID) Guidance Manual was adopted as a supplemental guidance for the design, construction, and maintenance of LID stormwater best management practices. The manual was a regional effort led by Spokane County in conjunction with many Eastern Washington municipalities, including the City of Spokane, the Washington Stormwater Center, Department of Ecology, and regional LID experts. It builds on the practices of stormwater pollution prevention, flow control, and treatment, promoting the use of natural features and managing stormwater as close to where it falls as possible. The guidance manual is available on the City's website.

The City of Spokane adopted this manual in the Spokane Municipal Code ([SMC 17D.060.300](#)). LID remains optional in Eastern Washington, but is encouraged in the City in part by the adoption of this manual. It provides an understanding of LID practices applicable in Eastern Washington and design guidance that both developers and City review engineers can follow.

2.6 Pollution Prevention & Good Housekeeping for Municipal Operations

Permit Requirements (S5.B.6)

- Implement Operations and Maintenance (O&M) Plans for municipally-owned facilities. The O&M Plan shall include appropriate pollution prevention and good housekeeping procedures for the following facilities and/or activities:
 - Stormwater collection and conveyance system
 - Roads, highways and parking lots
 - Vehicle fleets
 - Municipal buildings
 - Parks and open space
 - Construction projects

- Industrial activities
- Material storage areas, heavy equipment storage areas and maintenance areas
- Flood management projects
- Other facilities that would reasonably be expected to discharge contaminated runoff
- Provide training for employees who have primary construction, operations or maintenance job functions that are likely to impact stormwater quality

2.6.1 Introduction

An operation and maintenance (O&M) program has been developed and implemented that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.

2.6.2 Activities

In coordination with each pertinent City department, Wastewater Management developed a Stormwater Pollution Prevention Operations and Maintenance (O&M) Plan. The O&M Plan was updated to include City activities in one comprehensive document. The Wenatchee O&M Plan template, provided by Ecology, was used.

The O&M Plan highlights pollution control, good housekeeping, BMPs and source control measures that are implemented at public facilities. Basic principles of the O&M Plan are shown below. Recordkeeping and inspection requirements as well as responsible departments are listed within the O&M Plan. It's available on the City's website.

2.6.2.1 STORMWATER COLLECTION AND CONVEYANCE SYSTEM

Stormwater treatment and flow control facilities owned by the City were inspected by Wastewater Management at least once during the first Permit cycle. After major storm events, at a minimum for the 10-year recurrence interval, spot checks of these facilities are conducted. The second permit cycle requires that each facility be inspected at least once every two years. Maintenance concerns are reported after each inspection and addressed as necessary.

The MS4, including streets, catch basins, curbs, gutters, ditches, and storm drains, are also inspected by Wastewater Management. Wastewater Management utilizes a database to assist with documenting inspections. The City is divided into four quadrants. Maintenance crews inspect the sewer and stormwater systems in each quadrant until inspection of the system is complete before restarting the process. Catch basins are inspected for proper function, structural stability, and debris buildup. A work order is processed for any required maintenance work. Catch basins on steep hills and in problem flooding areas are inspected twice a year (spring and fall).

Numerous bio-infiltration swales are located throughout the City. Adjacent property owners and Planned Unit Developments (PUDs) are responsible for maintenance of most swales. WWM is responsible for maintenance of a portion of the swales. The swales maintained by WWM are either planted in dry land grass and maintained as needed or planted in turf grass and maintained on a regular schedule. Turf grass is mowed regularly to maintain a height of two to three inches. For curb cut inlets, maintenance crews remove grass, sediment and debris to prevent buildup and clogging of the inlet. Curb cut inlets are inspected as maintenance crews work through their designated quadrants of the City, or if there is flooding problems.

Culverts are inspected on a three-year cycle by the City's Street Department. Wastewater Management staff clean out culverts as needed upon request.

2.6.2.2 DECANT FACILITY

The City received a grant from the Department of Ecology to construct a Vactor waste decant facility at the Play fair site, located at 402 N. Lee, in Spokane, Washington. Waste generated from cleaning catch basins and other stormwater management and treatment facilities are transferred to the decant facility. At the facility, the liquids are decanted from solids. Liquids are conveyed to an evaporation pond, and solids are transported to a lined landfill. Procedures for using the decant facility are incorporated into the O&M Plan.

