

CHAPTER 4 OPERATION AND MAINTENANCE PROGRAM

4.1 INTRODUCTION

Chapter 4 provides an overview of the City’s stormwater Operation and Maintenance Program (O&M), equipment activities, and costs. Drainage facility maintenance is one of the most essential components of an effective Stormwater Management Program (SWMP). Stormwater facilities require regular inspection, cleaning, and repair to ensure that they are functioning as intended in order to provide the required flow control, water quality treatment, detention, and conveyance. An effective O&M Program aims to protect public health and safety, maintain drainage system integrity and function, reduce infrastructure repair and life cycle costs, enhance water quality, and achieve future regulatory compliance.

Both roadway and non-roadway areas contribute excess stormwater runoff, sediment, and pollutants to the City’s stormwater drainage system; the system also receives excess runoff from adjacent State and County roads and County lands. Providing regular maintenance is one of the best, most cost-effective ways to realize the capacity that has been designed into

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the City’s drainage system. It is this optimization of the existing capacity that allows the City to both reduce flooding and property damage, as well as control and remove sediments and other contaminants from the system and from entering into local receiving waters.

Upon issuance of an NPDES Phase II Permit, the City will be required to develop a specific annual O&M Program, map and inventory the system and its outfalls, provide routine facility performance inspections, conduct and record O&M activities within specific timeframes and according to the predetermined methodologies/standards of a future Permit, and routinely conduct annual maintenance functions, including facility cleaning, repair, and replacement.

4.2 DESCRIPTION OF THE CITY’S ANNUAL SWM OPERATION AND MAINTENANCE PROGRAM

4.2.1 Annual Operation and Maintenance Program – Overview of Services

The City currently implements a number of stormwater maintenance practices on an annual basis. Generally, these annual services include the cleaning, repair, and replacement of the City’s various stormwater related facilities including ditches, pipes, catch basins, ponds, and regional detention facilities. The maintenance crews are also often called upon by citizens, businesses and property owners to respond to localized drainage problems that are threatening public and private roads, homes, businesses, and other structures.

Activities and aspects of the City's annual stormwater O&M Program include:

- The City runs an efficient and effective annual O&M that is tailored to the unique characteristics of the drainage system.
- The City maintenance crew prides itself in being responsive to the public and in protecting local businesses and infrastructure by often responding around the clock during major storm events.
- The City has adopted the 2005 Ecology Manual, but has not yet developed a written annual O&M Program or set of standards to support its annual operating budget, staffing and equipment needs.
- The City's major structures, such as tide gates and pump stations, are inspected at least twice annually; some of the most critical facilities are routinely inspected during heavy rains, such as the Larson Dam, and the Irvine Slough and its pump station, along with other known problem areas located throughout the City.
- All catch basins and stormwater conveyance pipes are cleaned and inspected at least once every two years by an outside contractor.
- The City has entered into an Interlocal Agreement (ILA) with Snohomish County for maintenance work that has historically included specialized road maintenance activities, as well as the maintenance of the City's detention ponds.
- Public Works staff are industrious, capable, and creative; they have been trained on operating the City's sweeper and vactor equipment; however, they have had no formal training on detention/retention pond maintenance, water quality BMPs operation or how to maintain/replace the various types of new low impact development (LID) facilities, which are now required in Ecology's most recent Permit.
- The Public Works Department uses the iWorQ¹ work order system for managing work flow and passing out work assignments to the various crew members on a weekly and daily basis.
- Interagency coordination with adjacent agencies is an important part of the City's annual maintenance program and includes shared activities and costs with the tribes, flood control and diking districts, the County and a number of regional watershed shellfish and water quality enhancement associations.

4.2.2 Core Operation and Maintenance Program Goals and Objectives

The goals of the City's stormwater O&M Program are to:

- Maintain the proper function of each of the City's stormwater facilities in order to realize the full design capacity of the existing facilities.
- Interact and have a positive exchange with the community by conducting effective and responsive maintenance and repair activities.

