Donna Matrazzo
Wordstruck Editing

15500L NW Ferry Rd., Slip #14
Portland, OR 97231
(503) 621-3049
matrazzo@msn.com
www.donnamatrazzo.com

City of Portland
Environmental Services

City of Portland Environmental Services Stormwater System Plan Status Report

1. Introduction

1.1 Purpose

The purpose of this report is to provide the foundational background information for and an update on development of the Stormwater System Plan (SWSP). This report also provides a progress update on work conducted since the beginning of the Rapid Risk Assessment (R2A) in October 2015[1].

Preliminary components of the R2A are described in this report, providing the justification, validation, and direction for the overall approach in developing the SWSP. This report includes an overview of prevalent stormwater problems in Portland, the history leading to SWSP, results from the current R2A process, and recommendations for the continued evolution of the program. As the first SWSP status report, this document lays the foundation for future reporting as work progresses toward subsequent SWSP analyses.

1.2 Current Updates Included in Report

This report summarizes work done by the project team since the formation of the SWSP charter and work plan in 2014, with an emphasis on the following work elements:

- Chapter 1 *Introduction* describes the purpose of this report and includes an overview of the SWSP.
- Chapter 2 *Background* provides an overview of stormwater problems and how BES' approach to stormwater management led to the development of a SWSP.
- Chapter 3 *Methodology* provides an overview of asset management principles and explains how these principles have been adapted to BES' management of the stormwater system.
- Chapter 4 *Results* provides an overview of the data, preliminary results, products, and tools developed through the R2A.
- Chapter 5 *Programmatic Recommendations* outlines initial recommendations identified during the preliminary SWSP work. These include refinements of initial service category risk assessments and high-level recommendations that will guide SWSP implementation and maximize the value of SWSP analyses and implementation measures to the bureau.

[1] The schedule for this status report is aligned with the bureau's budget schedule.

- Chapter 6 *Future Work Elements* sets the course for the SWSP's next planning cycle, which will include R2A refinements, completion of a citywide risk assessment and evaluation by stakeholders. The chapter also outlines next steps, which will include incorporation of environmental justice risks into SWSP work and coordination with BES policy and regulatory programs.

1.3 Stormwater System Plan Overview

The SWSP is a collaborative effort that will align the bureau's planning approach for public stormwater assets with the asset management approach utilized for combined and sanitary sewer assets. For the first time, BES will be able to compare stormwater priorities across all parts of the city, integrate these priorities with other infrastructure needs, and focus investments where they are needed most.

1.3.1 Goal of the Stormwater System Plan

The goal of the SWSP is to develop a strategic, proactive, and transparent plan to cost-effectively manage the stormwater system at agreed-upon levels of service. The SWSP Program identifies the following strategies to guide its work towards achieving this goal:

- Improve the bureau's ability to meet its core mission of protecting human health, private and public property and stream health.
- Define stormwater customer service provisions in a manner that reflects strategic commitments and other bureau priorities.
- Inventory and evaluate existing stormwater assets, make informed decisions on how to improve existing assets and develop business rules for receiving new assets into the system.
- Provide a stable funding base for stormwater system improvements, and operation and maintenance requirements.
- Provide recommendations to the Stormwater Management Manual (SWMM) and the Sewer and Drainage Facilities Design Manual (SDFDM) that reflect system-specific conditions and needs.
- Integrate SWSP framework to support and inform regulatory requirements.
- Ensure that equity and environmental justice are considered at every scale of the SWSP analysis.
- Provide consistency and transparency in decision-making and prioritization.

- Inform ratepayers and City staff on the functions and importance of the stormwater system.

1.3.2 Stormwater System Plan Approach

The SWSP will enable BES to set priorities with a systematic and consistent analysis of risks of failure to meet stormwater service levels and inform work to meet levels of service. It will allow the assessment of relative risks and development of priorities on a citywide scale within a planning framework that provides accountability, efficiency, and transparency of investments in the city's stormwater infrastructure.

The SWSP Framework uses a series of living, dynamic analytical tools to conduct analyses with continual updates to input data and results, and frequent refinements to process methodology. The end result is an iterative and evolving process that delivers more informed project and policy recommendations addressing stormwater system risks at multiple scales:

- At the ***citywide scale***, the SWSP framework will provide a Citywide Risk Screen of the stormwater system that will identify high-priority areas at the basin scale. The Citywide Risk Screen is intended to be a low-resolution, high-level analysis and builds upon the lessons learned in the Stephens Creek Stormwater System Plan. The SWSP core team will lead the development of the Citywide Risk Screen.