2.6.2.3 ROADS, HIGHWAYS AND PARKING LOTS

The City of Spokane Street Maintenance Division is responsible for cleaning, repairing and performing preventative maintenance on the 2017 lane miles of paved streets and 61 lane miles of gravel streets. Various divisions within the Streets Department are responsible for maintaining the following: street sweeping, leaf pick up, weed control, street markers, asphalt repair, paving and bridge maintenance, de-icing operations and snow removal.

2.6.2.4 VEHICLE FLEETS, HEAVY EQUIPMENT STORAGE AREAS AND MAINTENANCE AREAS

The City of Spokane Fleet Services conducts routine vehicle maintenance on City vehicles including heavy equipment. Fleet Services also conducts major vehicle engine maintenance and/or repairs on vehicles. Vehicle maintenance BMPs are followed to prevent stormwater pollution from cleaning solvents, leaking vehicle parts and vehicle fluids.

The City of Spokane Fleet Services stores numerous heavy and small equipment as well as vehicles on impervious areas such as concrete or asphalt. Oils, greases, metals, vehicle fluids and suspended solids can contribute to stormwater pollution. These facilities are considered high-use sites and have oil/water separators installed.

Fleet Services' Broadway facility has a covered designated area wash bay for trucks, equipment, and vehicle washing. The wash bay is connected to the sanitary sewer and is equipped with an oil/water separator for pretreatment of wash water. Sewer Maintenance cleans and removes accumulated sediment as needed. BMPs are followed for proper washing and storage of equipment.

SWPPPs have been prepared for facilities with material storage areas, heavy equipment storage areas, and maintenance areas. However, there are no known municipal facilities which discharge runoff to the storm sewer system. At this time, we are unaware of any municipal facilities that require industrial stormwater permits.

2.6.2.5 MUNICIPAL BUILDINGS

Facility operations have the potential to pollute stormwater without proper BMP utilization. Measures are taken to control window washing, carpet and floor cleaning, exterior building and rooftop cleaning and maintenance, painting, trash and dumpster management, remodeling and retrofitting, parking lot maintenance, and landscape maintenance.

2.6.2.6 PARKS AND OPEN SPACE

Pesticides, herbicides, and fertilizers contain pollutants such as nutrients and toxins. City of Spokane Parks Operations only utilizes store-bought products (i.e. Trimec, Tripleshot, Foundation, Speedzone, Roundup®, fertilizers). Small amounts of such products are applied to stormwater facilities in the field for routine maintenance.

By law, when applying any Restricted Use Pesticide (RUP), the applicator must be certified. BMPs are utilized to minimize the impact of pesticides, herbicides, and fertilizers.

Landscaping waste can consist of, but is not limited to, leafy and woody debris from clipping, cutting, mowing and other maintenance activities. These materials can accumulate in the storm system and/or discharge into receiving waters. To ensure that these waste materials do not enter the storm drainage system, proper disposal is necessary.

2.6.2.7 CONSTRUCTION PROJECTS

Municipal construction projects are subject to the same requirements as those projects proposed by private developers. During construction, erosion and sediment controls are used to prevent sediment-laden stormwater from flowing away from the site and into the stormwater collection and conveyance system. Construction NPDES permits are obtained from the Department of Ecology for projects disturbing more than one acre.

2.6.2.8 STAFF TRAINING (S5.B.6.B.)

The City provides training for employees with primary construction, operation, or maintenance job functions likely to impact stormwater quality. Target employees were identified to participate in the training sessions. Training addresses the importance of protecting water quality, the requirements of the Permit, operation and maintenance requirements, inspection procedures, ways to perform job activities to prevent or minimize impacts to water quality, and procedures for reporting such water quality concerns as potential illicit discharges. Follow-up training should be provided as needed to address changes in procedures, methods or staffing.

Training is generally provided in conjunction with other permit training requirements and/or on the job training activities. Records should be kept including training materials, the date of training, and attendees.

3.0 TOTAL MAXIMUM DAILY LOAD REQUIREMENTS

Permit Requirements (S7)

Section S7 applies only if an applicable Total Maximum Daily Load (TMDL) is approved for stormwater discharges from MS4s as listed in Appendix 2 of the permit.