¹ iWorQ is a company that offers city and county government management applications as an Internet service, not as installed software. <http://www.iworq.com/>



- Effectively respond to public drainage complaints by performing small works projects or minor improvements using O&M crews, and identifying and recommending larger projects for capital design, funding, and construction.
- Reduce particulate and pollutant loading into the conveyance system and local receiving waters, such as Irvine Slough.
- Establish a plan that outlines how the City's O&M Program can begin to reverse itself from being mostly reactive to becoming more proactive in conducting its annual maintenance program and anticipating future maintenance, staffing, equipment, and facility repair/replacement needs.

4.2.3 Stormwater Facility Inventory and Mapping

An accurate stormwater inventory, developed in a GIS geodatabase, is a key development and implementation tool for an effective O&M Program. Once created, an O&M Program geodatabase needs to be updated and expanded in order to ensure it is always complete, up to date, and accurate. This is the type of stormwater investment that will always pay off. It is also an invaluable staffing and budget management tool, as the inventory and mapping network can be routinely used to plan the sequencing of O&M activities, create daily work orders for the crews, and support annual staffing, equipment, and budget requests. The uses of an up-to-date stormwater facility inventory and mapping system are numerous and may include the following:

- Asset management
- Recordkeeping
- Support to the annual budget processes
- Quick response to citizen and City Council requests
- When under a Permit, an up-to-date map of stormwater facilities supports compliance by providing the information needed for the development of an annual report to Ecology

Note that descriptions of various aspects of the City's stormwater and drainage system are presented in Chapter 2 – Planning Area Stormwater Characteristics, Chapter 5 – Stormwater System Hydrologic and Hydraulic Modeling, and Chapter 6 – Development of the Capital Improvement Program.

4.2.4 City's Major Stormwater Operation and Maintenance Services

The City's annual O&M Program is executed by routinely conducting the following activities and services, as listed and discussed below:

- Complaint response
- Annual maintenance
- Facility repair/replacement
- Waste disposal

4.2.4.1 O&M Service #1 – Complaint Response

The City's current O&M Program is responsible for receiving and responding to public complaints. Drainage concerns are documented and responded to as quickly as possible, with public requests being immediately passed on to the maintenance supervisor for response. The City's maintenance crew also currently responds to illicit discharges and spills, as reported to the City or observed by City Staff. Responses to water quality concerns and spill reports have recently become part of the City's emerging Illicit Discharge Detection and Elimination Program, and will be required under the City's future Permit.

4.2.4.2 O&M Service #2 – Routine Annual Maintenance Activities

The City's annual stormwater O&M Program includes a variety of activities including: ditch, pipe, and catch basin cleaning; vegetation trimming and removal; ditch reshaping and sediment removal; inspections to insure proper performance; observation of construction and redevelopment activities; response to spills; retention pond maintenance; interlocal agreements with the County, Stillaguamish Tribe, and Diking/Drainage District for pond and SWM facility maintenance and coordination for flood reduction; removal and replacement of broken or worn out parts; and equipment repair and maintenance. In general, the City's annual SWM O&M Program includes whatever is needed to protect public safety and properties and keep the drainage system functioning properly.

4.2.4.3 O&M Service #3 – Facility Repair and Replacement

During the routine investigation and maintenance of the City's drainage facilities, City crews will often run across parts of the system that are broken or not working properly and need to be fixed in the field or even replaced. Most of these types of facility repairs and replacements can be easily addressed by the crews themselves. The larger problems are usually referred to the Public Works Director and placed on the City's stormwater CIP list for formal design and construction, as funding becomes available. Having a crew that is both knowledgeable and capable of these types of repairs is invaluable to the City and can annually save the City considerable financial resources.

4.2.4.4 O&M Service #4 – Waste Handling and Disposal

An important part of having an effective maintenance program is also knowing how and where to safely dispose of collected waste materials and by-products. During maintenance there are a lot of urban sediments and some liquids that need to be disposed of properly. Most of these solid wastes are from catch basin, ditch, pipe, and pond cleaning, and vegetation removal. Although expensive, most solids are routinely picked up and disposed of by a waste management firm, with most wastes ultimately being safely disposed of in a certified landfill.



