EXECUTIVE SUMMARY

Introduction

The purpose of this Storm Drainage Master Plan (SDMP) is to provide the City of Sheridan with a comprehensive planning document that provides basic information and guidance necessary for the sound stewardship of the municipal storm drainage system. This plan is important because it:

- Compiles basic information relevant to the storm drainage system.
- Describes the basic functional parameters of the system.
- Highlights known system deficiencies.
- Describes and graphically illustrates recommended improvements.
- Presents basic cost information for general budgeting and the development of an adoptable 20-year capital improvements program (CIP).
- Provides a physical tool for informing individual citizens and other interested parties of the existing system and proposed improvements.
- Serves as an invaluable resource for gaining public support for needed improvements.
- Facilitates logical planning decisions relative to other City programs.

How This Plan Should Be Used

This SDMP should be used in the following manner:

- This master plan should be viewed as a dynamic working document.
- The plan should be reviewed annually for the purpose of prioritizing and budgeting for needed improvements.
- Plan mapping should be updated periodically to reflect current development and constructed system upgrades.
- Specific recommendations set forth in this plan should be considered as conceptual only. Additional details and potential alternatives should be investigated and analyzed in the preliminary engineering phase of final project designs.
- Cost estimates should be considered as planning level only, and should be updated and refined with preliminary engineering and final project designs.
- This plan should be used as the guiding document for future storm drainage system improvements.

Authorization

The City of Sheridan authorized Murray, Smith & Associates, Inc. (MSA) to prepare this Storm Drainage Master Plan. This report documents the storm drainage master planning work that was conducted under this professional services agreement.

Compliance

This plan supports the City's requirements under the Oregon Administrative Rules (OAR 660-011) Public Facilities Planning rules.

Study Area and Study Period

The study area consists of the planning area and the contributing area to the storm drainage system. The planning area for this plan is comprised of approximately 1,591 acres of land within the UGB. This includes an area of approximately 1,270 acres of residential, commercial, industrial and institutional land within the existing City limits boundary and 321 additional acres of land within the UGB designated for expansion outside of the existing City limits. The study period for this plan is 20 years, through the year 2028.

The flood plain and uplands area to the north of the South Yamhill River consists of 10 minor basins and incorporates a total of approximately 2,436 acres. The uplands area drains south through the stormwater collection systems within the City and discharges into the South Yamhill River.

The area south of the South Yamhill River is divided into 8 minor basins, totaling 979 acres, with drainage dominated by a single 832-acre subbasin. This large subbasin drains north to the South Yamhill River and extends from the flood plains adjacent to the river to higher elevations south of Highway 18.

Regulatory Considerations

In the early 1990's, the U.S. Environmental Protection Agency (EPA) promulgated regulations establishing Phase I of the National Pollutant Discharge Elimination System (NPDES). This program requires operators of municipal separate storm sewer systems (MS4s) in municipalities greater than 100,000 to obtain an NPDES permit to discharge stormwater to public waters. In 2003, Phase II rules required evaluation for any potential MS4s located outside of an urbanized area serving a jurisdiction with a population of at least 10,000 and a population density of at least 1,000 people per square mile.

The City's population puts it under the threshold for required evaluation as a small MS4 by the DEQ. At this time, it does not seem likely that the DEQ will choose to regulate the City storm drainage system as a MS4 for the following reasons:

- The South Yamhill River is not currently considered a sensitive water by DEQ.
- The City is not currently experiencing high growth, and this is anticipated to remain the case for the near future .
- .The City is not part of a defined urbanized area nor will it be in the foreseeable future.

Water bodies with an established TMDL are considered sensitive waters by the DEQ. The South Yamhill River does not currently have an established TMDL for any constituent. However, as discussed above, DEQ has identified the South Yamhill River as a Priority II water body with TMDL development scheduled to be completed by 2010.

It is not known if DEQ will designate the City as a "significant contributor" of pollutants to the South Yamhill River. This information will be determined in the DEQ water quality study of the South Yamhill River. However, similar sized Oregon communities have not been singled out as significant contributors, and it is unlikely that Sheridan will be designated as such for the remainder of the planning period.

Existing Conveyance System Overview

The City's stormwater system collects and conveys flow from developed and undeveloped properties inside the City as well as runoff from agricultural and forest lands inside and outside of the City. The system consists of a wide range of facilities, including natural channels, underground storm drainage piping, roadside ditches, culverts and constructed open channels.

In general, the City's drainage facilities were designed without guidance from an overall storm drainage master plan. Some creek drainage paths were altered to divert flow around historical parcels of agricultural land. This has resulted in improvements that were designed to address localized flooding issues without full consideration of the potential impacts on the upstream and downstream parts of the system.

Approximately eight miles of existing storm drainage pipes and channels were inventoried within the study area. The primary outfalls for these stormwater piping systems are located on the South Yamhill River. At least sixteen local storm system outfalls discharge to the South Yamhill River. An inventory of the existing stormwater facilities and their associated characteristics is shown in Table B-1 in Appendix B. It should be noted that several different sources of information were used to obtain the existing stormwater facility's characteristics.