- Comply with the specific requirements in Appendix 2 (WRIA 54 Spokane River and Lake Spokane)
 - Develop and implement a monitoring program for phosphorus, ammonia, CBOD, and flow rates in the Cochran Basin.
 - Evaluate results with respect to the Waste Load Allocations in the TMDL.
 - If the monitoring results indicate that WLAs are being exceeded, prepare an Action Plan.

3.1 Activities

The Permit includes requirements for the Spokane River Dissolved Oxygen (DO) TMDL. The DO TMDL was approved by the Environmental Protection Agency (EPA) mid-way through the first permit cycle. Stormwater monitoring requirements were included in the second 5 year permit for parameters affecting DO in Lake Spokane: phosphorus, ammonia, and carbonaceous biochemical oxygen demand (CBOD).

Monitoring requirements did not take effect until the second half of 2015. However, the City began preliminary sampling collection information on these and other stormwater constituents in several stormwater basins. The

information was collected primarily for the purpose of assessing and comparing pollutant loads from the MS4, combined sewer system, and water reclamation facility. The City continues to monitor, and evaluate results, of the Cochran Basin. At the time this was written, results concluded that the Cochran Basin was below DO TMDL requirements for stormwater. An Integrated Clean Water Plan was developed to aid in prioritization of pollutant load reductions from these three systems. The Integrated Clean Water Plan is available on the City's website.

4.0 MONITORING AND ASSESSMENT

Permit Requirements (S8)

- In each annual report, provide a description of any stormwater monitoring or stormwater-related monitoring studies performed by the permittee or on behalf of the permittee during the reporting period.
- Coordinate with other permittees to select, propose, develop, and conduct Ecology-approved studies to assess effectiveness of permit-required SWMP activities and BMPS.
 - In each annual report, describe participation in the effectiveness studies planning efforts and related outcomes.

4.1 Stormwater Monitoring and Related Studies

4.1.1 Integrated Clean Water Plan

The City collected monitoring information from several MS4 basins to inform efforts pertaining to the Integrated Clean Water Plan. The information was primarily collected for the purpose of assessing and comparing pollutant loads from the MS4, combined sewer system, and water reclamation facility. The Integrated Clean Water Plan was developed to aid in prioritization of pollutant load reductions from these three systems.

4.1.2 PCBs in Products

The City participated with the SRRITTF in a regional effort to reduce PCBs. To complement this effort and assess true sources of PCBs to the storm sewer system, the City received a grant from the Ecology to sample and analyzed approximately 40 different municipal products. Sampling was completed and laboratory analytical results concluded that PCBs were present in nearly all products tested, including motor oils and lubricants, deicer, road paints, pesticides, asphalt based materials, and hydroseed. The results should be used to inform pollution prevention management decisions. Additional investigations with the SRRITTF will potentially aid manufacturers in producing lower-PCB products.

4.1.3 Sharp Avenue

A pervious pavement field testing project is proposed at Sharp Avenue between Division and Hamilton Streets. Questions remain regarding the suitability for pervious pavements in eastern Washington. The City partnered with Gonzaga University to design and monitor pervious pavement installations for durability and water quality. Students prepared a mock RFP, feasibility study report, and interim report with recommendations for pervious pavement design alternatives and monitoring setup. The City applied for an Ecology grant to construct the project.

4.1.4 Biochar

The City partnered with Gonzaga University students and the Lands Council to study biochar regarding stormwater treatment. Laboratory bench scale studies were performed with two different biochar mixes (Kentucky blue grass and wood-based biochar) and various combinations of supplemental material, such as oyster shells and iron. Synthetic stormwater was pulsed through the systems and pollutant removal was measured. Results and conclusions from the study should be available sometime 2015.

To gain a better understanding of biochar usage, a field application, storm gardens comprised of the biochar mixed in the engineered soils, was constructed within a residential area. Three adjacent storm gardens located along Garland Avenue near Belt contains the two different biochar. The cell containing the wood biochar mix has sampling ports, and samples should be collected.

4.1.5 WSU

The City partnered with Washington State University (WSU) and the Center for Environmentally Sustainable Transportation in Cold Climates (CESTiCC) for another educational institution interest in the study of porous pavements. Research was primarily focused on the roadway sub-base effects from infiltrating water through porous pavements. WSU researchers designed a monitoring system for the Finch Arboretum porous asphalt parking lot. The goal was to analyze pollutant concentration that infiltrates through the porous pavement system.

