Chapter 3.0 Existing and Potential Water Resource-Related Problems

City of St. Louis Park Surface Water Management Plan

Page

Chapter 3.0 Existing and Potential Water Resource-Related Problems.....3-1

3.1 Water Quality Issues 3-1
3.1.1 National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Program (SWPPP)..... 3-2
3.1.2 Nondegradation Report..... 3-2
3.1.3 Impaired Waters and TMDL Issues 3-3
3.1.4 2018 Water Quality Modeling..... 3-5
3.2 Stormwater Runoff Rate and Volume Issues..... 3-6
3.2.1 2018 Hydrology and Hydraulic Modeling..... 3-8
3.3 Wetland Issues..... 3-10
3.4 Creek Issues 3-11
3.5 Erosion Control and Sedimentation Issues..... 3-11
3.6 Adequacy of Existing Programs..... 3-12
3.6.1 City Ordinances and Official Controls..... 3-13
3.6.2 Education and Public Involvement Program..... 3-13
3.6.3 Groundwater Protection..... 3-13
3.6.4 Maintenance of Stormwater System 3-13
3.6.5 Existing Capital Improvement and Implementation Programs..... 3-14

List of Tables

Table 3-1: MPCA Impaired Waters Listing Criteria* 3-4
Table 3-2: Load allocations assigned to the City of St. Louis Park 3-4
Table 3-3: City of St. Louis Park Pollutant Loading Summary..... 3-5
Table 3-4: Annual Total Phosphorus Load (2008–2017) to Nutrient-Impaired Waters in St. Louis Park..... 3-6
Table 3-5. City of St. Louis Park Lakes with Flooding Potential 3-9
Table 3-6. Peak Outflows from the City of St. Louis Park 3-9

Chapter 3.0 Existing and Potential Water Resource-Related Problems

This chapter describes the complex set of surface and storm water management issues facing the City of St. Louis Park. It also assesses the adequacy of the city's programs to address the issues, as outlined.

3.1 Water Quality Issues

Pollutants are discharged to surface waters as either point sources or nonpoint sources. Point source pollutants discharge to receiving surface waters at a specific point and from a specific identifiable source. Discharges of treated sewage from a wastewater treatment plant or from an industry are examples of point sources. Unlike point sources, nonpoint source pollution cannot be traced to a single source or pipe. Instead, pollutants are carried from land to water in stormwater or snowmelt runoff, in seepage through the soil, and via atmospheric transport. All these forms of pollutant movement from land to water make up nonpoint source pollution.

For lakes, ponds, and wetlands, phosphorous is typically the pollutant of major concern. Point sources of phosphorus typically come from municipal and industrial discharges to surface waters, whereas nonpoint sources of phosphorus come from urban runoff, construction sites, and individual septic treatment systems (ISTS), and in agricultural areas from fields and feedlots. Point sources frequently discharge continuously throughout the year, whereas nonpoint sources discharge in response to precipitation or snowmelt events.

For most waterbodies, nonpoint source runoff—especially stormwater runoff—is a major contributor of phosphorus. In urban areas, nutrient and sediment inputs (i.e., loadings) from stormwater runoff can far exceed the natural inputs to the city's waterbodies. In addition to phosphorus, stormwater runoff may contain pollutants such as oil, grease, chemicals, nutrients, metals, litter, and pathogens, which can severely reduce water quality.

Even in areas that are already well-developed, land disturbance activities (e.g., construction or redevelopment) may also result in increased amounts of phosphorus carried in stormwater runoff. In addition to watershed sources, other possibly significant sources of phosphorus include atmospheric deposition, internal loading (e.g., release from anoxic sediments, algae die-off, aquatic plant die-back, and fish disturbed sediment), and failing ISTS.

As phosphorus loadings increase, it is likely that water quality degradation will accelerate, resulting in unpleasant consequences such as profuse algae growth or algal blooms. Algal blooms, overabundant aquatic plants, and the presence of nuisance and/or exotic species, such as Eurasian watermilfoil, purple loosestrife, and curlyleaf pondweed, interfere with ecological functions as well as the recreational and aesthetic uses of waterbodies. Phosphorus loadings must be reduced often to control and/or reverse water quality degradation.

