

2015

Highland City Storm Drain Maintenance Plan



Highland City
Public Works Department
Accepted 11/17/2015

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Maintenance Plan

I. Introduction

The purpose of the Storm Drain Maintenance Plan (Plan) is to prolong the life of the system infrastructure and efficiently convey, detain or infiltrate storm water. The storm drain system mitigates flooding within the City. Due to the Environmental Protection Agency's (EPA) mandated National Pollution Discharge Elimination System (NPDES) regulations are also in place to improve the water quality discharged to the environment.

The majority of the City's Storm Drain system, South of Dry Creek, utilizes sumps to dissipate storm water directly into the soil. Sumps have been classified by the State of Utah as a Class V injection well and must have regular maintenance. The City currently has 522 sumps within the system.

This plan identifies annual maintenance required for sumps, catch basins, and detention facilities. Estimated costs for planning purposes are also provided.

It is anticipated that an annual summary will be prepared by Staff to outline the year's accomplishments, expenditures and any updates or adjustments to costs.

II. Background and Maintenance Plan

Highland City established in their 2011 Storm Water Management Plan (SWMP) a maintenance outline for the storm drain system. The outline was prepared with the objective to 'Maintain and operate the storm water drain system in a manner that reduces the discharge of pollutants'. Appropriate maintenance also ensures that the system can adequately convey or detain storm water to reduce flooding in streets and private property. The City's maintenance program ensures that the environment, property and safety of the public are protected at a reasonable cost for the Citizens of Highland. To this end, the following areas are further described and included in the Plan:

- System Inspection
- System Cleaning including Detention Basins, Catch Basins, Drainage Channels and Sump Systems
- Street Sweeping Activities

III. Maintenance Plan Description

To adequately plan resources for the maintenance of the storm drain system the following are annual requirements.

a. System Inspection

The SWMP directs that the sumps and other storm drain outfalls be inspected annually. The inspection is accomplished by the Storm Water Manager. Inspection of the detention basins are also accomplished annually. Periodic inspections of catch basins are proposed to be on a rotating four year basis. Inspection reports are utilized and the schedule of inspections will be kept through the City's GIS.

b. System Cleaning

i. Detention Basins

Detention Basins delay the release of storm drainage peak flows. Often during large storm events sediment is deposited in the bottom of the basins. The City has identified that the basins require major cleaning of the sediment on a 10-year cycle. Cleaning assists with maintaining the intended storage capacity of the basin.

Yearly maintenance of the ponds is also necessary and includes removal of trash and any nuisance plants that have begun to grow.

ii. Catch Basins

Catch Basins collect storm water from the road surface. Piping connects into the catch basin and conveys storm water to a sump, detention basin or outfall directly into a channel. The catch basin includes a grate and a small concrete box. During the past 15-years it has been common to place the outlet piping above the floor of the catch basin to provide catchment of gravels and sands.

Cleaning of catch basins includes removal of material at the grates (trash, plastic, leaves, etc.) and removal of the gravel, sand or debris at the bottom of the concrete box. Cleaning of the grate improves the capacity of the catch basin to accept roadway storm water. Removal of the debris in the box keeps the debris from making its way to detention basins or waterways.

iii. Drainage Channels

Drainage Channels are open waterways that convey storm water. Typically in Highland these channels are natural drainage paths north of Dry Creek that have historically collected rainwater and snowmelt and directed the runoff to Dry Creek. As the Northwest area of the City is developed these natural drainages have been utilized to convey storm

water. Maintenance of the channels will be required to remove debris and noxious plants that decrease the capacity of the channels. It is anticipated that cleaning of a channel will happen yearly with a rotating schedule.

iv. Sump Systems

A Sump System includes a deep manhole (12-feet) that does not have a bottom, has holes in the sides and is enveloped in gravel. The system also includes at least one catch basin and piping to collect runoff and convey the water to the sump.

During the past few years, to assist with groundwater quality, devices are installed over the pipe outlet in the catch basin to prevent floatables, trash, oil & grease, leaves and sediment from entering the sump manhole. These catch basins require periodic cleaning of the debris that has settled to the bottom. The easiest method to clean these catch basins is with a Vac Truck. Cleaning will keep debris out of the actual sump and will maintain the capacity of the sump to disperse water into the surrounding soil by not clogging the surrounding gravel or holes in the concrete.