4.1.6 Lincoln SURGE

The Lincoln Spokane Urban Runoff Greenways Ecosystem (SURGE) project on is a series of storm garden bump outs along Lincoln Street between 19th and 29th Avenue. Each storm garden has an underdrain that connects to Cannon Hill Park Pond. To better understand the treatment capability of the storm gardens, stormwater samples should be collected in the influent and effluent as well as in the pond for comparison.

4.1.7 South Hill Wetland Mitigation

The South Hill Wetland Mitigation project was a visually monitored project of the wetland mitigation area and buffer impacts. Monitoring occurred and it mitigated at a 2:1 replacement ratio as required by local code to create a minimum wetland replacement area of 14,890 square feet. The plan proposed 18,568 square feet of wetland mitigation area as compensation for wetland and buffer impacts. The herbaceous species were filling in nicely and surpassed the percent cover specified in the mitigation plan. The site was in full compliance with the terms of the mitigation plan.

4.1.8 Mycroremediation

Some literature research studies have concluded that fungi could be a potential opportunity for bioremediation activities. Fungi biologically secrete enzymes from their mycelium components and decompose items such as wood and chemicals. To better understand this type of bioremediation, the City partnered with The Lands Council to complete a mycroremediation study. The goal is to understand if fungi can reduce PCB concentrations in vector waste. The study is anticipated to occur throughout 2016 and partly into 2017.

4.2 Eastern Washington Effectiveness Studies

Each City and County in Eastern Washington was required to participate in preparation of studies to test the effectiveness of stormwater management program components. A total of twelve to fifteen study ideas were submitted to Ecology. Eight to twelve of these studies should be implemented.

The City of Spokane Valley received a grant from Ecology and was coordinating the first phase of this effort. In 2014, permittees developed a long list of potential study ideas and began to refine the list. Potential studies may involve:

- Public education and outreach strategies that provide the most benefit
- Catch basin cleaning and street sweeping effectiveness
- Most beneficial frequency of maintenance practices
- IDDE techniques that provide the most benefit
- Planting options for vegetated swales
- Pollutant loading from various land uses specific to eastern Washington
- Checklists for reporting requirements
- Effective design of BMPs

Permittees ranked the list of study ideas and include:

- Modernizing Education and Outreach Strategies
- Use of Non-vegetative Swale and Native Soils
- Street Sweeping and Catch Basin Cleaning Comparison
- Mobile Contractor Illicit Discharge Education
- Sand Filter Vault BMP
- BMP Inspection and Maintenance Responsibilities
- Seasonal Differences in Street Sweeping Material Removal
- Catch Basin Retrofit Device Placement
- Stormwater BMP Owner Awareness
- Determining Pollutant Contributions from Municipal Stormwater in Eastern Washington using GIS
- Media Thickness Study
- Media Component Study
- Sharp Avenue Porous Pavement Study
- Biochar Media Stormwater Treatment Study
- Long-term Permeable Pavement Sidewalk Infiltration Performance

Permittees will continue to refine study ideas and detailed study design proposals will be submitted to Ecology. Furthermore, permittees will develop quality assurance project plan (QAPP) for effectiveness studies that will also be submitted to Ecology. The City participated with the Eastern Washington Stormwater Group throughout the entire process of the described effectiveness studies. The City participated in meetings and other related coordination efforts.

5.0 SWMP PLAN

The Stormwater Management Program (SWMP) Plan is a list of activities for the upcoming calendar year. The following table includes a list of planned activities.