3.1.1 National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Program (SWPPP)

The City of St. Louis Park is included in a group of communities with populations greater than 10,000 that are federally required to obtain an MS4 permit for managing nonpoint source stormwater. The permitting process requires cities such as St. Louis Park to file a Phase-II NPDES permit with the MPCA, which addresses how the city will regulate and improve stormwater discharges. The City of St. Louis Park's SWPPP, presented in **Appendix B,** addresses the six minimum control measures required by the permit:

1. Public outreach and education
2. Public participation and involvement
3. Illicit discharge detection and elimination
4. Construction site runoff control
5. Post-construction runoff control
6. Pollution prevention and good housekeeping

3.1.2 Nondegradation Report

The city developed a nondegradation report in 2007(see **Appendix E**). **Appendix C** covers discharges to wetlands that are applicable to the City of St. Louis Park. **Appendix D** covers the city's nondegradation requirements, including the development of the loading assessment and nondegradation report.

The City of St. Louis Park's "Nondegradation Report Submittal to the Minnesota Pollution Control Agency for Selected MS4 Permit Requirements" (City of St. Louis Park, 2007) examines proposed land use changes and the resulting changes in impervious areas to estimate future phosphorus loading.

The results of the nondegradation analysis show that total average annual flow volume from the city has not increased or changed significantly from 1988 and will remain approximately the same through 2020, regardless of future BMP implementation. The analysis also shows that total phosphorus loading from the city decreased by 4 percent between 1988 and 2000/2002. The analysis presented in the nondegradation report assumed future BMP implementation would achieve a phosphorus removal efficiency of 56 percent from all redevelopment sites within the city. No phosphorus load reductions from additional BMPs were quantified at the time. With future BMP implementation, total phosphorus loading is expected to decrease by 5 percent relative to current conditions, resulting in an average total phosphorus load of 5,536 lbs. per year. The predicted future load with BMP implementation is 446 lbs. per year less than the estimated future phosphorus load, assuming

no BMP implementation (5,982 lbs. per year), and 307 lbs. per year less than the 2000/2002 estimated load (5,843 lbs. per year).

Current and future implementation of BMPs have provided significant treatment for flow volume and TP and TSS loadings in runoff to the city's receiving waters compared with the 1988 condition. In the future, the city intends to implement infiltration practices to mitigate any volume and loading increases wherever it is practical and reasonable to do so.

The city's 2007 nondegradation report also includes a qualitative assessment of BMP selection considerations, including channel erosion, wetland impacts, source water protection, and retrofitting. The complete City of St. Louis Park Nondegradation Report (City of St. Louis Park, 2007) is included in this plan as **Appendix E**.

3.1.3 Impaired Waters and TMDL Issues

The federal Clean Water Act (CWA) requires states to adopt water quality standards to protect the nation's waters. Water quality standards designate beneficial uses for each waterbody and establish criteria that must be met within the waterbody to maintain the water quality necessary to support its designated use(s). Section 303(d) of the CWA requires each state to identify and establish priority rankings for waters that do not meet the water quality standards. The list of impaired waters, or 303(d) list, is updated by the state every two years.

For impaired waterbodies, the CWA requires the development of a TMDL. A TMDL is a threshold calculation of the amount of a pollutant that a waterbody can receive and still meet water quality standards. A TMDL establishes the pollutant loading capacity within a waterbody and develops an allocation scheme among the various contributors, which include point sources, nonpoint sources, and natural background levels as well as a margin of safety. As a part of the allocation scheme, a waste load allocation (WLA) is developed to determine allowable pollutant loadings from individual point sources (including loads from storm sewer networks). A load allocation (LA) establishes allowable pollutant loadings from nonpoint sources and natural background levels in a waterbody.

The city's SWPPP also requires review of the impaired waters list to determine whether there are any impaired waters located within five miles of the city's boundaries that receive discharge from the city's MS4. The city must identify the location(s) of discharge(s) from the city's system to the identified impaired waters; delineate watershed areas within the city's jurisdiction that discharge to each impaired water; prepare an impaired waters evaluation addressing hydrology, land use, and other characteristics of each delineated watershed area; and determine whether changes to the city's SWPPP are warranted to reduce the impact from the city's stormwater discharge to each impaired water of concern.