There are seventeen major definable drainage basins within the City. Ten lie to the north of the South Yamhill River, and seven lie to the south. The basins studied are listed in order from west to east as follows:

North Sheridan Drainage Basins:

- Rock Creek Basin
- Industrial Basin
- Orchard Avenue Basin
- Richard Street Basin
- Western Street Basin
- Viola Street Basin
- Olive Street Basin
- Evans Street Basin
- Elm Street Basin
- Cherry Hill Basin

South Sheridan Drainage Basins:

- Monroe Street Basin
- Mason Street Basin
- Water Street Basin
- Morgan Street Basin
- South Bridge Street Basin
- Hope Court Basin
- South Basin

Analysis Methodology

The stormwater analysis consists of hydrologic and hydraulic components. The hydrologic component estimates the volume and peak flow rate of stormwater runoff entering the stormwater conveyance system in response to the rainfall associated with a particular design storm. The total volume and peak flow rate of stormwater runoff depends on the duration and intensity of the storm, the topography, soil type and amount of impervious area of the basin. The hydraulic component routes the stormwater that results from the hydrologic component through the conveyance system. The hydraulic component evaluates the conveyance system's capacity to route the design storm and is used to identify areas that may be prone to flooding. The hydraulic analysis depends on geometry (size, shape and slope) and other characteristic data of the pipe and channel system to estimate capacity.

The computer modeling program PCSWMM by Computational Hydraulics, Int., (Version 2005) is used for both the hydrologic and hydraulic analysis. PCSWMM is a well-known stormwater analysis model in common use for over 25 years and uses the Environmental Protection Agency's (EPA's) Stormwater Management Model (SWMM) core processes.

Stormwater System Analysis

The stormwater system analysis was used to complete the following specific tasks:

- Identify data gaps in the City stormwater facility records
- Assist in identifying causes of observed historical flooding
- Identify potential flooding areas that have not been identified in the historical record
- Assist in developing projects to improve City stormwater facilities

In general, the percent increase in peak flows increased with the amount of new development and redevelopment within each basin. Table ES-1 shows the estimated peak basin runoff, by drainage basin, for the existing and build-out conditions.

Table ES-1
Peak Flows for Existing and Build-out Conditions, by Drainage Basin

NORTH BASINS	Peak Basin Runoff (cfs)		
Basin	**Existing**	**Future**	**Increase (%)**
Cherry Hill	72.5	80.2	10.7%
Elm Street	103.1	119.5	15.9%
Evans Street	40.3	42.4	5.2%
Olive Street	66.7	81.6	22.3%
Viola Street	34.6	40.8	17.8%
Western Street	44.5	49.5	11.4%
Richard Street	59.1	64.7	9.6%
Orchard Avenue	57.6	65.7	14.0%
Industrial	40.8	60.5	48.4%
Rock Creek	25.8	25.8	0.0%
SOUTH BASINS	**Peak Basin Runoff (cfs)**		
Basin	**Existing**	**Future**	**Increase (%)**
Monroe Street	10.2	11.4	11.7%
Mason Street	8.3	8.3	0.0%
Water Street	2.1	2.2	3.9%
Morgan Street	3.0	3.2	4.0%
South Bridge Street	29.3	29.3	0.0%
Hope Court	10.2	11.9	17.2%
South	93.1	100.4	7.9%

Improvement Options

There are generally two types of improvement options considered for stormwater improvements: structural and non-structural. An example of a structural improvement is the construction of a diversion pipe around a flow restriction. A non-structural improvement could include increased cleaning of catch basins to reduce the potential for sediments filling up natural conveyance channels downstream. The City typically relies on a combination of both structural and non-structural improvements to provide cost-effective stormwater management.

Preferred alternatives were selected for each improvement required for the City's 20-year Capital Improvement Program (CIP), and focused on structural improvements. The improvement options are as follows:

- ***Increase Pipe Capacity.*** Increasing pipe capacity is the traditional approach to increasing overall stormwater system conveyance.

- ***Increase Capacity of Natural Channel.*** Where capacity in these natural channels may be limited, increasing capacity can be approached in two ways. Larger flows can be accommodated by increasing the cross-sectional area of the channel or by reducing the frictional resistance of the channel. Increasing cross-sectional area typically requires increasing the width, because channel depth is often limited by the available elevation drop in the system. Frictional resistance can be improved through routine maintenance, such as clearing vegetation, or by cleaning or resurfacing the channel.

- ***Construct Detention Facilities.*** Detention facilities temporarily store peak stormwater runoff from a developed area and then discharge the water to the receiving system at a lower controlled rate. This is traditionally performed where an analysis demonstrates the downstream conveyance system may be overburdened by increased flow.