Table 2. Stormwater Management Program (SWMP)

Permit Component	Description	SWMP Section #	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
S5.B.1: Public Education and Outreach															
S5.B.1.a,b.	Implement Educational Program	2.1													
	Attend public events														
	Cable 5 videos and tips														
	Cleanwater/stormwater pollution prevention interpretive signs along centennial trail														
	Educational materials to development/construction community														
S5.B.2: Public Involvement and Participation															
S5.B.2.a.	Involve public through ordinance process (should any arise)	2.2													
	Stormwater pledges at general public and student events														
	Manhole cover art contest														
S5.B.2.b.	Post SWMP and plan to website with public comment opportunity														
S5.B.3: Illicit Discharge Detection and Elimination															
S5.B.3.a.	Maintain map of the MS4	2.3													

	Conduct outfall field surveys													
S5.B.3.c.	Implement IDDE Program													
	Install curb markers													
	PCB product testing (City and SRRTTF)													
	Formalize procedures for conducting MS4 investigations													
	Field assess 10% of MS4													
	Maintain hotline and respond to IDDE complaints													
	Employee training													
S5.B.4: Construction Site Storm Water Runoff Control														
S5.B.4.b.	Review construction plans and SWPPPs	2.4												
S5.B.4.c.	Inspect construction sites and keep records													
	CESCL training for City Staff													
S5.B.4.d.	Provide information on available training to contractors													
S5.B.5: Post-construction SWM for New/Re-development														
S5.B.5.a.	Allow LID	2.5												
	Require projects to retain 10-year 24-hr storm													
S5.B.5.b.	Site plan review													

S5.B.5.c.	Inspect post-construction stormwater controls																				
S5.B.5.f.	Maintain project records																				
S5.B.6: Pollution Prevention and Housekeeping																					
S5.B.6.a.	Implement O&M Plan	2.6																			
	Operate new decant facility																				
	Obtain construction NPDES permit as applicable																				
	Inspect at least 50% of treatment and flow control facilities																				
	Inspect 25% of catch basins																				
S5.B.6.b.	Staff O&M training																				
S7: Compliance with TMDL Requirements																					
Appx 2	Revise Cochran Basin QAPP as needed	3																			
	Implement Cochran Basin QAPP																				
S8: Monitoring and Program Evaluation																					
S8.A	Sharp Avenue monitoring preparation	4.1																			
	Biochar study																				
	Finch Arboretum porous asphalt monitoring																				
	Mycroremediation project																				

S8.B.	Refine effectiveness study questions with eastern WA permittees	4.2												
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ACRONYMS

BMP:	Best Management Practice
CFR:	Code of Federal Regulation
CSO:	Combined Sewer Overflow
CWA:	Clean Water Act
ESC:	Erosion and Sedimentation Control
GIS:	Geographic Information System
LID:	Low Impact Development
MS4:	Municipal Separate Storm Sewer System
NPDES:	National Pollutant Discharge Elimination System
O&M:	Operation and Maintenance
RCW:	Revised Code of Washington
SRSM:	Spokane Regional Stormwater Manual
SMC:	Spokane Municipal Code
SMP:	Stormwater Management Plan
SWMP:	Stormwater Management Program
SWPPP:	Stormwater Pollution Prevention Plan
TMDL:	Total Maximum Daily Load
UIC:	Underground Injection Control
WAC:	Washington Administrative Code

DEFINITIONS

Best Management Practice: The utilization of methods, techniques and/or products that have been demonstrated to be the most effective and reliable in minimizing environmental impacts.

CWA: The federal Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended in Pub. L. 95-217, Pub. L. 95-576, pub. L. 96-483, and Pub. L. 97-117, 33 U.S.C 1251 *et seq.*

Development: Any proposed land use, zoning, or rezoning, comprehensive plan amendment, annexation, subdivision, short subdivision, planned unit development, planned area development, conditional use permit, special use permit, shoreline development permit, or any other property development action permitted or regulated by the Spokane Municipal Code (SMC).

Discharge (v): Disposal, injections, dumping, spilling, pumping, emitting, emptying, leaching or placing of any material so that material enters and exits from the MS4 or from any other publicly owned or operated drainage system that convey storm water. The term includes other verb forms where applicable.

Discharge (n): Runoff, excluding offsite flows, leaving the proposed development through overland flow, built conveyance systems or infiltration facilities.

Discharger: When used in the context of stormwater management and the SMC of 17D.060 and 17D.090, means any person who discharges to the City's MS4 or any other publicly owned or operated drainage system that conveys, manages or disposes of stormwater flows.

Drainage: (1) The process of removing surplus ground or surface water by artificial means, (2) the manner in which the waters of an area are removed, or (3) the area from which waters are drained; a drainage basin.

Erosion and Sedimentation Control: Any temporary or permanent measures taken to reduce erosion, control siltation and sedimentation, and ensure that sediment-laden water does not leave a site.