The criteria used to determine if a lake is impaired vary according to the lake's ecoregion. St. Louis Park is within the MPCA's designated North Central Hardwood Forest (NCHF)

ecoregion. The MPCA defines "shallow lakes" as having (a) a maximum depth of 15 feet or less, or (b) wherein 80 percent or more of the lake is littoral (i.e., the percentage of the lake that is 15 feet deep or less). These criteria are included in Table 3-1.

Table 3-1: MPCA Impaired Waters Listing Criteria*

Ecoregion/ Lake Type	Water Quality Constituent		
	Total Phosphorus ug/L (ppb)	Chlorophyll-a ug/L (ppb)	Secchi Disc (meters)
North Central Hardwood Forest			
Trout Lakes	<20	<6	>2.5
Deep Lakes	<40	<14	>1.4
Shallow Lakes	<60	<20	>1.0

*From Minnesota Rules Chapter 7050 (MPCA, December 18, 2007)

Impaired waters located within the City of St. Louis Park include Twin Lake, Bass Lake, Cobblecrest Lake, and Minnehaha Creek. These waterbodies are listed in Chapter 2, along with the affected MPCA designated use, the pollutant and/or stressor that is not meeting the MPCA water quality criteria, the year listed, and the MPCA TMDL completion date.

For these waterbodies, load reductions have been assigned to the city based on the TMDL results and are presented below in Table 3-2.

Table 3-2: Load allocations assigned to the City of St. Louis Park

Waterbody Name	Pollutant of Concern	Type of WLA	Numeric WLA				
Bassett Creek	Chloride	Categorical	6,642,961 lbs./yr.				
Brownie Creek	Chloride	Categorical	767 lbs./yr.				
Minnehaha Creek	Chloride	Categorical	28,279,140 lbs./yr.				
	Bacteria	Categorical	High	Moist	Mid	Dry	Low
			588	285	104	28	8
Lake Hiawatha	Phosphorus	Individual	333 lbs./yr.			3 lbs./day	

Waterbody Name	Pollutant of Concern	Type of WLA	Numeric WLA
Sweeney Lake	Phosphorus	Categorical	4 lbs./day
	Chloride		3,272 lbs./yr.

Also, the TMDL requirements will be incorporated into the city's NPDES Phase -II MS4 permit as part of the next revision of the city's SWPPP.

In addition to TMDLs for specific impaired waters, the MPCA has developed a statewide TMDL for mercury. Mercury in Minnesota fish comes almost entirely from atmospheric deposition, with approximately 90 percent originating outside of Minnesota (MPCA, 2004). Because the main source of mercury comes from outside the state and because the atmospheric deposition of mercury is relatively uniform across the state, the TMDL for mercury is 11 kg/year for the entire state.

3.1.4 2018 Water Quality Modeling

Using Event Mean Concentration (EMC) data for total phosphorus and total suspended solids, collected for the various land use types in the city, and a 10-year rainfall record, the watershed loading rates were calculated in the hydrologic and hydraulic SWMM models.

Given the significant area occupied by state highways in the city, the pollutant loading from MnDOT right-of-way was separated out along I-394, Trunk Highways 7 and 100, and US 169. Loading rates from the watershed were allocated to each entity based on their proportional areas in each subwatershed. The results for the City of St. Louis Park are provided in Table 3-3. The loads within the drainage areas of the three impaired lakes in the city are included in Table 3-4.

Table 3-3: City of St. Louis Park Pollutant Loading Summary

	St. Louis Park
Area (ac)	6,645
Annual TP Load (2008-2017) (lb/yr)	7,989
TP Loading Rate (lb/ac/yr)	1.20
Annual TSS Load (2008-2017) (lb/yr)	2,893,431

TSS Loading Rate (lb/ac/yr)	435.45
ac = acres. lb/yr = pounds per year. lb/ac/yr = pounds per acre per year.	

Table 3-4: Annual Total Phosphorus Load (2008–2017) to Nutrient-Impaired Waters in St. Louis Park

Impaired Water	City of St. Louis Park (lb/yr)
Bass Lake	1,975.7
Cobblecrest Lake	327.6
Twin Lake	2,303.9
lb/yr = pounds per year.	