The sump systems without the water quality devices require cleaning to keep the sump from overflowing during large runoff events. As debris settles and builds up in the bottom of the sump the capacity is decreased. In cases where the sumps have become unusable through clogging the entire gravel surrounding the sump would need to be removed, cleaned and replaced. Scheduled cleaning will lengthen the time that a full gravel replacement is necessary.

v. Street Sweeping Activities

Street sweeping was identified in the SWMP as a method to collect pollutants (sediment, trash, lawn clippings, etc.) before they can enter the storm drain system. The City has established that each street will be swept at least twice a year. Street sweeping is managed through the Storm Water Manager. Costs include the cost for maintenance and operation of the City's street sweeper.

IV. 10-Yr Annual Maintenance Cost Estimates

Table 1 was prepared to provide the City with typical annual maintenance costs for budgeting purposes. Costs were provided through past budgets, past projects within the City and supplier estimates. The costs are in 2015 dollars and include a 3% inflation rate, but do not provide for major system repairs.

As the City does not currently own a Vac Truck costs for the sump and catch basin cleaning was assumed to be bid out. It was assumed 20 sumps and 300 catch basins will be cleaned yearly. This schedule provides catch basins cleaned every four years.

V. *Capital Operation Expenditures Descriptions*

Table 2 was prepared to provide the City with typical capital operation expenditure costs for budgeting purposes. Costs were provided by suppliers and from past projects within the City. The costs are in 2015 dollars.

The following are descriptions of the necessary capital operation expenditures for the storm drain system. These items are necessary for replacement of plugged sumps or other roadway drain improvements, replacement of the 10+ year old sweeper, and purchase of a Vac Truck for cleaning.

a. *Sump Replacement and Roadway Drainage Improvements*

For the past number of years City Staff have identified minor drainage improvements to alleviate street flooding. Improvements have included placement of additional catch basins or sumps in areas historically prone to standing water after storm events. This items also includes the replacement of sumps should they become ineffective due to clogging of the surrounding gravel. The yearly cost anticipates two minor projects a year. This number could increase as the sump system ages.

b. *New Mechanical Sweeper*

The current sweeper is over 10-years old. It has been reported by staff that the sweeper is often not available due to being broken. There is currently one mechanic in the State who provides repairs for this type of sweeper. Mechanical problems and costly repairs happen numerous times a year. The purchase of a new sweeper should be anticipated in the near future.

c. *Vac Truck*

Cleaning the catch basins with sumps and those with water quality devices is best achieved through a vac truck. The vacuum on the truck can extract the water, contaminants, sediment, trash and debris. A vac truck can also be utilized in cleaning the sumps of debris. It would not be anticipated that a truck would be utilized full time in the cleaning of the storm drain system. It is likely that a shared truck would be sufficient.

TABLE 1**ANNUAL MAINTENANCE COST ESTIMATE**

REPAIR TYPE	2015 COST	2016 COST	2017 COST	2018 COST	2019 COST	2020 COST	2021 COST	2022 COST	2023 COST	2024 COST	2025 COST
Sump Vacuuming & Cleaning Catch Basins	\$ 42,000	\$ 43,260	\$ 44,558	\$ 45,895	\$ 47,271	\$ 48,690	\$ 50,150	\$ 51,655	\$ 53,204	\$ 54,800	\$ 56,444
Detention Pond Cleaning	\$ 5,000	\$ 15,000	\$ 2,500	\$ 2,575	\$ 2,652	\$ 2,732	\$ 2,814	\$ 2,898	\$ 2,985	\$ 3,075	\$ 3,167
Drainage Channels	\$ 3,000	\$ 3,090	\$ 3,183	\$ 3,278	\$ 3,377	\$ 3,478	\$ 3,582	\$ 3,690	\$ 3,800	\$ 3,914	\$ 4,032
Street Sweeping	\$ 22,500	\$ 23,175	\$ 23,870	\$ 24,586	\$ 25,324	\$ 26,084	\$ 26,866	\$ 27,672	\$ 28,502	\$ 29,357	\$ 30,238
Total	\$ 72,500	\$ 84,525	\$ 74,111	\$ 76,334	\$ 78,624	\$ 80,983	\$ 83,412	\$ 85,915	\$ 88,492	\$ 91,147	\$ 93,881

TABLE 2**OPERATION CAPITAL EXPENDITURE COST ESTIMATE**

EXPENDITURE	2015 COST	2016 COST	2017 COST	2018 COST	2019 COST	2020 COST	2021 COST	2022 COST	2023 COST	2024 COST	2025 COST
Replacement of Sumps & Roadway Drain Improvements	\$ 35,000	\$ 36,050	\$ 37,132	\$ 38,245	\$ 39,393	\$ 40,575	\$ 41,792	\$ 43,046	\$ 44,337	\$ 45,667	\$ 47,037
New Mechanical Sweeper			\$ 225,000								
Vac Truck for Storm Drain				\$ 375,000							