- At the ***basin scale***, the SWSP framework will incorporate more basin-specific data and provide a more in-depth analysis of priority areas identified by the Citywide Risk Screen. The refined analysis will evaluate alternative risk reduction strategies. The SWSP core team will provide citywide context to inform basin-scale analysis. Appropriate bureau staff will be identified to lead, participate, and/or evaluate for basin-scale analysis depending on the risks and needs identified.

- At the ***site scale***, the SWSP framework will provide context for project and program actions. Alternative evaluations at the site scale will typically be led by a program or project manager. The SWSP core team will be available to provide a citywide perspective and additional support. With the framework in place, specific projects and/or actions can proceed into the appropriate funding process.

1.3.3 Expected Outcomes

With the planning tools and analysis yet to be completed, the anticipated outcomes and products of the SWSP can only be generally described. As this report outlines, the complete list of potential applications for the SWSP maps, tools and resources will grow as the analysis progresses. At this point in time, the SWSP is expected to have the following expected outcomes:

Interactive Maps and Tools

The key deliverable from this work will be an interactive set of tools and data layers in a GIS platform that will inform BES priorities. The SWSP maps will evolve as updated data sources and methodologies are added to the analysis. Initially, these resources will be made available for internal use to inform planning efforts and for staff to validate data layers used in the SWSP analyses and evaluate the outcomes. Once complete, data layers and tools will be made available to different working groups in the City.

Asset Inventory and Conditions Assessment

A significant challenge in applying asset management to the stormwater system is the lack of a complete asset inventory or conditions assessment (see chapter 3.2.2.). The SWSP core team will work with the Mapping, Data and Application Services (MDAS), Asset Systems Management (ASM), Maintenance, Watershed Services, and Pollution Prevention Services to determine asset data and staffing needed to collect the data.

Project and Policy Recommendations

The SWSP framework will ensure that project recommendations for the Capital Improvement Program (CIP) will reduce risk by addressing gaps in levels of service performance in areas identified as priorities for BES. In addition, the SWSP will provide recommendations for operating and non-operating investment in programs, policies and projects that will lead to reduced risk in the stormwater system.

2. Background

BES is a recognized leader in stormwater management and has invested heavily in pursuing innovative methods that promote managing stormwater at the source (onsite infiltration, retention, detention, and pollution reduction) and removing stormwater from the combined sewer system. Over the past two decades, BES stormwater policy and infrastructure development has successfully responded to an array of regulatory requirements including but not limited to

flood management, reducing combined sewer overflows (CSOs) protecting the water quality of surface water and groundwater, and limiting impacts on federally protected species. Ultimately these responses evolved into a strategic focus on watershed health and an expanding inventory of assets – stormwater management facilities as well as natural resource assets.

The SWSP Program was formed in part because BES identified an opportunity to further refine and improve the effectiveness of these efforts by implementing stormwater system planning using an asset management approach. The SWSP Program utilizes available stormwater infrastructure data and advanced programming techniques in order to assess stormwater issues in a citywide context, assessing overall stormwater system function before prioritizing where to invest.

2.1 Structure and Definitions

The SWSP consists of many components in varying stages of completion that will undergo multiple iterations. This section is intended to clarify components of this work and how they are described in this document.

2.1.1 SWSP Organizational Structure

- The ***SWSP Core Team*** coordinates and carries out the work plan, including the development and implementation of the SWSP with guidance from the Stormwater Integration Team and Service Category Experts
- The ***Stormwater Integration Team*** provides input and policy direction for the project. The SIT reviews and endorses the project work plan and provides a forum to discuss project issues as they arise with BES leadership.
- ***Service Category Experts*** assist in the development of risk assessment methods for each service category and serve as an advisory panel for issues specific to each category risk.

2.1.2 SWSP Components

- The ***SWSP*** refers to the plan and planning activities developing and implementing the plan. While iterations of the plan itself will be in hard copy and placed 'on the shelf', the iterative process will include interim deliverables.

- The ***SWSP framework*** is the evolving set of measurements and values that guide our overall thinking and provides justification for decision-making at each scale of analysis.
- The ***SWSP interactive tools and resources*** will connect the data and framework to satisfy specific bureau program or project needs.

2.2 Stormwater System Plan Context[2]

BES provides stormwater service through a complex set of infrastructure systems that are closely intertwined with the natural systems of Portland's watersheds and the historical development of the city. Both the constructed and the natural systems are part of the broader stormwater system.