3.2 Stormwater Runoff Rate and Volume Issues

In a natural, undeveloped setting, the ground is often pervious, meaning water (including stormwater runoff) can infiltrate the soil. Land development dramatically changes how stormwater runoff moves in the local watershed. During construction or redevelopment, clearing and grading of the site results in less infiltration, higher rates and volumes of stormwater runoff, and increased erosion. Ground surfaces covered with impervious materials (e.g., asphalt and concrete) prevent infiltration of water into the soil. As a result, the rate and volume of stormwater runoff from the site increases even more, which can create significant problems for downstream water resources. Further, the reduced amount of infiltration means less water is being recharged into the groundwater system, which can result in decreased base flows in creeks, normal water levels in lakes, and potential losses to the long-term sustainability of groundwater drinking supplies.

If the land drains to a landlocked basin, the additional volume of runoff can increase the normal water level and flood level of the basin. If the land drains to a creek, the additional runoff volume can cause the creek to flow full for longer durations, which increases erosion potential.

Although both high water levels (flooding) and low water levels are of concern to city residents and city staff, more concern and attention is usually paid to flooding because it is a greater threat to public health and safety and can result in significant economic losses. Damages caused by flooding include the following:

- Damage to homes, businesses, and other buildings

- Damage to infrastructure (e.g., roads, bridges, wells)
- Flooding of individual septic treatment systems, rendering them unusable
- Damage or destruction of recreational trails and bridges

Flooding may cause other damages that are harder to quantify, including the following:

- Flooding of roads so they are impassable to emergency vehicles, residents, and school buses
- Shoreline erosion
- Destruction of vegetation, such as grass, shrubs, and trees due to extended inundation
- Unavailability of recreational facilities for use by the public (e.g., inundation of shorelines) and/or restricted recreational use of waterbodies
- More strain on budgets and personnel for repairing flood-damaged facilities and controlling public use of facilities during flooding events
- Alterations to mix and diversity of wildlife species as a result of inundation of upland habitats

Of special concern is flooding on landlocked waterbodies, which prolongs the damages and impacts. Because there is no surface outlet, runoff that collects in these depressions can only be removed by seepage and evaporation. As the water tables rise during periods of above-average precipitation, seepage out of landlocked basins can also decrease. As a result, landlocked basins are subject to wide variations in water levels, and their 100-year floodplains typically cover large areas.

Landlocked basins can also provide benefits. The long-lasting seepage from landlocked basins provides important groundwater recharge benefits. Also, landlocked basins do not discharge surface waters to downstream basins, which could otherwise be negatively impacted by additional stormwater volume.

The city may need to provide outlets from landlocked basins to prevent damages that occur during periods of sustained high-water levels, but it is not always feasible or reasonable for the city to do so. For example, it may not be feasible to provide outlets because of the long distances to the nearest receiving water, the depth of the pipe, and the capacity of the nearest outlet or receiving water. It may not be reasonable to provide outlets because of the downstream impacts on flood levels and/or water quality. It can also be difficult for the city to provide even temporary relief during flooding situations for the same reasons that it is difficult to provide permanent outlets.

Floodplain management is the management of development and other activities in or near the floodplain to prevent flood damages. The MnDNR defines floodplain management as "the full range of public policy and action for ensuring wise use of the floodplains. It includes everything

from collection and dissemination of flood control information to actual acquisition of floodplain lands, construction of flood control measures, and enactment and administration of codes, ordinances, and statutes regarding floodplain land use."

Minnesota law defines the floodplain as the land adjoining lakes, water basins, rivers, and watercourses that have been or may be covered by a 100-year or regional flood. Floodplains of larger basins and creeks are mapped by the Federal Emergency Management Agency (FEMA) on Flood Insurance Rate Maps (FIRMs), which are included in county-based Flood Insurance Studies (FISs). The city manages activities in the FEMA-designated floodplain areas through the St. Louis Park floodplain ordinance (Chapter 36, Division 11). The city has determined 100-year flood levels for many waterbodies that are not mapped on FEMA FIRMs. The city manages activities within the floodplains of these waterbodies through its permit and approval processes (See Appendix M).