4.3 RESULTS OF REGULATORY COMPLIANCE GAP ANALYSIS FOR OPERATION AND MAINTENANCE PROGRAM

If the City were under a Permit, the annual O&M Program would be guided by a series of Permit-mandated activities, specified methodologies with defined due dates, and other O&M program requirements including a detailed annual report documenting completed O&M activities and their completion dates. This section summarizes the O&M requirements of a new Permit. It also summarizes the results of a regulatory gap analysis that was performed on the City's current annual Operation and Maintenance Program.

4.3.1 Future Permit Operation and Maintenance Program Requirements

Issuance of a Permit will require the City to implement additional municipal O&M Program activities including:

- Adoption of maintenance standards consistent with the 2012 Ecology Manual.
- Development and implementation of specified stormwater O&M standards, as defined in the Ecology Stormwater Manual for Western Washington and the Permit.
- Conducting annual inspections of City owned stormwater treatment and flow control facilities, and performing needed maintenance.
- Spot checking stormwater treatment and flow control facilities after major stormwater events (>10-year recurrence interval); conducting repairs.
- Inspecting all catch basins and inlets at least once every two years and conducting needed maintenance.
- Implementing maintenance practices, policies, and procedures to reduce stormwater impacts from the various types of land uses throughout the City.
- Regularly conducting training activities for all O&M staff and applicable City staff, whose primary job functions include drainage O&M and construction-related activities.
- Developing and implementing a Stormwater Pollution Prevention Plan (SWPPP) document for the Public Works/Maintenance Yard.
- Continuing to keep O&M records of all activities using iWorQ municipal management software.
- Reporting annual O&M to the Department of Ecology.

4.3.2 Compliance with a Future Permit for Operation and Maintenance Program: Results of Gap Analysis

Compliance with a future Permit requires performance of the following specific seven O&M activities, as shown in Table 4-1. The seven O&M activities include:

- Annual inspections
- Spot checks after storms
- Catch basin inspections and maintenance

- Road and non-road maintenance
- Training
- SWPPP for maintenance yard
- Recordkeeping

The results of the regulatory gap analysis performed on the City’s annual O&M Program are summarized in Table 4-1 and show that, to be in compliance with a future Permit, the City will need to consider the following adjustments to their program.

- **O&M Staffing:** Increase staffing from 1.57 FTE to 3.05 FTE, an increase of 1.48 FTE (\$168,927) annually (or retain the support of outside services).
- **O&M Supplies/Expenses:** Increase expenses for supplies and services from \$42,500 to \$95,500, an annual increase of \$53,000.
- **O&M Program:** Increase total annual O&M costs from \$179,385 to \$401,312, an increase of \$221,927 annually.

See Table 4-1 for a detailed comparison of recommended levels of staffing and costs for each of the major O&M program elements required upon issuance of a future Permit.

Table 4-1: Results of Regulatory Compliance Gap Analysis for City’s O&M Program								
Adoption Maintenance Standards (SWMP Element 5.1)	Existing Staff (FTE)	Existing Staff Costs (\$)	Existing Expenses (\$)	Total Existing Program Costs (\$)	Future Staff (FTE)	Future Staff Costs (\$)	Future Expenses (\$)	Total Future Program Costs (\$)
Annual Inspections of Water Quality and Flow Control Facilities (SWMP Element 5.2)	See bottom line total				0.10	\$10,027	\$0	\$10,027
Spot Checks after Storm Events (SWMP Element 5.3)	See bottom line total				0.75	\$75,200	\$25,000	\$100,200
Catch Basin Inspections (SWMP Element 5.4)	See bottom line total				0.40	\$40,106	\$15,000	\$55,106
Road Maintenance/Non-Roadway Maintenance (SWMP Element 5.5)	See bottom line total				0.75	\$75,200	\$15,000	\$90,200
Staff Training (SWMP Element 5.6)	See bottom line total				0.75	\$75,200	\$30,000	\$105,200
SWPPP for Maintenance Yard (SWMP Element 5.8)	See bottom line total				0.10	\$10,027	\$5,000	\$15,027
Record Keeping (SWMP Element 5.9)	See bottom line total				0.05	\$5,013	\$500	\$5,513
Total	1.57	\$136,885	\$42,500	\$179,385	3.05	\$305,812	\$95,500	\$401,312
Total Gap					1.48	\$168,927	\$53,000	\$221,927