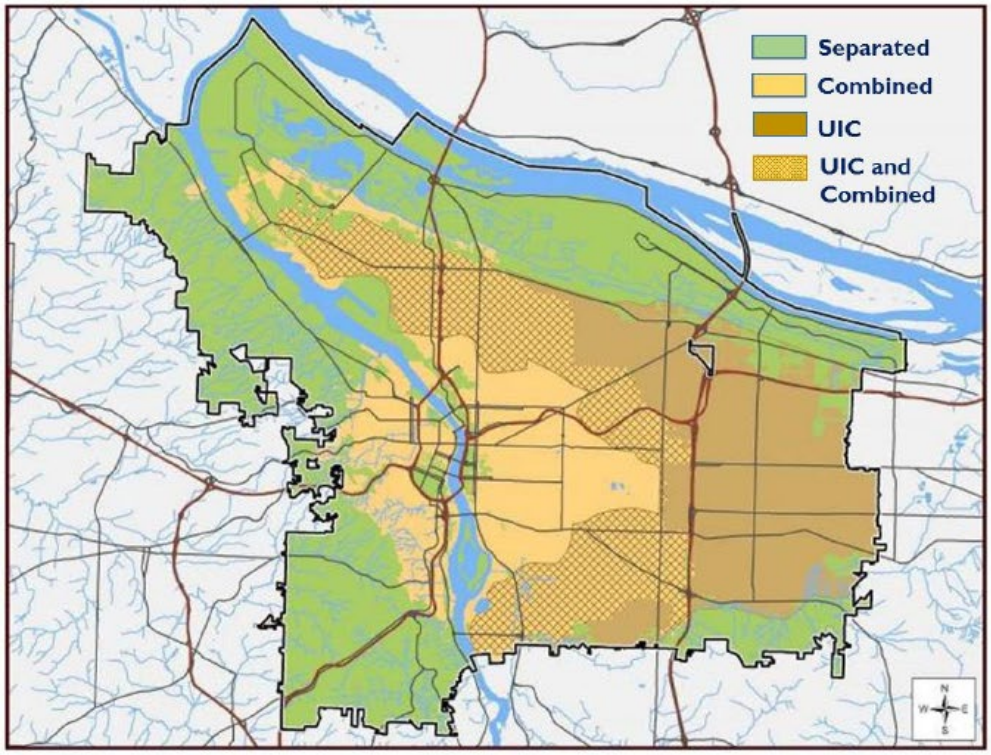
Assets in BES' stormwater infrastructure inventory include over 550 miles of pipes and ditches, 9,000 sumps and 2,000 flow control and pollution reduction facilities, including vegetated facilities, such as green streets and swales. Additionally, BES relies on thousands of private facilities within the stormwater network that are not owned or controlled by BES as formal assets. Portland's stormwater system depends on management and expansion of the city's tree canopy and natural areas that intercept rainfall, keeping it out of pipes and filtering it naturally. Although they are not owned by the bureau, acres of wetlands and thousands of miles of natural streams and drainageways are a critical part of the stormwater conveyance network.

In Portland, stormwater is managed in one of three systems:

- The ***combined sewer system***, consisting of pipes that carry wastewater and stormwater together. The combined pipes flow to a wastewater treatment plant.
- The ***separated sewer system***, where stormwater can be carried in stormwater-only pipes, but also in natural drainageways, swales, and ditches. Stormwater in the surface system is carried to surface waters such as streams, wetlands, lakes, and rivers.
- The ***underground injection control (UIC) system***, where the conveyance system directs stormwater into infiltration sumps that allow stormwater to be absorbed into the surrounding soils. The UIC system is regulated to protect groundwater quality.

[2] Background information in Chapter 2 was gathered from various BES sources including the 2016 *Citywide Systems Plan,* the 2014 *Portland Stormwater Management Manual,* the 2015 *Annual CSO and CMOM Report,* a 2005 BES white paper documenting *Federal Regulations Affecting the City of Portland*

Figure 2-1: Map of the Three Systems Subject to Stormwater Regulations in Portland.



2.2.1 Stormwater Problem Definition

As cities develop, pavement, roofing and other impervious surfaces prevent infiltration of stormwater into the ground and increase the amount of runoff during rainfall events. This disrupts the natural hydrologic cycle and increases pollution levels and temperature of stormwater washing into surface water and groundwater resources. Significant problems can result from urbanization and unmanaged or inappropriately managed stormwater:

- Stormwater collects pollutants and sediment from impervious surfaces and carries those materials to streams, rivers and groundwater.
- Increased in-stream erosion and decreased groundwater recharge occurs due to changes in the timing, routing and amount of runoff.
- Landslide risks can be exacerbated by a deficient or inadequate stormwater system.
- Negative impacts from stormwater runoff can worsen conditions for endangered species.