3.2.1 2018 Hydrology and Hydraulic Modeling

The results of the updated hydrologic and hydraulic SWMM analyses are presented in Appendix F, including the approximate extents of surface flooding and pipe capacities in the City. Excessive surface flooding, which are defined as more than 2-ft deep even during the smaller 10-year event, excluding ponds and lakes, include the following:

- City Hall parking lot
- Edgewood Industrial Area
- Franklin Avenue and Lamplighter Pond area
- Franklin Avenue and Louisiana Avenue
- Minnetonka Boulevard and Georgia Avenue
- Minnetonka Boulevard and Highway 7
- Morningside Road and Browndale Avenue
- Nelson Park
- West 26th Street and Raleigh Avenue
- West 27th Street and Zarthan Avenue
- West 28th Street and Jersey Avenue
- West 29th Street and Vernon Avenue
- West 34th Street and Xylon Avenue
- West 39th Street and Kipling Avenue

The large waterbodies in the City were evaluated for freeboard under TP-40 and Atlas 14 rainfall events for both the 100-year and 10-year events. A comprehensive list of modeled water surface elevations for all events is provided in Appendix F. All modeled lake elevations increased with the change from NOAA's TP-40 to Atlas 14 rainfall depths and as a result, all lakes show a decrease in available freeboard between the lowest primary structure elevation and the 10- and 100-year water surface elevation. Some lakes have negative freeboard, indicating the potential for the flooding of residential structures. Lakes with negative freeboard (i.e. possible flooding of the lowest structure) are shown in Table 3-5 for all four of the modeled events. The models were used to summarize the stormwater runoff leaving the City. The peak discharges and locations are summarized in Table 3-6.

Table 3-5. City of St. Louis Park Lakes with Flooding Potential

Lake	10-Year TP -40	100-Year TP-40	10-Year Atlas 14	100-Year Atlas 14
Bass Lake		X	X	X
Browndale Pond				X
Candlestick Pond				X
Kilmer Lake				X
Lamplighter Pond				X
Natchez Pond		X		X
Oak Pond		X		X
Oregon Pond	X	X	X	X
Otten Pond		X		X
Rhino Pond				X
South Oak Pond	X	X	X	X
Sumter Pond				X

Finally, the peak flows leaving the City of St. Louis Park and entering neighboring communities, these intercommunity flows are presented in Table 3-6.

Table 3-6. Peak Outflows from the City of St. Louis Park

Receiving Cities	Drainage District	10-Year Technical Paper-40	100-Year Technical Paper-40	10-Year Atlas 14	100-Year Atlas 14
Minneapolis	Bass Lake	85	177	141	365
Edina	Edina	2,008	299	243	410
Minneapolis	Edina	127	190	153	276

Receiving Cities	Drainage District	10-Year Technical Paper-40	100-Year Technical Paper-40	10-Year Atlas 14	100-Year Atlas 14
Golden Valley/MnDOT	Golden Valley	177	256	218	322
Minneapolis/Storm Sewer	Minneapolis	82	114	101	169
Minneapolis/Cedar Lake	Minneapolis	128	156	137	177
Minneapolis/MnDOT	Minneapolis	145	201	164	244
Plymouth (Bassett Creek)	Westwood	247	294	274	353
Golden Valley	Westwood	69	99	83	143
Note that all units are in cubic feet per second (cfs)					

3.3 Wetland Issues

Shallow, seasonal wetlands have equal value in the landscape to deep, open water wetlands, but their designated uses are as different as creeks are different from rivers or lakes. It is generally recognized that damming a stream to form a ponded reservoir causes significant changes in its habitat, hydrology, and downstream water quality as well as the plants and animals utilizing the resource.

In the same way, wetlands deserve careful consideration before they are converted into other types of wetlands or removed from the landscape altogether. Water resources are often interconnected and are not isolated from each other or from the ecosystem. Wetland benefits such as nutrient uptake, stormwater storage, erosion control, low flow augmentation, wildlife habitat, and groundwater recharge are extremely valuable even in remote wetlands that are only distantly connected to other resources in the watershed. Wetland removal has reverberations throughout the fabric of the landscape at large.