4.3.3 Summary of Results of the Gap Analysis for Operation and Maintenance Program

Additional staffing (or outside services) and expenses will be needed in order for the City’s annual O&M Program to come into compliance with a future Permit. Existing and future annual resources needed to implement new O&M Permit activities are listed below and are compared and contrasted with the City’s existing staffing levels and costs of various services and equipment:

Existing O&M	Future O&M	Total Difference (Increase)
Staff (FTE) = 1.57	Staff (FTE) = 3.05	Staff Gap (FTE) = 1.48
Staff Costs (\$) = \$136,885	Staff Costs (\$) = \$305,812	Staff Gap Expense Costs (\$) = \$168,927
<u>Expense Costs (\$)=\$42,500</u>	<u>Expense Costs (\$) = \$95,500</u>	<u>Gap in Expense Cost (\$) = \$53,000</u>
Total Costs (\$) = \$179,385	Total Costs (\$) = \$401,312	Total Cost (\$) Gap = \$221,927

4.4 RECENT ENHANCEMENTS TO THE CITY’S ANNUAL OPERATION AND MAINTENANCE PROGRAM

The City has started developing portions of an updated municipal O&M Program including the following activities:

- The City has adopted the 2005 Ecology Manual.
- City structures, such as tide gates, are inspected at least twice annually; some other areas and structures are also inspected during/after every heavy rain and flow event.
- All catch basins and stormwater conveyance pipes are cleaned and inspected at least once every two years by an outside contractor.
- The City has an Interlocal Agreement (ILA) with Snohomish County for maintenance work that includes pond maintenance and ditch cleaning.
- Public Works staff has been trained on the operation of the City’s sweeper and vector equipment.
- The Public Works Department uses iWorQ’s work order system for tracking and managing its work assignments to the O&M crew.

4.5 FUTURE OF THE CITY’S OPERATION AND MAINTENANCE PROGRAM

As the City’s stormwater system grows in size and complexity, the City will want to expeditiously expand its O&M Program in order to ensure that adequate staffing, supplies, outside support services, and funding are provided on an annual basis.

Recommendations/Suggestions:

- ***Maintain Responsiveness to the Public:*** Compliance with a new future Permit is important, but the real driver for a good annual O&M Program, is that it gives the City the ability to be responsive to public complaints and to reduce the number and magnitude of flooding problems, thus reducing property damage and enhancing public safety, and creating a positive public perception.
- ***Routinely Review and Re-Focus Annual O&M Program to Optimize Resources:*** Because O&M resources are always limited, the City's O&M crews will want to develop an annual maintenance work program and then routinely review and update it in order to set priorities, and optimize the use of its resources.
- ***Complete and Update Facility Inventory/Mapping For Use As A Management Tool:*** A critical tool in directing and optimizing resources, as well as refining and redefining objectives, is complete, up to date, and detailed inventory and mapping of existing facilities. Using the facilities inventory as a key management tool, work orders can be specifically written and tied to the completion of work in the field.

Many agencies are now putting their SWM facilities into a GIS geodatabase and then giving crew members an iPad (mobile device) so they can collect and record field data directly into the geodatabase. This device allows the crew to record the completion of work as it is performed on individual facilities in the field. With the collection of this type of information and use of this type of technology, the City will be creating a unique database so its crews can select only those facilities that need maintenance, based on previous recorded inspection results. This allows the O&M program to be much more specific so it focuses only on those facilities that need O&M, thus saving limited resources and getting the most out of the resources that the City has annually allocated for maintenance.