- ***Provide Reduction in Peak Flow Rates through Low-Impact Development Approaches (LIDA).*** LIDA are methods for stormwater management which are intended to reduce the impact of stormwater runoff from a development's impervious surfaces to the natural environment. This is accomplished through the reduction of peak runoff rates from impervious surfaces such as building roofs or pavement, and through infiltration, which reduces the overall volume of runoff. Examples of LIDA include vegetated infiltration swales, pervious asphalt and Portland cement concrete pavements, eco-roofs, vegetated filter strips and "green streets".

Recommended Improvements

Presented below are recommended storm drainage system improvements to include preliminary project descriptions, costs and prioritizations. The recommended facility sizes and locations designated in this master plan are preliminary only. During final design of facilities, it will be necessary to confirm design flows, pipe sizes, required inverts and routing schemes based upon the current land use plan, proposed development, soil surveys, soil investigations, physical constraints and other relevant field conditions.

The projects have been grouped into four priority levels with associated implementation time frames. Short range projects are those anticipated in the next five years. Mid-range projects are those anticipated for a period from five to ten years hence. Long range projects are those anticipated from 10 years hence to full build-out conditions. Where an improvement project is dependent on the timing of development in the affected areas, the time frame is described as developer-driven. The recommended improvements with priority levels are summarized in Table ES-2.

Additional Recommendations

Additional recommendations are as follows:

- ***Additional Studies Recommended.*** Several deficiencies were identified during the hydraulic modeling portion of the study that showed some potential that a capacity deficiency may exist, but the effect was determined to be minor surcharging only, and therefore did not warrant improvements at this time. Further detailed study is recommended before undertaking improvements or allowing further development upstream of these deficiency areas.

- ***Local Improvement Fund.*** It is anticipated that relatively small, local drainage problems will need to be addressed by City crews on an annual basis. Based on City staff input, an annual budget of approximately $40,000 is suggested to address such problems.

- ***Storm Drainage Master Plan Update.*** This storm drainage master plan should be updated approximately every 7 to 10 years after adoption in accordance with the periodic review provisions of OAR Chapter 660, Section 25. A cost of $60,000 to update the Storm Drainage Master Plan is recommended to be included in the CIP.

- ***As-built Survey Program and Record Keeping.*** Data gaps in the City's stormwater system records were identified during the development of this master plan. This information is helpful to accurately define the existing system and develop future storm drainage improvements. An annual cost of $5,000 over five years (assuming 5 percent yearly annual inflation) is recommended for inclusion in a storm drainage CIP to develop a systematic as-built survey program that can be used to enhance the existing stormwater system maps. In addition to an as-built surveying program, the City should require developers to submit as-built drawings after new projects are completed. Data from these drawings should be added to the City's stormwater system maps.

Table ES-2
Summary of Recommended Storm Drainage Improvement Projects

Project	Project Description	Improvement	Project Cost
Developer Driven			
CH-1	Regional detention system	Detention ponds	$100,000
I-1	Construct new storm drain system	3,000 LF of 36-inch pipe	$1,870,000
Short-Term			
EL-1	Construct bypass storm drain system	2,600 LF of 36-inch pipe	$1,620,000
R-1	Construct storm drain system	2,100 LF of 36-inch pipe	$1,300,000
V-1	Construct parallel storm drain system	900 LF of 36-inch pipe	$560,000
OL-1	Construct bypass storm drain system	750 LF of 36-inch pipe	$410,000
S-1	Construct sedimentation pond	500-cubic yard pond	$80,000
Medium-Term			
O-1	Construct storm drain system	1,500 LF of 30-inch pipe	$740,000
R-2	Construct storm drain system	600 LF of 24-inch pipe	$240,000
Estimated Cost of Storm Drainage Improvement Projects			**$6,920,000**

Note: Project cost estimates include an aggregate 45-percent allowance over the estimated construction cost to provide for contingencies, engineering, legal, permitting and administrative costs.

Funding Source Review

The funding sources that are generally available include:

- Outside Funding Assistance
    - *Rural Utilities Service (RUS) Water and Waste Disposal Program*
    - *Oregon Special Public Works Fund.*
    - *Oregon State Water/Wastewater Fund*
    - *Economic Development Administration Public Works Grant Program*
- Local Funding Through System Development Charges
- Local Funding Sources
- Fee-in-lieu-of Charges for On-Site Detention
- Storm Drainage System Fees

Potential Financial Impacts of Improvement Program

The total costs for the recommended capital improvements through the end of the 20-year study period are estimated at approximately $6,920,000. An annual increase of roughly 5% should be applied to this estimate for future budgeting purposes. As discussed in this section, a number of funding options available to help finance the recommended improvements. The various funding options include potential impacts to storm drainage system fees, SDC rates, and/or tax rates, depending on which options are implemented.

It is recommended that the City complete a comprehensive financial evaluation and update system development charges and storm drainage system fees as appropriate to implement storm drainage system improvement recommendations presented herein.