The City of St. Louis Park has developed a wetland management plan as a means to manage its wetlands (City of St. Louis Park [WSB], 2001). The management plan enables the city to evaluate the impact of redevelopment on wetland resources and the potential for restoration of wetland functions and values. The city's wetland management plan is intended as an additional resource, not to replace the rules or policies of local watershed districts. The city's wetland management plan is included in this plan as **Appendix D.**

The BCWMC, MCWD, and MnDOT serve as the LGU for the WCA within the city. The city has included the MCWD's wetland classification in this plan. The city also recognizes the MCWD's functional assessment for wetlands within the MCWD area of St. Louis Park. This has resulted in some changes in the designations of some wetlands. For example, this change results in an increase in the number of preserve-designated wetlands.

Stormwater ponds that are classified as jurisdictional wetlands fall under the WCA, and the maintenance of these wetlands is more regulated. Ponds that are included in the MCWD wetland assessment will be evaluated as necessary to determine if they must be regulated by the WCA. The wetlands in question can be classified as historical wetlands, historical wetlands that have been used for stormwater treatment prior to the WCA, or stormwater ponds that were created in upland areas for stormwater treatment. Wetlands used for stormwater treatment prior to WCA must follow the guidelines for maintenance outlined by the WCA. Wetlands that were created in upland areas to treat stormwater runoff are maintained as stormwater basins.

3.4 Creek Issues

Creeks are subject to stress brought on by urbanization and development in the same ways that waterbodies in general are. Generally, as impervious surface area is increased, creek flow rates and volume increase, leading to higher flood elevations, accelerated erosion, and pollutant loading. As streams become more unstable and prone to erosion, public infrastructure is increasingly at risk of failure.

The Minnehaha Creek is an important community amenity. The desire for recreational access and open space enhancement has led to the placement of creek corridors as high-priority rehabilitation and acquisition targets.

3.5 Erosion Control and Sedimentation Issues

Sediment is a major contributor to water pollution. Stormwater runoff from streets, parking lots, and other impervious surfaces carries suspended sediment consisting of fine particles of soil, dust, and dirt carried in moving water. Abundant amounts of suspended sediment are carried by stormwater runoff when erosion occurs.

Although erosion and sedimentation are natural processes, they are often accelerated by human activities, including construction and redevelopment. Prior to construction, the existing vegetation on a site intercepts rainfall and slows down stormwater runoff rates, which allows more time for runoff to infiltrate into the soil. When a construction site is cleared and graded, the vegetation (and its beneficial effects) is removed. Also, natural depressions that provided temporary storage of rainfall are filled and graded, and soils are exposed and compacted, resulting in increased erosion and sedimentation and decreased infiltration. As a result, the rate and volume of stormwater runoff from the site increases (Metropolitan Council, 2001). The increased stormwater runoff rates and volumes cause increased soil erosion, which releases significant amounts of sediment that may enter the city's water resources.

Regardless of its source, sediment deposition decreases water depth, degrades water quality, smothers fish and wildlife habitats, and degrades aesthetics. Sediment deposition can also wholly or partially block culverts, manholes, and storm sewers, causing flooding. Sediment deposition in detention ponds and wetlands also reduces the storage volume capacity, resulting in higher flood levels and/or reducing the amount of water quality treatment that can be provided.

Suspended sediment is carried in water. It clouds lakes and creeks and disturbs aquatic habitats. Sediment also reduces the oxygen content of water and is a major source of phosphorus, which is frequently bound to the fine particles. Erosion also results in the channelization of stormwater flow, increasing the rate of stormwater runoff and further accelerating erosion.

As erosion and sedimentation increase, the city's stormwater management systems (e.g., ponds, pipes) require more frequent maintenance, repair, and/or modification to ensure they can function as designed. Monitoring the stormwater system, including inspection of sediment build-up in stormwater ponds, will be an increasingly important task for the city. The urban conditions in the city will result in erosion and sedimentation unless effective erosion prevention and sediment control measures are implemented before, during, and after construction.

St. Louis Park ordinances and approval processes address erosion and sediment control at construction sites. The current ordinance requires implementation of temporary and permanent erosion and sediment control measures for developments and other projects.

3.6 Adequacy of Existing Programs

The level of service that a storm sewer system provides is defined by its capacity to remove runoff and prevent frequent interference with normal daily transportation, commerce, and access that might result from a rain event. This design level should not result in the surface flooding of streets flooding of intersections and right-of-way systems, and public infrastructure should operate normally. However, in many older communities, the storm sewer systems were typically designed to handle flows from storms up to a two-year frequency rainfall event, much less than the level of service provided by the capacity of storm sewers designed for today's standards.