Groundwater: Water in a saturated zone or stratum beneath the surface of the land or below a surface water body.

Heavy Equipment Maintenance or Storage Yard: An uncovered area where heavy equipment (e.g. mowers, excavators, dump trucks, backhoes, or bulldozers) is washed or maintained, or where at least five pieces of heavy equipment are stored regularly or on a long term basis.

Illicit Connection(s): Any man-made conveyance connected to the municipal separate storm sewer system (MS4 system) in violation of the National Pollutant Discharge Elimination System (NPDES) permit requirements.

Illicit Discharge: The introduction or discharge of anything into the municipal separate storm sewer system (MS4 system) in violation of the National Pollutant Discharge Elimination System (NPDES) permit requirements.

Impervious Surface: A hard surface area that either prevents or retards the entry of water into the soil mantle. Common impervious surfaces include, but are not limited to, rooftops, walkways, patios, driveways, parking lots, storage areas, concrete, or surfaces that impede the natural infiltration of stormwater.

Industrial Activity: Manufacturing, processing or raw materials storage areas at an industrial plant. These activities may be required to have Department of Ecology's NPDES permit coverage in accordance with 40 CFR 122.26.

Low Impact Development: A stormwater management and land development strategy applied at the parcel and/or subdivision scale that emphasizes conservation and use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely mimic pre-development hydrologic conditions.

Material Storage Facilities: An uncovered area where bulk materials (liquid, solid, granular, etc.) are stored in piles, barrels, tanks, bins, crates, or other means.

Municipal Separate Storm Sewer System (MS4): A conveyance or system of conveyances, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains, (1) owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State Law) having jurisdiction over disposal of wastes, stormwater, or other wastes, including special districts under State Law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States, (2) designed or used for collecting or conveying stormwater, (3) which is not a combined sewer, and (4) which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES): The national program for issuing, modifying, revoking, and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Federal Clean Water Act, for the discharge of pollutants to surface waters of the state from point sources. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington State Department of Ecology (Ecology).

NPDES Eastern Washington Phase II Municipal Stormwater Permit (WAR04-6505): A permit issued to the City of Spokane from the Washington State Department of Ecology, granting authority to discharge stormwater into state surface waters. Permit also addresses water quality issues.

Outfall: A point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the State and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels, or other conveyances which connect segments of the same stream or other waters of the State and are used to convey waters of the State.

Permittee: Any Primary Permittee, Co-Permittee, or Secondary Permittee unless specifically stated otherwise for a particular section of permit WAR40-6505.

Pollutant: (1) Any substance prohibited or limited by federal, state or local regulations, released or discharged in conjunction with development. (2) Any substance, released or discharged, that causes or contributes to violation of water quality standards.

Runoff: Water that travels across the land surface, or laterally through the ground near the land surface, and discharges to water bodies either directly or through a collection and conveyance system, includes stormwater and water that travels across the land surface from other sources.

Spokane Regional Stormwater Manual: A technical document establishing standards for stormwater design and management to protect water quality, natural drainage systems, and down-gradient properties as urban development occurs.

Stormwater: Any runoff flow occurring during or after any form of natural precipitation, and resulting from such precipitation, including snowmelt. Stormwater further includes any locally accumulating ground or surface waters,

even if not directly associated with natural precipitation events, where such waters contribute or have potential to contribute to runoff onto the public right-of-way, public storm or sanitary sewers, or flooding or erosion on public or private property.

Stormwater Management Program (SWMP): A set of actions and activities designed to reduce the discharge of pollutants from the regulated small MS4 to the MEP, and to protect water quality; it comprises the components listed in S5 or S6 of permit WAR04-6505 and any additional actions necessary to meet the requirements of applicable TMDLs.

Total Maximum Daily Load (TMDL): A water cleanup plan. A TMDL is both a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and non-point sources. The calculation includes a margin of safety to ensure that the water body can be used for its state-designated purposes. The calculation also accounts for seasonable variation in water quality. Water quality standards are set by states, territories, and tribes. They identify the uses for each water body—such as drinking water supply, contact recreation (swimming), and aquatic life support (fishing)—and the scientific criteria to support that use. The Clean Water Act, Section 303, establishes the water quality standards and TMDL programs.

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