The level of protection that a storm sewer system provides is defined as its capacity provided by a drainage system to prevent property damage and assure a reasonable degree of public safety following a rain event. Large storm flows, such as the 100-year flood event, may exceed the capacity of the storm sewers and bypass its catch basins, with excess water collecting in low areas, such as intersections and designed ponding areas. Water accumulation at this level of protection may interfere with traffic or access but should not damage right-of-way systems or structures, such as bridges. The level of protection is typically based on the critical 100-year frequency storm event.

Because portions of St. Louis Park were developed in the early to mid-1900s, some areas have undersized stormwater systems and experience flooding during a variety of storm events, including small frequent events.

The following section presents existing program adequacy to address surface and stormwater issues facing the city.

3.6.1 City Ordinances and Official Controls

St. Louis Park actively and progressively manages stormwater to protect life, property, and waterbodies within the city as well as receiving waters outside the city. Toward this end, St. Louis Park creates and implements regulatory programs that accomplish these aims. The city's regulations and programs are detailed in **Chapter 5**.

The City of St. Louis Park is required to meet the conditions of its NPDES Phase II MS4 permit and implement the St. Louis Park SWPPP. The city continues to actively engage the MPCA and others to keep its permit and implementation up to date with regard to technology and regulations.

To continue improving the city's efficacy regarding surface water management, the city will review and update its existing ordinances and processes to bring them into conformance with the policies and goals of this plan, the BCWMC and MCWD plan requirements, and the NPDES MS4 permit requirements.

3.6.2 Education and Public Involvement Program

The City of St. Louis Park maintains various education and communication programs aimed at water resources issues. The city develops and distributes articles and information regarding impacts of stormwater on water quality as well as the city's SWPPP. Details of the city's education program are presented in the city's SWPPP (included as **Appendix B** of this plan). The city also works collaboratively with the BCWMC and the MCWD in distributing educational materials and promoting and supporting outreach programs.

3.6.3 Groundwater Protection

The water supply for St. Louis Park is obtained from 11 primary wells. These water supply wells meet current standards for construction and maintenance and thus do not contribute to the source water's susceptibility to contamination. The city is also implementing its wellhead protection plan, as approved by the MDH under Minnesota Rules 4720.

3.6.4 Maintenance of Stormwater System

The City of St. Louis Park is responsible for maintaining its stormwater system, including storm sewer pipes, ponds, pond inlets and outlets, and channels. To comply with this requirement, the City has developed and maintains a GIS geodatabase of storm sewer coverage for the entire city.

The St. Louis Park stormwater maintenance program integrates activities undertaken by the City of St. Louis Park that can affect stormwater quality and conveyance. These activities

range from grounds, vehicle, and street maintenance to construction projects, facility management, and routine inspection tasks.

The stormwater maintenance program includes routine line cleaning, catch basin cleaning, manhole sump cleaning, lift station upkeep, pump replacement program, general pond maintenance, and delta removal as well as inspection of structural pollution control devices, outfalls, stockpiles, and infrastructure. The program covers city operations that have an effect on the stormwater system. The stormwater maintenance plan shall define expectations describing how to carry out duties to minimize adverse impacts on stormwater runoff quality. The stormwater maintenance program is managed by the superintendent of utilities.

The SWPPP in **Appendix B** presents measurable stormwater maintenance program goals and responsibilities, which include operation and maintenance program documentation, staff training, and biannual program evaluations.

3.6.5 Existing Capital Improvement and Implementation Programs

This plan, along with its capital improvement and implementation programs, combined with the existing Storm Water Utility Fund gives the city adequate tools to correct current and future problems.

The city will continue to use the Storm Water Utility Fee program to fund stormwater system improvements, maintenance, and other activities. The Storm Water Utility Fee is the primary funding source for all stormwater improvements related to the city's Water Resources Management Plan and NPDES Phase-II requirements. In 2017, the stormwater utilities raised annual revenues of approximately $2.816 million. This program is periodically reviewed to determine its adequacy for funding projects and programs.